Bull NovaScale R480

User's Guide

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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, hazards that may cause by ignoring warnings, and preventive actions against such hazards.

Server components with possible danger are indicated with a warning label placed on or around them as well as 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:

⚠ **WARNING**	Indicates the presence of a hazard that may result in death or serious personal injury.
⚠ **CAUTION**	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)

Symbol to draw attention

Term indicating a degree of danger

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

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

Description of a danger

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 the clip of a hand.
⚠	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.

SAFETY INDICATIONS BY COLOR OF THE PARTS

Only green area is available for hot swap or hot plug operation. To avoid electric shock, disconnect all AC cords before accessing to other parts especially blue area inside the system.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Statement

Warning: This is a Class A product. In domestic environment this product may cause radio interference in which case the user may be required to take adequate measures (EN55022).

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CLASS 1
LASER PRODUCT
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This system is classified as a CLASS 1 LASER PRODUCT. This label is located on the internal DVD-ROM installed in your system.

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.

PREFACE

Welcome to the Bull NovaScale R480 server.

The Bull NovaScale server holds powerful performance and employs the latest technology to implement a computer for the next generation. With its potential capabilities, the server may be used as the workstation PC that configures a client-server system and provides high-speed processing and superior reliability.

Read this User's Guide thoroughly to fully understand handling of the 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 aid you in finding information quickly, this User's Guide contains the following information:

Chapter 1   Notes on Using Your Server
> includes information that needs attention to use the server. Make sure to read this chapter before setting up and using the server.

Chapter 2   General Description
> includes information necessary to use the server, such as names and functions of its components, handling of the floppy disk and DVD-ROM drives. It also includes requirements and advisory information for transfer and disposal of the server.

Chapter 3   Setting Up Your Server
> tells you how to select a site, unpack the system, assemble the rack-mount subsystem, make 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 Disk Array Configuration Utility, which is used to configure SAS devices in your system. This chapter also provides information on I/O board 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 a description on using the attached "EXPRESSBUILDER" CD-ROM.

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.

Appendix A   Specification
> provides specifications for your server.

Appendix B   Other Precautions
> provides supplementary notes on using the server.

Appendix C   IRQ and I/O Port Address
> provides a list of factory-set IRQs and 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. Using the Express Setup tool is recommended for installing 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. Using the Express Setup tool is recommended for installing Windows Server 2003. See Chapter 5 for details.

Appendix F   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 any component 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 floppy disk or CD-ROM may alter your system environment. If you find anything unclear, immediately ask your service representative for help.

CONTENTS

Chapter 1

Notes on Using Your Server

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

WARNING LABELS

The warning label is attached to components with possible danger 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.
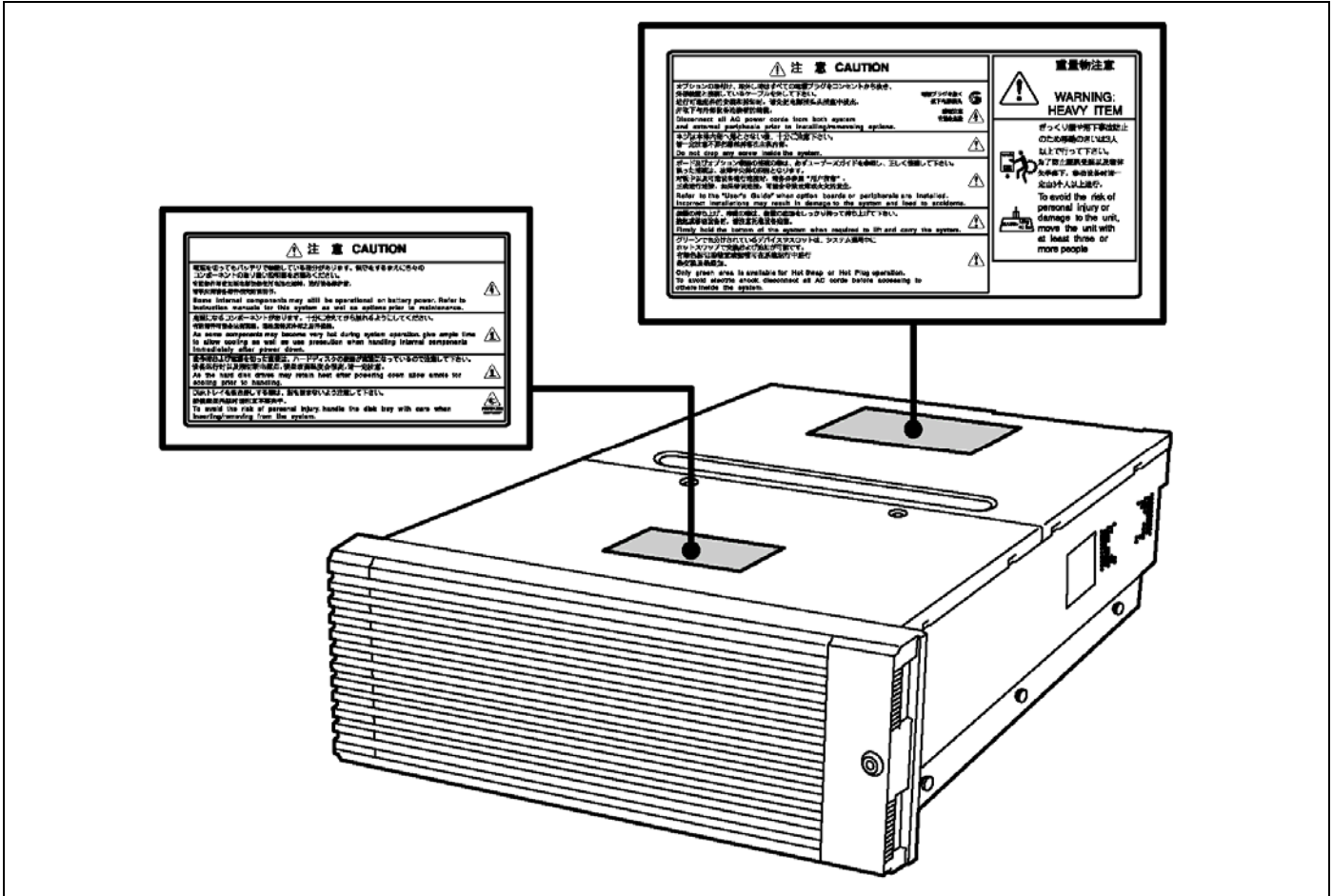
SAFETY NOTES

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

⚠ WARNING
🚫 Do not use the server for services where critical high availability may directly affect human lives. 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. We assume no liability for any accident resulting in personal injury, death, or property damage if the server has been used in the above conditions.
⚠ Do not use the server if any smoke, odour, or noise is present. If smoke, odour, or noise is present, immediately turn off the POWER switch and disconnect the power plug from the outlet, then contact your service representative. Using the server in such conditions may cause a fire.
⚠ Keep needles or metal objects away from the server. Do not insert needles or metal objects into ventilation holes in the server or openings in the floppy disk or DVD-ROM drive. Doing so may cause an electric shock.
🚫 Do not use the server in any unapproved place. Install the server on a standard EIA 19-inch rack cabinet. Do not install the rack containing the server in a place inappropriate to the rack installation environment. Failure to follow these instructions may cause some bad influences to be imposed on your server and other systems installed on the rack and also a fire or personal injury due to falling of the rack may occur. For the detailed explanation on the place where your server should be installed and the earthquake-resistant construction for the rack, refer to the manual attached to the rack or contact your service representative.
🚫 Always install the server on a rack conforming to the relevant standard. Install the server on a rack confirming to the EIA standard for the server to be used. Do not use the server with installed on any other rack than standard EIA 19-inch rack or without the installation on a proper rack. Failure to follow these instructions may cause your server to operate incorrectly and/or personal injury or damages of surrounding devices to occur. Contact your service representative for the racks available for your server.

⚠ CAUTION
⚠⚠ Keep water or foreign matter away from the server. 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 turn off the power and disconnect the power plug from the outlet. Do not disassemble the server. Contact your service representative.

Notes on Installing and Accessing the Rack Cabinet

	⚠ CAUTION
🚫	Do not carry or install the rack cabinet only by a single person. More than one person is required to carry or install the rack. Failure to follow this instruction may cause the rack to fall to result in personal injury and/or breakages of surrounding devices. In particular, a high rack (such as 44U rack) is unstable if it is not fixed by stabilizers. More than one person must always carry or install the rack while they support it.
🚫	Do not install the rack cabinet so that the load may be concentrated on a specific point. Install stabilizers on the rack so that the total load of the rack and devices mounted on the rack is not concentrated on a singe point or join more than one rack with each other to distribute the load. Failure to follow this instruction may cause the rack to fall to result in personal injury.
🚫	Do not install components on the rack cabinet only by a single person. More than one person is required to install parts including the doors and trays for the rack. Failure to follow this instruction may cause some parts to fall to be broken and/or to result in personal injury.
🚫	Do not pull out a device from the rack if the rack is unstable. Always pull out a device from the rack in the state that the rack is made stable (by the installation of stabilizers or earthquake-resistant construction).
🚫	Do not leave more than one device being pulled out from the rack. Pulling out more than one device from the rack may cause the rack to be fallen. Only pull out a single device from the rack at a time.
⚠	Do not provide the wiring for the server to exceed the rating of the power supply. To prevent burns, fires, and device damages, the power supplied to the server shall not exceed the rating load of the power branch circuit. The server requires at least two Power Cords or up to four Power Cords (depends on your configuration). Connect each power cord to each appropriate Wall Outlet provided with 20A branch circuit. Contact your electric constructor or the local power company for the requirements on the wiring and installation of electric facilities.
❗	Maintain reliable earthing Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connection other than direct connection to the branch circuit (e.g. use of power strips).

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 proper wall outlet. Use of an improper power source may cause a fire or a power leak. Do not install the server where you need an extension cord. Use of 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, which may cause 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 is formed on dusty blades of the halfway inserted plug, increasing the possibility of fire.

Use the authorized power cord only.
 	
Use only the power cord that comes with your server. Use of an unauthorized power cord may cause a fire when 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 any damaged power cord. (Replace a damaged power cord with a new one of the same specifications. Ask your service representative for replacement.)

Do not use the attached power cord for any other devices or usage. The power cord that comes with your server is designed aiming to connect with this server and to use with the server, and its safety has been tested. Do not use the attached power cord for any other purpose. Doing so may cause a fire or an electric shock.

Installation, Relocation, Storage, and Connection

⚠ CAUTION

Never attempt to lift the server only by yourself.

Your server weighs 47 kg (depending on its hardware configuration). Carrying the server only by yourself may strain your back. Hold the server firmly by its bottom with at least three persons to carry it. Do not hold the front bezel to lift the server. The front door may be disengaged from the server, causing personal injury.

Do not install your server on a rack with leaving covers removed.

Do not install your server on a rack with the cover being removed. Failure to follow this instruction may reduce the cooling effect in the server to result in some malfunction and/or dusts to enter the server to result in a fire or electric shock.

Do not pinch your finger with rails or other components.

Note sufficiently that your fingers may not be caught between a rail and another mechanical part or cut by a rail at installation or removal of the server from the rack. When pressing the safety latch release lever on the rack slide rail, use a screwdriver or tools to press the release levers on the slide rail. Pressing the levers with your finger may cause an injury.

Do not apply any load on the server pulled out from the rack.

Do not apply any load on the server pulled out from the rack. Doing so bends the frame of the server. Consequently, the server cannot be pushed back into the rack. Placing an object on the server may also cause personal injury if the server drops.

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

Do not install the server in the following places or any place other than 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 use the equipment in the place where corrosive gases exist.

Make sure not to locate or use the server in the place where corrosive gases (sulphur dioxide, hydrogen sulphide, nitrogen dioxide, chlorine, ammonia, ozone, etc) exist.
Also, do not set it in the environment where the air (or dust) includes components accelerating corrosion (ex. sulphur, sodium chloride) or conductive metals. There is a risk of a fire due to corrosion and shorts of an internal printed board.

⚠ CAUTION

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 a power outlet before installing/removing any optional internal device or connecting/disconnecting any interface cable to/from the server. If the server is off-powered but its power cord is plugged to a power source, 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 interface cables provided by your 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 on 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 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 DVD-ROM drive.
A laser beam used in the DVD-ROM drive is harmful to the eyes. Do not look into or insert a mirror into the drive while the drive is powered. If a laser beam is caught in your eyes, you may lose your eyesight (the laser beam is invisible).
Do not remove the lithium and NiMH batteries.
Your server contains the lithium and NiMH batteries. Do not remove the battery. Danger of explosion if the battery is incorrectly replaced. Placing the battery close to a fire or in the water may cause an explosion.
When the server does not operate appropriately due to the dead lithium and NiMH batteries, contact your service representative to replace only with the same or equivalent type. Do not disassemble the server to replace or recharge the battery by yourself.
Disconnect all the power plugs before accessing inside the server, or connecting the peripherals.
The server has two power cords. Make sure to power off the server and disconnect the all power plugs from a power outlet before cleaning or installing/removing internal optional devices. Touching any internal device of the server with its power cords connected to a power source may cause an electric shock even of the server is off-powered.
Disconnect all the power plugs from the outlet occasionally and clean the plug with a dry cloth. Heat will be generated if condensation is formed on a dusty plug, which may cause a fire.

⚠ CAUTION
Hot surface
Immediately after the server is powered off, its internal components such as hard disks are very hot. Leave the server until its internal components fully cool down before installing/removing any component.
Make sure to complete board installation.
Always install a board firmly. An incompletely installed board may cause a contact failure, resulting in smoking or fire.
Protect the unused connectors with the protective cap.
The unused power supply cable connectors are covered with the 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.
Do not touch any electrical components inside the server during the hot-swap replacement.
All power flows inside the server while the hot-swap replaceable components (PCI add-in cards, hard disk, cooling fan, and power supply). Do not touch the electrical components inside the server to avoid an electric shock.

During Operation

	⚠ **CAUTION**
	Avoid contact with the server during thunderstorms. Disconnect all the power plugs from the outlet when a thunderstorm is approaching. If it starts thundering before you disconnect the all power plugs, 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 place any object on top of the server. An object placed on top of the server may fall down, resulting in damage to your property around the server.
	Do not use a cellular phone or pager around the server. Turn off the cellular phone or pager. Radio interference may cause malfunctions of the server.
	Do not remove the cooling fans. Only an authorized service technician can remove the cooling fans from the server.

FOR PROPER OPERATION

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

- Install the server in a place that meets requirements for successful operation. For details, see Chapter 3, "Setting Up Your Server."

- Do not delete the hard disk partition exclusively provided for maintenance of the server although it may appear on the OS.

- Make sure to power off the server before connecting or disconnecting cables between the server and peripheral devices.

- Verify that the access lamp on the server is unlit before turning off the server or ejecting the floppy disk.

- The server management logic on your system board monitors and logs system voltage changes. When plugging the power cord to the system, you may experience 10 seconds delay from the time you press the POWER switch on the front panel. This is normal system operation and is required by the server management logic.

- When you have just turned off the server, wait at least 30 seconds before turning it back on.

- Do not turn off the server until characters following the "Bull" logo appear on the screen. The time until the characters appear depends on your system configuration. Approximately, it may take three to five minutes.

- Turn off the power and unplug the power cord from the outlet before relocating the server.

- Some software includes a command to eject the CD/DVD-ROM tray. Make sure that the front bezel is removed before running the command. Running this command with the front bezel installed may cause the CD/DVD-ROM tray or the media to hit against the front bezel, resulting in a failure of the server

- Clean the server on a regular basis. (See Chapter 7 for cleaning.) Regular cleaning proactively prevents various failures of the server.

- Lightning may cause a momentary voltage drop. To prevent this problem, it is recommended to use of an uninterruptible power supply unit.

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

  – After carriage of the server
  – After storage of the server
  – After the server is entered into the pause state under the environmental condition enduring the server operation (temperature: 10°C to 35°C, humidity: 20% to 80%)

- Check the system clock at the rough rate of once per month. When the system clock is installed in a system requiring high time precision, it is recommended to use a time server (NTP server).
  If the system clock is remarkably delayed or advanced as the passage of time in spite of adjustment, contact your sales agent to ask maintenance.

- Store the unit under the storage condition (temperature: -10°C to 55°C, humidity: 20% to 80%, without condensation) to allow built-in devices and the unit to operate correctly in the next operation.

- Make sure to use optional devices supported by the server. Some non-supported devices may be physically installed/connected but cause failures of the server as well as a malfunction of the server.

- We recommend you use genuine products. Some third-party products claim that they support the server. However, repair of the server due to a failure or damage resulted from use of such third-party products will be charged.

- For the disk which does not conform to the CD/DVD standard, the playback of such a disk with the DVD-ROM drive is not guaranteed.

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:

Bull NovaScale server

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

> **IMPORTANT:** About data on the hard disk
>
> Be sure to take appropriate measures not to leak important data (e.g., customers' information or companies' management information) on the removed hard disk 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. 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.

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 provided software applications must be transferred and no backup copies must be retained.

- Transfer requirements listed in "Software License Agreement" that comes with each software application must be satisfied.

- Software applications that are not approved for transfer must be uninstalled before transferring the server.

CONSUMABLES

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-ROM drive, the floppy disk drive, and the mouse. For stable operation of the server, Bull recommends you replace these components on a regular basis. Consult with your service representative for replacement or the product lives.

DISPOSAL OF THE SERVER

Dispose the server, all the internal devices, floppy disks, and CD/DVD-ROMs according to all national laws and regulations. Also dispose of the power cord provided with the server to avoid diversion to some other devices.

> **IMPORTANT:** For disposal (or replacement) of the battery on the I/O board of the server, consult with your service representative.

> **NOTE:** If the real-time clock battery on the I/O board reaches its life, the following message appeared on the display while running the POST. Contact your service representative to replace the battery.
>
>   0250 System battery is dead –Replace and run SETUP
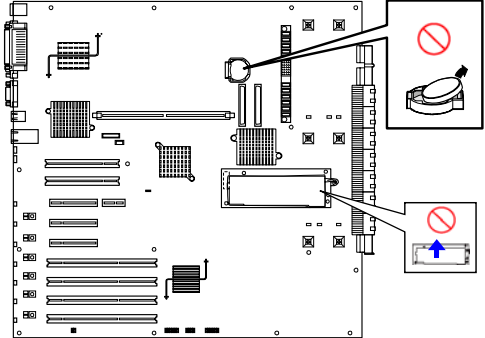
⚠ WARNING

Do not remove the lithium and NiMH batteries.

Your server contains lithium and NiMH batteries. Do not remove any battery. Danger of explosion if the battery is incorrectly replaced. Placing the lithium or NiMH battery close to a fire or in the water may cause an explosion.

When the server does not operate appropriately due to the failure of lithium and NiMH batteries, contact your service representative to replace only with the same or equivalent type. Do not disassemble the server to replace or recharge the battery by yourself.

Lithium battery

NiMH battery

IO board

USER SUPPORT

When the server needs after-sales service, check if the warranty is still valid, and determine which service is necessary as indicated on the "Certificate".

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 the description. If it does, take the recommended measure for it.

3. Check if the software required for operation of the server is properly installed.

4. Check the server using a computer virus detection program. Computer virus detection programs are available for purchase in stores.

If the server still appears to fail after you have taken the above actions, consult with your service representative immediately. Take notes on lamp indications of the server and alarm indications on the display unit before consultation, which may provide a significant help to your service representative.

When Having Your Server Repaired

Prepare the following when having your server repaired:

- Certificate
- Notes of the messages displayed on the display unit
- Error information*
- Records of the Bull NovaScale server and peripheral equipment

   * Error information includes the Error Message shown in Chapter 8.
     Prepare the error information only when required by 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
You have good posture 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.

You have "good working posture" as described in the above when no part of your body is under excess strain, in other words when your muscles are most relaxed.

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

Adjustment of 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 "good working posture" and you will feel more tired than you should if you operate a display unit without adjusting horizontal and vertical angles.
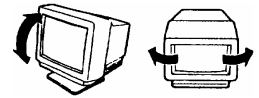
Adjustment of Screen Brightness and Contrast
The display unit has brightness and contrast adjustment functions. The most suitable brightness and contrast depend on the individual and the working environment (well-lighted room or insufficient light). Adjust brightness and contrast so that the screen will be easy to see. An extremely bright or dark screen will give a bad effect to your eyes.
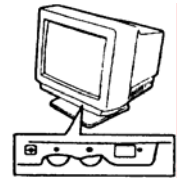
Adjustment of Keyboard Angle
The keyboard provided with the server is designed for adjustment of an angle. Adjust the keyboard angle at which the keyboard is easy to operate. The adjustment assists in reducing strain on your shoulders, arms, and fingers.
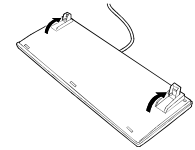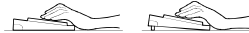
Cleaning of Equipment
Clean equipment regularly. It is difficult to see the display contents on a dusty screen. Keeping equipment clean is also important for your sight.

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

Chapter 2

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 highly reliable, high-powered, fault-tolerant, high-capacity, multiprocessing server based on the 64bit Intel® Xeon™ Processor MP. It is a solid performer and offers the latest technology. The combination of compute 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 rack-mount system. Your server conveniently installs into a standard EIA 19-inch rack cabinet.
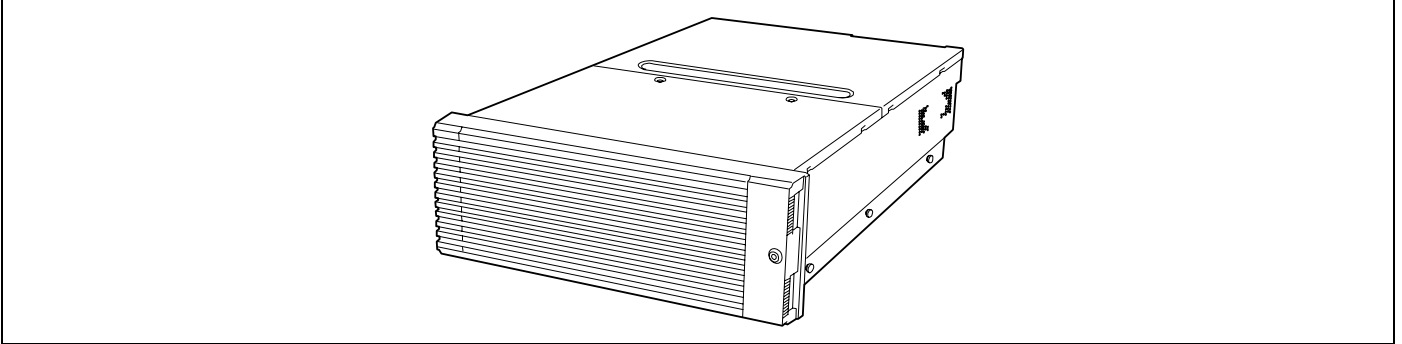
Your server includes a DVD-ROM drive, a 3.5-inch hard disk bay, and removable media device bay (option). The 3.5-inch hard disk bay supports up to five 1.0-inch SAS hard disk drives that can be swapped in or out of the system without powering it down, if RAID functionality is configured in the system.

As application requirements increase, you can expand your server with an additional processor, additional memory, add-in boards and peripheral devices: tape devices, DVD-ROM, and hard disk drives.

Top View
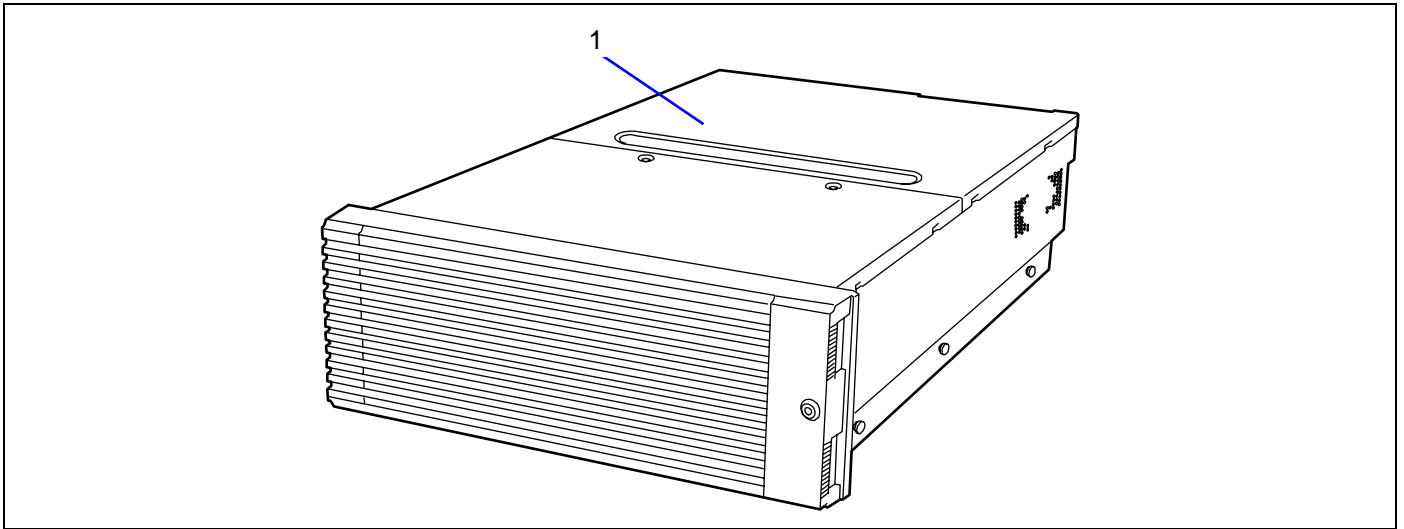
1   Rear access cover
Open the rear access cover to install or remove optional PCI boards and fans.

Front View

See "EXPRESSSCOPE monitor"
described later.

1

2
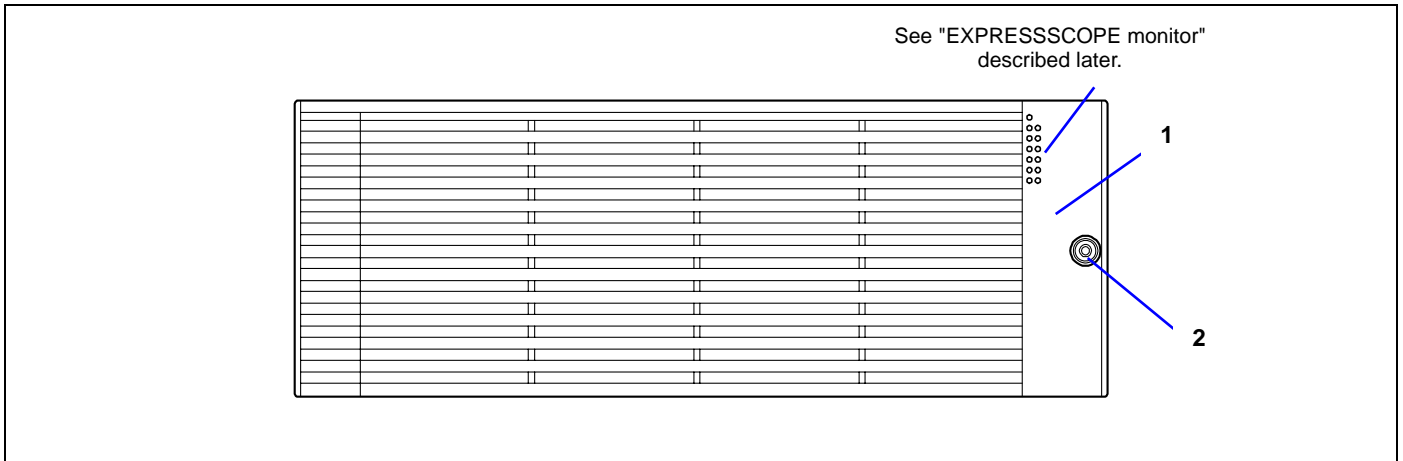
1   **Front bezel**
    Open the front bezel when you access to the POWER switch, 3.5-inch device (option), or DVD-ROM drive, or install or
    remove the USB floppy disk drive, hard disk drive, processor, memory board, or DIMM.

2   **Key hole**
    Insert the security key to lock/unlock the front bezel

Front View (with Front Bezel Removed)

See Chapter 8 for detail information on lamp indication.
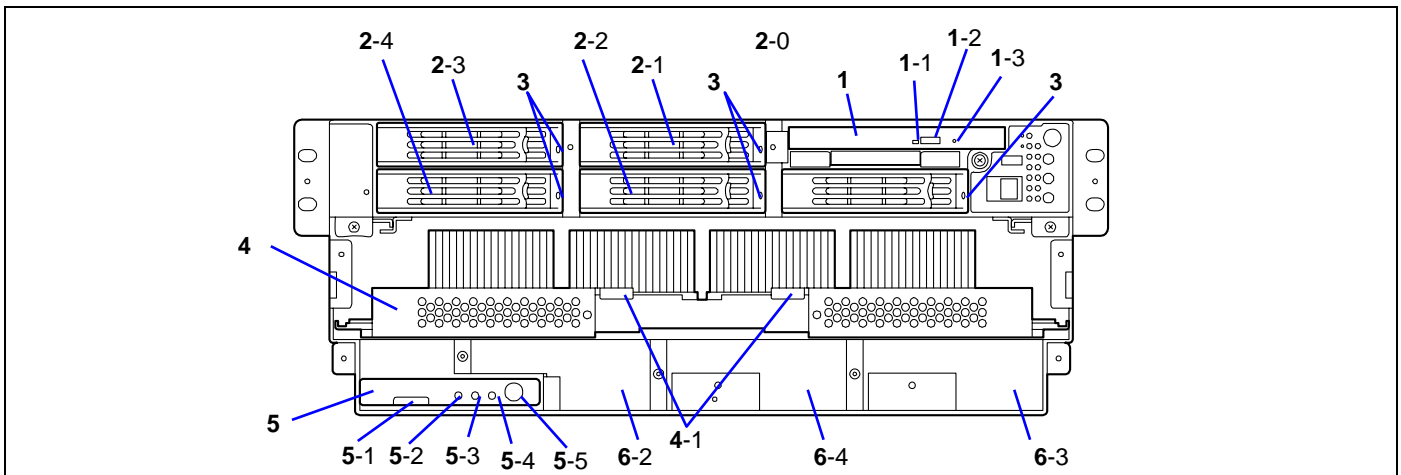
1   DVD-ROM drive
The DVD-ROM drive reads data from the inserted CD/DVD-ROM.
1-1: Access lamp (lit orange during accessing)
1-2: CD tray eject button
1-3: Emergency hole

2   3.5-inch hard disk bay/3.5-inch device bay
Additional hard disk drive slots. A hard disk drive of 1-inch high can be installed in this slot. The number following the bold-faced number indicates slot number. When additional HDD cage with 3.5-inch bay (dedicated BTO option), slots **2**-3 and **2**-4 are used for 3.5-inch device bay.

3   Disk lamp (green/amber)
The disk lamp is lit green if a hard disk installed in the server is accessed. If a hard disk is defected, the lamp is lit amber. During the rebuild processing, the lamp is lit green or amber alternately. (This occurs only in the disk array configuration.)

4   Processor board
Up to four processors can be connected to this board.
4-1 Board ejector

5   Memory board
Up to four DIMMs can be connected to this board.
5-1 Board ejector
5-2 POWER lamp
5-3 Attention lamp
5-4 Redundancy lamp
5-5 Attention switch

6   Additional memory board slot
The number following the bold-faced character indicates the slot number.
Additional memory board shall be installed in the slot #2, #3, and then #4 in the order.

Front View (Switches and EXPRESSSCOPE monitor)

See Chapter 8 for detail information on lamp indication.
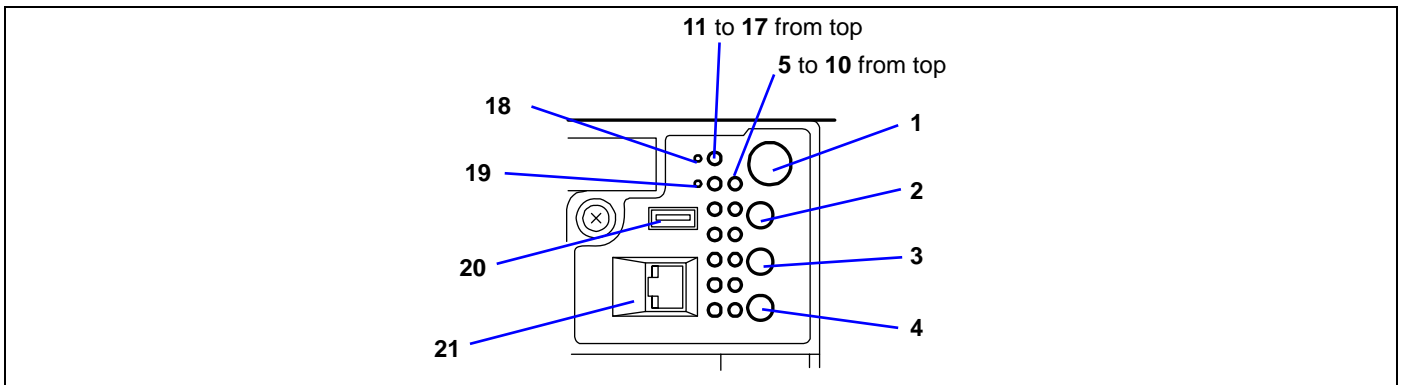
1   **POWER switch**
The power switch is used to turn on/off the power. If you press the switch once, then the POWER/SLEEP lamp goes on and the power is turned on. If you press the switch again, the power is turned off. The system is forcibly shut down when the power switch is pressed continuously for four seconds or longer.

2   **RESET switch**
The reset switch is used to reset the server.

3   **SLEEP switch**
Pressing the sleep switch once causes the server to enter into the sleep state (power saving mode). Pressing the power switch in the sleep state recovers the machine to the normal state. (This function is supported by Windows Server 2003.)

4   **UID (Unit ID) switch**
Pressing the UID switch turns UID lamp (blue) located on the front panel and the rear panel on and off. The UID lamp located on the rear panel is visible through the rear of the chassis and allows you to locate the server you're working on from the rear of the servers on a rack.

5   **POWER/SLEEP lamp (green)**
Lights in green when the server is powered on. Goes off when the server is powered off. Blinks when the system is placed in the sleep mode.

6   **STATUS lamp (green/amber)**
Lights in green while the server is in successful operation. When any error is detected, this lamp lights or blinks in amber.

7   **DISK ACCESS lamp (green/amber)**
Lights in green while the internal hard disk is in access. When any one of the internal hard disks fails, this lamp lights in amber.

8   **LAN1 ACCESS lamp (green)**
Lights in green while the server is connected to the network. Blinking in green indicates the network activity. Numbers printed near the lamps indicate the LAN port number.

9   **LAN2 ACCESS lamp (green)**
Lights in green while the server is connected to the network. Blinking in green indicates the network activity. Numbers printed near the lamps indicate the LAN port number.

10   **UID lamp (blue)**
Lights in blue when the ID switch is pressed.

11   **Attention lamp**

12   **Processor board error lamp**

13   **Memory board error lamp**

14   **I/O board error lamp**

15   **Power supply unit error lamp**

16   **FAN error lamp**

17   **Thermal error lamp**

18   **Dump switch**
The dump switch is used to collect the event logs having occurred in the server.

19   **CLEAR switch**

20   **USB3 connector**
Used to connect with a device accepting the USB 1.1 interface.

21   **Serial Port B connector**
Used to connect with a device having a serial interface. UPS must be connected to Serial Port A connector on the rear side of the server. Serial port B on the front panel and the one on the rear panel are mutually exclusive.

> **IMPORTANT:** The shape of serial port B (on the rear panel) connector is the same as that of LAN connector and ICMB connector (RJ-45). Pay attention to connect the proper cable.

Rear View

See Chapter 8 for detail information on lamp indication.
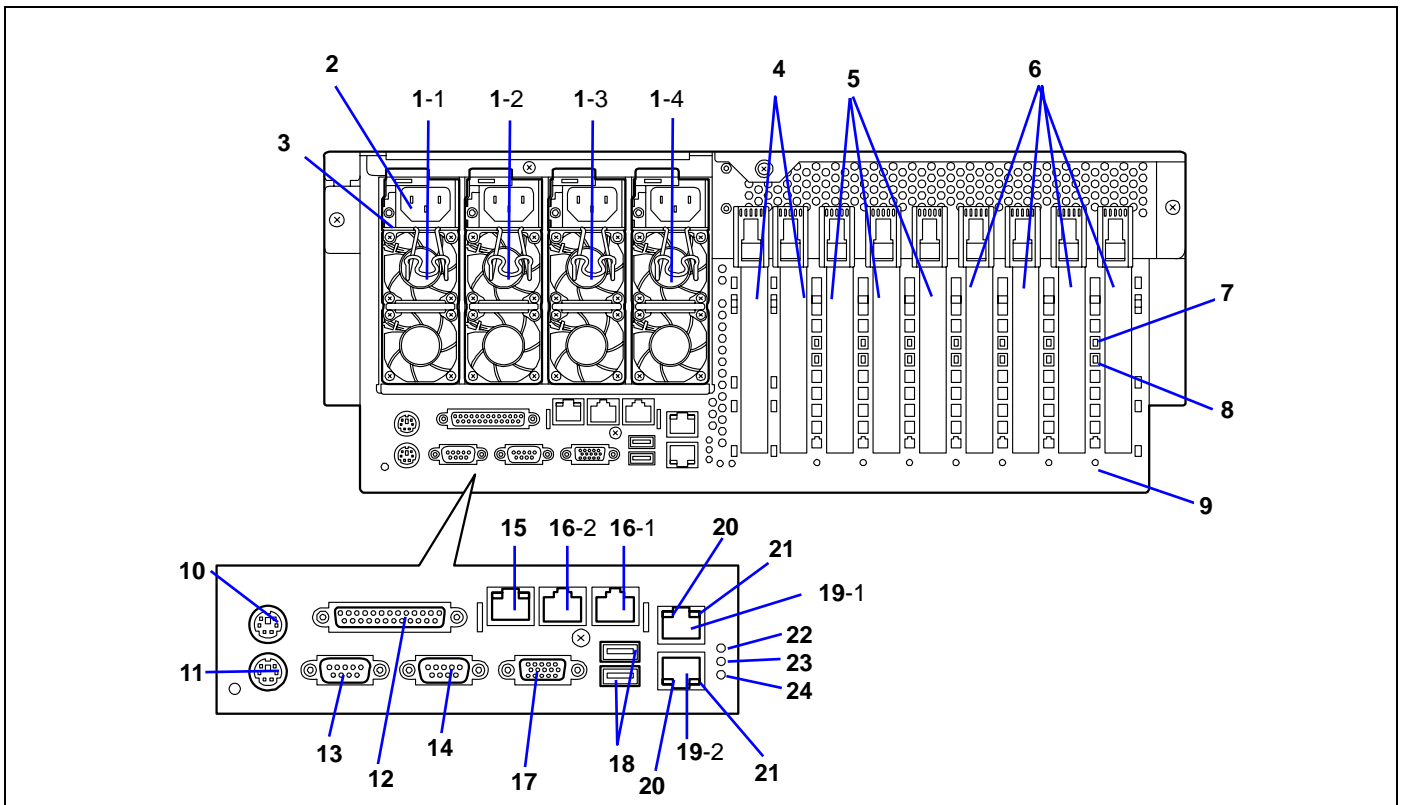
1   Power supply unit
The power supply unit supplies DC powers to the server. The factory-installed power supply units are installed in slots 1 and 2. Slots 3 and 4 are for optional slot for power redundant configuration.

2   AC inlet
The AC inlet is connected with the power cord of the server.

3   Power supply unit lamp

4   PCI slot (slots 1 and 2)
32-bit/33MHz 5V, non-hot-plug PCI

5   PCI Express slot
Slot 3: Non-hot-plug PCI-Express (x4) (Can contain x8 board.)
Slots 4 and 5: Hot-plug PCI-Express (x8)

6   PCI-X slot (slots 6 to 9)
64bit/100MHz, hot-plug PCI-X

7   PCI slot POWER lamp

8   PCI slot Fault lamp

9   PCI slot error lamp

10   Mouse connector
Used to connect with the optional mouse.

11   Keyboard connector
Used to connect with the optional keyboard.

12   Printer port connector
Used to connect with a printer with the Centronics interface.

13   Serial port A connector
The serial port A connector is connected with a device having the serial interface.
The server can't directly be connected to a leased line through the connector.

14   Serial port B connector
To be used exclusively with the serial port B connector on the front panel.

15   Management LAN Port

16   ICMB connector
Used to connect a device having the ICMB interface. The number following the bold-faced character shows the port number.

17   Monitor connector
The monitor connector is connected with the display unit.

18   USB-1 - USB-2 connectors
The USB-1 (upper) and USB-2 (lower) connectors are connected with devices accepting the USB interface (2.0).

19   LAN connector
Used to connect with a network system on LAN.
The number following the bold-faced character shows the port number.

20   LINK/ACT lamp

21   1000/100/10 lamp

22   I/O board error lamp

23   Processor board error lamp

24   BMC error lamp

Internal View
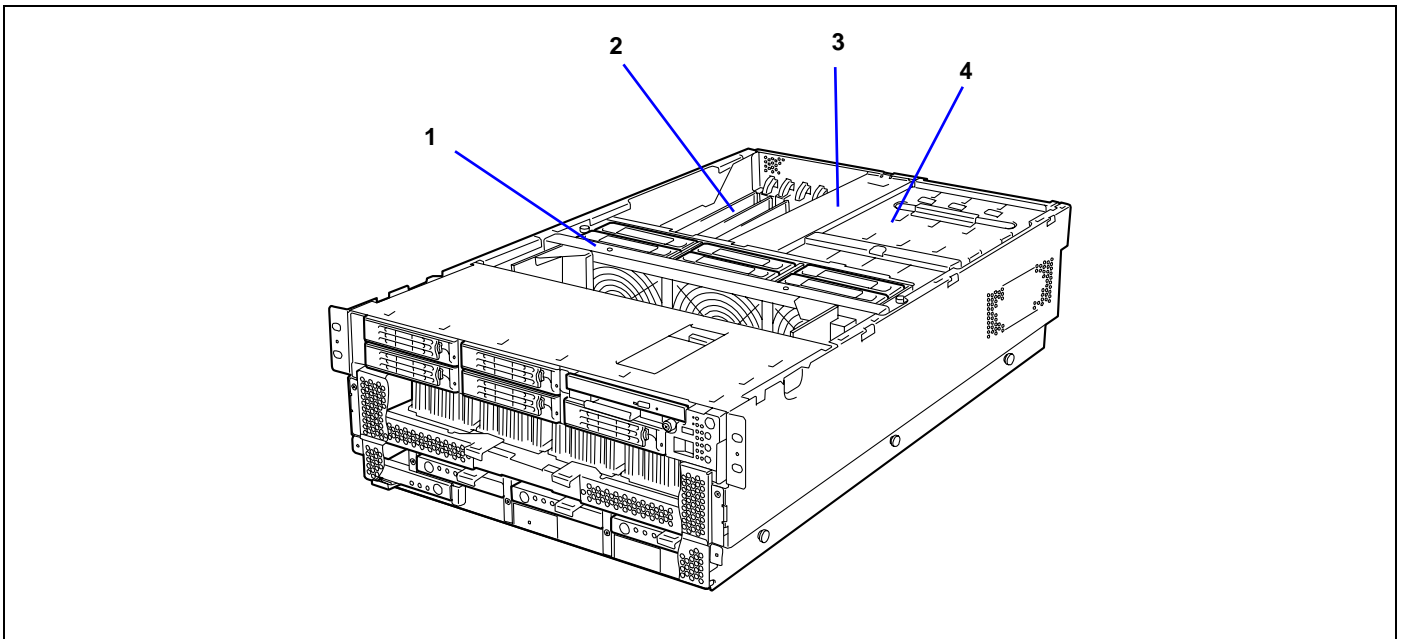
1	Fan bay
2	Hot-plug PCI slot
3	Non-hot-plug PCI slot
4	Power supply cage

I/O Board
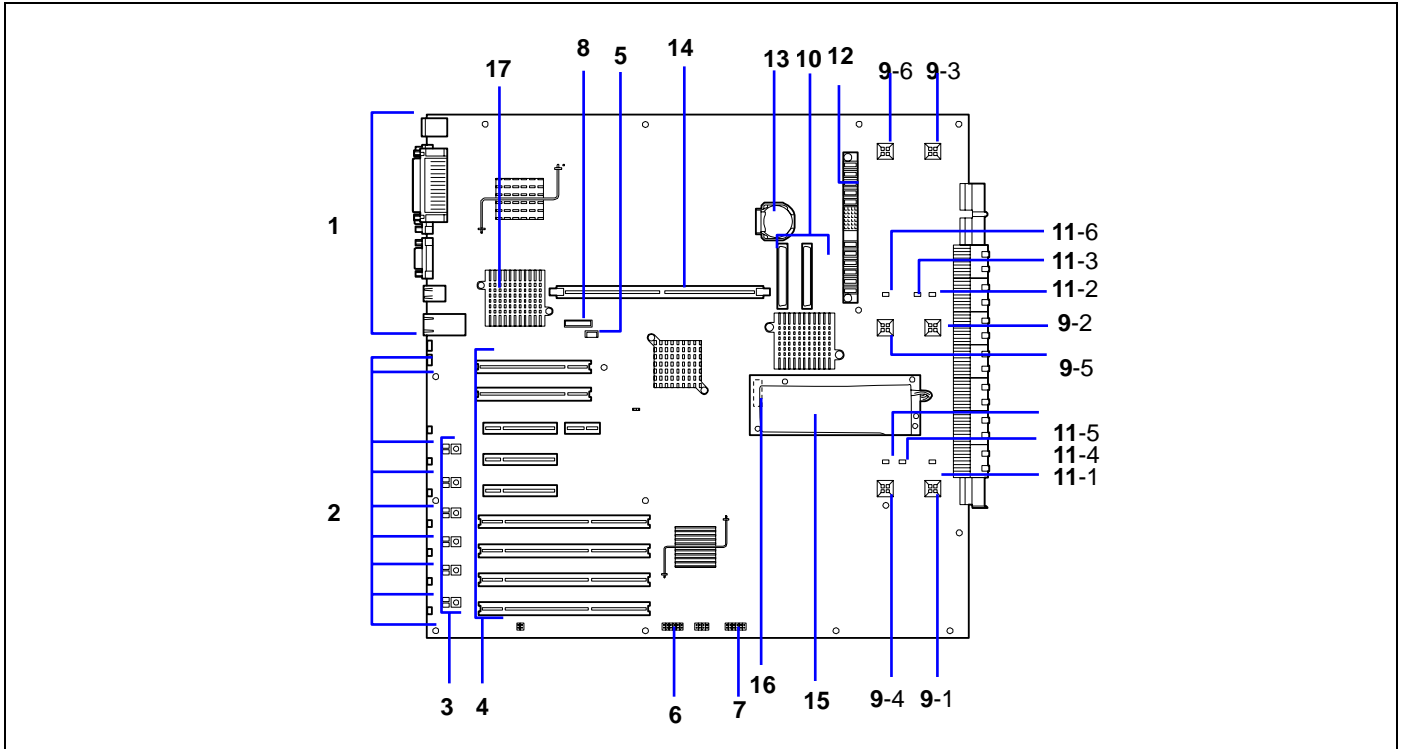
1   **Connectors for external devices**
2   **PCI slot error lamp** (corresponds to PCI slots #1 to #9 from top)
3   **PCI slot power lamp (upper) / PCI slot Fault lamp (lower)**
    (corresponds to PCI slots #4 to #9 from top)
4   **PCI board slot** (PCI slots #1 to #9 from top)
    Slots 1, 2: Non-hot-plug PCI, 5V, 33MHz   Slots 4 and 5: (Hot-plug PCI-Express (x8)
    Slot 3: Non-hot-plug PCI-Express (x4)   Slots 6 to 9: Hot-plug PCI-X, 3.3V, 100MHz
5   **IPMB connector**
6   **BMC configuration jumper block**
7   **Jumper switch for CMOS/Password clear**
8   **Management LAN board connector**
9   **Fan connector**
    Number following the bold-faced number indicates port number.
10 **SAS connectors**
    Ch-2, Ch-1 from left
11 **Fan error lamp**
    Number following the bold-faced number indicates fan number.
12 **Power BP connector**
13 **Lithium battery**
14 **DIMM connector for RAID**
15 **NiMH battery module**
16 **Battery module connector**
17 **LAN controller**

Processor Board
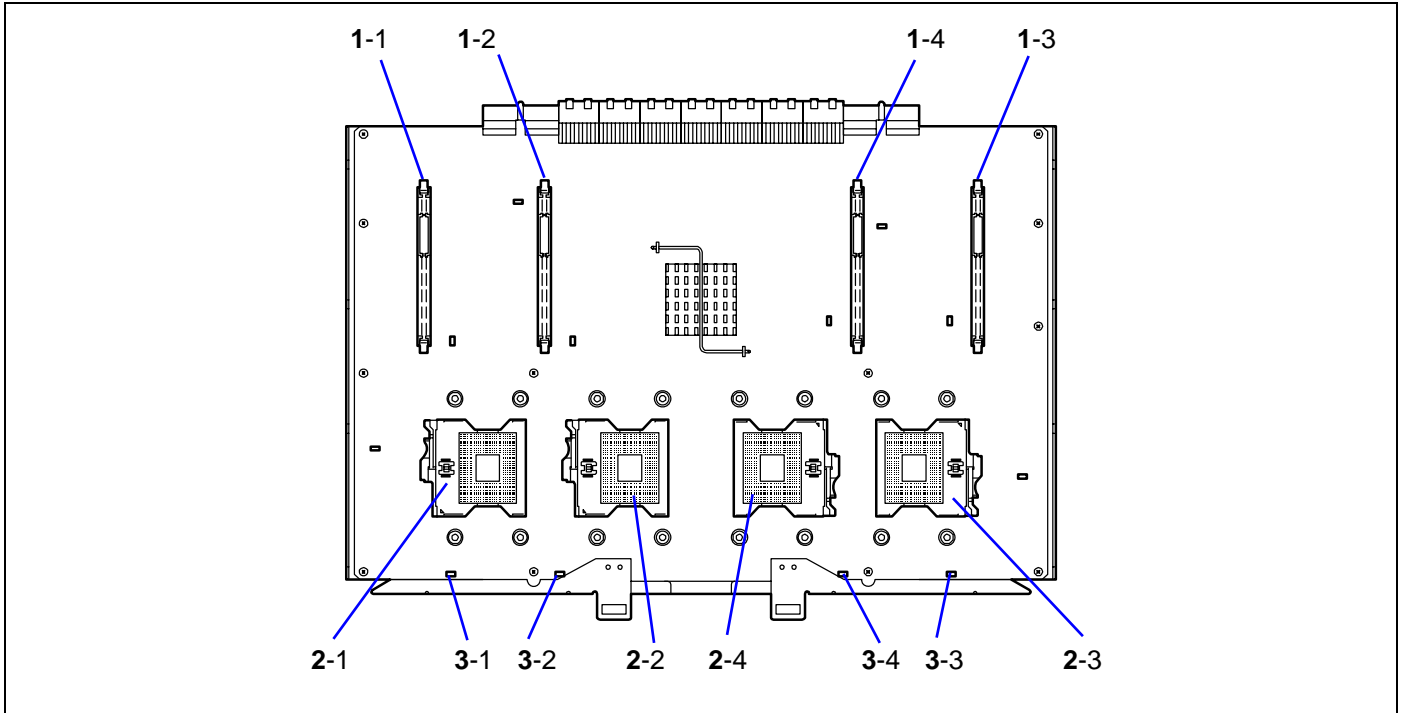
1   **VRM socket** (Number following the bold-faced character indicates the socket number.)

2   **Processor socket** (Number following the bold-faced character indicates the socket number.)

3   **Processor/VRM error lamp** (Number following the bold-faced character indicates the lamp number.)

Memory Board
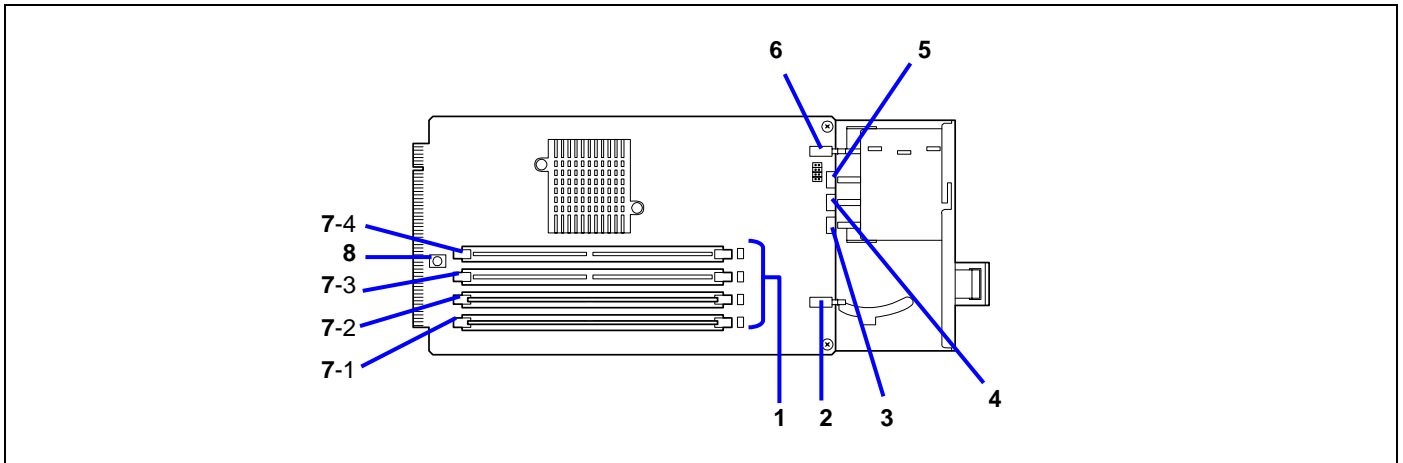
1   **DIMM slot error lamp** (DIMM slot #1 to 4 from bottom)

2   **Memory board Eject switch**

3   **Memory board Power lamp**

4   **Memory board Attention lamp**

5   **Memory board Redundancy lamp**

6   **Memory board Attention switch**

7   **DIMM slot** (Number following the bold-faced character indicates the socket number.)

    The factory-installed memory board contains at least 2 x 512 MB DIMM in slots 1 and 2.

8   **Switch to turn on DIMM slot error lamp**

Management LAN Board
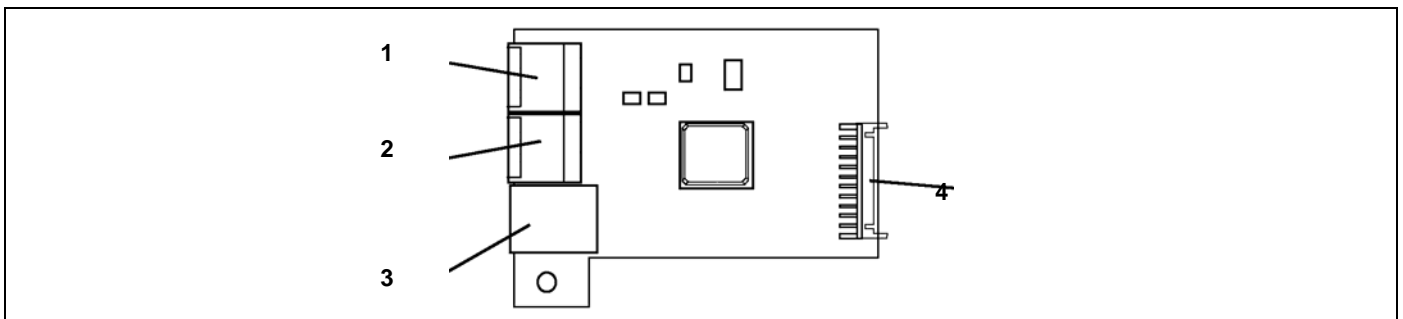
1   **ICMB #1 connector**

2   **ICMB #2 connector**

3   **Management LAN Port**

4   **I/O board connector**

STANDARD FEATURES

High performance

- 64-bit Intel® Xeon® Processor MP
  3.16 GHz/1 MB
  3.66 GHz/1 MB
  Dual Core Intel® Xeon®
  Processor 7000 series
  3 GHz/2x2 MB
  2.60 GHz/4 MB
  3.40 GHz/16 MB
- High-speed memory access
  (Supports DDRII 400-compliant interleaved memory)
- High-speed 1000BASE-T/
  100BASE-TX/10BASE-T
  interface
  (1000 Mbps/100 Mbps/10 Mbps supported)
- High-speed disk access
  (SAS disk)

High-reliability

- Memory mirroring feature
- Online sparing memory feature
- Memory hot-swap feature
- Memory RAID feature
- Memory monitoring feature (single-bit error correction/ double-bit error detection)
- Memory/processor degradation feature (logical isolation of a failed device)
- Bus parity error detection
- Thermal sensor
- Error notification
- Internal cooling fan monitoring feature
- Internal voltage monitoring feature
- BIOS password feature
- Security feature (security lock)
- Redundant power supply
- Disk array (onboard)
- Recovering BIOS Data

Expandability

- Wide variety of optional I/O slots
  Two 32-bit/33 MHz PCI slots
  Four 64-bit/100 MHz PCI-X sots (support hot-plug)
  Two PCI EXPRESS(x8) slots (support hot-plug),
  One PCI EXPRESS(x4) slot.
- Large memory of up to 64 GB
- 3.5-inch hard disk drive bay holds five hot-swap SAS hard disk drives
- Remote power-on feature
- Up to 3 additional processors are available for upgrade.
- USB interface

Many Available Features

- Graphic accelerator "Radeon7000M" support
- El Torito Bootable CD-ROM (no emulation mode) format support
- POWER switch mask
- Software power-off
- Remote power-on feature
- AC-LINK feature
- Intelligent Platform Management Interface (IPMI) feature
- Baseboard Management Controller (BMC)
- Remote console feature

Self-diagnosis

- Power On Self-Test (POST)
- Test and Diagnosis (T&D)

Maintenance Features

- Off-line Maintenance Utility
- Memory dump feature using the DUMP switch

Power Saving Feature

- Sleep feature (available for Windows Server 2003)

Easy and Fine Setup

- EXPRESSBUILDER (system setup utility)
- Express Setup
- Configuration Diskette Creator
- SETUP (BIOS setup utility)
- RAID Configuration Utility

Management Utilities

- NEC ESMPRO
- NEC DianaScope (optional)
- Advanced Remote Management

Power Supplies

When an additional power supply unit is installed and system operates with three power supply units, the server can continue its operation without interruption even if one of these power supply units fails (in the redundant configuration).

When one more additional power supply unit is installed and system operates with four power supply units, AC power can be divided into two lines with a pair of power supply units. With the AC power redundant configuration, the server can continue its operation without power interruption even if either of AC power line fails.

If an additional power supply unit is installed while the system is operating with two power supply units, a log that represents "power degrade" along with "power recovery" may be recorded in the system event log. This indicates that the power supply is in redundant configuration but not in maximum configuration.

If you disconnect the power cord immediately after you have connected it, the log indicating "power recovery" is displayed, but "power degrade" may not be displayed.

Peripheral Bays

If you purchased the server with the Hot-swap HDD Cage 3 Hard Drives with Media Bay, one slot for backup device such as a magnetic tape drive is provided.

Hot-swap HDD Cage 3 Hard Drives with Media Bay is a factory-installed option. You cannot purchase it separately.

Available Devices

The 3.5-inch device slot can contain a single-height SCSI device.

- Setting of SCSI ID

    When connecting the 3.5-inch device with the optional SCSI controller, refer to the manual that comes with the SCSI controller.

    – Setting of terminator
        Set the terminator to "OFF".

Memory Mirroring / Memory RAID Feature

Memory Mirroring Feature

The memory mirroring feature places a memory board as spare memory in standby state. If the current memory board encounters an uncorrectable error, the memory mirroring feature switches to the standby memory board. When this feature is used, the current memory board and the standby memory board should be combined. Available combinations are:

- Mirroring with memory boards 1 and 2

- Mirroring with a pair of memory boards 1 and 2 and a pair of memory boards 3 and 4

To enable the memory mirroring feature, the combined memory boards must have the DIMM of same capacities.

The table below shows combinations of memory boards installed.

	Memory board 1	Memory board 2	Memory board 3	Memory board 4
A	2 GB (1 GB*2)	2 GB (1GB*2)	2 GB (1 GB*2)	2 GB (1 GB*2)
B	8 GB (2 GB*4)	8 GB (2 GB*4)	8 GB (2 GB*4)	8 GB (2 GB*4)
C	4 GB (1 GB*4)	4 GB (1 GB*4)	–	–
D	16 GB (4 GB*4)	16 GB (4 GB*4)	16 GB (4 GB*4)	16 GB (4 GB*4)

Memory RAID Feature

If one of the four memory boards encounters an uncorrectable error, the memory RAID feature switches to the other memory board to continue operation. To use this feature, four memory boards must be installed. Each memory board must have the DIMM of same capacities.

The table below shows combinations of memory boards installed.

	Memory board 1	Memory board 2	Memory board 3	Memory board 4
A	2 GB (1 GB*2)	2 GB (1 GB*2)	2 GB (1 GB*2)	2 GB (1 GB*2)
B	8 GB (2 GB*4)	8 GB (2 GB*4)	8 GB (2 GB*4)	8 GB (2 GB*4)
C	4 GB (1 GB*4)	4 GB (1 GB*4)	4 GB (1 GB*4)	4 GB (1 GB*4)
D	16 GB (4 GB*4)	16 GB (4 GB*4)	16 GB (4 GB*4)	16 GB (4 GB*4)

Setting BIOS

Start SETUP and select [Advanced] → [Memory Configuration] → [Memory RAS Feature] in order and set as follows:

- To enable the memory mirroring feature: Select [Mirror].

- To enable the memory RAID feature: Select [RAID].

Others

- Memory capacity displayed on the operating system = total capacity of physically installed memory – capacity for standby memory
  Memory mirroring feature: 1/2 of actually installed memory capacity
  Memory RAID feature: 3/4 of actually installed memory capacity

- Enabling the memory mirroring or memory RAID feature does not influence the operations of applications.

- The selected feature is automatically disabled when an error message is displayed:

The following indicates that the memory mirroring /memory RAID feature has worked:

a) The Redundancy lamp on the front panel of the server lights green.

b) The failing DIMM group is degraded when the server restarts.

c) If NEC ESMPRO Agent has been installed, the following log is registered as a system log of Event Viewer:

Source name: ESMCommonService

Event ID: 2313

Explanation: Part of the DIMM was isolated due to a memory error.

Memory number: XX

Date/time: XX

d) If report setting is made through NEC ESMPRO Agent, Manager reporting and ALIVE reporting is performed. The report contents are as follows:

Explanation: Part of the DIMM was isolated due to a memory error.

Memory number: XX

Date/time: XX

Recovering BIOS Data

Two system BIOS, primary and secondary, are used to realize the duplex configuration.

Normally, the system operates with the primary BIOS. If the primary BIOS data error occurs or the device containing the system BIOS fails, the control is immediately transferred to the secondary BIOS. Thus, the activation of the system is ensured.

At the shipment, the latest version of system BIOS is stored both in the primary and the secondary BIOS. If you execute the system BIOS update, the secondary BIOS is updated, and the updated BIOS becomes the primary BIOS. Thereafter, the system is activated from that primary BIOS.

System Cooling

The chassis includes a hot-swappable fan module with six fans for cooling the processor(s), hard drives, and PCI cards. The fan system is located in the middle of the chassis to pull cooling air through the chassis.

System Board Features

The following subsections describe the system board major components.

Processor

The processor board accommodates one to four 64 bit Intel® Xeon™ processors MP with 1 MB cache in the FC-PGA2 package. 8MB cache processors are available on specific platforms.

DIMM Memory

To install or remove the DIMM, remove the memory board first. One memory board is factory-installed in the server. Up to four memory boards (64 GB at the maximum) can be installed in the server.

Install the DIMM (Dual Inline Memory Module) to the DIMM socket on the memory board in the server. DIMMs are installed in the ascending order of DIMM socket numbers in the unit of two modules.

Onboard Video

The baseboard incorporates an ATI® Radeon® 7000M graphics accelerator with 16 MB of video SDRAM. The baseboard supports disabling of the onboard video through BIOS Setup or when a plug-in video card is installed in any of the PCI slots.

LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB

The I/O board includes the LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB (called "On Board RAID (MegaRAID ROMB)" hereafter) The On Board RAID (MegaRAID ROMB) supports the following features:

- Dual-channel SAS interface (CH0 and CH1)
  Connect the HDD cage to CH0, and reserve to CH1.
- RAID levels 0, 1, 5, and spanning of RAID1
- 256 MB of cache memory
- Battery-backup cache memory

Network Interface Controllers

> **NOTE:** To ensure EMI product regulation compliance, the system must be used with shielded LAN cables.

The I/O board includes Intel® 82546GB network interface controller (NIC). The Intel® 82546GB network interface controller supports the following features:

- Two channels of 10Base-T, 100Base-TX, and 1000BASE-T networks.

- Direct 64-bit, 133MHz interface to the PCI-X bus

- 82546GB provides standard IEEE 802.3 Ethernet Interface for 1000Base-T, 100Base-TX, and 10Base-T (802.3, 802.3u, 802.3ab).

System Board Management Controller (BMC)

Server management is concentrated in the System Board Management Controller (BMC). The BMC and associated circuitry are powered from a 5Vdc standby voltage, which remains active when system power is switched off, but the ac power source is still on and connected.

The BMC supports the DianaScope (optional), which allows remote server management through networks.

See Chapter 6 or online document in the EXPRESSBUILDER CD-ROM for DianaScope.

One major function of the BMC is to autonomously monitor system management events, and log their occurrence in the non-volatile System Event Log (SEL). The events being monitored include overheating and overvoltage conditions, fan failure, or chassis intrusion. To enable accurate monitoring, the BMC maintains the non-volatile Sensor Data Record (SDR), from which sensor information can be retrieved. The BMC provides an ISA host interface to SDR sensor information, so that software running on the server can poll and retrieve the server's current status.

The BMC performs the following:

- Monitors server board temperature and voltage
- Monitors processor presence and controls Fault Resilient Boot (FRB)
- Detects and indicates fan failure
- Manages the SEL interface
- Manages the SDR Repository interface
- Monitors the SDR/SEL timestamp clock
- Monitors the system management watchdog timer
- Monitors the periodic SMI timer
- Monitors the event receiver
- Controls secure mode, including video blanking, diskette write-protect monitoring, and front panel lock/unlock initiation
- Controls Wake On LAN via Magic Packet support.

Degradation Feature

The degradation feature automatically isolates a failed DIMM, processor, or cooling fans to assure continuous operation of the server when the POST (Power On Self-Test, self-diagnosis program after power on) detects such a DIMM, processor, or cooling fans.

Failed DIMMs, processors, and cooling fan may be identified on the screen that the POST displays, or with the BIOS setup utility, "SETUP." They may also be identified on the system that has the ESMPRO installed.

Remote Power-On Feature (Wake On LAN/PME)

The remote power-on function turns on the server through a network. It sends a special packet from the management computer to a remote server to turn it on if the server is powered off.

To enable this feature, you must select "Enabled" for "Wake On LAN/PME" in the Advanced Chipset Control of the Advanced menu of the BIOS setup utility, "SETUP." (See Chapter 4.)

The remote power-on feature is not available in the following cases. Press the POWER switch once to start the operating system, and turn off the server in an appropriate procedure.

- Abnormal previous system shut-down

- No power supply to the server (due to turned-off breaker, disconnected power cord, power blackout, etc.)

> **NOTE:** Wake On LAN feature is supported in 100BASE-TX/1000BASE-T adapter on the I/O board.

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. AC-LINK feature can be enabled or disabled with "AC-LINK" in the Server menu of the BIOS setup utility, "SETUP." (See Chapter 4.)

Security

To help prevent unauthorized entry or use of the system, the system includes a full lockable front panel and Server Management software that monitors the system intrusion switches.

Security with Mechanical Locks and Monitoring

The front bezel of the server contains a mechanical lock to prevent access to the front of the computer chassis.

The computer chassis includes an intrusion switch for the front access cover. When this cover is opened, the switch transmits an alarm signal to the system board, where server management software processes the signal.

Software Locks via the System Setup Utility

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 enters the correct password(s). For example:

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period – 1 to 120 minutes.

- Set and enable an administrative password.

- Set and enable a user password

- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset, power and sleep switches.

- Activate a hot-key combination to enter secure mode quickly.

- Disable writing to the floppy disk drive when secure mode is set.

EXPRESSBUILDER

The CD-ROM that comes with your server contains a setup utility called «EXPRESSBUILDER." When you have first installed the server or append features to the server, use the EXPRESSBUILDER to set up your server.

Refer to Chapter 6 for details.

The major functions of the EXPRESSBUILDER are:

- To install the Operating System.

   "Express Setup" helps you to install Windows 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 floppy 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 Bull NovaScale System" in Master Control Menu (Windows-based EXPRESSBUILDER feature) updates several resources of Microsoft® Windows Server™ 2003. (See Chapter 6)

- To install the utilities.

   EXPRESSBUILDER CD-ROM includes some management software for Windows (NEC ESMPRO, NEC DianaScope and so on) and maintenance utilities for DOS (System diagnostics, Off-line Maintenance Utility and so on). Note that some of these utilities must be purchased as options or accessories.

   You can install the applications for Windows from Master Control Menu and install the utilities for DOS from Tools menu. (See Chapter 6)

- To read the online documents

   You can refer to the online documents from Master Control Menu. (See Chapter 6)

   NOTE: Some features among those listed above can be used from the remote computer via cross cable, modem, or LAN (remote console). See Chapter 6 for details.

   * available under Windows system

NEC ESMPRO

The NEC ESMPRO is server management software that runs on the operating system. The NEC ESMPRO includes the NEC ESMPRO Manager for the server monitoring terminal and the NEC ESMPRO Agent for the Express server.

   NOTE: For details of major functions of the NEC ESMPRO, system configuration and setups with the NEC ESMPRO, see Chapter 6.
   Available functions of the NEC ESMPRO depend on the operating system you install. Ask your service representative for details.

Off-line Maintenance Utility

The Off-line Maintenance Utility is used for proactive maintenance and fault analysis of the server. Normally this utility is used by the maintenance engineer.

Refer to Chapter 8 for details.

System Diagnostic Utility

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

NEC DianaScope

The NEC DianaScope is a software application for the remote management of the server.

The NEC DianaScope can control the managed server even if the operating system is not running on the managed server.

See Chapter 6 and online document in the EXPRESSBUILDER.

USING YOUR SERVER

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

Front Bezel

Remove the front bezel to power on/off the server, to access DVD-ROM drive, and to install/remove hard disks to the 3.5-inch hard disk bay.

> **IMPORTANT:** To open the front bezel, you must unlock the door with the provided security key.

Installing or Removing the Front Bezel

When turning the power of the server on/off, accessing to the DVD-ROM drive, or installing or removing a hard disk on or from the 3.5-inch hard disk bay, first remove the front bezel.

> **IMPORTANT:** The front bezel can be opened only when you unlock it by using the attached security key.

1. Insert the attached security key into the key slot and turn the key to the front bezel side with it pressed lightly to release the lock.

2. Hold the right end of the front bezel lightly to pull it toward you.

3. Slide the front bezel to the left a little to remove the tab from the frame and then remove the front bezel from the server.
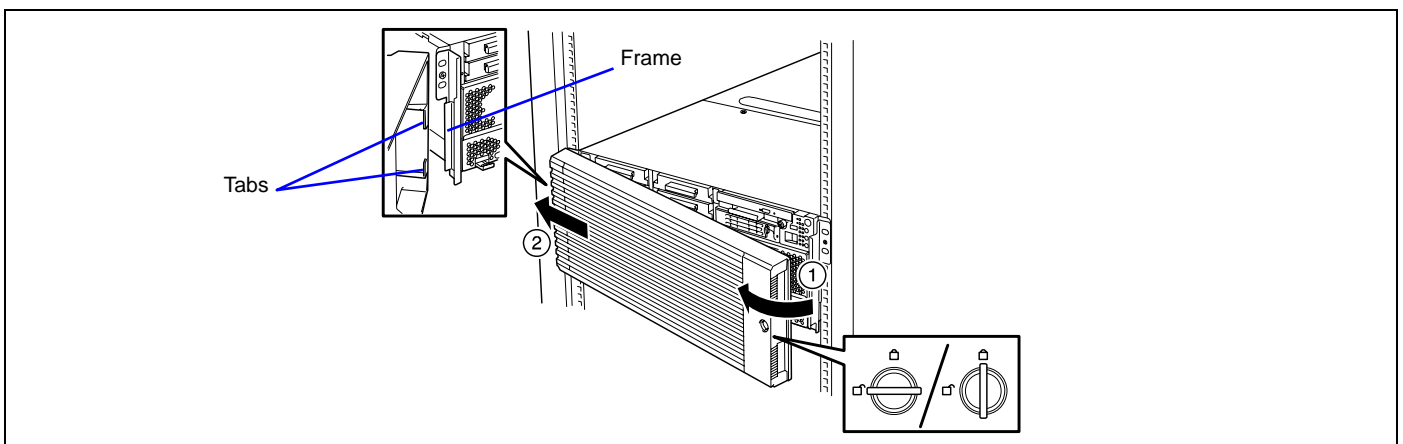
To install the front bezel, latch the tab at the left side of the front bezel on the server frame. After the installation, lock the front bezel by using the key for security.

POWER Switch

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

Power On

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

The POWER/SLEEP lamp lights in green.
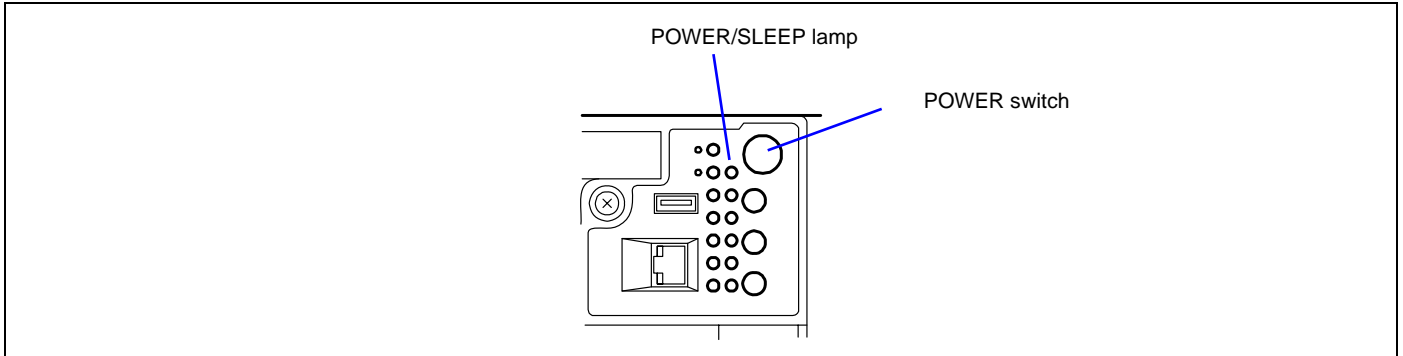
IMPORTANT:

- 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.

- If the power cord is connected to the server, an initial diagnosis of the hardware starts. The POWER switch does not work while in diagnosis. Wait for about 10 seconds, then press the POWER switch.

- Do not turn off the server until characters following a full-screen logo appear on the screen. The time until the characters appear depends on your system configuration. Approximately, it may take three to five minutes.

POST

POST (Power On Self-Test) is the self-diagnosis feature saved in the I/O board of the server.

When the power of the server is turned on, POST automatically runs to check the I/O board, memory board, processor, keyboard, and mouse. During POST messages indicating the starts of several BIOS setup utilities may also appear.

At the shipment of the server, it is set to have a full-screen logo appear on the display unit during POST. Pressing **Esc** allows the information on the execution of POST to be displayed.

> **NOTE:** The information on the result of diagnosis by POST can be displayed from the start without the depression of **Esc** on the BIOS Setup menu. If you desire it, change the setting of "Boot-time Diagnosis Screen" on "Advanced" of the BIOS SETUP to "Enabled."

It may not always be necessary to check the result of POST. Check the messages which may appear during POST in the following cases:

- Installation of the server
- Suspicion of failure
- Beep for many times in the period from power-on to operating system start
- Appearance of an error message on the display unit

POST Flow

The flow of operations executed by POST is sequentially described below:

> **IMPORTANT:** Depending on the system configuration, message "Press Any Key" requesting key entry may appear on the display screen. This is requested by BIOS on an installed optional board. See the explanation described in the manual for the option and press any key.

1. After power-on, POST is activated to start the memory check. The message indicating the counted size of the base memory and that of the additional memory appears at the upper left corner of the display screen. In addition, the following message appears at the bottom of the screen.

   ```
   Press <F2> to enter SETUP, <F4> Service Partition, <F12> Network
   ```

   > **NOTE:** If you change the factory-default for [Extended RAM Step] in [Advanced] menu of BIOS SETUP and execute the memory test, pressing **Space** allows the memory test to be skipped.

   It may take several minutes to complete the memory check depending on the size of the memory installed in the server. Similarly, it may take about a minute to display the proper information on the screen at rebooting.

2. If your server has some option boards such as disk array controller installed, POST displays the message prompting the start of the BIOS setup utility for the option board.

   Refer to the manual that comes with the option board for details.

   When you press **Ctrl** and any other key at the same time to start the setup utility of the option board, the subsequent key entry may sometime fails (e.g., key entry is not accepted or incorrectly recognized). In the case, press **Ctrl** again to recover.

3. POST displays SCSI ID numbers used by the connected SCSI devices on the screen.

4. POST detects the on-board RAID controller and displays the message prompting the start of the WebBIOS (without any key entry for several seconds, POST is automatically continued). Press the proper keys according to the screen display.

```
LSI MegaRAID BIOS                    Version XXX (Build XXX XX XXXX)
Copyright(C) 2005 LSI Logic Corp.
HA-X (Bus XX   Dev XX)   MegaRAIS SCSI 320-2E
  Standard FW XXXX DRAM = 256MB (SDRAM)
Battery module is present on adapter
  Channel-0 ID-14 -- XXX    XXXXX
  Channel-1 ID-14 -- XXX    XXXXX
X Logical Drive(s) found on the host adapter.
X Logical Drive(s) handled by BIOS
Press <Ctrl><M> or <Enter> to Run Config Utility
Or Press <Ctrl><H> for WebBIOS
```

Now press **Ctrl** + **H.** The utility starts upon completion of POST.

NOTES:

- Using WebBIOS allows you to configure or change an array configuration with internal SAS hard disk drives.

- If your server has LSI Logic MegaRAID SAS 8480E disk array controller installed and the BIOS of disk array controller is enabled, the message prompting you to start WebBIOS of LSI Logic MegaRAID SAS 8480E disk array controller is displayed first, then on-board RAID (MegaRAID ROMB).

- The on-board RAID (MegaRAID ROMB) has factory-installed battery. See Chapter 8 for error messages related to the battery. See also "Battery for Onboard RAID (MegaRAID ROMB)" in Chapter 4.

---

5. Displays the message notifying you of the detection of the processor and the connected keyboard and mouse.

6. Displays any of the following messages.

Pattern 1:

```
Press <F2> to enter SETUP or <F12> to Network
```

Pattern 2:

```
Press <F2> to enter SETUP, <F4> Service Partition, <F12> to Network
```

Or

Pattern 3:

```
Press <F1> to resume, <F2> to enter Setup, <F12> to Network
```

Pattern 4:

```
Press <F1> to resume, <F2> to enter Setup, <F4> Service Partition, <F12> Network
```

* The displayed message may vary depending on the device status.

NOTE: The operation or utility to be started at each key entry is described below. These operations or utilities may not always be started.

- **Esc**

   Press **Esc** to display the boot menu at the end of POST. This menu allows you to select the boot device.

```
┌─────────────────────────────────────┐
│            Boot Menu                 │
├─────────────────────────────────────┤
│  1. CD-ROM Drive                     │
│  2. +Removable Devices               │
│  3. +Hard Drive                      │
│  4. IBA GE Slot 0B20 v1222           │
│  5. IBA GE Slot 0B21 v1222           │
├─────────────────────────────────────┤
│          <Enter Setup>               │
└─────────────────────────────────────┘
```

- **F2**

   Press **F2** to start the BIOS setup utility. Start the utility to change the setting of the server in order to fit to the environment in which the server is used. This setting needs not be changed, unless it is displayed along with an error message. See Chapter 4 for the setting procedures and features of the parameters.

- **F4**

   Press **F4** to start the Off-line Maintenance Utility from the maintenance partition. See Chapter 6 for the maintenance partition.

- **F12**

   Press **F12** to run the network boot.

- **F1**

   If message "Press <F1> to resume" appears, an error is detected during POST. See "Error messages during POST" for the information on the messages and the proper actions against the errors. If an error message appears, pressing **F1** allows the BIOS setup utility to be started.

7. When a password is set in the BIOS setup utility SETUP, the screen prompting you to enter the password appears after the normal termination of POST.

The password can be entered for up to three times. If you enter the password incorrectly all the time, the server cannot be started. In this case, turn off the power of the server, wait for about 10 seconds, and then turn on the power to start the server again.

IMPORTANT: Set the password only after operating system is installed.

8. Starts operating system at the termination of POST.

POST Error Messages

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

IMPORTANT: Take a note on 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 the manual for the application that controls the UPS.

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

1. Shut down the operating system.

2. Press the POWER switch on the front of the server.
   The POWER/SLEEP lamp goes off.

3. Power off peripheral devices.

SLEEP Switch

The SLEEP switch allows you to save almost all power of the server (power-saving mode or sleep mode).

> **NOTE:** To use the SLEEP switch, an operating system supporting the sleep feature is required. (Available for Windows 2003)
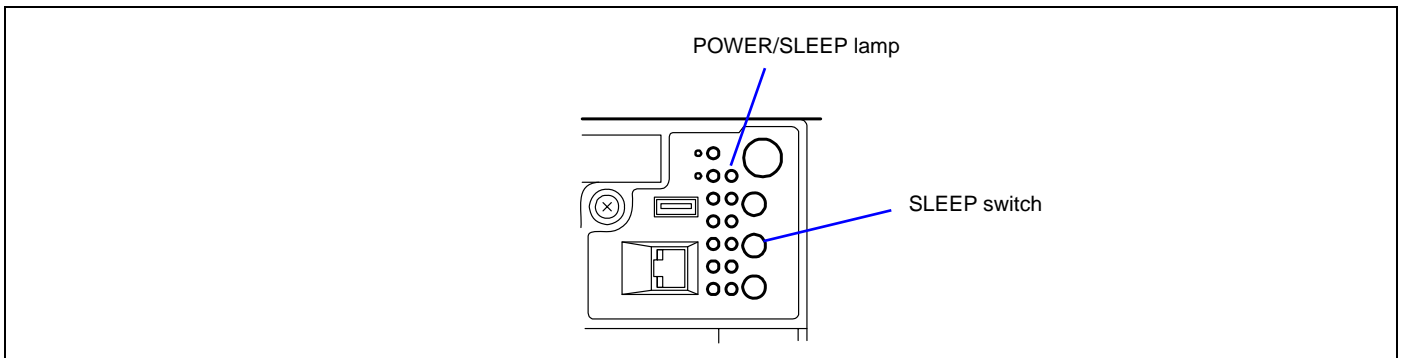
Press the SLEEP switch on the front of the server to place the server in the power-saving mode. (The POWER/SLEEP lamp blinks.) In the power-saving mode, the server retains the memory data and the status of the previous operations.

To resume the original state, press the POWER switch. (It may take a little time to resume the original state.)

> **NOTE:** The operational level in the power-saving mode depends on the operating system in use. (Available for Windows 2003.)

> **IMPORTANT:** Do not change system configuration while turning into the power-saving mode or in the power-saving mode. Otherwise, you may fail to resume the original state.

Floppy Disk Drive

Your server is not equipped with floppy disk drive. Use the optional USB floppy disk drive if necessary.

DVD-ROM Drive

Your server is provided with the DVD-ROM drive on its front to read data from a CD/DVD-ROM. The CD/DVD-ROM provides larger and faster data read than the floppy disk.

⚠ 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 leave the tray ejected from the DVD-ROM drive.

Setting/Removing the CD/DVD-ROM

1. Confirm that the power of the server is on (with the POWER lamp being lit) before setting the CD/DVD-ROM on the DVD-ROM drive.

2. Press the optical disk tray eject button on the front of the DVD-ROM drive. The tray comes out. Put the CD/DVD-ROM on the tray carefully and securely with the label facing upward.

CD tray eject button
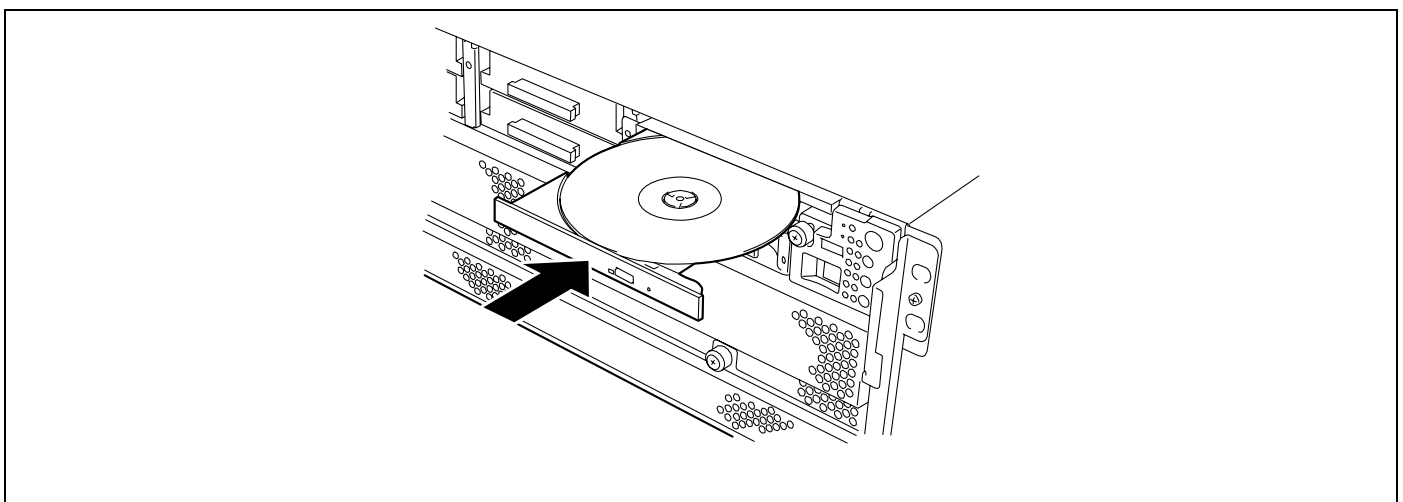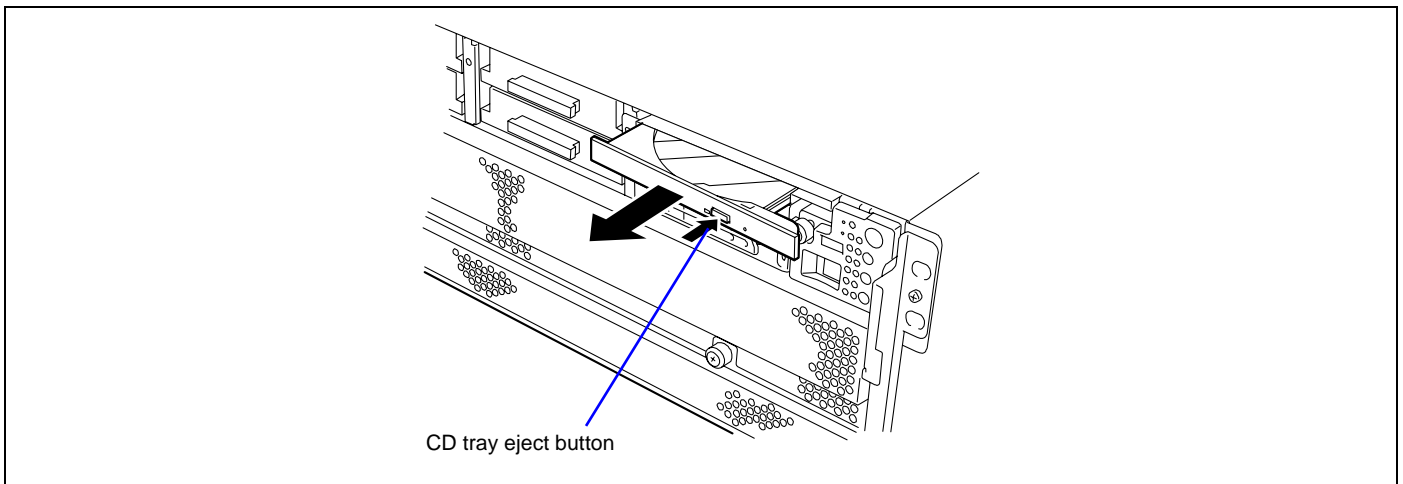
3. Press the CD tray eject button or push the front of the tray lightly to retract it into the drive.

IMPORTANT: If a noisy sound in driving the DVD-ROM drive occurs after setting a CD/DVD-ROM, set it again correctly.

To take out the optical disk from the DVD-ROM drive, press the CD/DVD tray eject button in the similar way in setting the CD/DVD-ROM to make the tray go out. (If the access lamp is lit in orange, the CD/DVD is being accessed and CD/DVD tray eject button is disabled.) Some operating systems have a command to eject a tray.

After taking out the CD/DVD-ROM, return the tray into the drive.

When you fail to eject the CD/DVD-ROM tray with the CD/DVD tray eject button and take out the CD/DVD-ROM 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 upper front of the DVD-ROM drive and gently push it in until the tray is ejected.
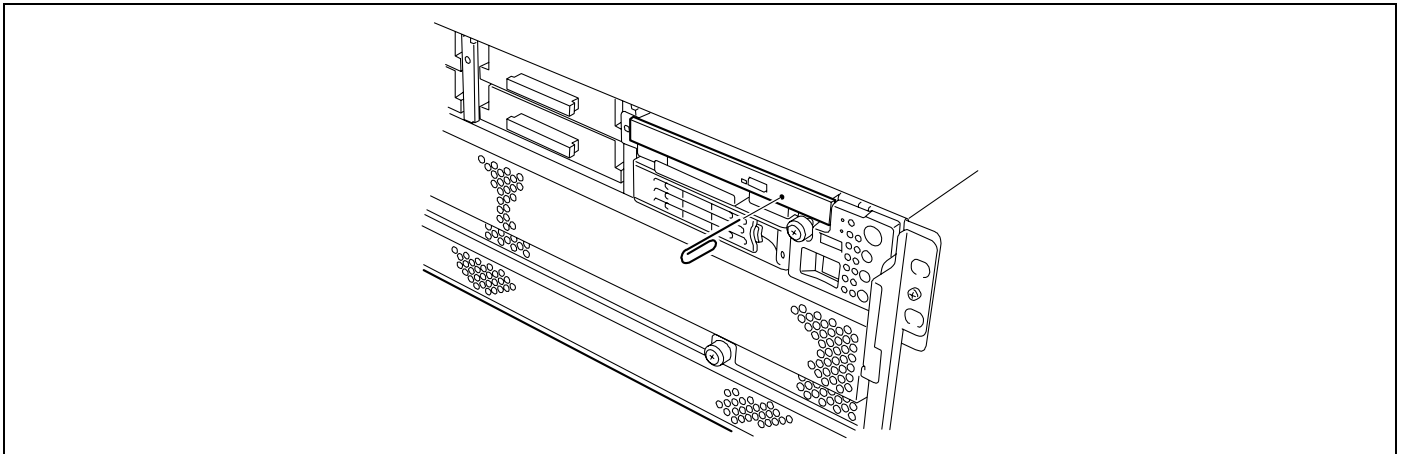
IMPORTANT:

- Do not use a toothpick or plastic stick that is easy to break.

- If the above procedure does not let you take out the CD/DVD-ROM, contact your service representative.

3. Hold the tray and pull it out.

4. Take out the CD/DVD-ROM.

5. Push the tray back into position.

NOTE: Use of the CD/DVD-ROM

Keep the following notes in mind to use the CD/DVD-ROM for the server:

- If the optical disk does not conform to the CD/DVD-ROM standard, the playback of this one with the DVD-ROM drive is not guaranteed.
- 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 hand.
- 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.
- Keep the CD/DVD-ROM away from 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 attached on the CD/DVD-ROM, wipe the CD/DVD-ROM from its centre to edge with a dry soft cloth slowly and gently.
- Use 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 in use.
- If the CD/DVD-ROM emits large noise in the DVD-ROM drive, remove the CD/DVD-ROM and insert it back again.

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Chapter 3

Setting Up Your Server

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

SETUP FLOW

Follow the flowchart below to set up the server.

Selecting a site
Select a suitable site for the server.

⇩

Unpacking the system
Unpack the server and accessories from the chipping carton box.

⇩

Assembling the rack-mount system
Assemble the 19-inch rack cabinet and install the server.

⇩

Connecting peripheral devices
Connect peripheral devices to the server.

⇩

Connecting the power cord
Connect the power cord to the server.

⇩

Turning on the server
Power on the server to start software setups. Setups depend on the optional internal devices installed and the peripheral devices connected.

⇩

Installing the operating system
Install an operating system to the server. See Chapter 5.

⇩

Installing the utilities
Install the utilities in the provided EXPRESSBUILDER CD-ROM.
See Chapter 6.

⇩

Making backup copies of system information
After all the system setup procedures are completed, make backup copies of system information.
System information is required for recovering the server from the trouble or after replacing the system board.

SELECTING A SITE

Your server unit should be mounted in a standard EIA 19-inch rack cabinet.

Refer to the documentation attached to the rack or contact your service representative for installation of the rack.

⚠ 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 use the server in any unapproved place.

⚠ 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 carry or install the server only by a single person.
Do not install the server where the load may be concentrated on a specific point.
Do not install any component on the server only by a single person.
Do not pull out a device from the rack if the rack is unstable.
Do not provide the wiring exceeding the rating power.

IMPORTANT: Increase in temperature within rack and air flow

If more than one server are installed on the rack or the ventilation within the rack is not enough, the temperature in the rack may be raised by the heat generated from the units to be higher than the operation temperature of the server (10 to 35°C).

It causes the server to operate improperly. Review the air flow within the rack or in the room and take sufficient measures so that the temperature within the rack does not exceed the warranted temperature range during the system operation.

The following figure illustrates a site suitable for installing the rack cabinet.

* It is recommended that the server should be used in a room where temperature is in the range between 15 to 25°C.

100 to 120 Vac/200 to 240 Vac parallel bi-polar wall power outlet with the ground line.

Room that satisfies the following conditions for operation: *
Temperature: 10 to 35°C
Humidity: 20 to 80% (no condensation)

Wall outlet to connect the supplied power cord.

1 m

1 m

1 m

1 m

Place having available space of 1 m or more in front, side and rear of the server.
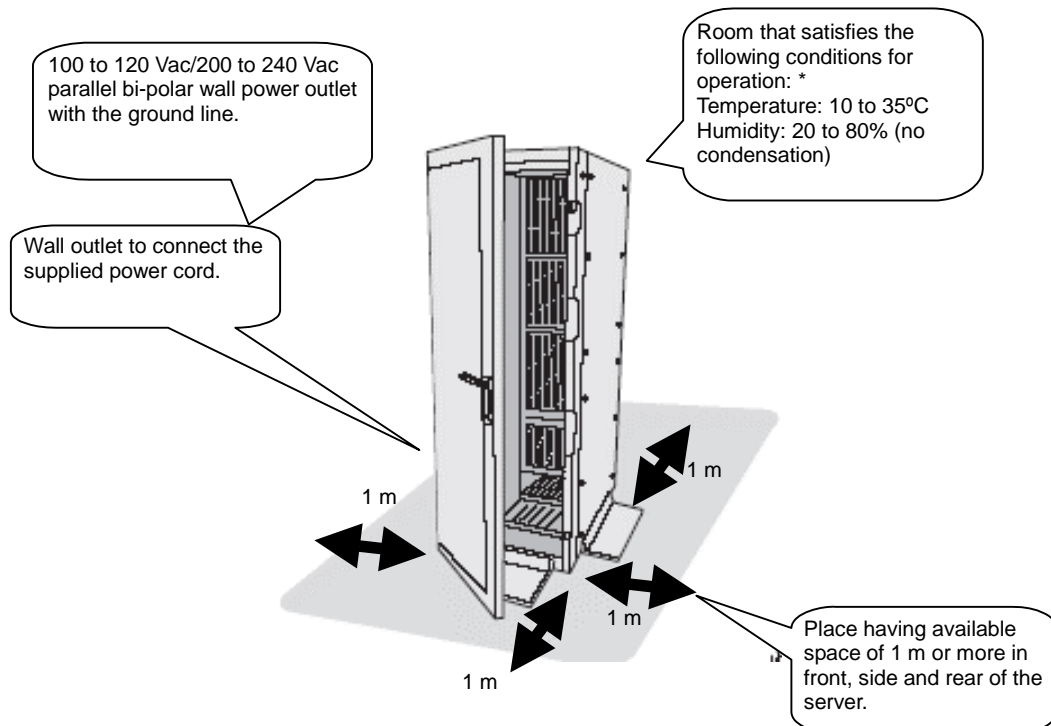
Do not install the rack in the places listed below. Installing the rack or mounting the server on the rack in such a place may cause some malfunction to occur.

Do Not:

- Locate a rack in a narrow space that would inhibit devices from being pulled out from the rack completely.

- Locate the rack on a floor that cannot bear the total weight of the rack and devices mounted in the rack.

- Locate the rack in a place where stabilizers cannot be installed or where the rack can be installed only after proper earthquake-resistant is constructed.

- Locate the rack on an uneven or slanting floor

- Locate the rack in an area that has drastic temperature change (near a heater, air conditioner, or refrigerator).

- Locate the rack where intense vibration may be generated.

- Locate the rack where corrosive gas is generated (ex. the area, where the vapour of sulphur is generated), chemicals are nearby, or chemicals may be sprayed accidentally.

- Place the rack on a carpet not subject to the anti-static process.

- Locate the rack where some objects may fall on the rack.

- Locate the rack near a device that is generating intense magnetic fields (such as a TV, radio, broadcast/communication antenna, power transmission wire, and electromagnetic crane.) If unavoidable, contact your service representative to request proper shielding.)

- Locate the rack where the power cord of the server must be connected to an AC outlet that shares other devices with large power consumption.

- Locate the rack next to 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.

- Locate the rack where following conditions can not be satisfied.

  Conditions for operation: *
  Temperature: 10 to 35°C
  Humidity: 20 to 80% (no condensation)

  * It is recommended that the server should be used in a room where temperature is in the range between 15 to 25°C.

  * If installed in a closed or multi-unit rack assembly, required air flow for cooling might not be maintained, and this cause the operating ambient temperature of the rack environment may rise greater than room ambient. Therefore, consideration should be given to installing the server in an environment compatible with the rated ambient temperature (10 to 35°C) and appropriate air flow.

Installing or Removing the Server into/from the Rack

This subsection provides the instructions for the rack-mount server unit into a standard EIA 19-inch rack cabinet.

This subsection also describes the removal procedures for the rack mount server unit from the 19-inch rack cabinet.

⚠ 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 use any rack which does not conform to the relevant standard.
Disconnect the power cord(s) before installing or removing 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.

Do not leave more than one device being pulled out from the rack.
Do not lift the server only by a single person.
Always install the server in the specified place.
Do not install the server on the rack leaving the cover removed.
Do not pinch your finger with mechanical components.

Checking Components

Confirm that the following tools or components are provided to install the server on the rack.
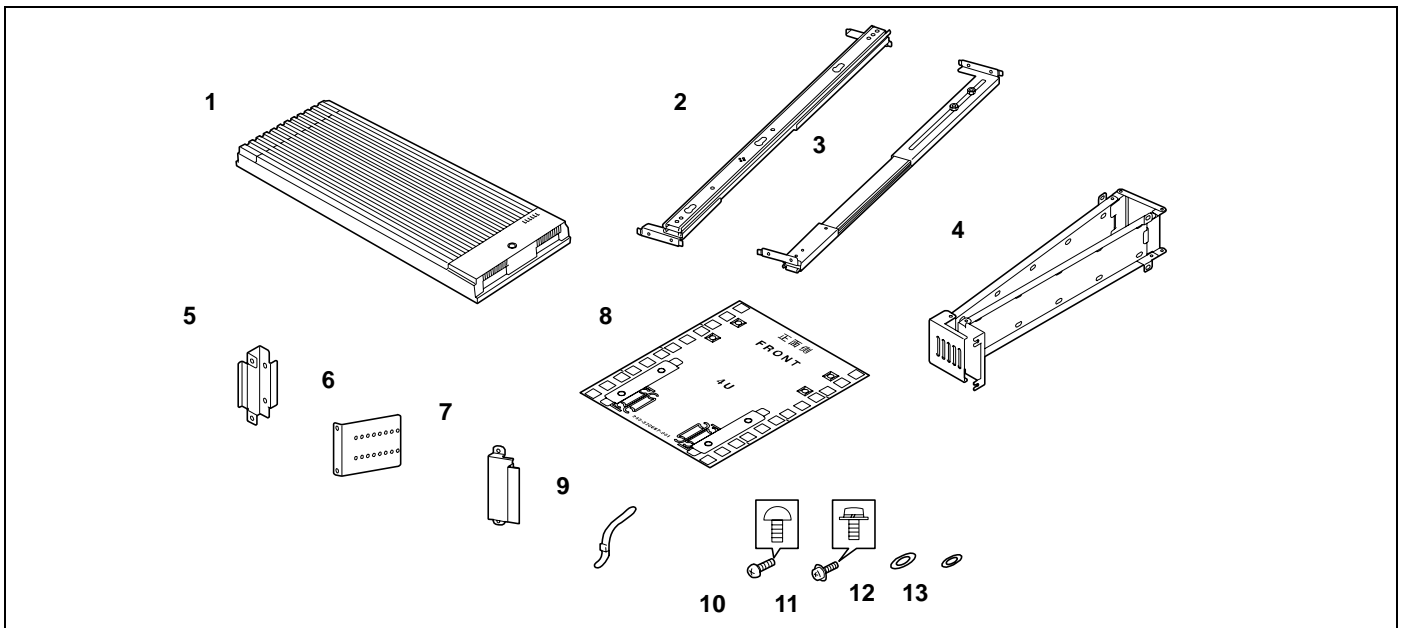
No.	Item	Q'ty	Remarks
1	Front bezel	1	
2	Slide rail assembly (L)	1	"L" is stamped on the rail.
3	Slide rail assembly (R)	1	"R" is stamped on the rail.
4	Cable arm	1	
5	Adapter bracket	1	
6	Arm bracket	1	
7	Arm stopper	1	
8	Template	1	
9	Tie-wrap	6	25 cm long.
10	Screw (A)	14	M5 screw
11	Screw (B)	8	M4 screw
12	Washer (A)	12	Assembled with Screw (A)
13	Washer (B)	4	Assembled with Screw (B)

Required Tools

#2 Phillips screwdriver and flat tip screwdriver are recommended for assembling the rack-mount system.

Installation Procedure

Install the server on the rack in the following procedure.

1. Define the position (height) at which the server is installed by using templates.

   The templates have the same vertical size as the server. Put the templates on the front and rear of the rack to locate them. The installation positions of the core nuts and slide rail assembly are specified on the templates.

Icons showing the positions at which core nuts are installed

正面側 **FRONT** 4U 243-320687-001

背面側 **REAR** 4U

Template (front)   Template (rear)
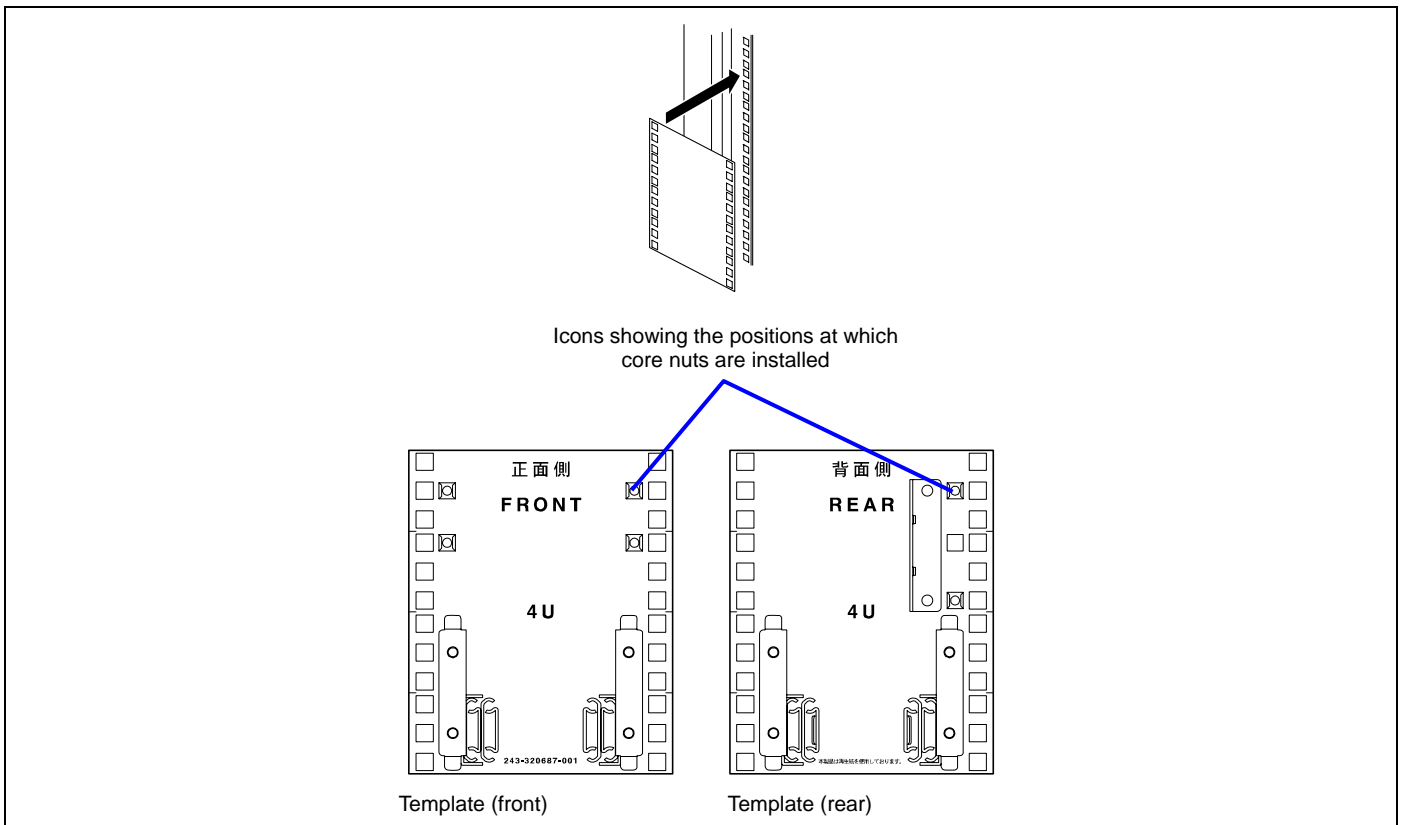
2. Install the core nuts coming with the rack at the positions defined by the templates.
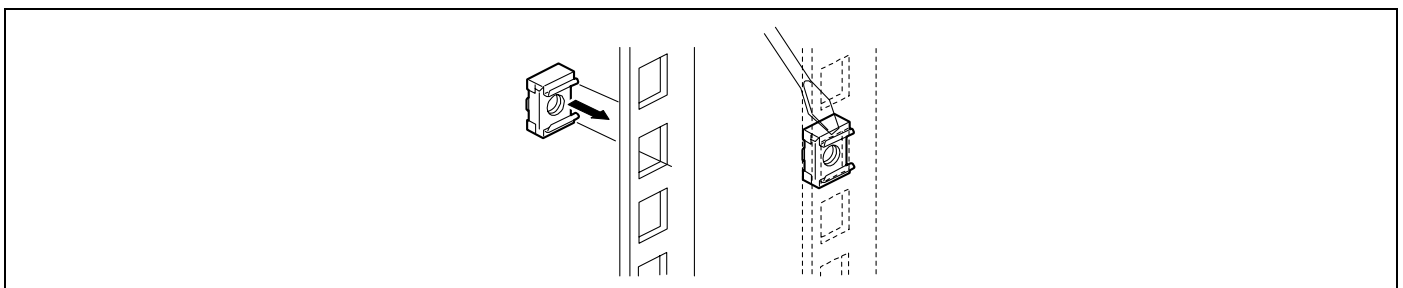
Install four core nuts (two for each of left and right sides) on the front face of the rack from the inner side. The server is fixed to the rack with the core nuts, four screws (A), and four washers (A).

Install two core nuts from the inner side of the rear of the rack (at the right side when you face the rear of the rack).

Hang the one clip of a core nut on the proper rectangular hole and insert the other clip into the hole using a flat-tip driver or a similar tool.

> **IMPORTANT:** Install the core nuts so that the clips are located at the top and bottom. If any core nut is installed with the clips located at the left and right ends, the server may be dropped to cause it to be defected and also people to be injured severely.

3. After removing the screw located on the rear right of the server, install the adapter bracket on the rear of the server with the screw removed before.

Screw removed from the rear of the server.

Align the folded part along with the side of the chassis.
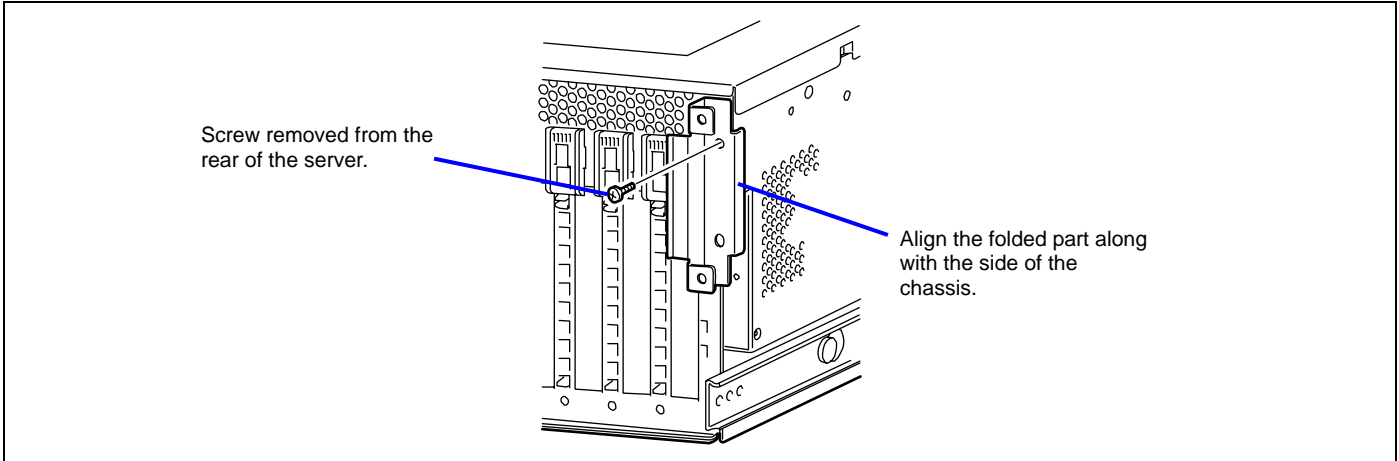
4. Locate the slide rail assembly on the right side of the rack frame at the position defined by the template.

Stamp (located at the upper right position of screw hole)

Stamp (located at the lower right position of screw hole)
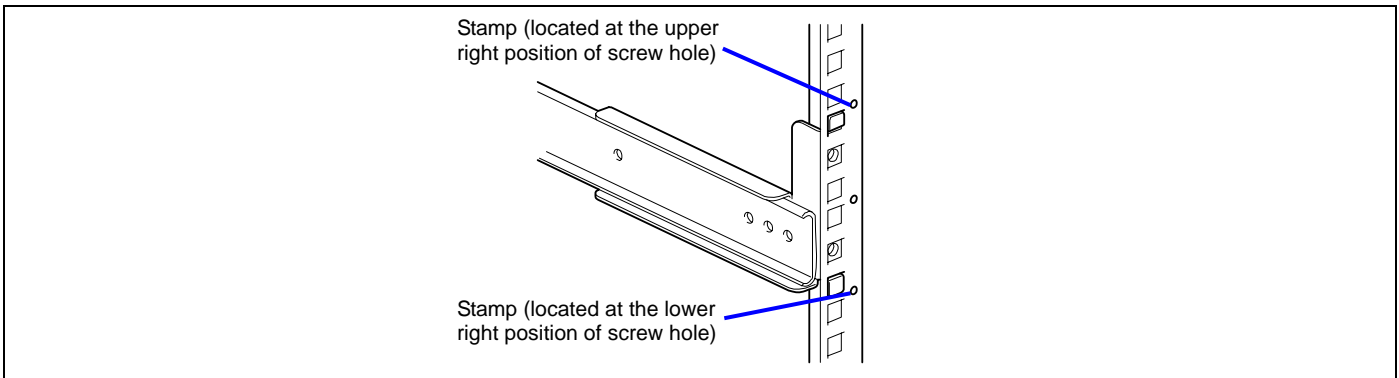
NOTES:

■ Check the direction of installing the slide rail assembly.

– Make the bracket face facing the outside of the rack.

– Locate the side with the slide bracket at the rear of the rack.

■ The front and rear supports of the rack have rectangular holes for screw fastening. For the rack, round stamps are provided in 1U. As shown in the figure, locate the slide rail assembly so that a stamp is positioned at the upper right of the top screw hole of the slide rail assembly.

5. Fix the slide rail assembly with four screws (two on each of the front and rear sides) and four washers (two on each of the front and rear sides).
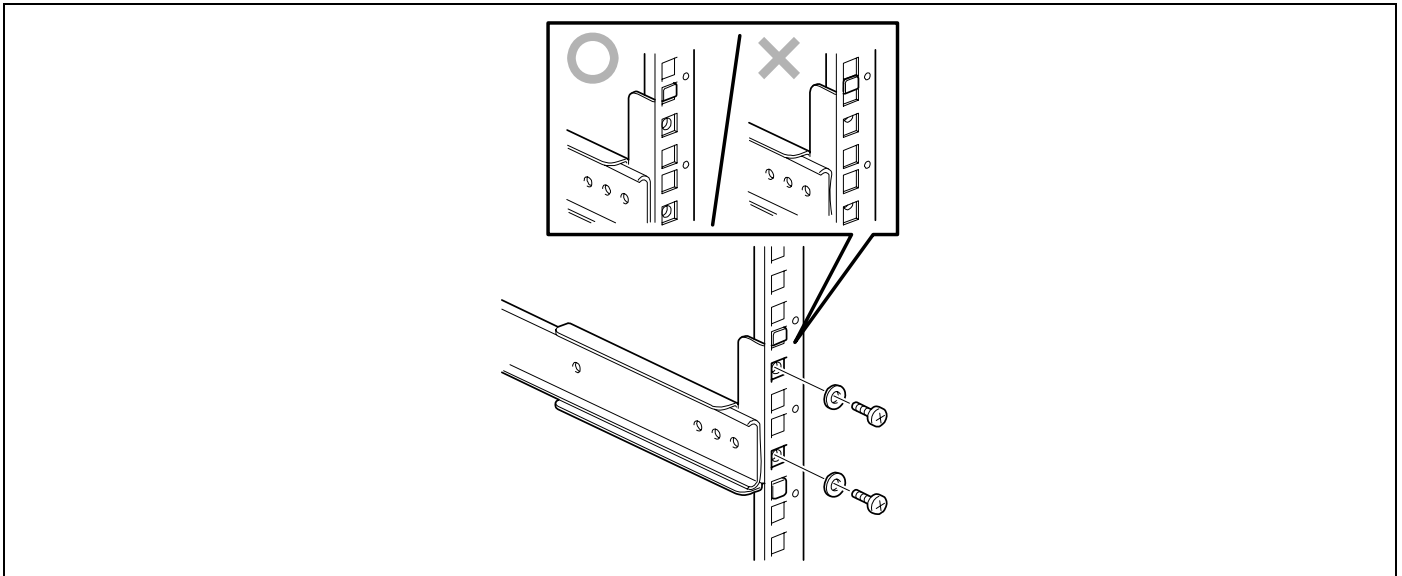
NOTES:

- Make sure that the frame tips on the slide rail assembly are contact to the rectangular hole frames of the rack properly and the four screw holes of the rail can be seen through the mating rectangular holes of the rack

- Check that the slide rail assembly is located to the level.

6. Install the other slide rail assembly on the left side of the rack in the same procedure as that described by steps 7 to 8 above.

NOTE: Make sure that the slide rail assembly is installed at the same level as the other slide rail assembly already installed.

7. Hold the server by three or more persons to mount it on the rack.

⚠ 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 lift the server only by two or less persons. Do not pinch your fingers with mechanical component. Do not push the release lever with fingers.

Insert the rails on the side faces of the server into the slide rail assemblies securely and then push the server slowly and carefully. If the server is locked on the way, push the server slowly with the depression of the release lever on each of the left and right sides.
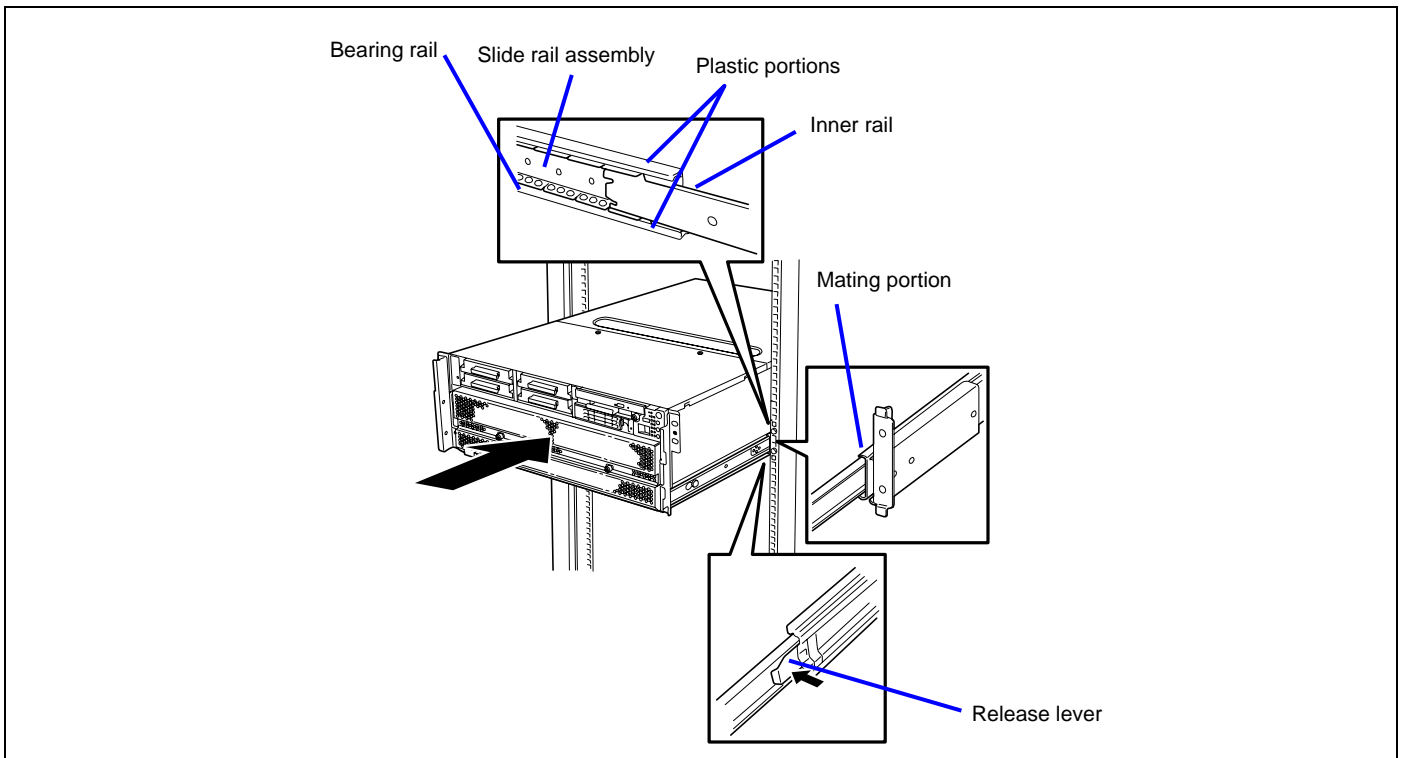
IMPORTANT: Push each release lever using a screwdriver or a similar tool. Pushing a release lever with your fingers may cause the fingers to be caught and thus injured.

NOTE: The slide rail assembly installed in the rack contains a slide rail called the bearing rail. The bearing rail can be moved freely in the slide rail assembly. To install the server in the rack securely, slide the bearing rail to the front of the rack to put the plastic components at the tip of the rail and the inner rail into the server.

At the first installation, you may feel strong friction in pushing because the mechanical components cannot be completely engaged with each other. Push the server intensely.

NOTE: While the server is pushed into the rack, the server may be locked and thus cannot be pushed any more. This is because the lock lever on the rail prohibits the server from being pushed into the rack any more. Set the lock lever to be on the level to release the lock and then push the server into the rack slowly.
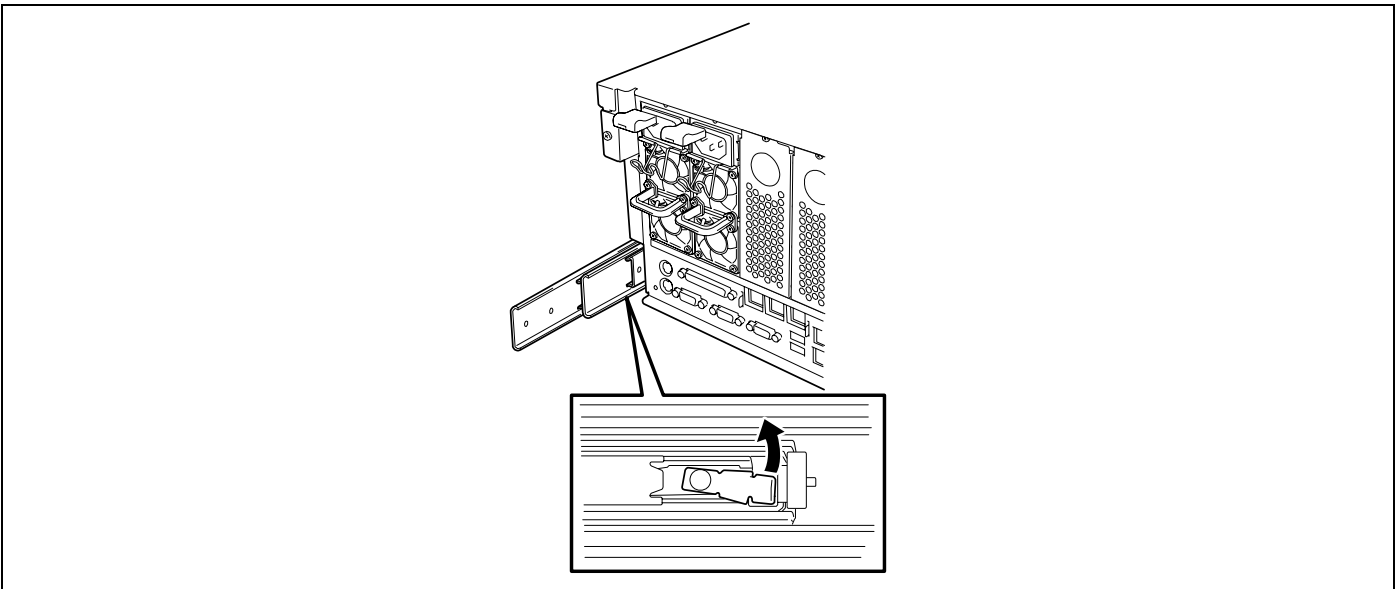
8.   Install the cable arm on the rear of the server with two screws (B).

Screws (B)
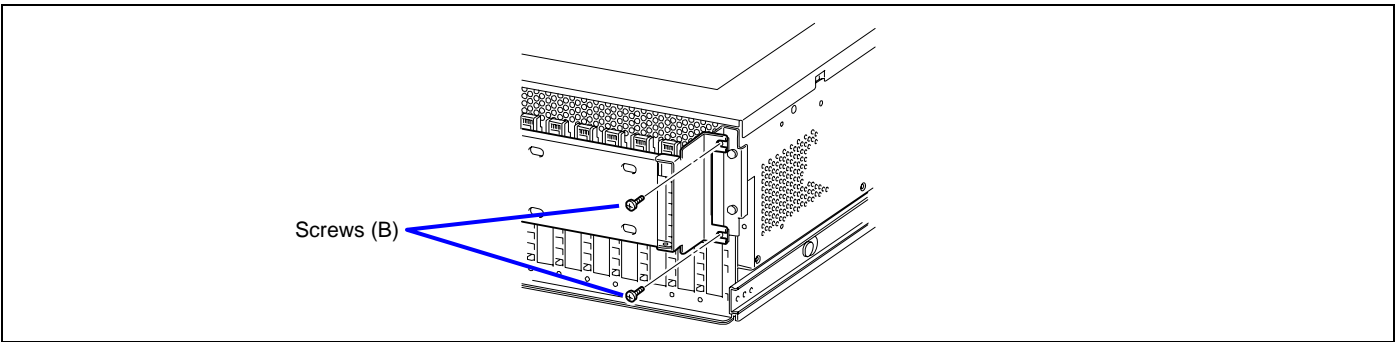
9.   Install the arm bracket on the mount face at the rear of the rack.

Mount face
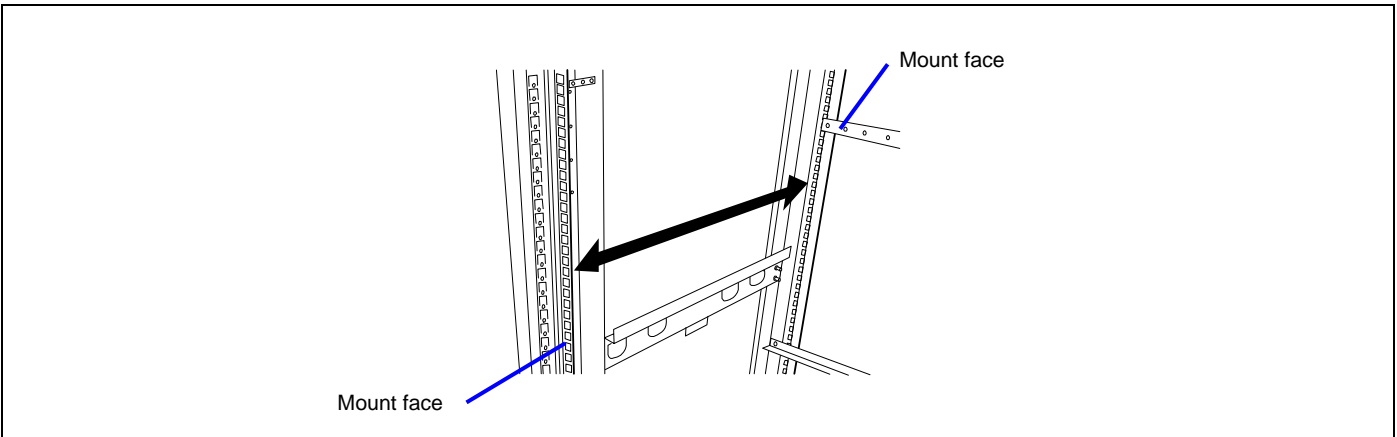
Mount face

> **NOTE:** Installation procedure for arm bracket depends on the distance between the mount faces at the front and rear of the rack.

■ For the distance between the mount faces at the front and rear of the rack being 700 or 760 mm:

Fix the arm bracket to the core nuts installed on the mount face of the rear of the rack with two screws (A) in the direction as shown in the figure below.
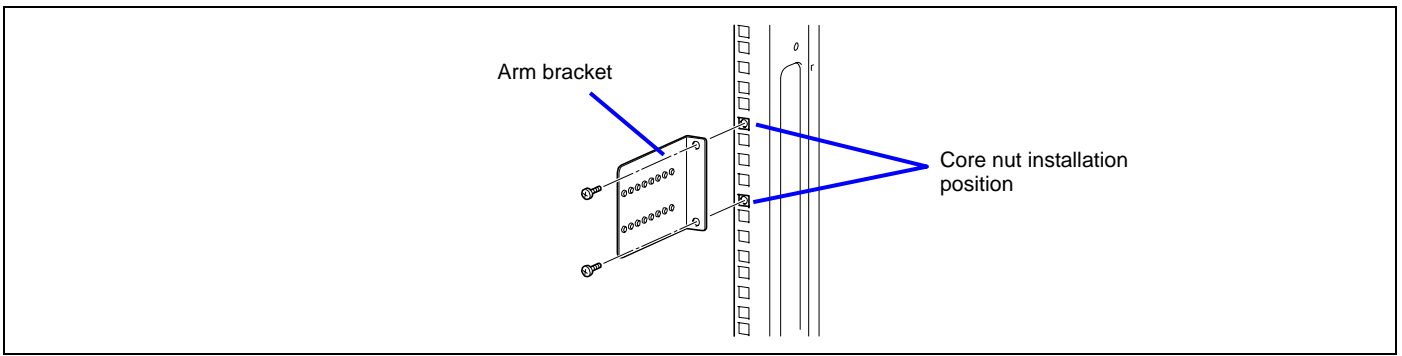
■ For the distance between the mount faces at the front and rear faces of the rack being 900 mm:

Fix the arm bracket to the core nuts installed on the mount face of the rear of the rack with two screws (A) in the direction as shown in the figure below.
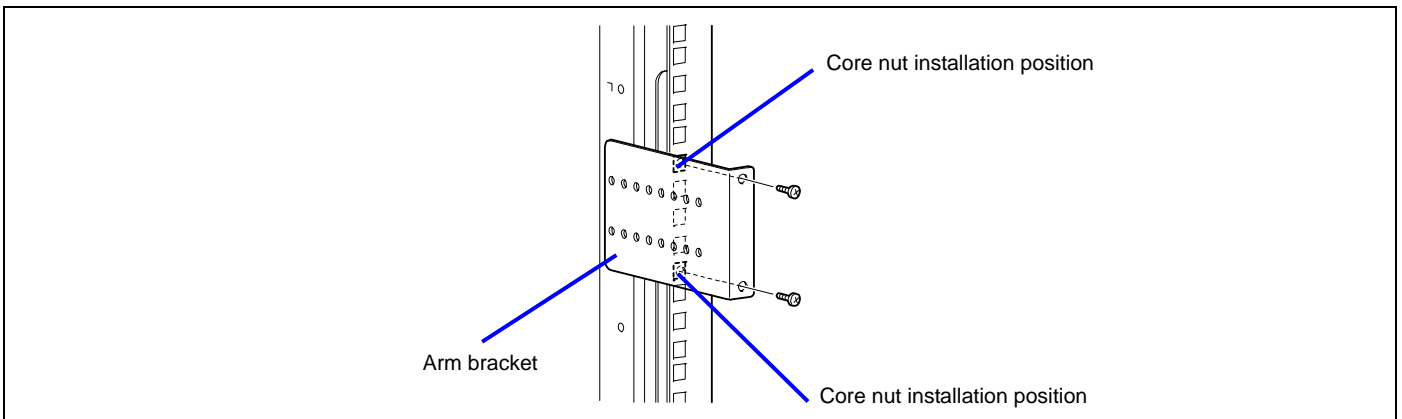
10. Install the other end of the cable arm on the arm bracket installed in step 13.

■ For the distance between the mount faces at the front and rear of the rack being 700 mm:

Fix the arm bracket with four screws (B) and four washers (B) at the position shown in the figure below.
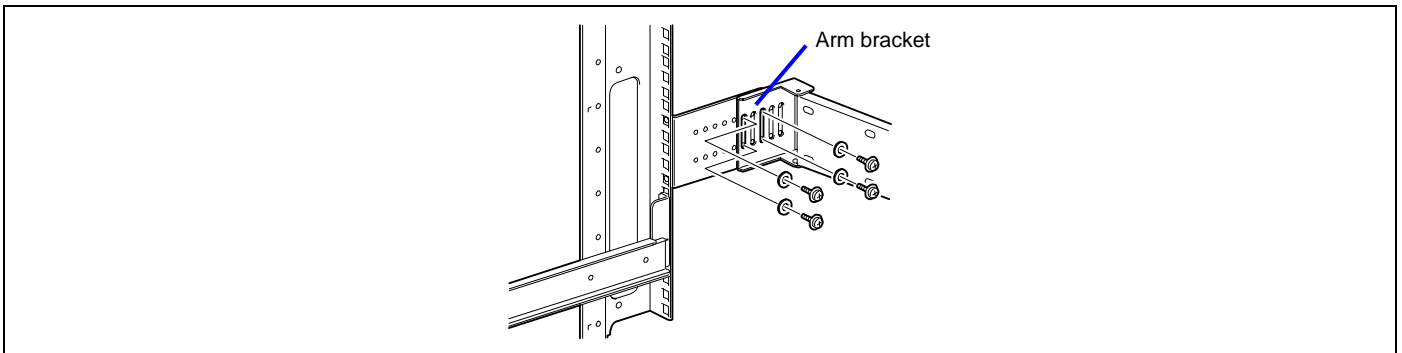
■ For the distance between the mount faces at the front and rear of the rack being 743 mm to 760 mm:

Fix the arm bracket with four screws (B) and four washers (B) at the position shown in the figure below.
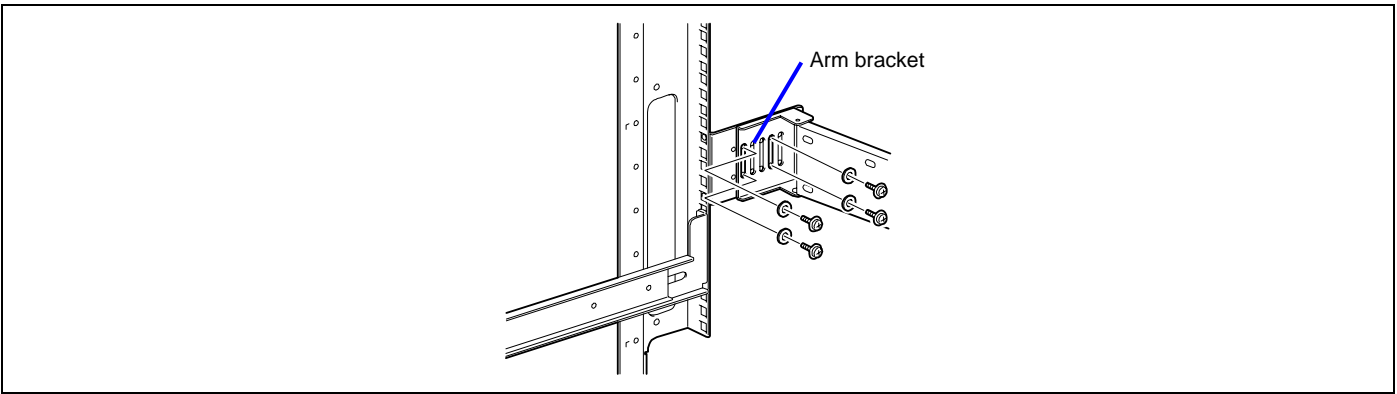
- For the distance between the mount faces at the front and rear of the rack being 760 or 900 mm:

  Fix the arm bracket with four screws (B) and four washers (B) at the position shown in the figure below (the figure below shows the example with the distance between the mount faces at the front and rear of the rack being 900 mm).
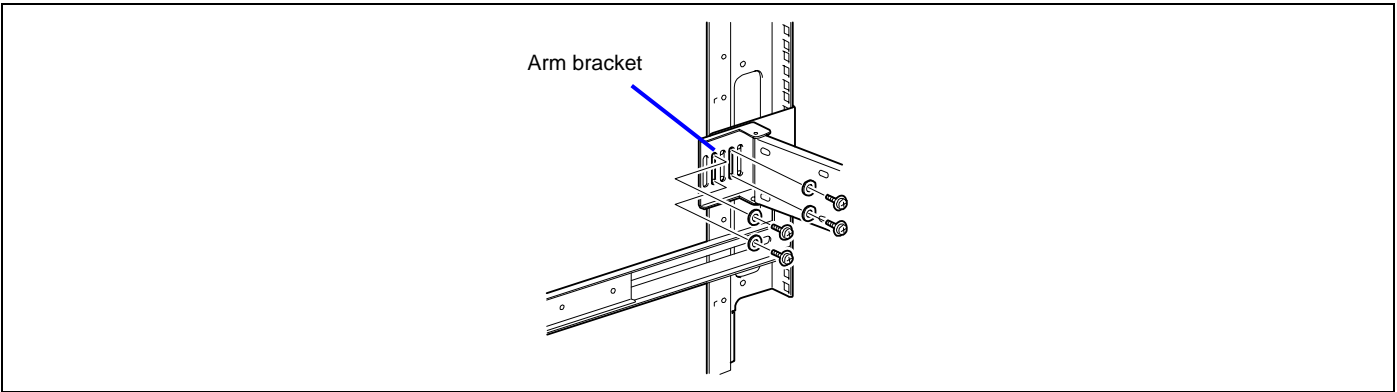
NOTE: When installing the server into rack, fix the arm stopper to the slide rail assembly with screw (B).

Viewed from inside

Arm stopper

Push the arm stopper in the direction shown by arrow mark so that the folded portion hits the end.
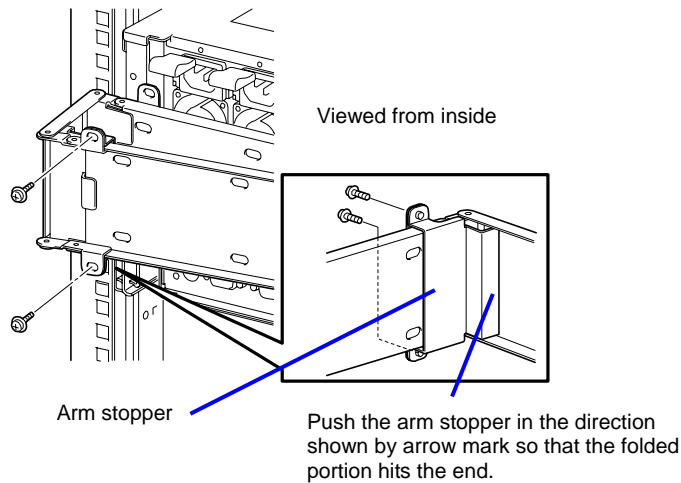
11. Push the server into the rack once to check the installation position.

> **NOTE:** Make sure that the four screw holes at the upper left and right sides on the front of the server are fit to the core nuts installed in step 2. If the four positions are not fit at all, the slide rail assembly or the core nuts may be installed incorrectly. If so, the adjacent units cannot be installed without clearance. Confirm the installation positions and make the reinstallation from the first step.

12. Pull out or push the server into the rack for several times to confirm that the slides move smoothly.

13. Fix the server to the rack with four screws (A) and four washers (A).

Screws (A) and Washers (A)
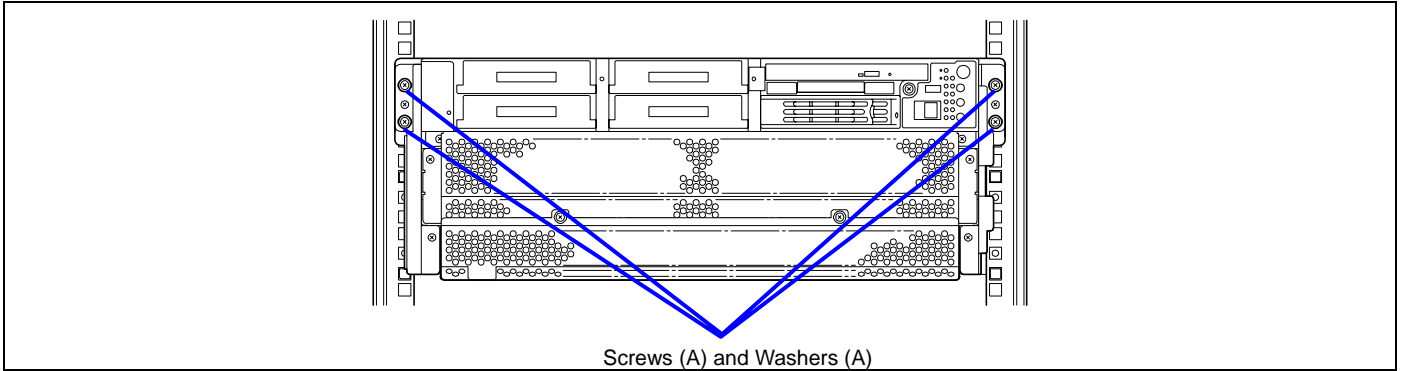
14. Install the front bezel.
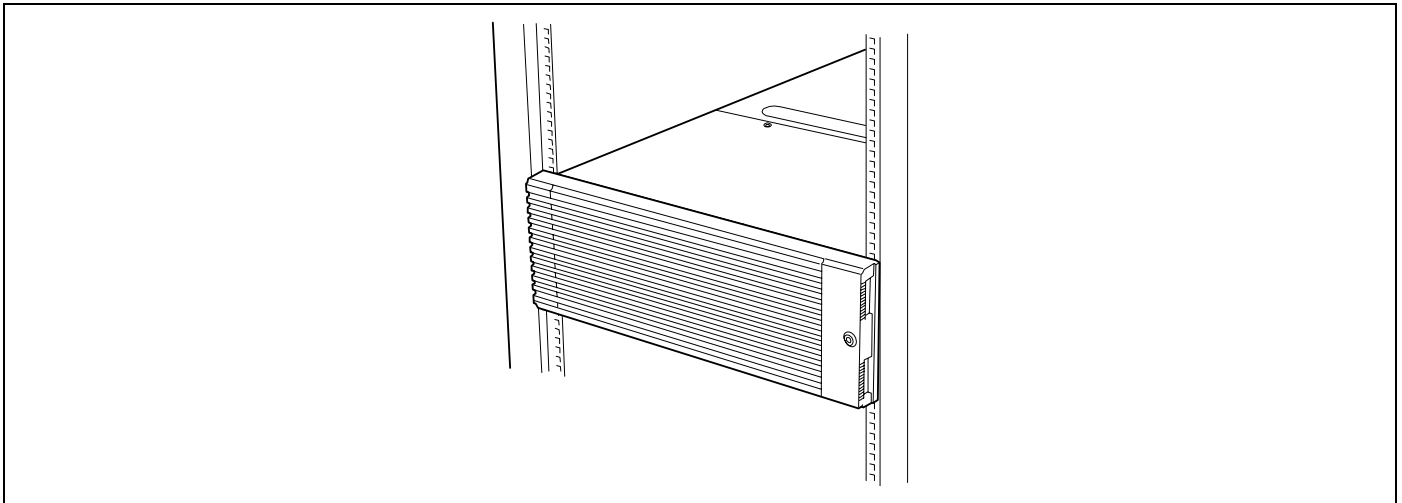
Now the installation is completed.

Removal Procedure

More than one person should remove the server from the rack.

⚠ CAUTION
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 lift the server only by two or less persons. Do not pinch your finger with mechanical components. Note high temperature. Do not pull out a device from the rack if the rack is unstable. Do not leave more than one device being pulled out from the rack.

1. After making sure that the server is off-powered, remove the power cords and all interface cables from the server.

2. Loosen two screws with which the cable arm is fixed to the rear of the server to remove the cable arm from the server.

Cable arm
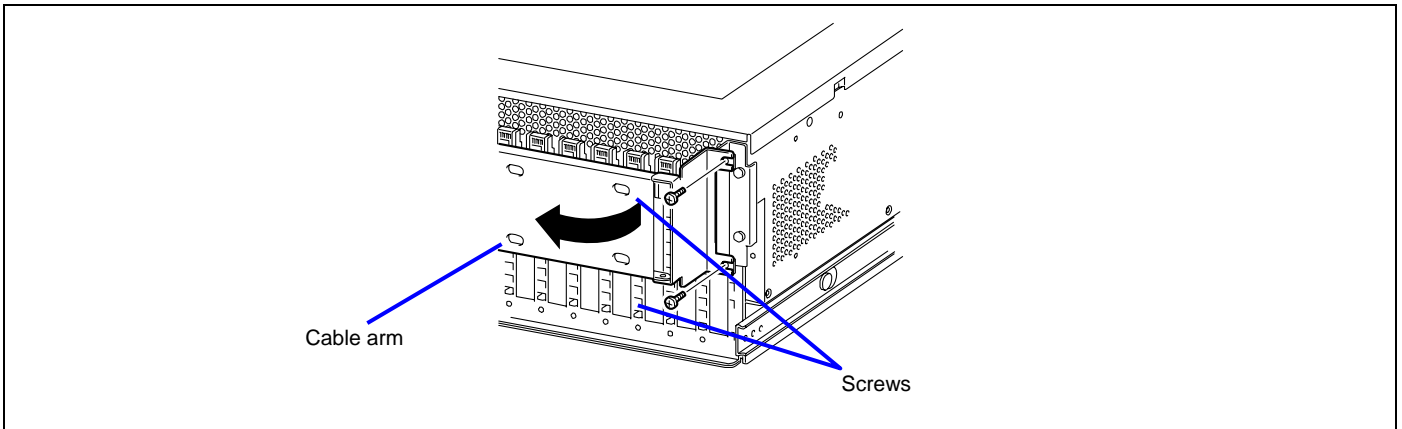
Screws

> **NOTE:** Loosen the screws to unlock the arm stopper.

3. Release the security lock to remove the front bezel.

Frame

Tab

Unlock   Lock
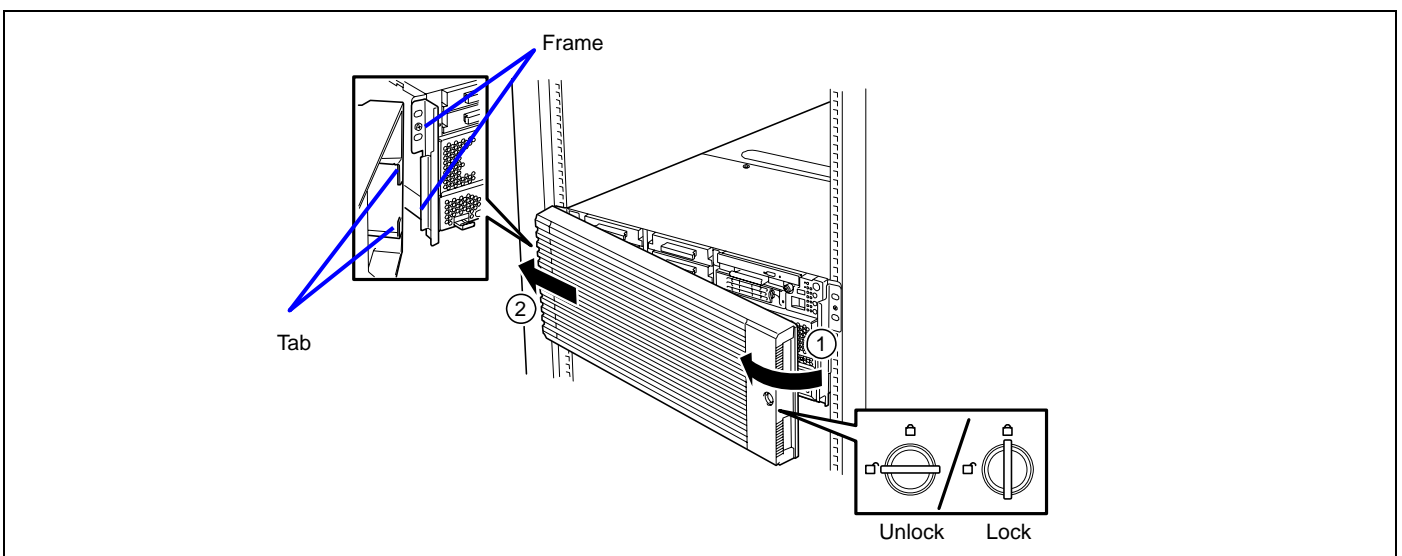
4. Remove four screws (A) located at both side of the front face of the server.

5. Hold the handle to pull out the server from the rack slowly and carefully.
    The server clicks to be latched.

6.   Push the left and right release levers to release the latch and then pull out the server from the rack slowly.
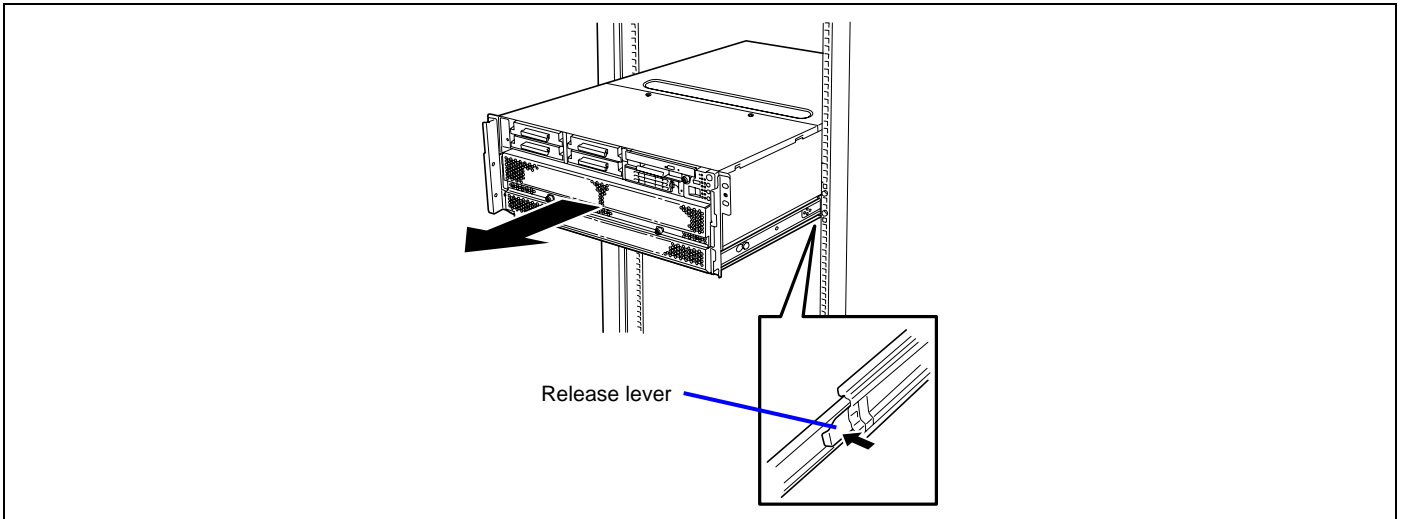
Release lever

IMPORTANT:

■   Push each release lever using a driver or a similar tool. Pushing a release lever with your fingers may cause the fingers to be caught and thus injured.

■   Pull out the server slowly with the bottom supported by more than one person.

See the "Installation procedure" when the mechanical components of the rack are removed also.

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 available peripheral devices for the server in the standard configuration and locations of the connectors for the devices.

⚠ 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 connect any interface cable with the power cord of the Express Server plugged to a power source.
Do not use any unauthorized interface cable.

IMPORTANT:

- Power off the server and a peripheral device before connection. Connecting a powered peripheral device to the powered server will cause malfunctions and failures (excluding the USB device).

- To connect a third-party peripheral device or interface cable to the server, consult with your service representative for availability of such a device or cable. Some third-party devices may not be used for the server.

- A leased line cannot be connected directly to the serial port connectors.

- Secure the power cord(s) and interface cables with a lock spring.

- Form the cables in such a way that they will not come into contact with the door or the guide rails on the sides of the server.

Device with USB (USB1.1) interface (e.g., keyboard)

Device with the serial interface (e.g., modem/management PC) Direct connection to the leased line is prohibited.

Finally connect the provided power cord to the receptacle. If connecting the server to UPS, see the explanation below.

Use this inlet only when an optional power supply unit is additionally installed.

Hub (multiport repeater) 1000BASE-T / 100BASE-TX / 10BASE-T

Printer with the parallel interface

Mouse

Keyboard

Device with ICMB interface

Device with the serial interface (e.g., modem) Direct connection to the leased line is prohibited.

Hub (multiport repeater) 100BASE-TX / 10BASE-T

Display unit

Device with USB interface (USB2.0) (e.g., terminal adapter)

Network system on LAN (connected via a hub for management purposes)

NOTE: Make sure of the cable you are going to connect. The ICMB connector and the front serial port B connector of this server have the same shape as the LAN connector. Be careful not to connect a cable to a wrong connector.

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 in to 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 AC inlet on the rear of the server.

2. Plug the other end of the power cord into the wall outlet.

3. Secure the power cord with a lock spring.
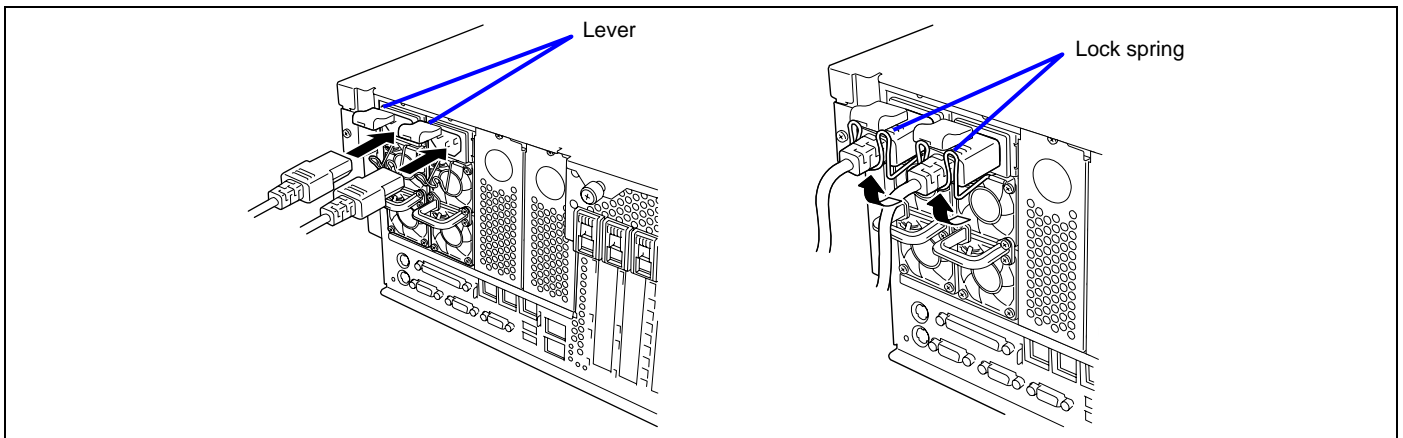
To connect the power cord from the server to an interruptive power supply (UPS), use service outlets on the rear of the UPS.

The UPS service outlets are categorized into two groups: SWITCH OUT and UN-SWITCH OUT. (They may be called "OUTPUT1" and "OUTPUT2".)

To control power supply with an application (ESMPRO UPSController) that controls the UPS, connect the power cord to an SWITCH OUT outlet.

For constant power supply, connect the power cord to a UN-SWITCH OUT outlet. (Connect the modem that is in service for 24 hours to this outlet.)
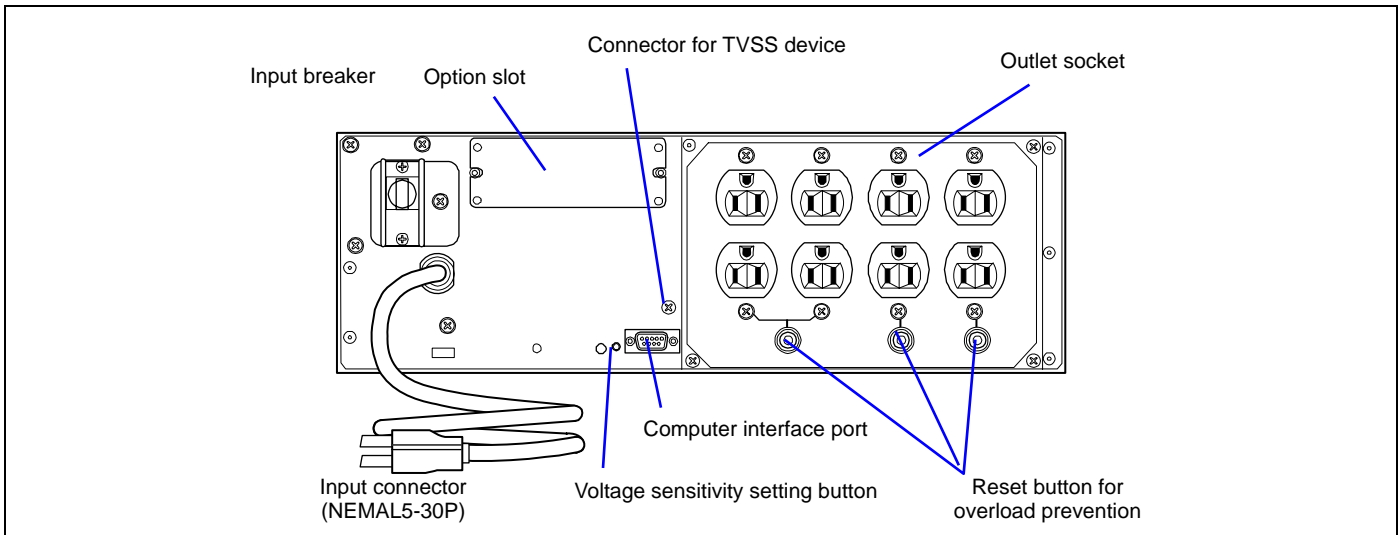
When the power cord from the server to a UPS, change the BIOS setup of the server to link with power supply from the UPS.

Change a parameter for "AC-LINK" 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 for setup.

> **IMPORTANT:** Before turning on the server:
> - Some optional boards require setups with the SETUP utility before installation. If the server has a PCI board with the PCI-to-PCI bridge installed, the SETUP utility is enabled to launch. Check on the board specifications to find out whether it requires pre-installation setups before actually installing the board.
> - Some installed optional devices or connected peripheral devices require setups before proceeding to the next step.
>
> To use the server with no optional devices installed besides the graphic board, install a desired OS to the server.

1. Make sure that the floppy disk drive contains no disk and the DVD-ROM drive contains no bootable CD-ROM.

2. Press the POWER switch.

> **NOTES:**
> - If the power cord is connected to the power control unit such as the UPS, turn on the power control unit.
> - Connect the power cord and wait a few seconds before pressing the POWER switch. The POWER switch does not work in a few seconds after connecting the power cord due to BMC (Baseboard Management Controller) firmware start-up.
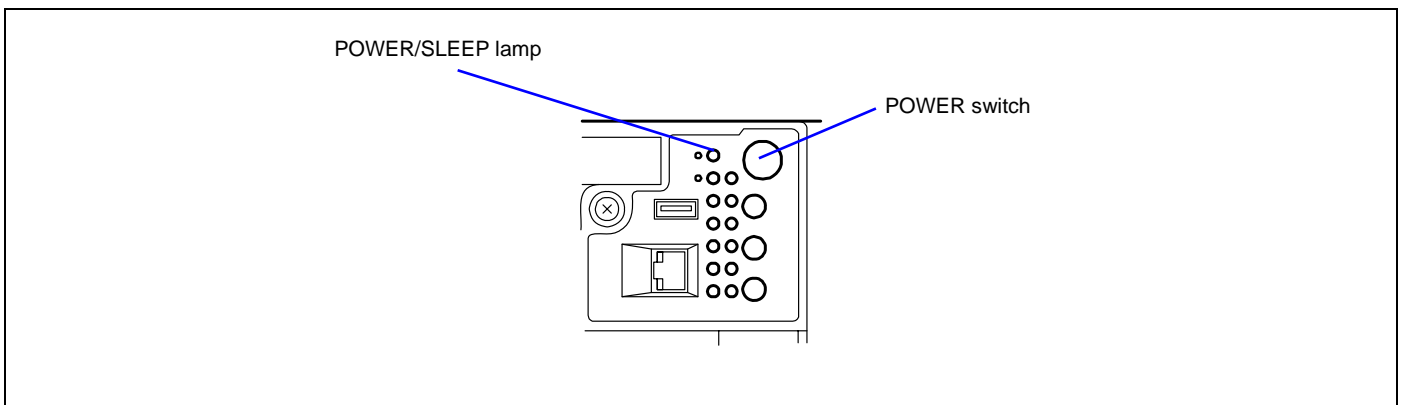
The POWER/SLEEP lamp on the front of the server comes on.

In 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 interrupt vectors, detects installed peripheral devices, and boots the operating system (if installed). See Chapter 2 for detailed description on 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 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 the logo screen. You can always change the logo screen 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 the banner message to prompt you to launch the BIOS SETUP utility stored in ROM on system board 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 for the option board, refer to the manual that comes with the option board.

INSTALLING THE OPERATING SYSTEM

See Chapter 5 for installing the Microsoft® Windows Server™ 2003.

To install the other operating system listed above, contact your service representative.

> **IMPORTANT:** Before installing the operating system, adjust the system date and time by using the BIOS setup utility "SETUP". See Chapter 4 detail.

INSTALLING UTILITIES

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

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 by the following process.

1. Insert the EXPRESSBUILDER CD-ROM in the DVD-ROM drive and reboot the system.

2. Select [Tools].

3. Select [Off-line Maintenance Utility].

4. Select [System Information Management].

5. Insert a floppy disk in the floppy disk drive.

6. Select [Save].

Chapter 4

Configuring Your Server

This chapter describes Basic Input Output System (BIOS) configuration.

When you install the server for the first time or install/remove optional devices, thoroughly read this chapter for better understanding and correct setups.

SYSTEM BIOS ~ SETUP ~

The SETUP utility is provided to make 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 configured with the correct parameters using the SETUP utility and shipped in the best conditions. Thus, you don't need to use the SETUP utility in most cases. However, you might wish to 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 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 operating system.
>
> - The server contains the latest version of the SETUP utility. Dialog boxes appear on your SETUP utility, thus, may differ from descriptions in this manual. If you find anything unclear, see the online help or ask your service representative.

Starting SETUP Utility

To run the SETUP utility, perform the following procedures:

1. Turn on the power of the server.

The manufacturer logo appears on the screen (the POST screen may appear depending on the setting in SETUP.).

After a while, any of the following messages appears at the bottom of the screen.

Pattern 1:

```
Press <F2> to enter SETUP or <F12> to Network
```

Pattern 2:

```
Press <F2> to enter SETUP, <F4> Service Partition, <F12> to Network
```

Or

Pattern 3:

```
Press <F1> to resume, <F2> to enter Setup, <F12> to Network
```

Pattern 4:

```
Press <F1> to resume, <F2> to enter Setup, <F4> Service Partition, <F12> Network
```

* The displayed message varies depending on the device status.

2. Press **F2** to start the SETUP utility and display its Main menu.

If you have previously set a password with the SETUP utility, the password entry screen appears. Enter the password.

Up to three password entries will be accepted. If you fail to enter the password correctly for three consecutive times, the server halts. (You can no longer proceed.) Power off the server.

> **NOTE:** The server is provided with two levels of password: Supervisor and User. With the Supervisor password, you can view and change all system parameters. With the User password, system parameters available for viewing and changing are limited.

Description on 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.)

Indicates the current menu.

Setup item menu

Indicates there are submenus.

Online help window
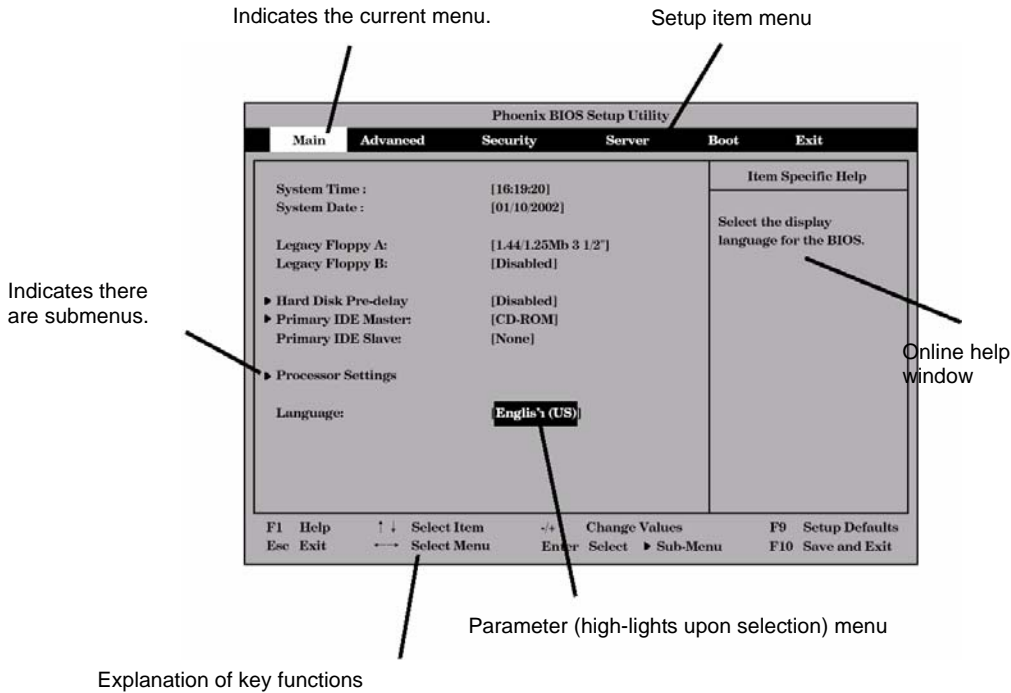
Explanation of key functions

Parameter (high-lights upon selection) menu

Cursor (↑, ↓):	Selects an item on the screen. The highlighted item is currently selected.
Cursor (←, →):	Selects the Main, Advanced, Security, System Hardware, 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	Displays the previous screen.
F1:	Press **F1** when you need help on SETUP operations. The help screen for SETUP operations appears. Press **Esc** to return to the previous screen.
F9:	Sets the parameter of the currently displayed item back to the factory set parameter.
F10:	Sets the parameter back to the one stored by the server before the SETUP utility was started.

Configuration Examples

The following describes examples of configuration required to use software-link features or for system operations.

Link with Management Software

To link with the temperature monitoring feature of NEC ESMPRO Agent

Select [Server] - [Thermal Sensor] - [Enabled].

To control power supply of the server with NEC ESMPRO Manager via the network

Select [Advanced] - [Advanced Chipset Control] - [Wake On LAN/PME] - [Enabled].

Select [Server] - [AC-LINK] - [StayOff].

UPS

To link power supply with the UPS

- To power on the server when power is supply from the UPS

    Select [Server] - [AC-LINK] - [Power On].

- To keep the server off-powered even when power is supplied from the UPS if the POWER switch was used to power off

    Select [Server] - [AC-LINK] - [Last State].

- To keep the server off-powered even when power is supplied from the UPS

    Select [Server] - [AC-LINK] - [StayOff].

Boot

To change the boot order of devices connected to the server

Select [Boot] and specify the boot order.

To display POST check results

Select [Advanced] - [Boot-time Diagnostic Screen] - [Enabled].

You can also press **Esc** while the full-screen logo is on the screen to display POST check results.

To control from the HW console

Select [Server] - [Console Redirection] and set each item.

Memory

To enable the memory degradation feature

Select [Advanced] - [Memory/Processor Error] - [Halt].

To check the installed memory (DIMM board) status

Select [Advanced] - [Memory Configuration] and check the status indications.

The on-screen DIMM group numbers and socket locations on the IO board are associated as shown in the following figure.

To clear the memory (DIMM board) error information

Select [Advanced] - [Memory Configuration] - [Memory Retest] - [Yes] and reboot.
Select [Server] - [Clear FRU LED] - [Yes] and reboot.*

* Only when [Server] - [FRU LED Feature] - [Enabled] has been selected.

DIMM #4
DIMM #3
DIMM #2
DIMM #1
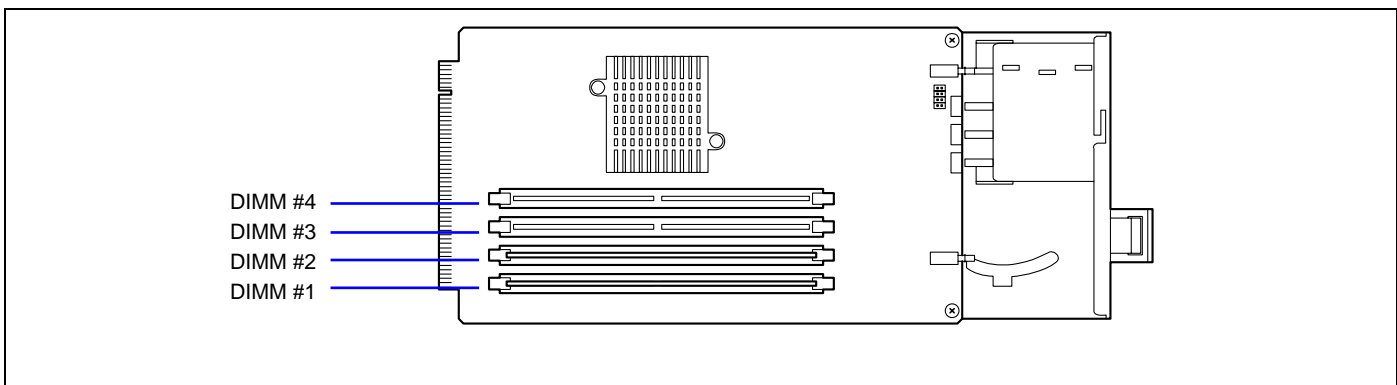
To enable the memory mirroring feature or memory RAID feature

Select [Advanced] - [Memory Configuration] - [Memory RAS Feature], and select [Mirror] or [RAID].

Processor

To enable the processor degradation feature

Select [Advanced] - [Memory/Processor Error] - [Halt].

To check the installed processor status

Select [Main] - [Processor Settings] and check the status indications.

The on-screen processor numbers and socket locations on the IO board are associated as shown in the following figure.

To clear the processor error information

Select [Main] - [Processor Settings] - [Processor Retest] - [Yes] and reboot.
Select [Server] - [Clear FRU LED] - [Yes] and reboot.*

* Only when [Server] - [FRU LED Feature] - [Enabled] has been selected.

Processor #1

Processor #2   Processor #4

Processor #3
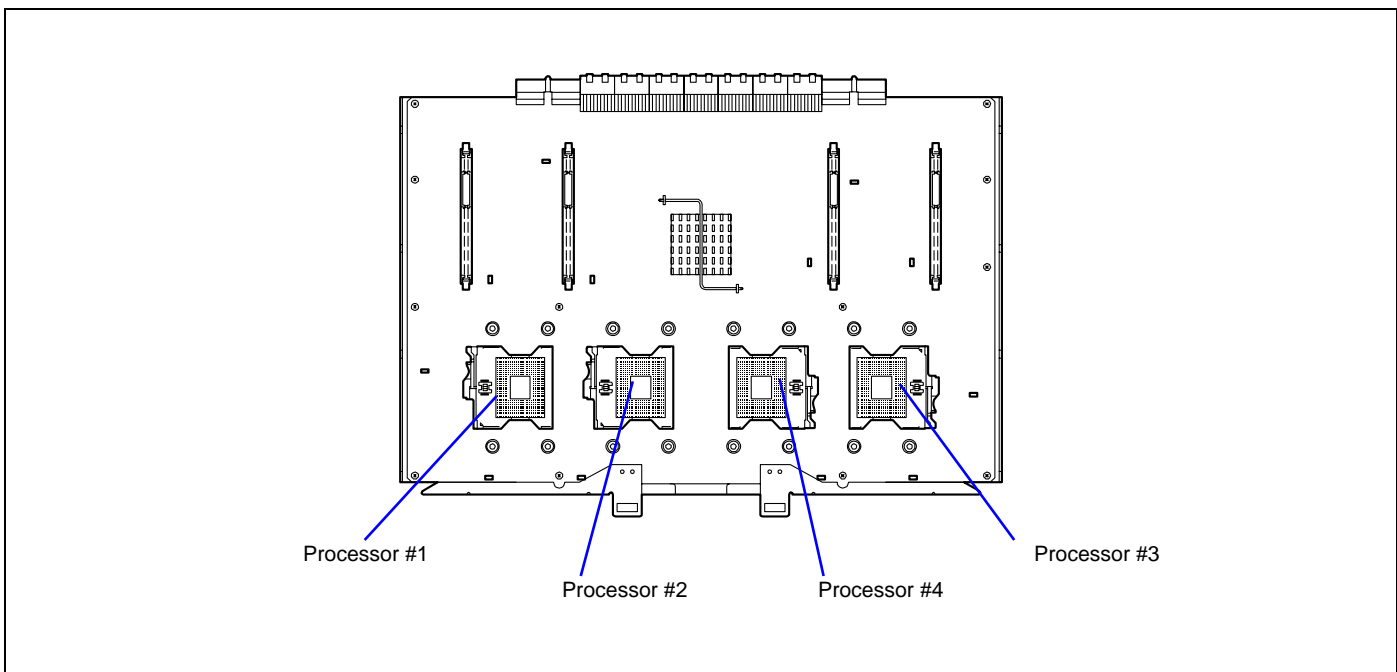
Security

To set passwords on the BIOS

Select [Security] - [Set Supervisor Password] and enter a password.

Supervisor password and User password can be set separately, and only User password has a restriction to access to SETUP utility.

To enable/disable the POWER switch and SLEEP switch

■ To disable

Select [Security] - [Power Switch Inhibit] - [Enabled].

■ To enable

Select [Security] - [Power Switch Inhibit] - [Disabled].

IMPORTANT: Enabling [Power Switch Inhibit] disables forced shutdown (see Chapter 8) as well as power on/off using the POWER switch.

To set the secure mode

Select [Security] - [Secure Mode] and set each item.

External Devices

To set up external devices

Select [Advanced] - [Peripheral Configuration] and set up each device.

Internal Devices

To set up internal PCI devices of the server

Select [Advanced] - [PCI Configuration] and set up each device.

To clear the hardware configuration data (after installing/removing internal devices)

Select [Advanced] - [Reset Configuration Data] - [Yes].

PCI Hot Plug

To install the PCI board with the PCI hot plug

Select [Advanced] - [PCI Configuration] - [Hot Plug PCI Control] - [Minimum/Middle/Maximum*]

* The setting varies depending on the PCI board subject to the hot plug. See the table below.

Board name	Setting Value
100BASE-TX Adapter	Minimum
1000BASE-T Adapter	Minimum
1000BASE-TX Adapter	Minimum

Saving the Configuration Data

To save the BIOS configuration data

Select [Exit] - [Exit Saving Changes] or [Save Changes].

To discard changes to the BIOS configuration data

Select [Exit] - [Exit Discarding Changes] or [Discard Changes].

To resume the default BIOS configuration data (may differ from factory-set value)

Select [Exit] - [Load Setup Defaults].

To save the current value as user default

Select [Exit] - [Save Custom Defaults].

To load the user-defined default

Select [Exit] - [Load Custom Defaults].

Menu and Parameter Descriptions

The SETUP utility has 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-set, for each menu.

Main

After entering SETUP, the Main menu appears first. To display a submenu, position the cursor on a selection that has a submenu (preceded by the ▶ symbol) and press **Enter**.

```
                    Phoenix BIOS Setup Utility
   Main    Advanced      Security      Server      Boot        Exit

                                                  Item Specific Help
   System Time:          [16:19:20]
   System Date:          [12/24/2001]             <Tab>, <Shift-Tab>, or
                                                  <Enter> selects field.
   Legacy Floppy A:      [Disabled]
   Legacy Floppy B:      [Disabled]

   Hard Disk Pre-Delay   [Disabled]
 ▶ Primary IDE Master    [CD-ROM]
 ▶ Primary IDE Slave     [None]


 ▶ Processor Settings

   Language:             [English (US)]



 F1  Help        ↑↓  Select Item    -/+     Change Values      F9   Setup Defaults
 Esc Exit        ←→  Select Menu     Enter Select  ▶ Sub-Menu  F10  Save and Exit
```
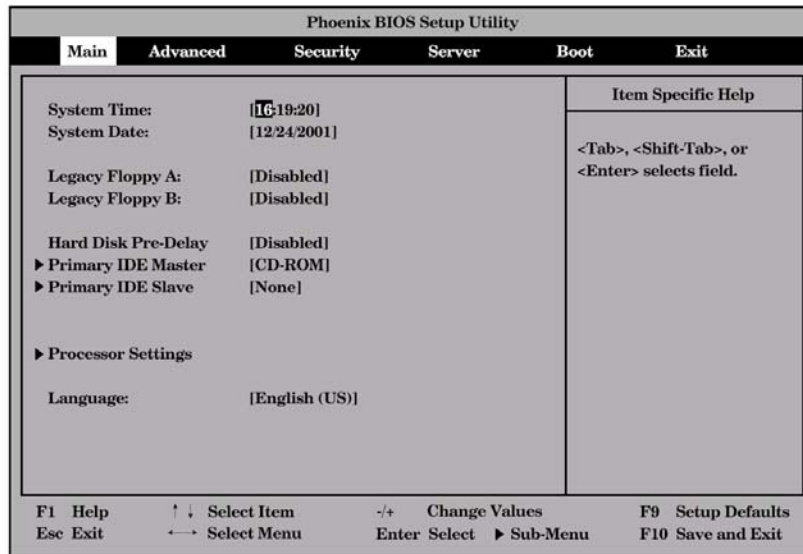
The items which can be set on the Main menu screen and their functions are described below.

Option	Parameter	Description	Your Setting
System Time	HH:MM:SS	Set the time.	
System Date	MM/DD/YYYY	Set the date.	
Legacy Floppy A	[Disabled] 1.2MB 5 1/4" 720Kb 3 1/2" 1.44/1.25MB 3 1/2" 2.88MB 3 1/2"	Set the settings of floppy disk drive A. Set to "Disabled" since the server does not support drive A.	
Legacy Floppy B	[Disabled] 1.2MB 5 1/4" 720Kb 3 1/2" 1.44/1.25MB 3 1/2" 2.88MB 3 1/2"	Set the settings of floppy disk drive B. Set to "Disabled" since the server does not support drive B.	
Hard Disk Pre-Delay	[Disabled] 3 seconds 6 seconds 9 seconds 12 seconds 15 seconds 21 seconds 30 seconds	Wait for the specified time until the first access to the IDE device during POST.	
Primary IDE Master/Primary IDE Slave	–	Displays the information on the device connected to each channel on the submenu. (Display only)	
Language	[English (US)] French German Spanish Italian	Select the language used for SETUP.	
			[ ]: Factory-set

Processor Settings

Selecting "Processor Settings" on the Main menu shows the following submenu.


```
                        Phoenix  BIOS Setup Utility
   ┌─────────┐
   │  Main   │
   ├─────────┴──────────────────────────────────────┬─────────────────────────┐
   │            Processor  Settings                  │    Item Specific Help   │
   │                                                 │                         │
   │   Processor  Retest          [No]               │   Select 'Yes', BIOS    │
   │                                                 │   will clear historical │
   │   Processor  Speed Setting :   3.16 GHz         │   processor  status and │
   │                                                 │   retest all processors │
   │   Processor  1 CPUID :         0F41             │   on next boot .        │
   │   Processor  1 L2 Cache Size :  1024 KB         │                         │
   │                                                 │                         │
   │   Processor  2 CPUID :         0F41             │                         │
   │   Processor  2 L2 Cache Size :  1024 KB         │                         │
   │                                                 │                         │
   │   Processor  3 CPUID :         0F41             │                         │
   │   Processor  3 L2 Cache Size :  1024 KB         │                         │
   │                                                 │                         │
   │   Processor  4 CPUID :         0F41             │                         │
   │   Processor  4 L2 Cache Size :  1024 KB         │                         │
   │                                                 │                         │
   ├─────────────────────────────────────────────────┴─────────────────────────┤
   │  F1  Help       ↑↓  Select Item    -/+   Change Values     F9  Setup Defaults│
   │  Esc Exit       ←→  Select Menu    Enter Select  ▶ Sub-Menu  F10 Previous Value│
   └────────────────────────────────────────────────────────────────────────────┘
```

See the table below for the items.

Option	Parameter	Description	Your Setting
Processor Retest	[No] Yes	Clears the error information on the processor.	
Processor Speed Setting	–	Indicates the frequency of the processor.	
Processor 1-4 CPUID	–	A numeral indicates the ID of processor. "Disabled" indicates that the processor is defected by BMC. "Not Installed" indicates that the processor is not installed. (Display only)	
Processor 1-4 L2 Cache Size	–	Indicates the L2 cache of processor.	
Processor 1-4 L3 Cache Size	–	Indicates the L3 cache size if the processor has L3 cache memory.	
Hyper-Threading Technology	Disabled [Enabled]	Setting this item to "Enabled" allows the hyper-threading technology to be used in the ACPI mode. From operating system that supports Hyper-Threading Technology feature, the specified number of processors is twice as many as the actual number of the installed processors.	
Execute Disable Bit	[Disabled] Enabled	Disables or enables the Execute Disable Bit feature of the processor.	
Intel(R) Virtualization Tech.	[Disabled] Enabled	This menu appears only when the processor supports the Intel® Virtualization Technology. Specify whether the Intel® Virtualization Technology is enabled or disabled. If the parameter is changed, the DC power of the system must be turned off. Select [Exit] -> [Exit Saving Changes] and restart the system. Then, turn off the DC power on POST screen.	
Echo TPR	[Enabled] Disabled	Specify whether Echo TPR is enabled or disabled. This menu appears on N8100-1225F only.	

[ ]: Factory-set

Advanced

The Advanced menu appears if you move the cursor to the position of "Advanced."

To display a submenu, position the cursor on a selection that has a submenu (preceded by the ▶ symbol) and press **Enter**.

```
                        Phoenix BIOS Setup Utility
         Main    Advanced    Security    Server    Boot    Exit
  ┌──────────────────────────────────────────────┬──────────────────────┐
  │              Setup Warning                    │  Item Specific Help  │
  │        Setting items on this menu to incorrect│                      │
  │      values may cause your system to malfunction.│ Additional setup menus│
  │                                               │ to configure Memory  │
  │  ▶ Memory Configuration                       │ devices.             │
  │  ▶ PCI Configuration                          │                      │
  │  ▶ Peripheral Configuration                   │                      │
  │  ▶ Advanced Chipset Control                   │                      │
  │                                               │                      │
  │    Boot-time Diagnostic Screen:    [Disabled] │                      │
  │                                               │                      │
  │    Reset Configuration Data:       [No]       │                      │
  │                                               │                      │
  │    NumLock:                        [Off]      │                      │
  │    Memory/Processor Error:         [Boot]     │                      │
  │                                               │                      │
  ├──────────────────────────────────────────────┴──────────────────────┤
  │  F1  Help     ↑↓  Select Item    -/+  Change Values   F9  Setup Defaults│
  │  Esc Exit     ←→  Select Menu    Enter Select ▶Sub-Menu F10 Save and Exit│
  └──────────────────────────────────────────────────────────────────────┘
```

See the table below for the items.

Option	Parameter	Description	Your Setting
Boot-time Diagnostic Screen	[Disabled] Enabled	Specify whether the self-diagnosis (POST) running screen is displayed or not on boot. If this item is set to "Disabled," the manufacturer logo appears during POST. (Pressing **Esc** in the status causes the screen display to be switched to the POST execution screen. The Boot-time Diagnostic Screen is automatically enabled if the Console Redirection is enabled.	
Reset Configuration Data	[No] Yes	Select "Yes" to clear the extended system configuration data area (system information stored by POST). The parameter is changed to "No" after the system is booted.	
NumLock	On [Off]	Specify whether NumLock is enabled or disabled on boot.	
Memory/ Processor Error	[Boot] Halt	Indicates whether POST is paused once at the occurrence of a processor or memory error during the execution of POST. When processor error or Memory error is encountered, the utility is not paused at the end of POST if this item is set to "Halt" and even though "POST Error Pause" of "Server" menu is "Enabled".	

[   ]: Factory-set

Memory Configuration

Selecting "Memory Configuration" on the Advanced menu shows the following screen.

```
                        Phoenix BIOS Setup Utility
            Advanced

              Memory Configuration                    Item Specific Help

    DIMM Group #1 Status        Normal              Clear the memory
    DIMM Group #2 Status        Not Installed        error status.
    DIMM Group #3 Status        Not Installed
    DIMM Group #4 Status        Not Installed
    DIMM Group #5 Status        Not Installed
    DIMM Group #6 Status        Not Installed
    DIMM Group #7 Status        Not Installed
    DIMM Group #8 Status        Not Installed

    Memory Retest               [No]
    Extended RAM Step           [Disabled]
    Online Spare Memory         [Disabled]
    Memory RAS Feature:         [Normal]
    Hot-Add Memory Support:     [Disabled]


    F1   Help     ↑↓  Select Item    -/+    Change Values      F9   Setup Defaults
    Esc  Exit     ←→  Select Menu    Enter Select ▶ Sub-Menu   F10  Save and Exit
```

See the table below for the items.

Option	Parameter	Description	Your Setting
DIMM Group #1 - #8 Status	Normal Not installed Disabled	Indicates the current memory status. "Normal" indicates that the memory devices operate normally. "Disabled" indicates that one or more memory devices are defected. "Not Installed" indicates that no memory devices are installed. (Display only)	
Memory Retest	[No] Yes	Clears the DIMM group error status information. Run this menu when the failed DIMM(s) are replaced.	
Extended RAM Step	1MB 1KB Every Location [Disabled]	"1MB" indicates that the memory test is done in the unit of 1MB. "1KB" indicates that the memory test is done in the unit of 1KB. "Every-Location" indicates that every memory device is tested. "Disabled" indicates that only memory initialization is done.	
Online Spare Memory	[Disabled] Enabled	Select "Enabled" to enable the Online Spare Memory feature.	
Memory RAS Feature	[Normal] Mirror RAID	Set the memory configuration. Select "Mirror" to enable the memory mirroring function. Select "RAID" to enable the memory RAID function.	
Hot-Add Memory Support	[Disabled] Enabled	Specify whether to use the Hot-Add Memory feature on Windows Server 2003 Enterprise Edition or Datacenter Edition. Select "Enabled" to use the Hot-Add Memory feature.	

[ ]: Factory-set

PCI Configuration

Selecting "PCI Configuration" on the Advanced menu shows the following screen. Selecting an item on the screen allows the proper submenu to appear.

```
                        Phoenix BIOS Setup Utility
          Advanced

              PCI Configuration                       Item Specific Help

 ▶ Hot-plug PCI Control                            Additional setup
                                                   menus to configure
 ▶ Embedded SCSI                                   Hot-plug PCI.
 ▶ Embedded NIC (Dual Gbit)
 ▶ Embedded Video Controller

   PCI Slot 1 Option ROM:      [Enabled]
   PCI Slot 2 Option ROM:      [Enabled]
   PCI Slot 3 Option ROM:      [Enabled]
   PCI Slot 4 Option ROM:      [Enabled]
   PCI Slot 5 Option ROM:      [Enabled]
   PCI Slot 6 Option ROM:      [Enabled]
   PCI Slot 7 Option ROM:      [Enabled]
   PCI Slot 8 Option ROM:      [Enabled]
   PCI Slot 9 Option ROM:      [Enabled]

 F1   Help       ↑↓  Select Item    -/+   Change Values      F9   Setup Defaults
 Esc  Exit       ←→  Select Menu    Enter Select  ▶ Sub-Menu  F10  Save and Exit
```

See the table blow for the items.

Option	Parameter	Description	Your Setting
PCI Slot 1-9 Option ROM	[Enabled] Disabled	Disables/enables the Option ROM BIOS on the PCI bus. When the graphic accelerator board is installed or the disk array controller or SCSI controller boards to be installed are connected to the hard disk in which operating system is installed, set this item to "Enabled." When the LAN controller board with installation of the option ROM BIOS is used but the board does not provide network booting, set this item to "Disabled."	

[ ]: Factory-set

Hot-plug PCI Control

Selecting "Hot-plug PCI Control" on the PCI Configuration submenu shows the following screen.

```
                        Phoenix BIOS Setup Utility
            Advanced

            Hot-plug PCI Control                    Item Specific Help

    Reserving memory space for PHP:     [Disabled]    Determines memory space
                                                      at every empty slot
                                                      for PHP(PCI Hot Plog).

                                                      Reserved memory space is

                                                      [Disabled]
                                                        None
                                                      [Minimum]
                                                        6( 2+4) MB
                                                      [Middle]
                                                        48(16+32) MB
                                                      [Maximum]
                                                        96(32+64) MB


    F1   Help      ↑↓   Select Item    -/+   Change Values      F9   Setup Defaults
    Esc  Exit      ←→   Select Menu    Enter Select  ▶ Sub-Menu  F10  Save and Exit
```
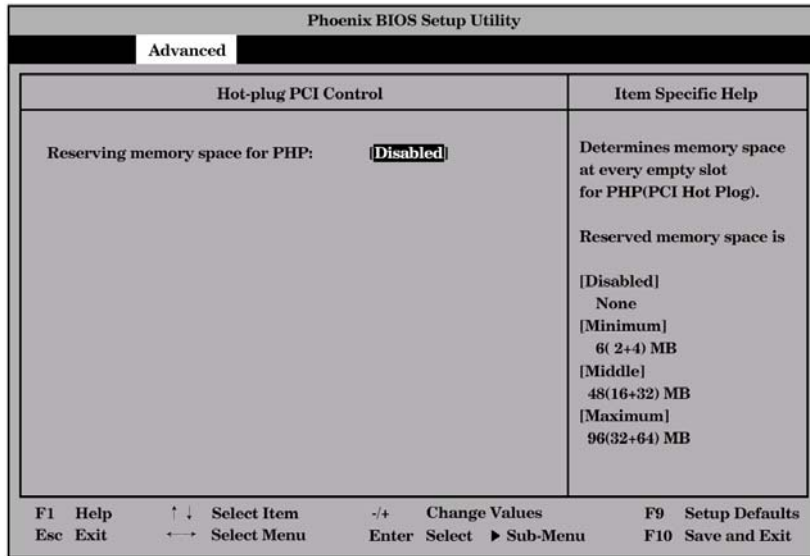
See the table blow for the items.

Option	Parameter	Description	Your Setting
Reserving memory space for PHP	[Disabled] Minimum Middle Maximum	Determines memory space at every empty slot for PHP (PCI Hot-plug). Reserved memory space is: [Disabled]: None [Minimum]: 6 (2+4) MB [Middle]: 48 (16+32) MB [Maximum]: 96 (32+64) MB	

[ ]: Factory-set

NOTE: The bus number of PCI slot varies depending on whether this parameter is set to "Disabled" or others. Pay attention when you need to setup the program again.

Embedded SAS/Embedded NIC/Embedded Video Controller

Selecting "Embedded SAS", "Embedded NIC", or "Embedded Video Controller" on the PCI Configuration submenu shows the following screen.

```
                        Phoenix BIOS Setup Utility
            Advanced

                PCI Slot 1                              Item Specific Help

    SCSI Controller:    [Enabled]             Disables/enables the
    Option ROM Scan:   [Enabled]             on-board SCSI
                                             controller.












    F1   Help        ↑↓  Select Item     -/+   Change Values     F9   Setup Defaults
    Esc  Exit        ←→  Select Menu   Enter  Select  ▶ Sub-Menu  F10  Save and Exit
```
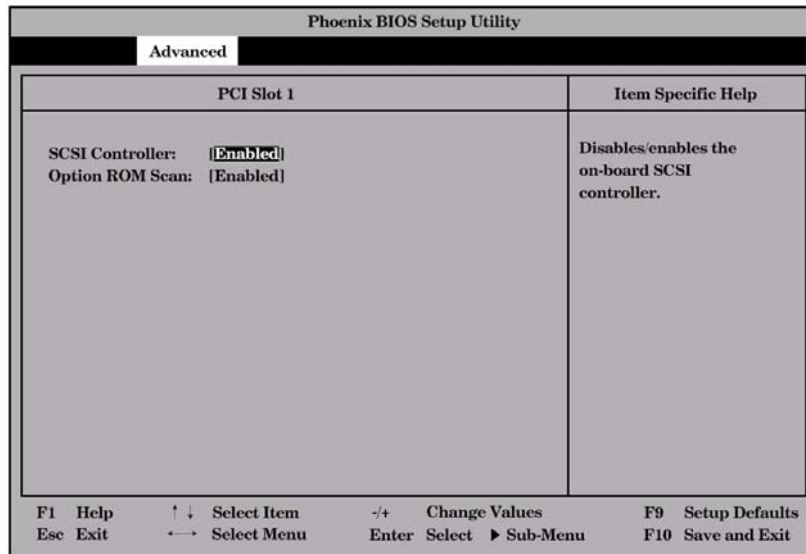
See the table blow for the items.

Option	Parameter	Description	Your Setting
SAS Controller LAN Controller Video Controller	[Enabled] Disabled	Indicates whether the on-board controller is enabled or disabled.	
Option ROM Scan*	[Enabled] Disabled	Displays the submenu for indicating whether the expansion of BIOS of on-board controller is enabled or disabled. Do not set this option to "Disabled".	

[ ]: Factory-set

* Only displayed for SAS and LAN controllers.

Peripheral Configuration

Selecting "Peripheral Configuration" on the Advanced menu shows the following screen.

```
                        Phoenix BIOS Setup Utility
          ┌──────────┐
          │ Advanced │
          └──────────┘
    ┌──────────────────────────────────────────┬──────────────────────────────┐
    │      Peripheral Configuration            │      Item Specific Help       │
    │                                          │                               │
    │  Serial port A:          [Enabled]       │  Configure serial port A      │
    │    Base I/O address:     [3F8]           │  using options:               │
    │    Interrupt:            [IRQ 4]         │                               │
    │  Serial port B:          [Enabled]       │  [Disabled]                   │
    │    Base I/O address:     [2F8]           │    No configuration           │
    │    Interrupt:            [IRQ 3]         │                               │
    │  Parallel port:          [Enabled]       │  [Enabled]                    │
    │    Mode:                 [ECP]           │    User configuration         │
    │    Base I/O address:     [378]           │                               │
    │    Interrupt:            [IRQ 7]         │  [Auto]                       │
    │    DMA channel:          [DMA 1]         │    BIOS or OS chooses          │
    │                                          │    configuration              │
    │  PS/2 Mouse              [Enabled]       │                               │
    │  USB Controller:         [Enabled]       │                               │
    │  Legacy USB Support:     [Enabled]       │                               │
    ├──────────────────────────────────────────┴──────────────────────────────┤
    │ F1  Help    ↑↓ Select Item    -/+  Change Values        F9  Setup Defaults│
    │ Esc Exit    ←→ Select Menu    Enter Select ▶ Sub-Menu  F10 Save and Exit  │
    └──────────────────────────────────────────────────────────────────────────┘
```
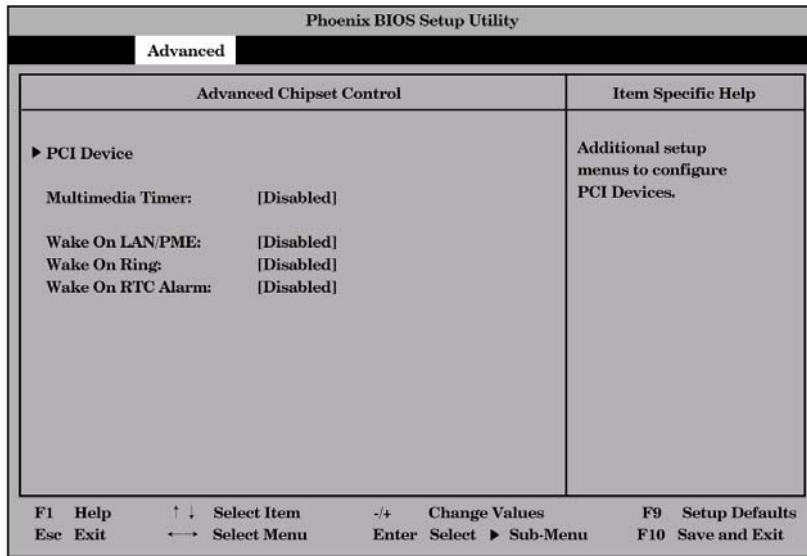

IMPORTANT: Note that the interrupt and/or base I/O address are not overlapped with others. If the value set for the interrupt or base I/O address is used in another resource, the yellow asterisk (*) appears. Reset any item with the yellow asterisk properly.

Option	Parameter	Description	Your Setting
Serial Port A	Disabled [Enabled]	Specify whether serial port A is enabled or disabled.	
Base I/O Address	[3F8] 2F8 3E8 2E8	Selects the base address and interrupt (IRQ) for serial port A. These menus are displayed when the Serial port A is enabled.	
Interrupt	IRQ 3 [IRQ 4]		
Serial Port B	Disabled [Enabled]	Specify whether serial port B is enabled or disabled.	
Base I/O Address	3F8 [2F8] 3E8 2E8	Selects the base address and interrupt (IRQ) for serial port B. These menus are displayed when the Serial port B is enabled.	
Interrupt	[IRQ 3] IRQ 4		
Parallel Port	Disabled [Enabled]	Specify whether the parallel port is enabled or disabled.	
Mode	Output Only Bi-directional EPP [ECP]	Selects the parallel port operation mode, base address, interrupt (IRQ), and DMA channel for the parallel port. These menus are displayed when the Parallel Port is enabled.	
Base I/O Address	[378] 278		
Interrupt	IRQ 5 [IRQ 7]		
DMA channel	[DMA 1] DMA 3		
PS/2 Mouse	Disabled [Enabled]	Specify whether the mouse is enabled or disabled.	
USB Controller	Disabled [Enabled]	Specify whether the USB controller is enabled or disabled.	
Legacy USB Support	Disabled [Enabled]	Specify whether the USB keyboard is made available in operating system which does not support USB formally.	
			[ ]: Factory-set

Advanced Chipset Control

Selecting "Advanced Chipset Control" on the Advanced menu shows the following screen. Positioning the cursor on a menu (item preceded by symbol "✳") and pressing **Enter** allows the appropriate submenu.
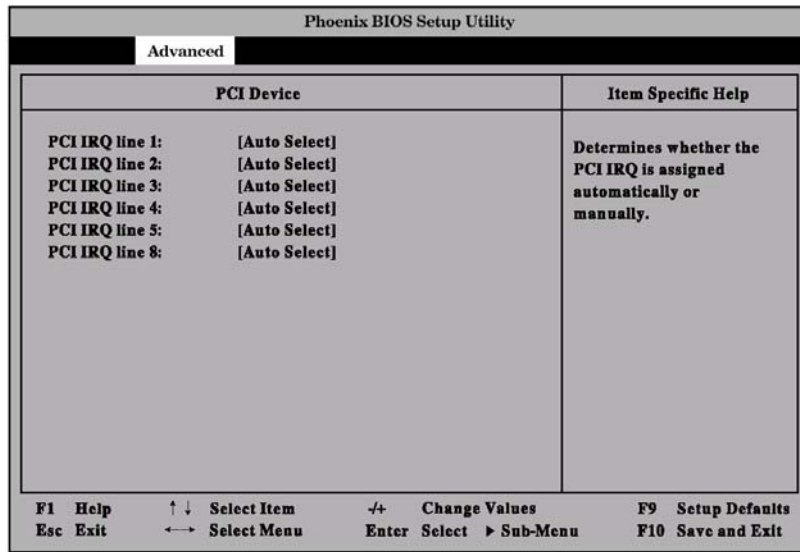
```
                       Phoenix BIOS Setup Utility

         Advanced

               Advanced Chipset Control              Item Specific Help

   ▶ PCI Device                                    Additional setup
                                                   menus to configure
     Multimedia Timer:        [Disabled]           PCI Devices.

     Wake On LAN/PME:         [Disabled]
     Wake On Ring:            [Disabled]
     Wake On RTC Alarm:       [Disabled]




   F1   Help      ↑↓  Select Item     -/+   Change Values     F9   Setup Defaults
   Esc  Exit      ←→  Select Menu    Enter  Select ▶ Sub-Menu F10  Save and Exit
```

See the table below for the items.

Option	Parameter	Description	Your Setting
Multimedia Timer	[Disabled] Enabled	Selecting "Enabled" enables this function if the operating system supports HPET (High Precision Event Timers) feature.	
Wake On LAN/PME	[Disabled] Enabled	Specify whether the remote power-on function through network is enabled or disabled.	
Wake On Ring	[Disabled] Enabled	Specify whether the remote power-on function through a serial port is enabled or disabled.	
Wake On RTC Alarm	[Disabled] Enabled	Specify whether the remote power-on function through an RTC alarm is enabled or disabled.	

[ ]: Factory-set

PCI Device

Selecting "PCI Device" on "Advanced Chipset Control" of the Advanced menu shows the following screen.

```
                          Phoenix BIOS Setup Utility
        Advanced

                   PCI Device                    Item Specific Help

        PCI IRQ line 1:        [Auto Select]     Determines whether the
        PCI IRQ line 2:        [Auto Select]     PCI IRQ is assigned
        PCI IRQ line 3:        [Auto Select]     automatically or
        PCI IRQ line 4:        [Auto Select]     manually.
        PCI IRQ line 5:        [Auto Select]
        PCI IRQ line 8:        [Auto Select]




        F1   Help      ↑↓  Select Item    -/+   Change Values     F9   Setup Defanlts
        Esc  Exit      ←→  Select Menu    Enter Select ▶ Sub-Menu F10  Save and Exit
```

See the table below for the items.

Option	Parameter	Description	Your Setting
PCI IRQ line 1 - 5 PCI IRQ line 8	Disabled [Auto Select] 3 5 6 7 9 10 11 12 14 15	Set the assignment of each of 7 interrupt signals on the PCI bus to a specific IRQ request. Parameter "11" cannot be selected if they are the same as those set for BMC IRQ in the Server menu.	

[ ]: Factory-set

Security

Positioning the cursor to "Security" shows the following screen.

On the Security menu, register the Supervisor password first, then the User password. When the User password is registered, you can access all the menu items.
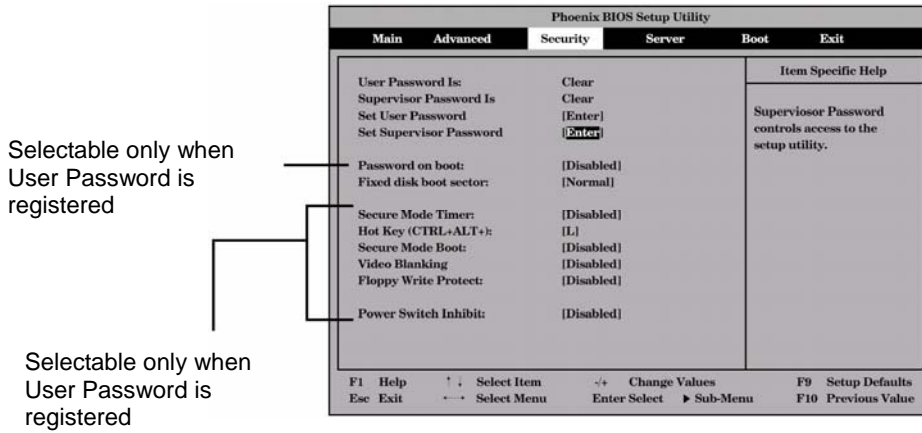
If you press **Enter** with the selection of "Set Supervisor Password", such a screen as shown below appears.

Specify the Supervisor password on the dialog box. Enter each of the passwords with up to seven characters including alphanumerics and symbols.
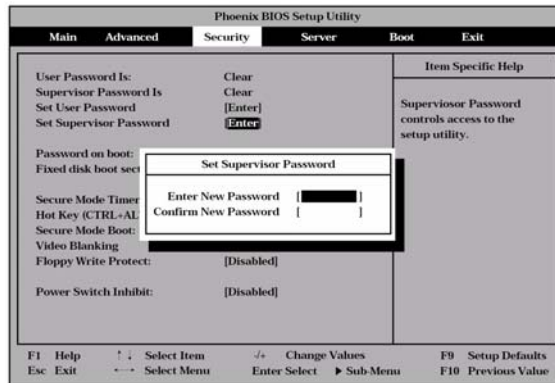
After the Supervisor password has been registered, specify the User password in the same way.

IMPORTANT:

- Set the passwords only after operating system is installed.

- If you forget the passwords, contact your service representative.

See the table below for the items.

Option	Parameter	Description	Your Setting
Set User Password	Up to seven alphanumerics	Press **Enter** to display the user password input screen. For this password, accessing to the SETUP menu is restricted. This item becomes accessible after the Supervisor password is registered.	
Set Supervisor Password	Up to seven alphanumerics	Press **Enter** to display the supervisor password input screen. This password enables all the SETUP menus to be accessed. This setting can be done only on login with the password input of "Supervisor" at start of SETUP.	
Password on boot	[Disabled] Enabled	Specify whether the passwords are entered or not on booting. This item becomes accessible after the User password is registered.	
Fixed disk boot sector	[Normal] Write Protect	Prevents data from being written to hard disks.	
Secure Mode Timer	[Disabled] 1 minute 2 minutes 5 minutes 10 minutes	Specify the period from no input from the keyboard or mouse to the point at which the system enters into the secure mode. This item becomes accessible after the User password is registered.	

Option	Parameter	Description	Your Setting
	20 minutes 60 minutes 120 minutes		
Hot Key (CTRL+ALT+)	[L] Z	Specify the key with which the secure mode is started. Press the selected key with the **Ctrl** and **Alt** pressed to start the secure mode. This item becomes accessible after the User password is registered.	
Secure Mode Boot	[Disabled] Enabled	Specify whether the server is operated in the secure mode at the start of the server. This item becomes accessible after the User password is registered.	
Video Blanking	[Disabled] Enabled	Specify whether the monitor is disconnected if the server is entered into the secure mode. This item becomes accessible after the User password is registered.	
Floppy Write Protect	[Disabled] Enabled	Specify whether data write to the floppy disk inserted into the floppy disk drive is enabled or disabled in the secure mode. This item becomes accessible after the User password is registered.	
Power Switch Inhibit	[Disabled] Enabled	Specify whether the power switch is enabled or disabled. If this item is set to "Enabled," the power cannot be turned off by using the POWER switch (including the forced shutdown). The system cannot also enter the power saving mode by pressing the SLEEP switch. This item becomes accessible after the User password is registered.	

[ ]: Factory-set

NOTE: The Secure Mode is used to restrict access from unauthorized users. In the Secure Mode, the POWER switch, SLEEP switch, RESET switch, keyboard and mouse are disabled. The lamps on the keyboard flash in order from the ScrollLock lamp, the CapsLock lamp, and the NumLock lamp. To resume server operation in the normal state from the Secure Mode, enter the user password from the keyboard and press **Enter** key.

Server

Positioning the cursor on "Server" shows the Server menu.

The items which can be set on the Server menu and their functions are described below. For the setting, first select "System Management" or "Console Redirection" and press **Enter** to display the proper submenu.

The following screen shows when [5 Minutes] is set for [Boot Monitoring].

```
                      Phoenix BIOS Setup Utility
      Main    Advanced     Security      Server     Boot      Exit
  ─────────────────────────────────────────────┬──────────────────────
                                                │    Item Specific Help
   ▶ System Management                          │
   ▶ Console Redirection                        │ Additional setup menu to
   ▶ Event Log Configuration                    │ menu to view Server
     Assert NMI on PERR:        [Enabled]       │ management features.
     Assert NMI on SERR:        [Enabled]       │
     FRB-2 Policy:              [Disable BSP]   │
     Boot Monitoring:           [5 Minutes]     │
     Boot Monitoring Policy:    [Retry 3 times] │
     Thermal Sensor:            [Enabled]       │
     BMC IRQ:                   [IRQ 11]        │
     POST Error Pause:          [Enabled]       │
     AC-LINK                    [Last State]    │
     Power ON Delay Time        [    0]         │
     FRU LED Feature:           [Enabled]       │
     Clear FRU LED:             [No]            │
     Platform Event Filtering:  [Enabled]       │
  ─────────────────────────────────────────────┴──────────────────────
   F1   Help      ↑↓  Select Item    -/+    Change Values      F9  Setup Defaults
   Esc  Exit      ←→  Select Menu     Enter  Select ▶ Sub-Menu  F10 Save and Exit
```

See the table below for the items.

Option	Parameter	Description	Your Setting
Assert NMI on PERR	Disabled [Enabled]	Indicates whether PCI PERR is supported or not. If this item is set "Enabled", the system offers an error through the NMI when an error occurred.	
Assert NMI on SERR	Disabled [Enabled]	Indicates whether PCI SERR is supported or not. If this item is set "Enabled", the system offers an error through the NMI when an error occurred.	
FRB-2 Policy	Disable FRB2 Timer [Disable BSP] Do Not Disable BSP Retry 3 Times	Set this item to "Disable BSP".	
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	Indicates whether the boot monitoring function is enabled or disabled on booting. To use this function, install NEC ESMPRO Agent. Do not use this function if the system is booted from operating system without installation of NEC ESMPRO Agent or CD-ROM. Set this item to "Disabled" if ARCServe uses the Disaster Recovery Option.	
Boot Monitoring Policy	[Retry 3 Times] Retry Service Boot Always Retest	Appears when the boot monitoring feature is enabled. This item indicates the processing at the occurrence of timeout during boot monitoring. If [Retry 3 times] is selected, the system is reset after the occurrence of timeout and operating system boot is retried up to three times. The failure in the third boot causes the boot to be tried from the service partition. If [Retry Service Boot] is selected, the system is reset after the occurrence of timeout and operating system boot is retried up to three times. Then the boot is tried from the service partition for three times. If [Always Reset] is selected, the system is reset after the occurrence of timeout and operating system boot is retried repeatedly.	
Thermal Sensor	Disabled [Enabled]	Indicates whether the temperature sensor monitoring function is enabled or disabled.	
BMC IRQ	Disabled [IRQ 11]	Indicates the IRQ of the BMC interrupt.	

Option	Parameter	Description	Your Setting
Post Error Pause	Disabled [Enabled]	Indicates whether POST is aborted once at the end of POST if an error occurs during the execution of POST.	
AC-LINK	Stay Off [Last State] Power On	Indicates the AC-LINK function. Shows the state of the power of the server.	
Power ON Delay Time	[0] - 255	Sets the power on delay time when "Power On" or "Last State" is specified for AC LINK.	
FRU LED Feature	Disabled [Enabled]	Select "Enabled" to turn on the error lamp to identify the location if the system detects a failure.	
Clear FRU LED	[No] Yes	Select "Yes" to turn off the FRU LED. When the faulty component is replaced, turn off the FRU LED.	
Platform Event Filtering	Disabled [Enabled]	Enables or disables the Platform Event Filtering feature of the baseboard management controller (BMC).	

[ ]: Factory-set

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

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

* Press the power switch continuously at least four seconds. This forcibly turns off the power.

IMPORTANT: Set this item to "Power on" in order to link the AC power source supplied from UPS when the server is connected to UPS.

System Management

Selecting "System Management" on the Server menu shows the following screen.

```
                        Phoenix BIOS Setup Utility
                              Server

        System Management                    Item Specific Help

   BIOS Version:               6.0.00xx

   Board Part #:               243-xxxxxx
   Board Serial #:             xxxxxxxxxxx
   System Part #:              [8100-xxxx]
   System Serial #:            xxxxxxxxxxx
   Chassis Part #:             243-xxxxxx
   Chassis Serial #:           xxxxxxxxxxx
   BMC Device ID:              22
   BMC Device Rev:             01
   BMC Firmware Rev:           00.xx
   SDR Rev:                    SDR Version 00.xx
   PIA Rev:                    xx.xx

   ARM MAC Address:            xx-xx-xx-xx-xx-xx

   F1   Help      ↑↓  Select Item   -/+   Change Values   F9   Setup Defaults
   Esc  Exit      ←→  Select Menu   Enter Select ▶ Sub-Menu  F10  Save and Exit
```

See the table below for the items.

Option	Parameter	Description	Your Setting
BIOS Version	–	Indicates the version of BIOS. (Display only)	
Board Part #	–	Indicates the IO board information. (Display only)	
Board Serial #	–		
System Part #	–	Indicates the system information. (Display only)	
System Serial #	–		
Chassis Part #	–	Indicates the chassis information. (Display only)	
Chassis Serial #	–		
BMC Device ID	–	Indicates the BMC (Baseboard Management Controller) information. (Display only)	
BMC Device Rev	–		
BMC Firmware Rev	–		
SDR Rev	–	Indicates the revision of SDR (Sensor Data Record). (Display only)	
PIA Rev	–	Indicates the revision of PIA. (Display only)	
ARM MAC Address	–	Indicates the default DNS (Hostname) of Management LAN Port. (Display only)	

[ ]: Factory-set

Console Redirection

Selecting "Console Redirection" on the Server menu shows the following screen.

```
                    Phoenix  BIOS Setup Utility
                                    Server

 ┌──────────────────────────────────────┬─────────────────────────┐
 │         Console  Redirection          │   Item Specific  Help   │
 │                                       │                         │
 │   BIOS Redirection   Port :  [Disabled] │ Selects  the  Serial  port │
 │   ACPI Redirection   Port :  [Disabled] │ to use  for Console      │
 │                                       │ Redirection  .           │
 │   Baud  Rate :               [19.2K]    │ "Disabled " completely   │
 │   Flow  Control :            [CTS/RTS]   │ disables  Console        │
 │   Console  Type :            [VT100+]    │ Redirection  .           │
 │   Remote  Console  Reset :   [Disabled] │                         │
 │                                       │                         │
 ├──────────────────────────────────────┴─────────────────────────┤
 │ F1   Help      ↑↓  Select  Item    -/+   Change  Values    F9   Setup  Defaults │
 │ Esc  Exit      ←→  Select  Menu    Enter  Select   ▶ Sub-Menu  F10  Save  and  Exit │
 └─────────────────────────────────────────────────────────────────┘
```
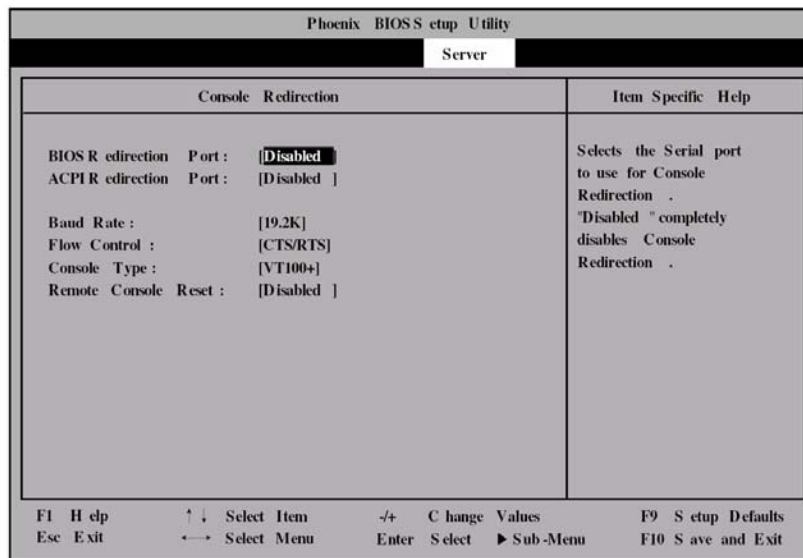
See the table below for the items.

Option	Parameter	Description	Your Setting
BIOS Redirection Port	[Disabled] Serial Port A Serial Port B	Selects the port to be used as the redirection port. The parameters specified in Peripheral Configuration submenu is used as address and interrupt.	
ACPI Redirection Port	[Disabled] Serial Port A Serial Port B	Specify the I/O port address or interrupt level used in ACPI headless console redirection. If [Disabled] is selected, console redirection feature is disabled.	
Baud Rate	9600 [19.2K] 38.4K 57.6K 115.2K	Specify the baud rate used for the interface with successive hardware consoles.	
Flow Control	None XON/XOFF [CTS/RTS] CTS/RTS+CD	Specify the flow control method.	
Console Type	PC ANSI [VT100+] VT-UTF8	Specify the console type.	
Remote Console Reset	[Disabled] Enabled	Specify whether the reset from remote console is enabled or disabled.	

[ ]: Factory-set

Event Log Configuration

Selecting "Event Log Configuration" on the Server menu and pressing **Enter** shows the following screen.

```
                    Phoenix  BIOS S etup  Utility
                              Server

        Event  Log  Configuration              Item  Specific  Help

     Clear  All Event  Log:       [P ress  Enter ]     The  system   event  log
                                                       will  be  cleared   if selecting
                                                       "Yes ".




     F1   H elp          ↑ ↓  Select  Item      -/+    C hange  Values         F9   S etup  D efaults
     Esc  E xit          ← →  Select  Menu      Enter  S elect    ▶ Sub -Menu  F10  S ave  and  Exit
```
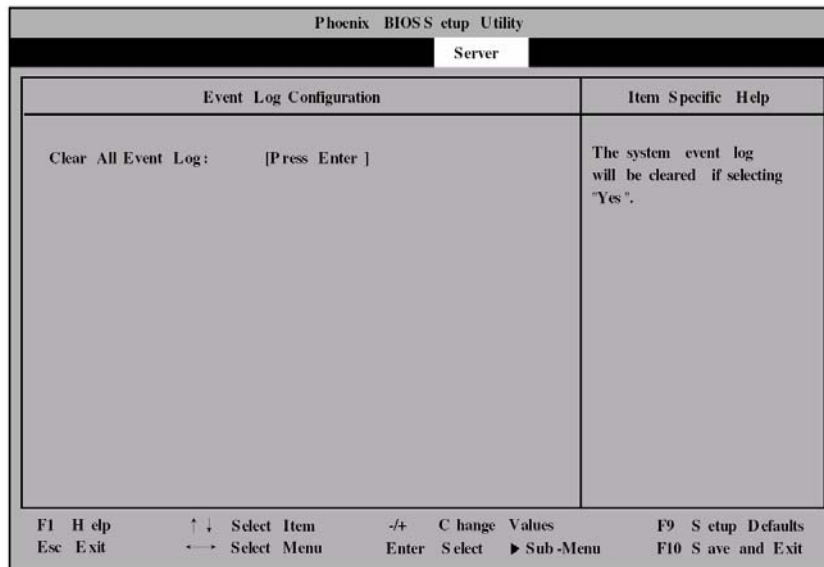
See the table below for the items.

Option	Parameter	Description	Your Setting
Clear All Event Log	–	Press **Enter** and select "Yes" to clear the system event log.	

[ ]: Factory-set

Boot

Positioning the cursor on "Boot" shows the Boot menu which is used to set the boot priority.

```
                    Phoenix  BIOS S etup  U tility
   Main      Advanced       Security       Server      Boot       Exit

                                                  Item  S pecific  H elp
    CD -ROM D rive
   +R emovable   D evices
   +H ard  D rive                            Keys  used  to view  or
    IBA GE S  lot  0B20  v 1222              configure  devices  :
    IBA GE S  lot  0B21  v 1222              <Enter > expands   or
                                             collapses  devices   with
                                             a + or -
                                             <+> and  <-> moves  the
                                             device   up  or down  .




   F1   H elp        ↑ ↓   Select  Item      -/+    C hange  Values        F9    S etup  D efaults
   Esc  E xit        ←—→  Select  Menu     Enter  S elect    ▶ S ub -Menu  F10  S ave  and  Exit
```

The server searches for devices in the order set in this menu on booting. Finding the boot software, the server starts the software.

The priority of the boot devices can be changed by using the ↑, ↓, **+**, and **-** keys. Move the cursor to the desired device with the ↑ or ↓ key and change the priority with the **+** or **-** key.

> **IMPORTANT:** To boot EXPRESSBUILDER, set the priority of the devices as shown in the figure above.

Exit

Positioning the cursor to "Exit" shows the Exit menu.

The options on the menu are described below.

```
                        Phoenix BIOS Setup Utility

     Main    Advanced    Security    Server    Boot    Exit

                                              Item Specific Help

   Exit Saving Changes
   Exit Discarding Changes
   Load Setup Defaults                    Exit System Setup and
   Load Custom Defaults      [Enter]      save your changes to
   Save Custom Defaults      [Enter]      CMOS.
   Discard Changes
   Save Changes




   F1   Help       ↑↓  Select Item    -/+   Change Values     F9   Setup Defaults
   Esc  Exit       ←→  Select Menu    Enter  Select  ▶ Sub-Menu  F10  Previous Value
```

Exit Saving Changes

Select this item to terminate SETUP after saving the newly selected information in CMOS (non-volatile memory). The selection of "Exit Saving Changes" causes the confirmation screen to appear.

If you select "Yes," SETUP is terminated with the newly selected information saved in CMOS (non-volatile memory). Then the server automatically reboots the system.

Exit Discarding Changes

Select this item to terminate SETUP without saving the newly selected information in CMOS (non-volatile memory).

Selecting "Yes" allows SETUP to be terminated without storage of the modified information. If the setting value is modified, the confirmation screen will appear.

Selecting "No" allows SETUP to be terminated without storage of the modified information. If you select "Yes" in the next screen, SETUP is terminated with the modified information saved in CMOS. Then the server automatically reboots the system.

Load Setup Defaults

Select this item to return all the values of SETUP 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.

Save Custom Defaults/Load Custom Defaults

Running the Save Custom Defaults menu saves the current SETUP parameters as the user-defined SETUP defaults. The Load Custom Defaults menu is used to restore the user-defined SETUP defaults.

Discard Changes

Select this item to return the values modified currently to the previous values before saving the values to CMOS. Selecting "Discard Changes" causes the confirmation screen to appear.

Select "Yes" to discard the newly selected information and return to the previous values.

Save Changes

Select this item to save the newly selected information to CMOS (non-volatile memory) without the termination of SETUP. Selecting "Save Changes" causes the confirmation screen to appear.

Select "Yes" to save the newly selected information to CMOS (non-volatile memory)

DISK ARRAY CONFIGURATION

This section describes the configuration utility "WebBIOS". With On Board RAID (MegaRAID ROMB), you can use the internal hard disk drives in the disk array configuration.

RAID

This section describes the RAID features which the on-board RAID controller (MegaRAID ROMB) supports.

Overview of RAID

What is RAID (Redundant Array of Inexpensive Disks)?

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

In fact, RAID can configure more than one 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 on-board RAID (MegaRAID ROMB) has a feature to divide a single disk group into several logical drives. The on-board RAID (MegaRAID ROMB) recognizes these virtual disks as if it were a single HDD. The on-board RAID (MegaRAID ROMB) accesses to more than one HDD configuring a disk group in parallel.

Some RAID levels can recover data from remaining data and parity by using rebuild feature if an error occurs in a single HDD. This can provide 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, and RAID 5. 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	13
RAID 1	2	2
RAID 5	3	13
Spanning of RAID 1	4	4
Spanning of RAID 5	6	12

NOTE: For details of the RAID levels, see "RAID Levels" described later in this chapter.

Disk Group

A disk group is configured with more than one HDDs.
Up to five disk groups are permitted by the on-board RAID (MegaRAID ROMB) when five HDDs are installed in the server.

The figure below shows a sample configuration. The three HDDs are connected to the on-board RAID (MegaRAID ROMB), creating one disk group (DG).
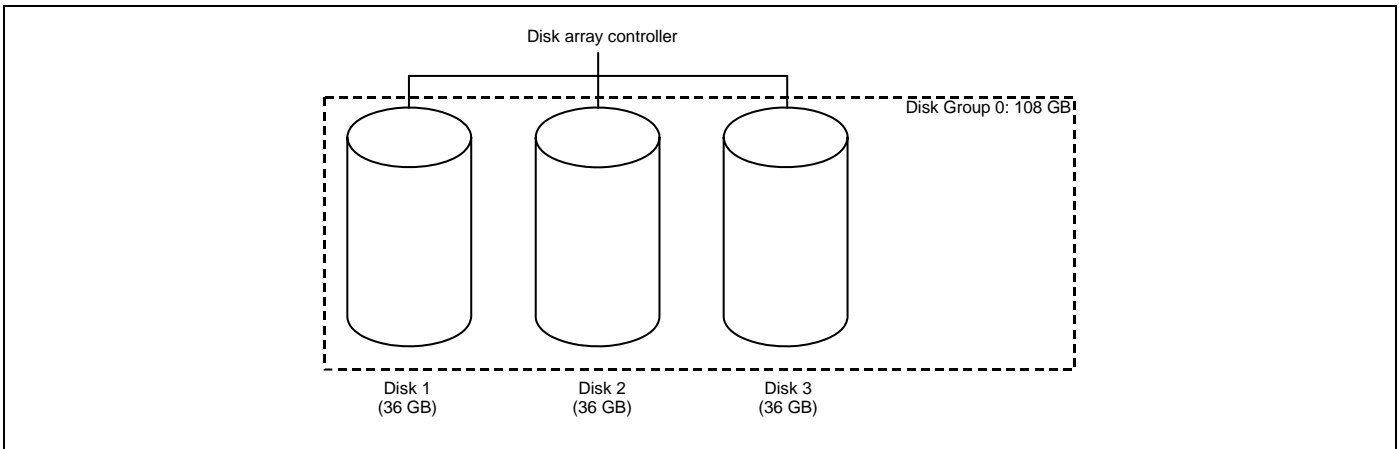
Virtual Disk

A virtual disk is a logical drive defined in disk group. It is recognized as a physical drive by OS. Up to 40 virtual disks are permitted by the on-board RAID (MegaRAID ROMB).

The figure below shows a sample configuration in which the on-board RAID (MegaRAID ROMB) is connected with three HDDs, creating one disk group (DG). Two RAID5 virtual disks (VD) are defined in the DG.
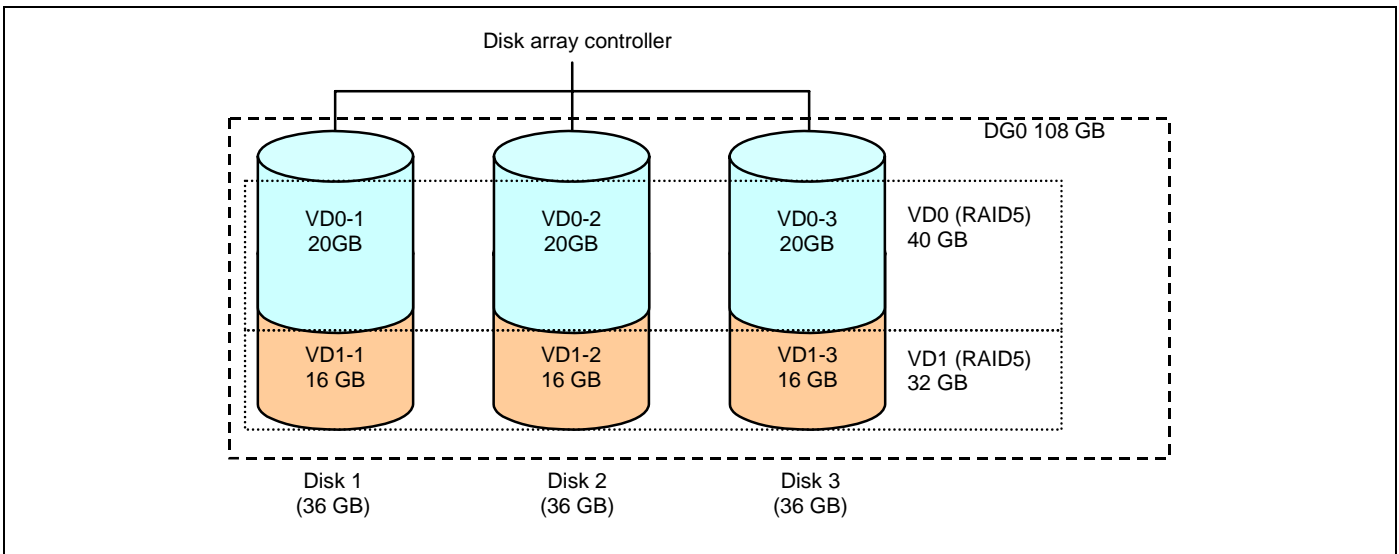
Parity

The parity means redundant data. A single set of redundant data is created from the data saved in more than one HDD.

The created redundant data is used for data recovery when a HDD is defected.

Hot-Swap

The hot-swap enables a HDD to be removed (or replaced) under system operation.

Hot-Spare Disk

The hot-spare disk is prepared as an auxiliary HDD substituting for a defected 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 disk.

> **NOTE:** For standby rebuild (rebuild using hot-spare disks), see "Features of On-board RAID (MegaRAID ROMB)".

RAID Levels

This section details the RAID levels which the on-board RAID (MegaRAID ROMB) can support.

Characteristics of RAID Levels

The table below lists the characteristics of the RAID levels.

Level	Function	Redundancy	Characteristics
RAID0	Striping	No	• Data read/write at the highest rate • Largest capacity • Capacity: (capacity of single HDD) × (number of HDDs)
RAID1	Mirroring	Yes	• Two HDDs required • Capacity: capacity of single HDD
RAID5	Striping of both data and redundant data	Yes	• Three or more HDDs required • Capacity: (capacity of single HDD) × ((number of HDDs) - 1)

RAID0

In RAID 0, 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 the order. Because RAID0 allows all HDDs to be accessed collectively, it can provide the best disk access performance.

> **IMPORTANT:** RAID 0 cannot have data redundancy. If a HDD is defected, the data saved in the HDD cannot be recovered.
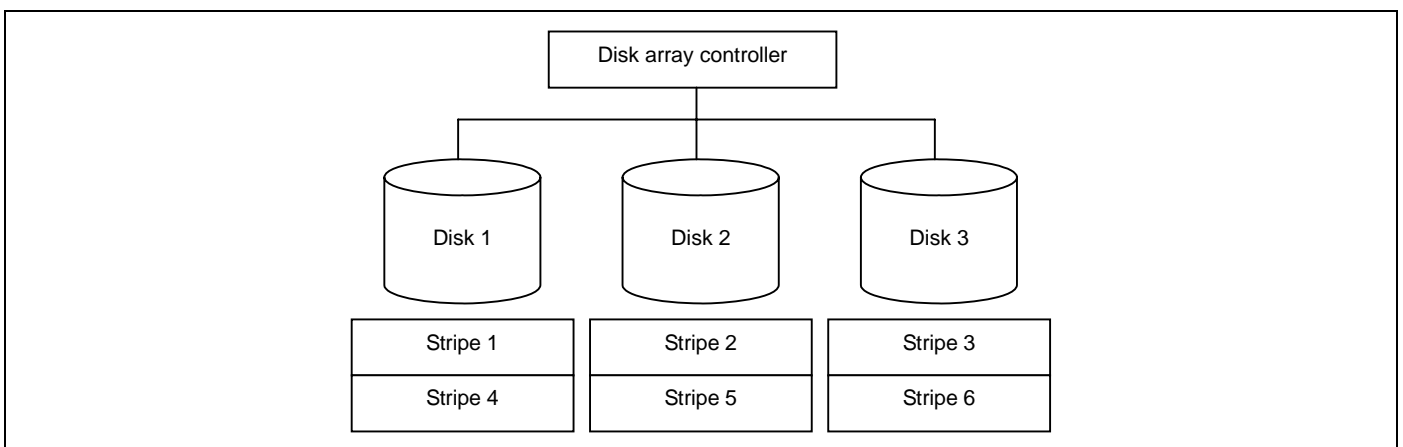
RAID1

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

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

```
                        ┌─────────────────────┐
                        │ Disk array controller│
                        └─────────────────────┘

         ┌───────────┐                    ┌───────────┐
         │  Disk 1   │                    │  Disk 2   │
         └───────────┘                    └───────────┘
         ┌───────────┐                    ┌───────────┐
         │ Stripe 1  │                    │ Stripe 1  │
         ├───────────┤                    ├───────────┤
         │ Stripe 2  │                    │ Stripe 2  │
         └───────────┘                    └───────────┘
```
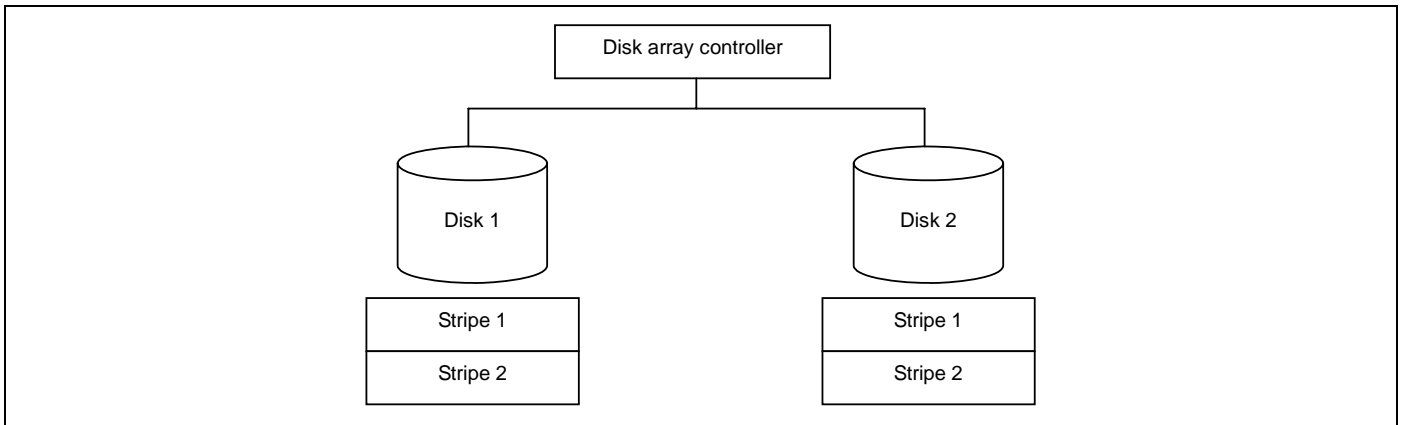
RAID5

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 one of the HDDs configuring a logical drive is defected, data is still available with no problems.

```
                        ┌─────────────────────┐
                        │ Disk array controller│
                        └─────────────────────┘

    ┌───────────┐        ┌───────────┐        ┌───────────┐
    │  Disk 1   │        │  Disk 2   │        │  Disk 3   │
    └───────────┘        └───────────┘        └───────────┘
    ┌───────────┐        ┌───────────┐        ┌───────────┐
    │ Stripe 1  │        │ Stripe 2  │        │Parity (1, 2)│
    ├───────────┤        ├───────────┤        ├───────────┤
    │ Stripe 4  │        │Parity (3, 4)│       │ Stripe 3  │
    ├───────────┤        ├───────────┤        ├───────────┤
    │Parity (5, 6)│      │ Stripe 5  │        │ Stripe 6  │
    └───────────┘        └───────────┘        └───────────┘
```
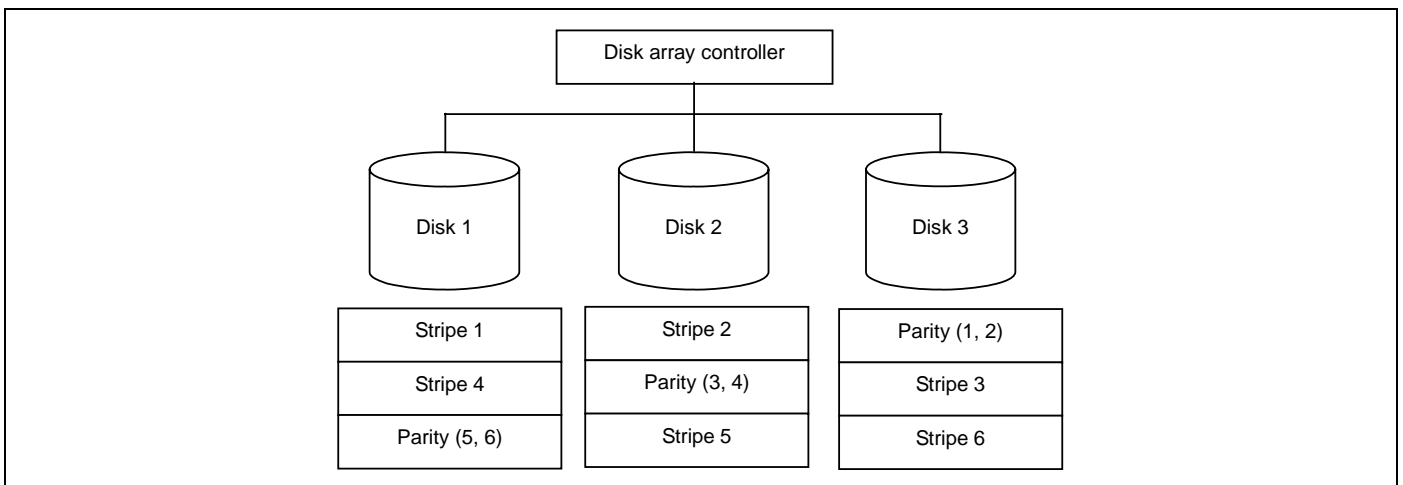
Spanning of RAID1 (also known as RAID10)

Data to be recorded is distributed to two HDDs in mirroring mode. Then, each mirrored data is written onto HDD by striping. Owing to this feature, high disk access performance of RAID0 and, in addition, high reliability of RAID1 can be achieved.
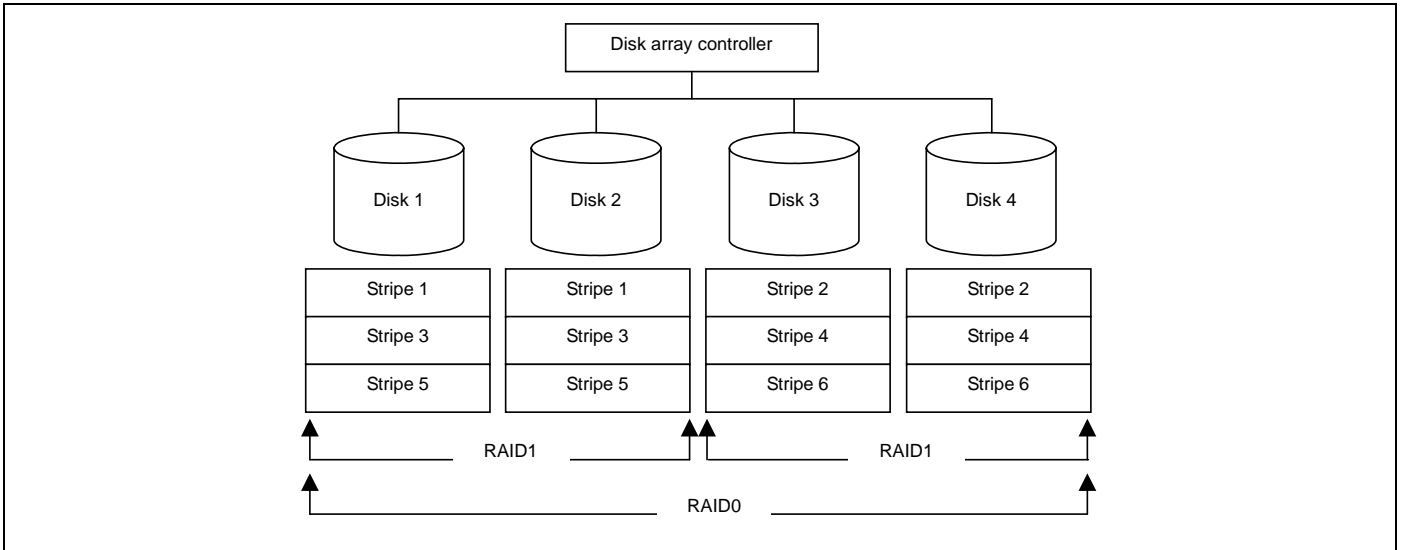
Spanning of RAID5 (also known as RAID50)

Data is distributed to HDDs by striping with distributed parity, and then written onto HDDs by striping. Owing to this feature, high disk access performance of RAID0 and, in addition, high reliability of RAID5 can be achieved.
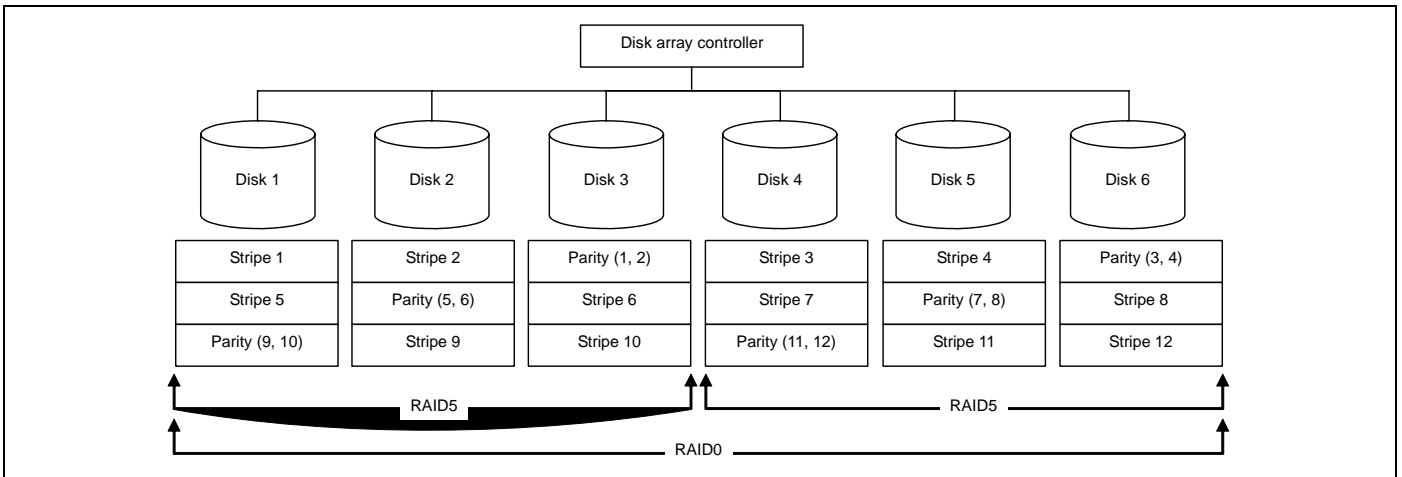
Features of On-board RAID (MegaRAID ROMB)

This section describes the features of the on-board RAID (MegaRAID ROMB).

Rebuild

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

Manual Rebuild

The manual rebuild can be performed by using MegaRAID Storage Manager (called MSM hereafter), the management utility of the on-board RAID (MegaRAID ROMB). Select a HDD and start the rebuild manually.

For the detailed operation, refer to the "MegaRAID Storage Manager™ User's Guide" in EXPRESSBUILDER CD-ROM that comes with the server.

Auto Rebuild

The on-board RAID (MegaRAID ROMB) can automatically start the rebuild without use of any utility such as MSM.

The auto rebuild includes two types as follows:

- Standby rebuild

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

- Hot-swap rebuild

  Automatic rebuild by hot-swapping defected HDD.

IMPORTANT: Note the following for the rebuild:

- The HDD used for rebuild should have the same capacity, rotation speed, and standard as the defected HDD.

- During rebuild, the processing rate is decreased due to much 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 is automatically restarted.

- The interval from the removal of the defected HDD to the installation of a substitute HDD should be 90 sec or longer.

- If the hot-swap rebuild does not operate, perform the manual rebuild.

- The following hard disk drive cannot be specified as a hot spare disk.
  – Hard disk drive with partitions
  – Hard disk drive used for another array
  Prepare another new hard disk drive or a formatted hard disk drive.

Patrol Read

The patrol read gives the read & verify test in the entire area of HDDs. It can be performed for all HDDs assigned to virtual disks and hot-spare disks.

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

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

> **IMPORTANT:** Note the following for the patrol read:
> - Patrol Read feature is factory-set to "Disabled".
> - To utilize Patrol Read, MSM must be installed.
> - If the system is restarted, Patrol Read is aborted. After restart of the system, Patrol Read runs from the first step (top of HDD).

Consistency Check

The Consistency Check is used to check consistency among virtual drives. It is available for redundant virtual drives in the RAID1 or RAID5 level.

Consistency Check can be performed through WebBIOS or MSM.

Consistency Check performs not only consistency check but also repair of 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 much load.
> - If the system is restarted, the Consistency Check is aborted. However, the Consistency Check resumes after restart.

Background Initialize

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

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

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

- Full Initialize has already been executed and completed normally before executing Background Initialize.

  (*) Full Initialize is a function to clear 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 completed normally before executing Background Initialize.
- "Yes" is specified for "Disable BGI" in VD Definition.

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 HDD being in offline status, and the virtual disk becomes Optimal state.
- When you replace the disk array controller with the maintenance parts and others.
- When you execute Reconstruction to existing virtual disk to make RAID5 VD with five or more HDDs.

IMPORTANT: Note the following for Background Initialize:

- During Background Initialize, the processing rate is decreased due to much 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 on-board RAID (MegaRAID ROMB) supports "Migration with addition" only.

Removed physical drive

Unsupported.

Migration only

Unsupported.

Migration with addition

Use this feature to add HDDs to existing virtual disk. On MSM, this feature is indicated as "Add Drive". The execution patterns are as shown below (α: Number of HDDs to be added).

Before execution		After execution		
RAID level	Number of HDDs	RAID level	Number of HDDs	Description
RAID0	x	RAID0	x+α	Capacity increased: equivalent to α HDDs
RAID0	1	RAID1	2	Capacity remains unchanged.
RAID0	x	RAID5	x+α	Capacity increased: equivalent to α-1 HDDs
RAID1	2	RAID0	2+α	Capacity increased: equivalent to α+1 HDDs
RAID1	2	RAID5	2+α	Capacity increased: equivalent to α HDDs
RAID5	x	RAID0	x+α	Capacity increased: equivalent to α+1 HDDs
RAID5	x	RAID5	x+α	Capacity increased: equivalent to α HDDs

IMPORTANT: Note the following for the Reconstruction:

- Be sure to make backup copy of data and perform Consistency Check before starting Reconstruction.

- The Reconstruction is disabled in the configuration where several virtual disks are defined in one disk group

- During Reconstruction, the processing rate is decreased due to much load.

- The Reconstruction is disabled for the degraded virtual disk. First execute Rebuild to recover the virtual disk, then execute Reconstruction.

- During Reconstruction, 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 Reconstruction is automatically restarted.

- In some configuration, Background Initialize may start automatically upon completion of 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.
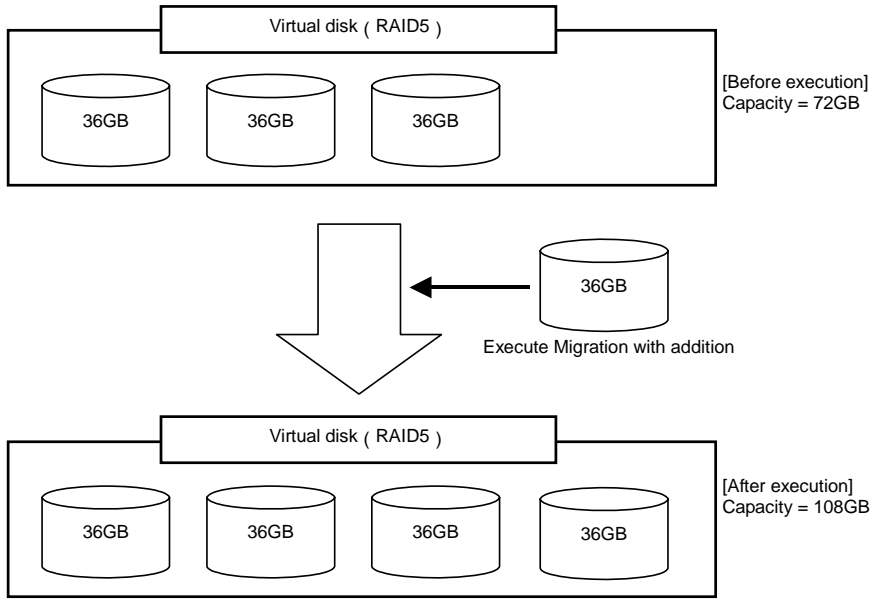
Before Using WebBIOS

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

Supported Functions

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

Notes on Creating Virtual Drive

The HDDs configuring the disk group should have the same capacity and rotation speed.

- Be sure to execute Consistency Check after creating VD.
- When installing an OS in VD under the Onboard RAID (MegaRAID ROMB), create a VD dedicated to OS installation.
- WebBIOS cannot be handled via remote console functions of NEC DianaScope.
- The physical drive numbers shown in Physical Drives box differ from slot numbers of 3.5-inch hard disk bay. "PD 0" denotes the physical drive number 0. See "Physical Drive Properties" described later.
- The physical drive numbers shown in Physical Drives box of WebBIOS may differ from those shown in MegaRAID Storage Manager.
- The physical drive number shown in Physical Drives box of WebBIOS is identical to the Device ID shown in Disk Properties View of MegaRAID Storage Manager.

■ In the example below, Physical Drive 2 (PD 2) in WebBIOS is displayed as Physical Drive 1 in Disk Properties View of MegaRAID Storage Manager.
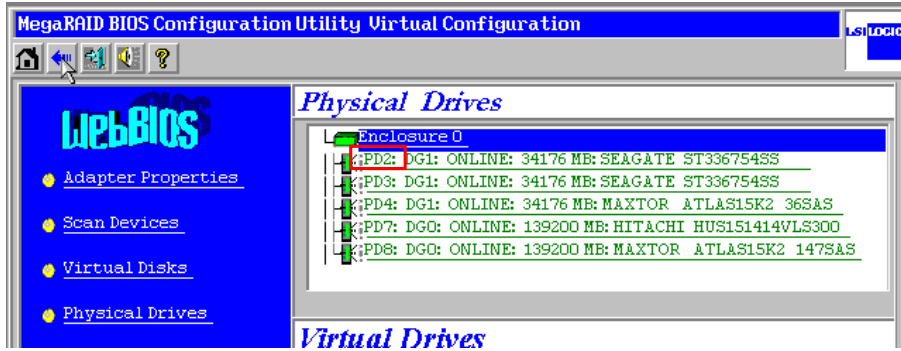
Physical Drives View of WebBIOS
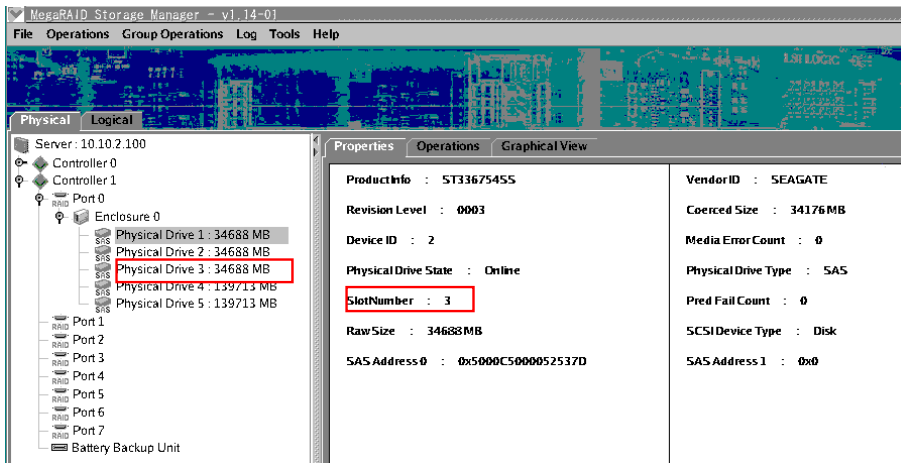
Disk Properties View of MegaRAID Storage Manager

Using WebBIOS

Starting WebBIOS

1. Press **Esc** when the screen with the manufacturer's logo appears after powering on the server.

2. Press **Ctrl** + **H** on POST screen to start WebBIOS.

POST screen image (with no virtual disk assigned)

```
LSI MegaRAID SAS - MFI BIOS Version XXXX (Build MMM DD, YYYY)
Copyright (c) 2005 LSI Logic Corporation

HA - X (Bus X Dev X)    MegaRAID SAS XXX (1000/0411/1033/8287)
FW package: X.X.X - XXXX


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

IMPORTANT: Do not press unnecessary key such as **Pause** during POST.

Main Menu

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

NOTES:

- When an optional LSI Logic MegaRAID SAS 8480E disk array controller is installed, it is displayed as "MegaRAID SAS 8408E".

- When an optional SecuRAID 321 disk array controller is installed, it is displayed as "MegaRAID SCSI 320-2".

- The on-board RAID controller (MegaRAID ROMB) is displayed at the bottom line.

When the adapter is selected on [Adapter Selection], the WebBIOS Top Menu appears.
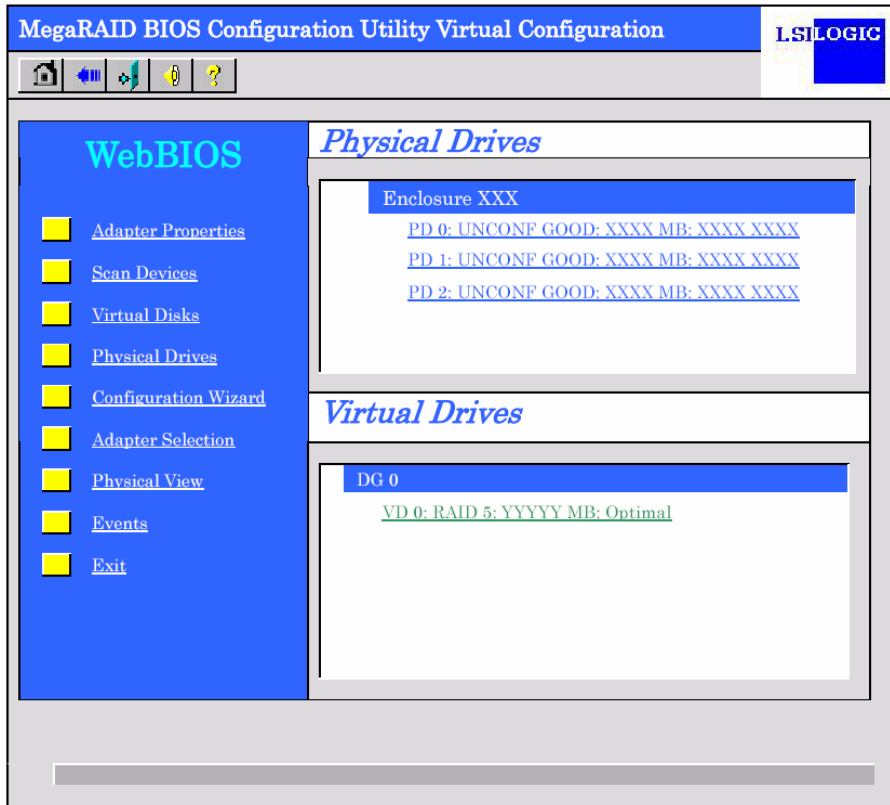
IMPORTANT:

- The physical drive numbers shown in Physical Drives box differ from slot numbers of 3.5-inch hard disk bay. "PD 0" denotes the physical drive number 0. See "Physical Drive Properties" described later.

- Do not use WebBIOS to configure MegaRAID SCSI320-2 disk array controller.

Adapter Properties

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

MegaRAID BIOS Configuration Utility Adapter Information				LSILOGIC

MegaRAID SAS XXX			
Firmware Version X.XX.XX-XXXX		WebBIOS Version X.XX-XXX	
Sub Vendor ID	0x1033	Sub Device ID	0x8287
Host Interface	PCIE	Port Count	8
NVRAM Size	32 KB	Memory Size	256 MB
Firmware Time	XXX XX XXXX:XX:XX:XX	Serial Number	None
Min Stripe Size	8 KB	Max Stripe Size	128K
Virtual Disk Count	XX	Physical Disk Count	XX

Next

Home   Back

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

MegaRAID BIOS Configuration Utility Adapter Properties				LSILOGIC

Properties

Battery Backup	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	6
Adapter BIOS	Enabled	StopOnError	Disabled

Submit   Reset

Home   Back

Default settings and their explanation

Item	Default	Description	Change
Battery Backup	Present None	Displays Properties. • When battery is installed: Present • When battery is not installed: None	–
Set Factory Defaults	[No] Yes	Restores factory defaults.	Permitted
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 [1]
Spinup Delay	6	–	Prohibited [1]
StopOnError	[Disabled] Enabled	–	Prohibited

*1 After performing Set Factory Defaults, change values of "Spinup Drive Count" and "Spinup Delay" as shown in the table above, if they are not.

*2 Error notification by beep sound is not issued even if Alarm Control is set to Enabled.

How to change setting value

On [Adapter Properties] screen, change a parameter to desired value, and then click [Submit] at the centre of the screen to determine the new value.

The status of "Battery Backup" is indicated as "Present". Clicking [Present] opens the Battery Status screen as shown below.

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

NOTES:

■ Status field shows "Charging" when the battery is in charged status.
  It shows "Discharging" when the battery is in discharged status.

■ When powering on the server after replaced the battery, the Status may not immediately change to "Charging". In that case, power on the server for several hours, and check "Status" again.

Scan Devices

When you click [Scan Devices] on WebBIOS top menu, the HDDs connected are detected again. Use this feature when you have installed a new HDD additionally while the WebBIOS is running.

> **IMPORTANT:** If the newly connected HDD contains another configuration information, [Foreign Configuration] screen as shown below appears. To use the HDD as new one, click [ClearForeignCfg] to clear the configuration information in HDD.
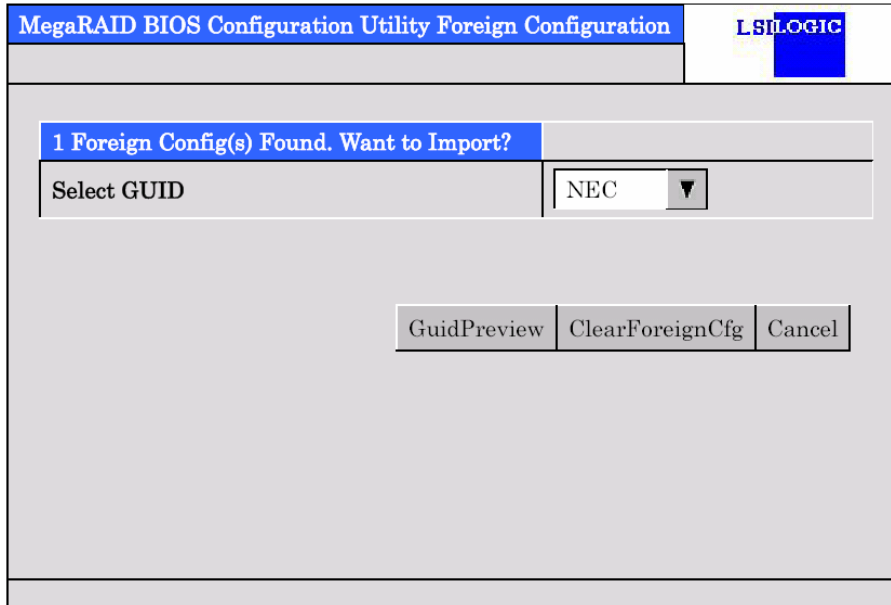
Virtual Disks

When you click [Virtual Disks] on WebBIOS top menu, the screen for operating the VD that has already been configured.
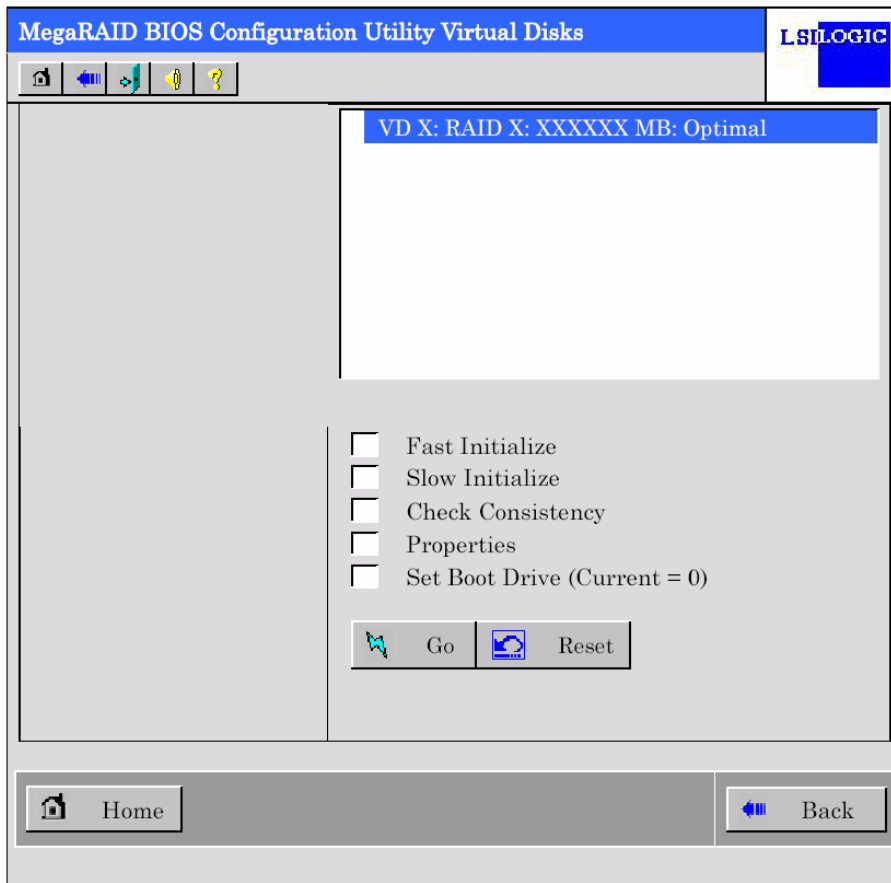
IMPORTANT: If no virtual disk exists, the upper right column of the screen will be blank. Use this menu only when a virtual disk exists.

Physical Drives

When you click [Physical Disks] on WebBIOS top menu, the screen for operating the physical drive (HDD) appears.
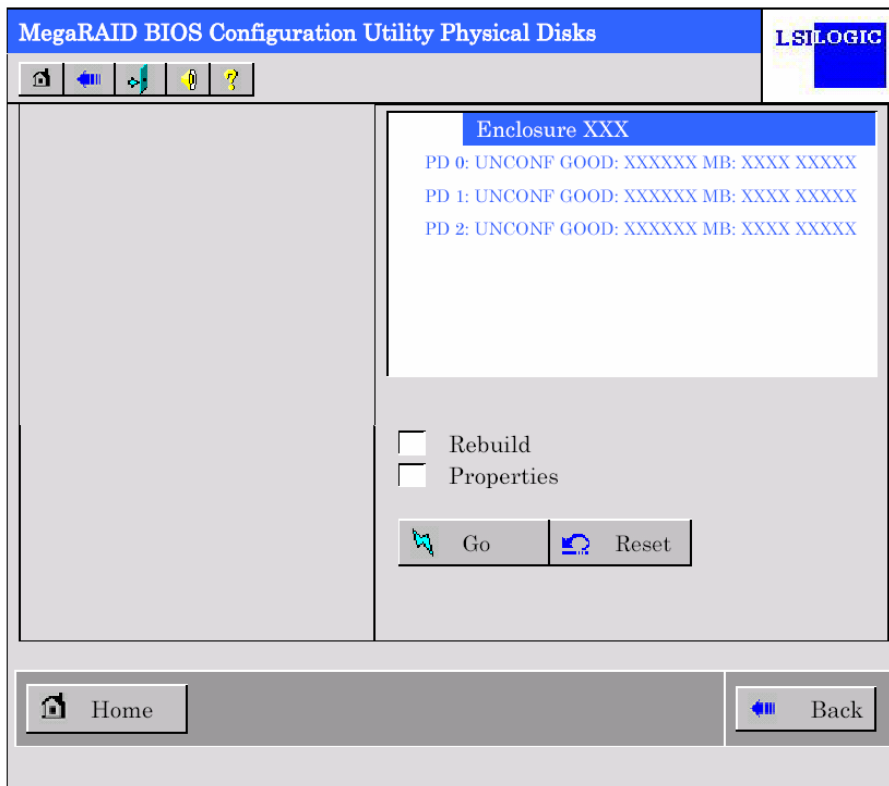
IMPORTANT: If no physical disk exists, the upper right column of the screen will be blank. Use this menu only when a physical disk exists.

Physical Drives Properties

Take the following procedures to check Physical Drive Properties. Shown below is an example to check property of physical drive number 0.

1. Click the desired PD number (PD 0).

2. Click the checkbox for [Properties].

3. Click [Go].
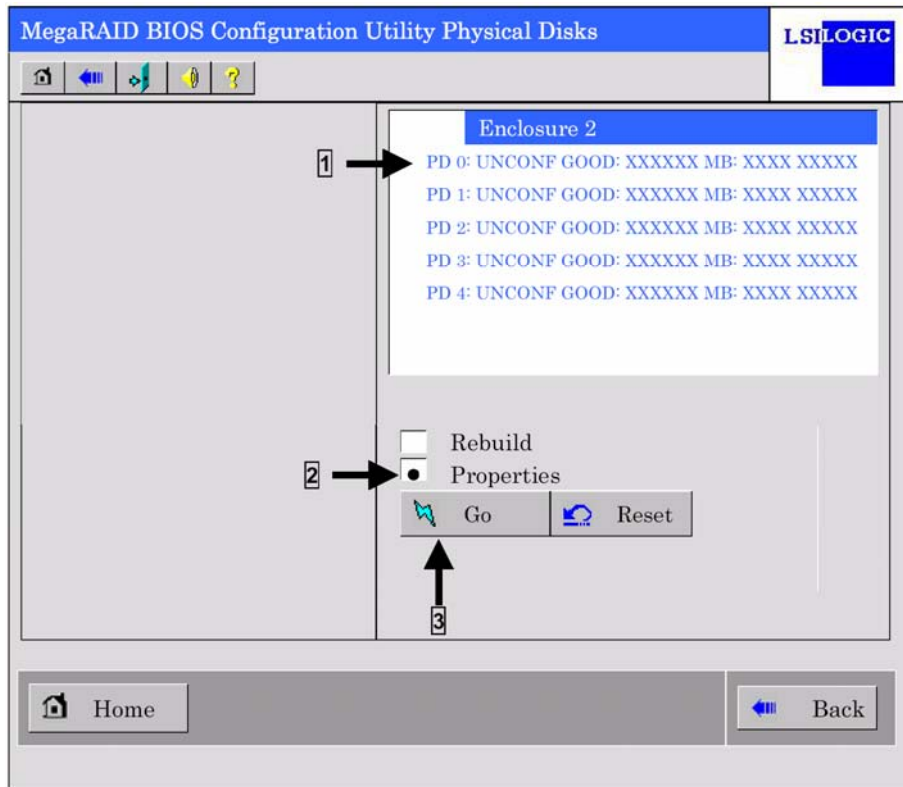
The Slot Number field shows a slot number to which a 3.5-inch disk bay is installed. In the example, the disk bay is installed in slot 2.
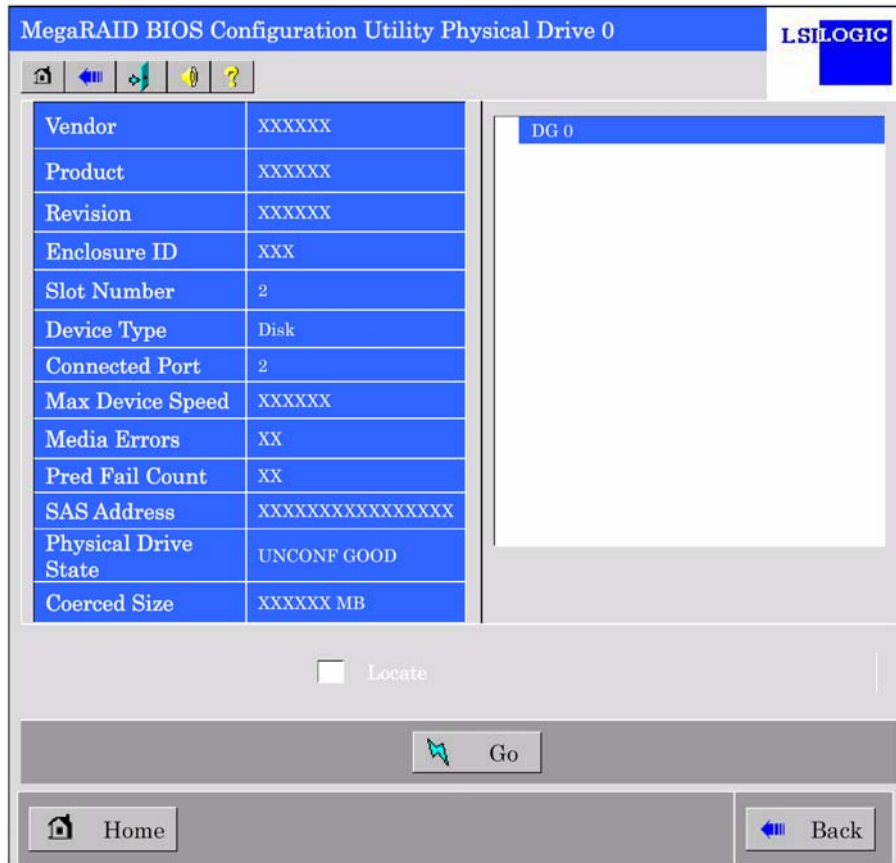
NOTE: If you click the check box for [Locate] and then [↓ Go], nothing happens, this feature is not supported.

Configuration Wizard

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

Adapter Selection

If several disk array controllers N8103-90F are installed in the server, you need to select an adapter controlled by WebBIOS to configure each adapter. Clicking [Adapter Selection] on WebBIOS top menu opens the [Adapter Selection] screen again.

Physical View / Logical View

If the virtual disk has been configured using the disk array controller, DG (disk group) is displayed on WebBIOS top menu. Clicking [Physical View] displays information for HDDs in DG. Clicking [Logical View] displays virtual disk in DG.

Events

The Events screen is used to confirm the system events.

IMPORTANT: The On Board RAID (MegaRAID ROMB) does not support Events feature.

Exit

When you click [Exit] on WebBIOS top menu, a confirmation screen to exit from WebBIOS is displayed. Click [Yes] to exit from WebBIOS.
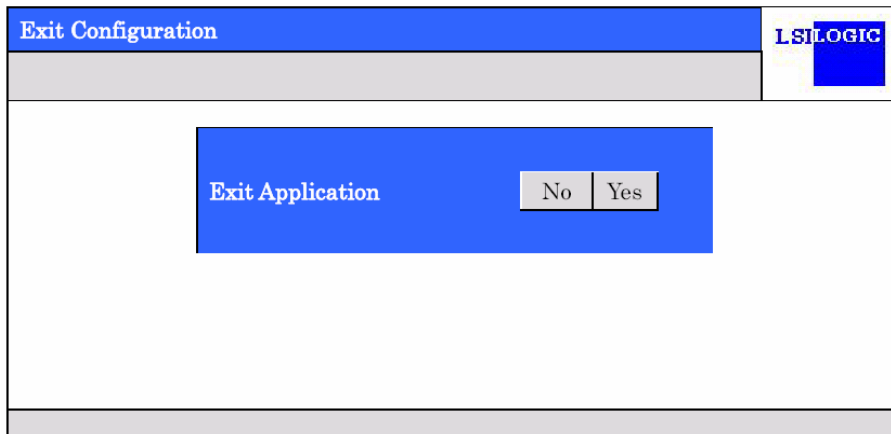
The screen as shown below appears when WebBIOS is terminated. Restart the server.
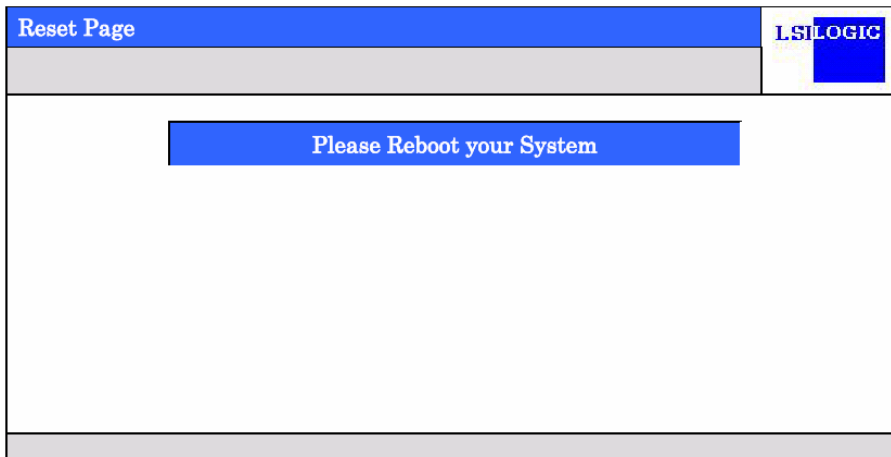
Configuring Virtual Disk

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

Configuration Wizard

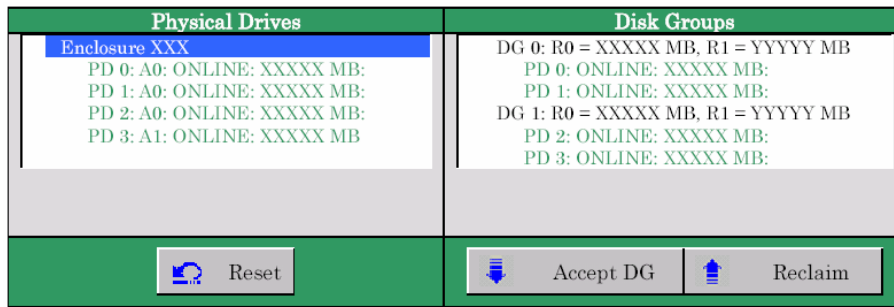When you click [Configuration Wizard] on WebBIOS top menu, the screen as shown below appears. Select the relevant operation, and click [Next] at lower right of the screen.
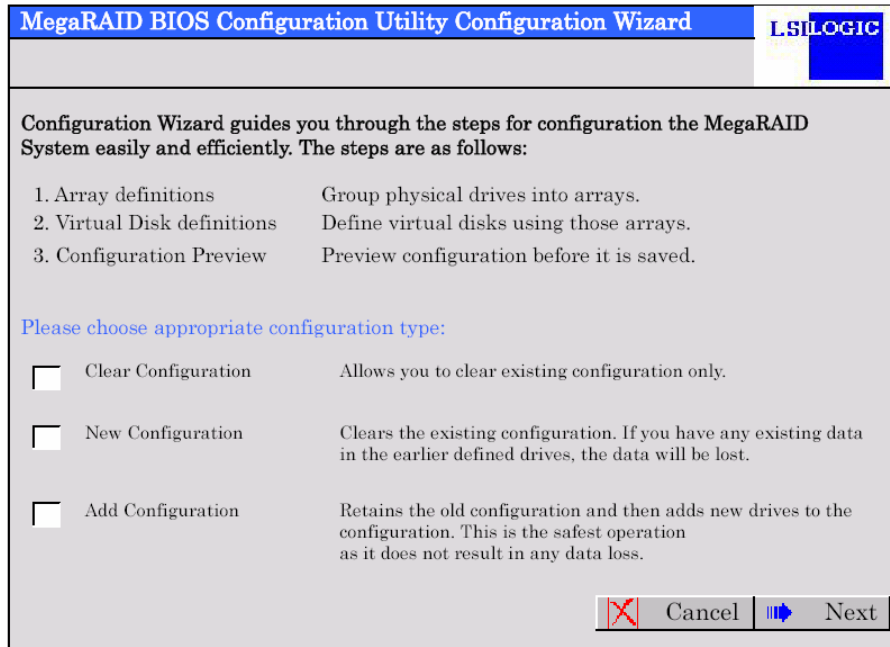
Clear Configuration	Allows you to clear existing configuration.
New Configuration	Clears the existing configuration and creates a new VD. If you have any existing data in the earlier defined virtual disk, the data will be lost.
Add Configuration	Retains the old configuration and then adds new virtual disk.

When you select [New Configuration] or [Add Configuration], the screen as shown below appears.
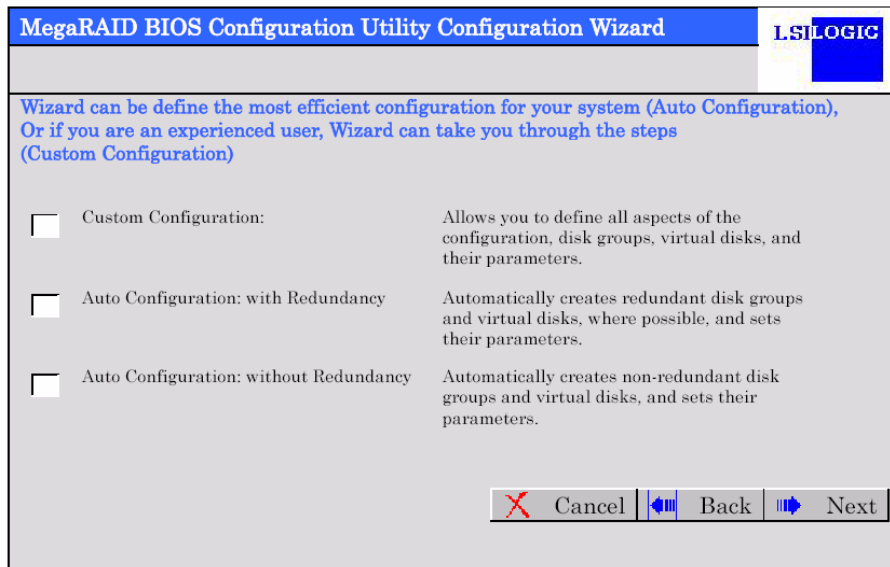
Custom Configuration:	Allows you to define all aspects of the configuration, RAID level, size, and others.
Auto Configuration with Redundancy:	Automatically creates redundant virtual disk.
Auto Configuration without Redundancy:	Automatically creates non-redundant virtual disk.

IMPORTANT: The On Board RAID (MegaRAID ROMB) supports "Custom Configuration" only.

Use this menu to define several physical drives (PD) as a disk group (DG).
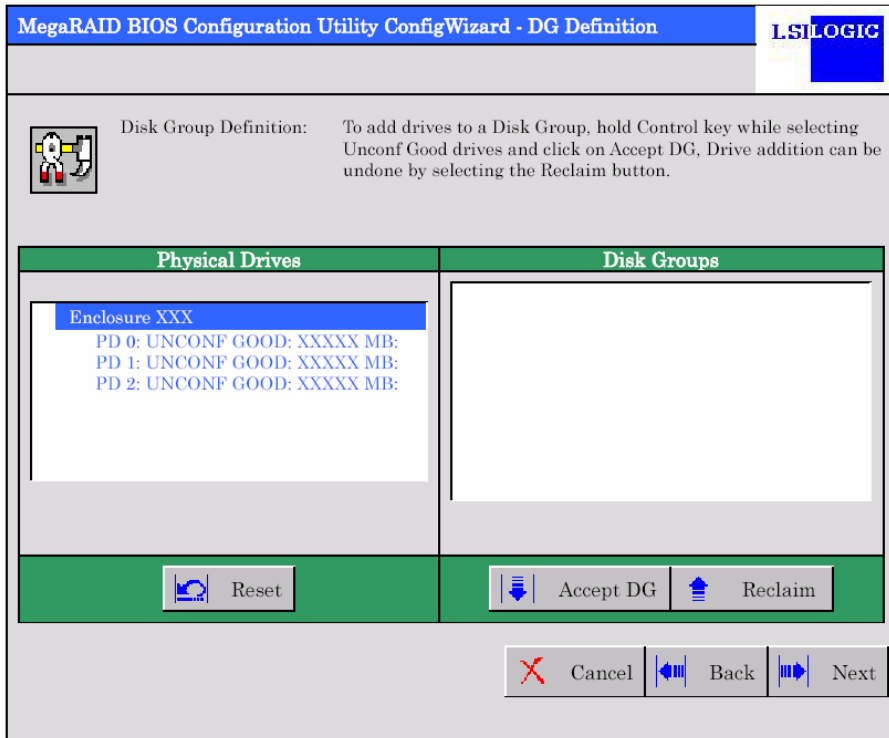
> **IMPORTANT:** The physical drive number is not identical to the slot number of disk bay. To define several Disk Groups in ascending order of the slot number of disk bay, confirm the slot number on Properties screen of Physical Drive.

1. To add physical drives (HDD) to a Disk Group, hold **Ctrl** while selecting UNCONF GOOD drives.
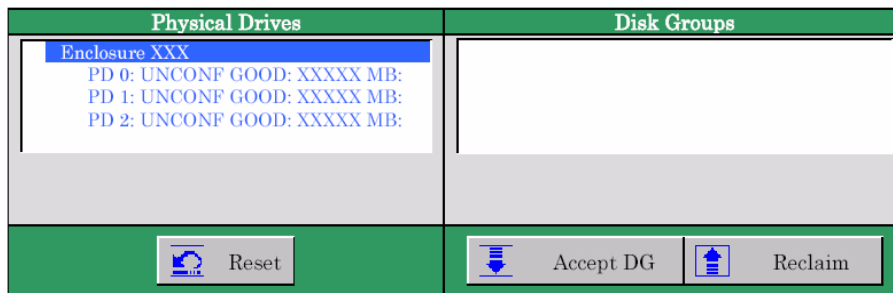
2. Upon completion of selection, click [Accept DG] at the lower right of the screen.
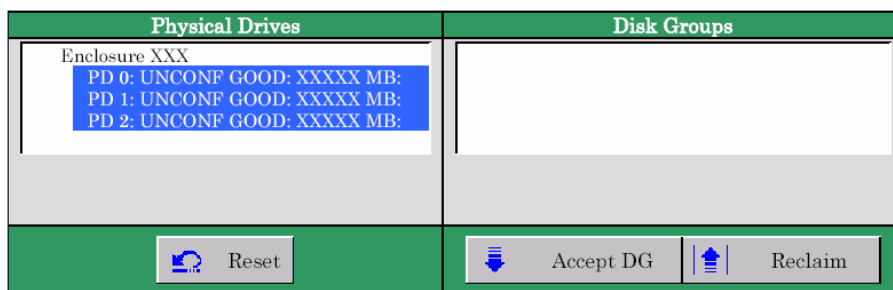
3. A new DG is defined in the Disk Groups frame. After DG has been defined, click [Next] at the lower right of the screen.

Physical Drives	Disk Groups
Enclosure XXX PD 0: A0: ONLINE: XXXXX MB: PD 1: A0: ONLINE: XXXXX MB: PD 2: A0: ONLINE: XXXXX MB:	DG X: R0 = XXXXX MB, R5 = XXXXX MB PD 0: ONLINE: XXXXX MB: PD 1: ONLINE: XXXXX MB: PD 2: ONLINE: XXXXX MB:
Reset	Accept DG Reclaim
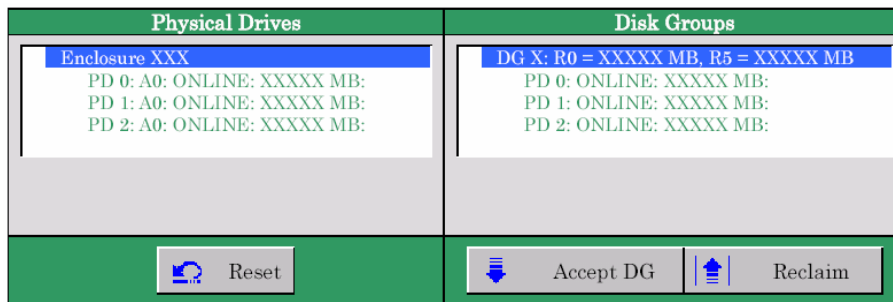
Define the virtual disk (VD) in DG that has been created in previous step. When DG was defined, [VD Definition] screen is displayed. The defined DG is displayed in Configuration column. Available RAID levels and maximum size for VD are also displayed.

MegaRAID BIOS Configuration Utility ConfigWizard – VD Definition   LSILOGIC

Virtual Disk 0

			Configuration
RAID Level	RAID 5 ▼		DG 0 :R0 = XXXXX MB, R5 = XXXXX MB
Strip Size	64 KB ▼		
Access Policy	RW ▼		
Read Policy	Normal ▼		
Write Policy	WBack ▼		
IO Policy	Direct ▼		Disk Group n: RAID Level = Size Available
Disk Cache Policy	Unchanged ▼		
Disable BGI	No		
Select Size	MB		

Accept   Reset

Cancel   Back   Next
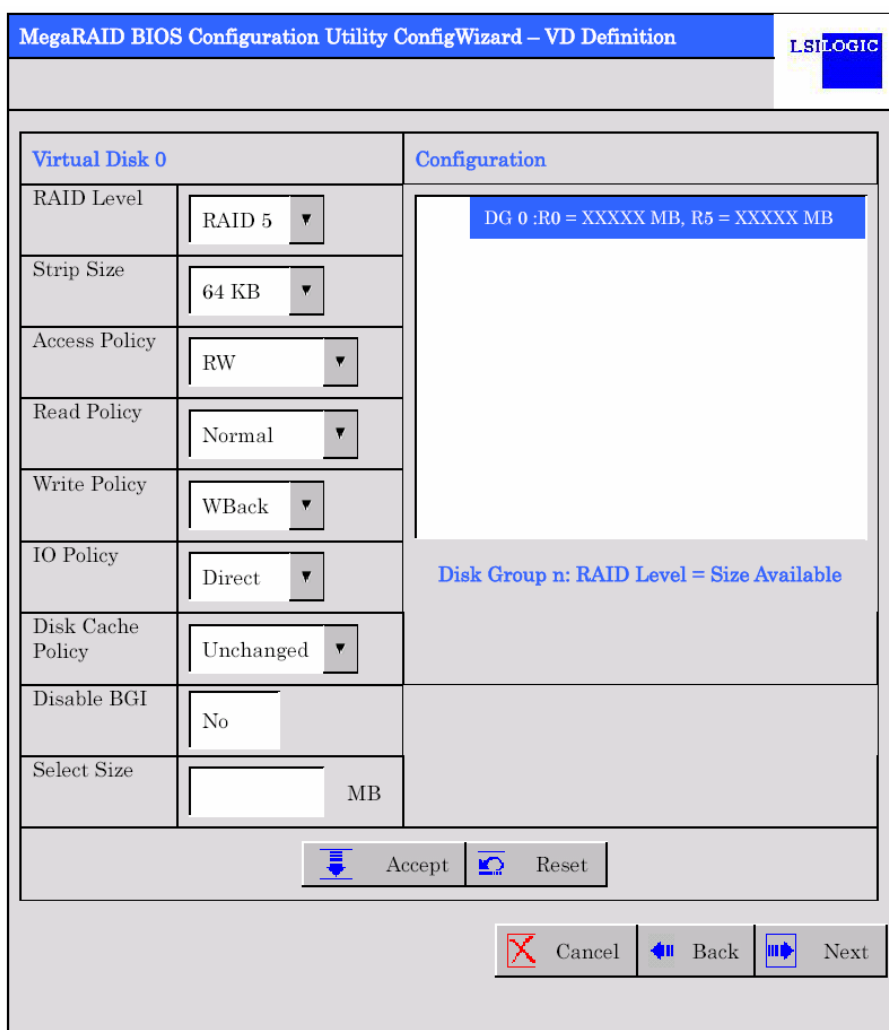
NOTE: Disk Cache Policy field may be displayed as "Disable" depending on firmware version of On Board RAID (MegaRAID ROMB). It is not a problem in operating the system.

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

1. Specify the necessary parameters in Virtual Disk column.

2. Enter "YYYYY" (the maximum size allowed for RAID5) in "Select Size" field.

3. Click [Accept] at the lower centre of the screen.

Virtual Disk 0		Configuration
RAID Level	RAID 5 ▼	DG 0 :R0 = XXXXX MB, R5 = YYYYY MB
Strip Size	64 KB ▼	
Access Policy	RW ▼	
Read Policy	Normal ▼	
Write Policy	WBack ▼	
IO Policy	Direct ▼	Disk Group n: RAID Level = Size Available
Disk Cache Policy	Unchanged ▼	
Disable BGI	No	
Select Size	YYYYY MB	
	Accept Reset	

NOTE: Disk Cache Policy field may be displayed as "Disable" depending on firmware version of On Board RAID (MegaRAID ROMB). It is not a problem in operating the system.

4.   VD 0 is created in DG 0 as shown in the screen below.
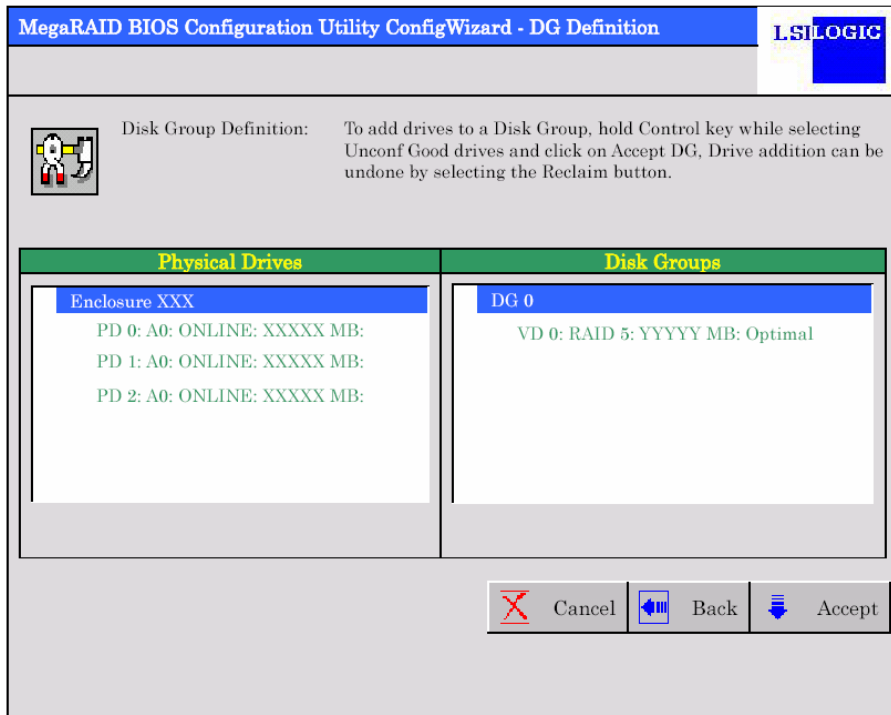
5.   After making sure that the VD is created correctly, click [Accept] at the lower right of the screen.

6.   The confirmation message "Save this Configuration?" appears. Click "Yes" to save the configuration.

7.   The confirmation message "Want to Initialize the New Virtual Disks?" appears. Normally, select "Yes".

8.   "Virtual Disks" operation screen is displayed. If no other operation is required, click [Home] at the lower left of the screen.

9.   The WebBIOS top menu is displayed. Virtual Disk you have created is displayed in the lower right frame of the screen.
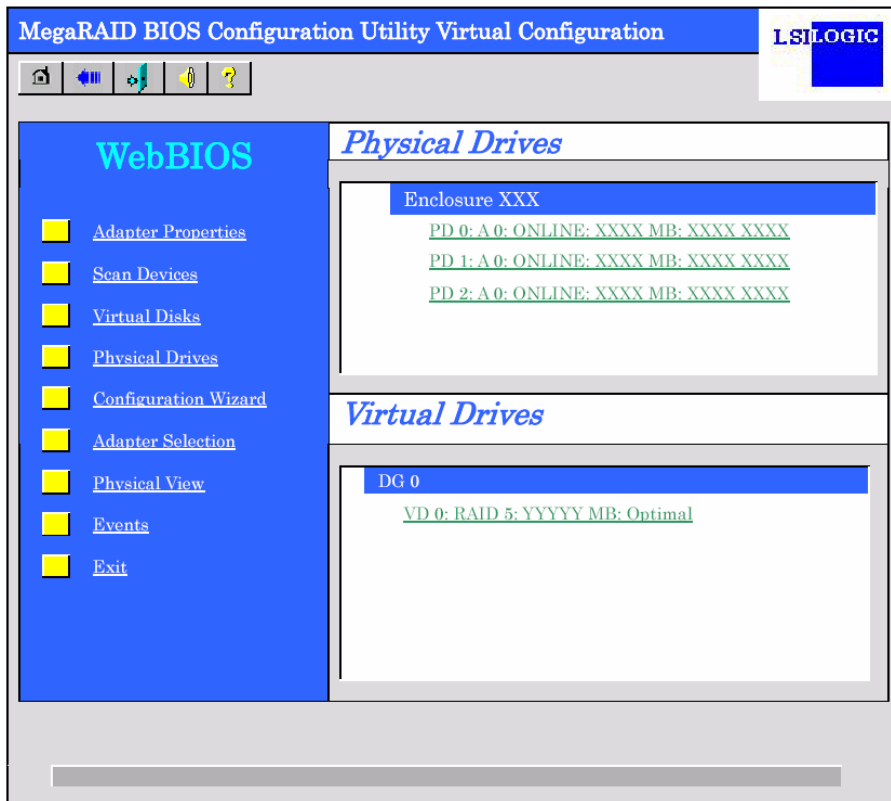
Configure SPAN

The following explains the sample procedure to configure the spanning of RAID1 with four HDDs.

> **IMPORTANT:** To define two or more Disk Groups (DG) to the disk bay in ascending order of the slot number, the physical drive numbers do not match the slot numbers of disk bay. You need to check the actual slot number on Properties view of Physical Drives.

1. Click [Configuration Wizard] on WebBIOS top menu to start Wizard.
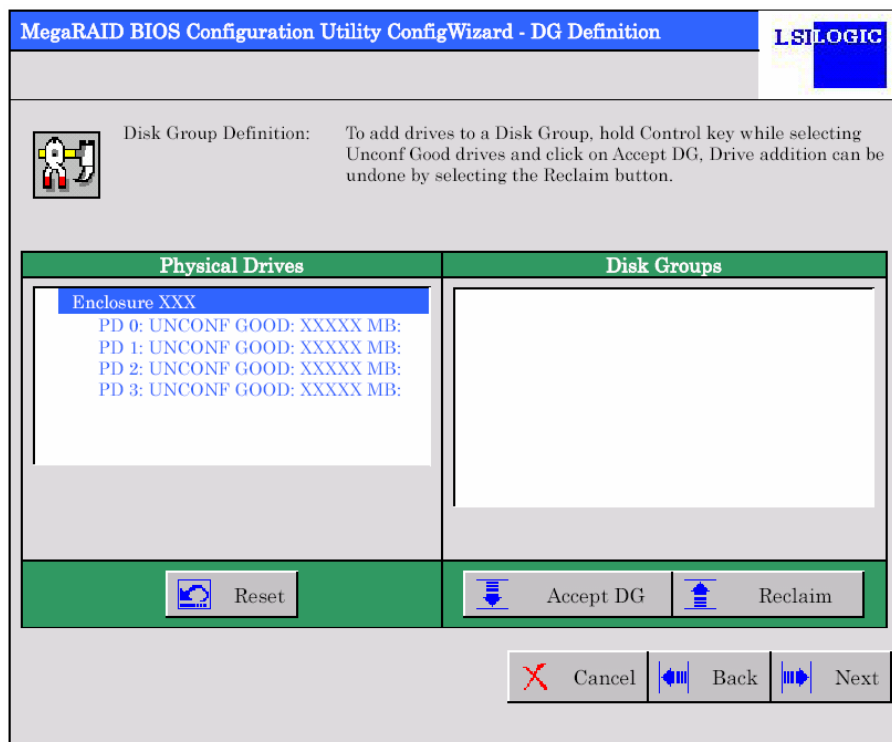
2. To add physical drives (HDD) to a Disk Group, hold Ctrl while selecting UNCONF GOOD drives. (In the example, two DGs will be configured and spanned.)

3. Upon completion of selection, click [Accept DG] at the lower right of the screen.

Physical Drives	Disk Groups

Enclosure XXX
  PD 0: UNCONF GOOD: XXXXX MB:
  PD 1: UNCONF GOOD: XXXXX MB:
  PD 2: UNCONF GOOD: XXXXX MB:
  PD 3: UNCONF GOOD: XXXXX MB:
	DG 0: R0 = XXXXX MB, R1 = YYYYY MB
	  PD 0: ONLINE: XXXXX MB:
	  PD 1: ONLINE: XXXXX MB:
	DG 1: R0 = XXXXX MB, R1 = YYYYY MB
	  PD 2: ONLINE: XXXXX MB:
	  PD 3: ONLINE: XXXXX MB:

Reset	Accept DG Reclaim

4. A new DG is defined in the Disk Groups frame. After DG has been defined, click [Next] at the lower right of the screen.

Physical Drives	Disk Groups
Enclosure XXX	DG 0: R0 = XXXXX MB, R1 = YYYYY MB
PD 0: A0: ONLINE: XXXXX MB:	PD 0: ONLINE: XXXXX MB:
PD 1: A0: ONLINE: XXXXX MB:	PD 1: ONLINE: XXXXX MB:
PD 2: A0: ONLINE: XXXXX MB:	DG 1: R0 = XXXXX MB, R1 = YYYYY MB
PD 3: A1: ONLINE: XXXXX MB	PD 2: ONLINE: XXXXX MB:
	PD 3: ONLINE: XXXXX MB:
↺ Reset	⬇ Accept DG ⬆ Reclaim

Configure the spanning of RAID1 using the DG that has been created in previous step. When DG was defined, [VD Definition] screen is displayed. The defined DG is displayed in Configuration column. Available RAID levels and maximum size for VD are also displayed.

MegaRAID BIOS Configuration Utility ConfigWizard – VD Definition   LSI LOGIC

Virtual Disk 0   **Configuration**

Virtual Disk 0		Configuration
RAID Level	RAID 0 ▼	DG 0 :R0 = XXXXX MB, R1 = YYYYY MB
Strip Size	64 KB ▼	DG 1 :R0 = XXXXX MB, R1 = YYYYY MB
Access Policy	RW ▼	
Read Policy	Normal ▼	
Write Policy	WBack ▼	
IO Policy	Direct ▼	Disk Group n: RAID Level = Size Available
Disk Cache Policy	Unchanged ▼	
Disable BGI	No	
Select Size	MB	

⬇ Accept   ↺ Reset

☒ Cancel   ◀ Back   ▶ Next
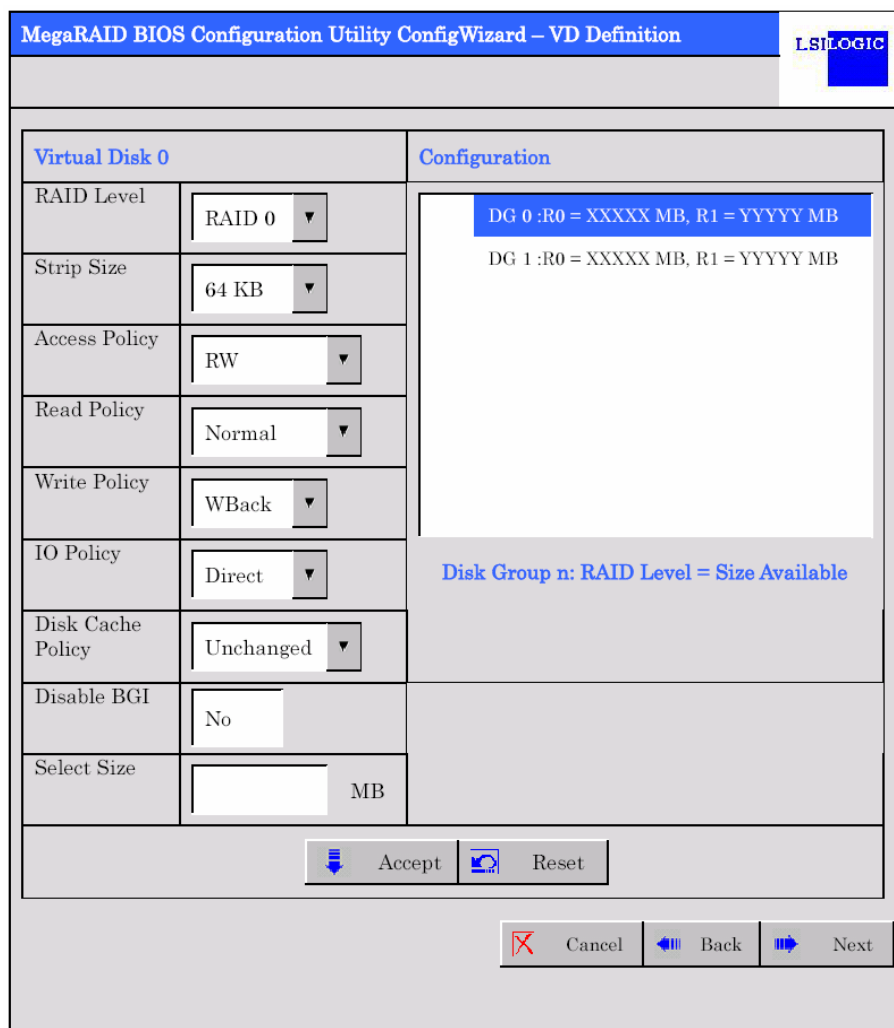
5. Hold **Ctrl** and click the two DGs in the Configuration column to select.

6. Specify the necessary parameters in Virtual Disk column.

> **NOTE:** Disk Cache Policy field may be displayed as "Disable" depending on firmware version of On Board RAID (MegaRAID ROMB). It is not a problem in operating the system.

7. Enter YYYYY x 2 (multiply the maximum size of each DG by the number of DGs) in "Select Size" field.

> **IMPORTANT:** To enter the value of virtual disk size below, multiply "the maximum size of each DG allowed for the RAID level" by the number of DGs.

8. Click [Accept] at the lower centre of the screen.

Virtual Disk 0		Configuration
RAID Level	RAID 1 ▼	DG **0** :R0 = XXXXX MB, R1 = YYYYY MB
Strip Size	64 KB ▼	DG **1** :R0 = XXXXX MB, R1 = YYYYY MB
Access Policy	RW ▼	
Read Policy	Normal ▼	
Write Policy	WBack ▼	
IO Policy	Direct ▼	**Disk Group n: RAID Level = Size Available**
Disk Cache Policy	Unchanged ▼	
Disable BGI	No	
Select Size	YYYYY * 2 MB	
	⬇ Accept ↺ Reset	

> **NOTE:** Disk Cache Policy field may be displayed as "Disable" depending on firmware version of On Board RAID (MegaRAID ROMB). It is not a problem in operating the system.

9. VD 0 is created in DG 0 as shown in the [Preview] screen below.
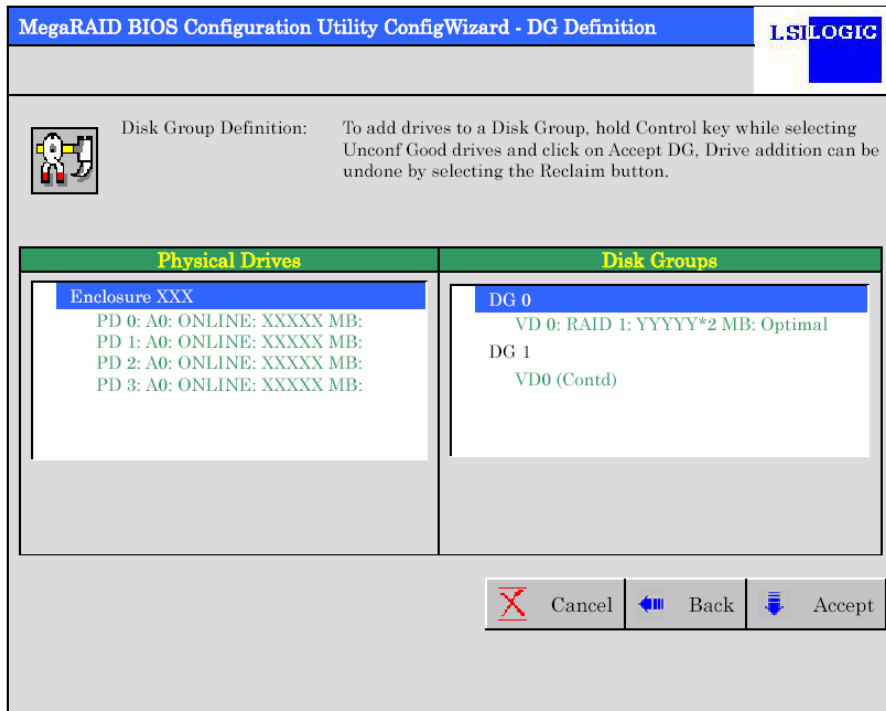
10. After making sure that the VD is created correctly, click [Accept] at the lower right of the screen.

11. The confirmation message "Save this Configuration?" appears. Click "Yes" to save the configuration.

12. The confirmation message "Want to Initialize the New Virtual Disks?" 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	RAID 0 / RAID 1 / RAID 5	
Strip Size	8 KB / 16 KB / 32 KB / 64 KB / 128 KB	Recommended value: 64KB
Access Policy	RW / Read Only / Blocked	Recommended value: RW
Read Policy	Normal / Ahead / Adaptive	Recommended value: Normal
Write Policy	WBack / WThru / BadBBU	WBack: WriteBack WThru: WriteThru BadBBU: Unavailable
IO Policy	Direct / Cached	Recommended value: Direct
Disk Cache Policy	Unchanged / Enable / Disable	Recommended value: Uncharged
Disable BGI	No / Yes	Specify whether to perform Background Initialize after creation of VD. Recommended value: No

IMPORTANT: BGI (Back Ground Initialize) is available only for RAID5 VD configured with five or more HDDs.

Operation of Various Features

Check Consistency

1. Start WebBIOS.

2. Click [Virtual Disks] on WebBIOS top menu.

3. Select a VD to perform Check Consistency from the upper right frame of Virtual Disks screen.

4. Click the checkmark column for Check Consistency from the lower right frame of Virtual Disks screen.

5. Make sure that Check Consistency is checked, and click [Go].
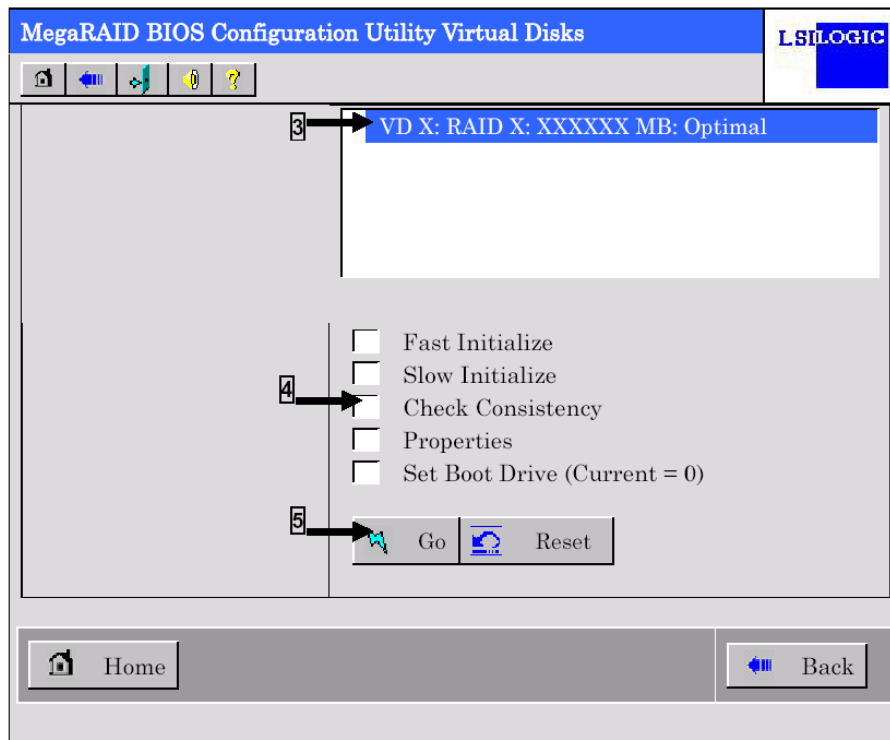
6. The progress of Check Consistency is displayed on the left frame of Virtual Disks screen.

7. Click [Home] at the lower left of Virtual Disks screen to return to the top menu.
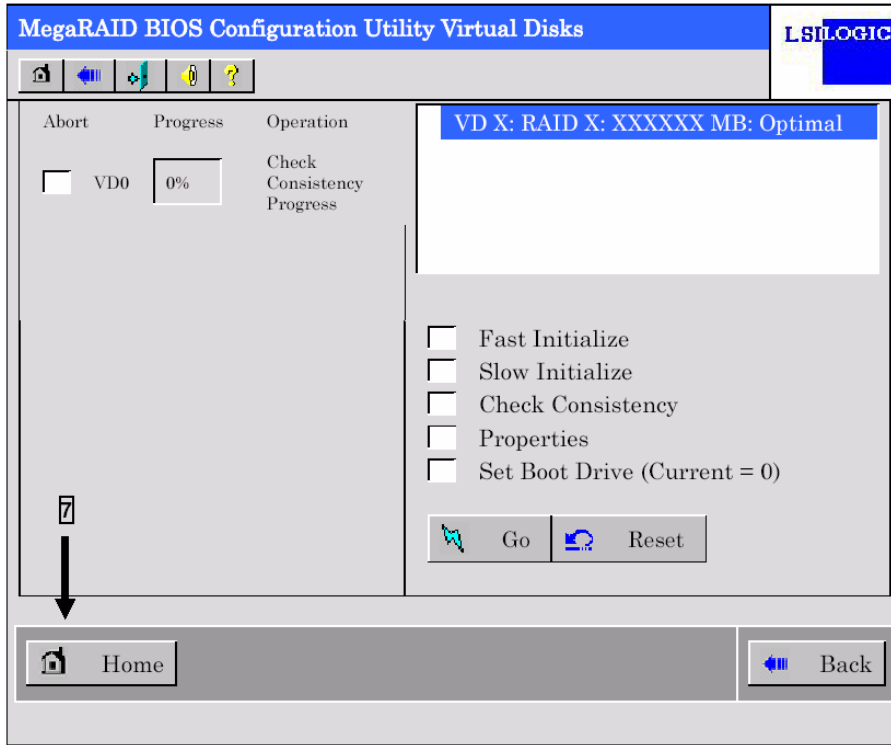
IMPORTANT: Click [Home] while the background task such as Consistency Check, Rebuild, or reconstruction is being executed. With the progress indication being displayed, the background task may be processed at slow rate.

Manual Rebuild

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

Replace the failed HDD with new one after turning off the power of the server. Auto Rebuild feature is disabled for non-hot-swap replacement. Use 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" represents that the PD (physical drive) having been installed in slot number 2 was removed.
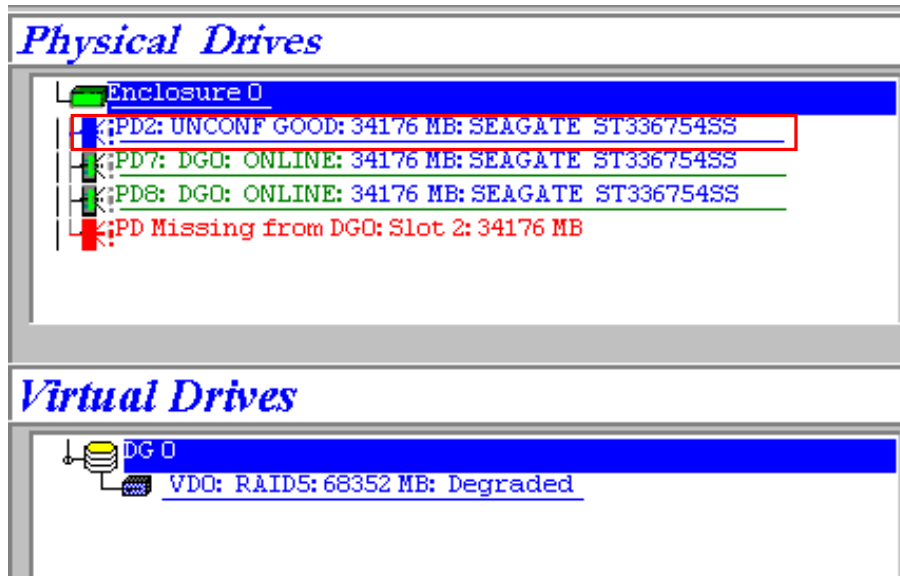
2. Select "PD2" (newly connected HDD) in [Physical Drives].

3. The properties for Physical Drive are displayed.

4. Select "Make Global HSP" or "Make Dedicated HSP" on the lower part of the screen, and then click [Go] on the lower centre of the screen.

MegaRAID BIOS Configuration Utility Physical Drive 2   LSILOGIC

Vendor	XXXXXX
Product	XXXXXX
Revision	XXX
Enclosure ID	XX
Slot Number	X
Device Type	Disk
Connected Port	0
Max Device Speed	XXXXXX
Media Errors	XX
Pred Fail Count	XX
SAS Address	XXXXXX
Physical Drive State	UNCONF GOOD
Coerced Size	XXXXX MB

DG 0

☐ Make Global HSP   ☐ Make Dedicated HSP   ☐ Make Unconf Bad

☐ Prepare for Removal   ☐ Undo prepare for Removal   ☐ Replace Missing PD

Go

4

Home   Back

5. When [Rebuild Progress] is displayed, click [Home] at the lower left of the screen to go back to WebBIOS top menu.
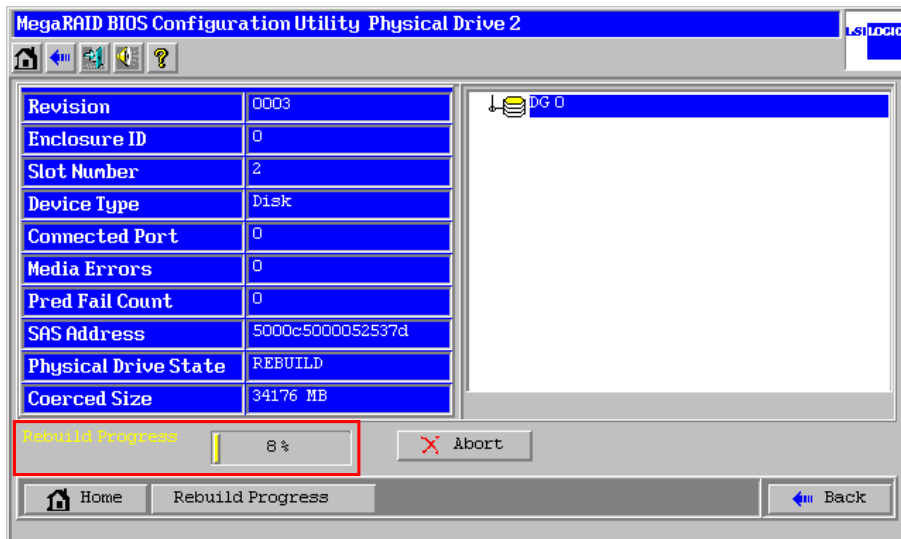
IMPORTANT: Click [Home] while the background Consistency Check, Rebuild, or reconstruction the progress indication being displayed, the background processed at slow rate.

Setting Hot Spare Disk

Described below are procedures based on assumption:
Add a HDD to a RAID5 virtual disk configured with three HDDs and assign a newly added HDD as Hot Spare Disk.

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.

Physical Drives

Enclosure XXX

PD 0: A 0: ONLINE: XXXX MB: XXXX XXXX

PD 1: A 0: ONLINE: XXXX MB: XXXX XXXX

PD 2: A 0: ONLINE: XXXX MB: XXXX XXXX

PD 3: UNCONF GOOD: XXXX MB: XXXX XXXX

Virtual Drives

DG 0

VD 0: RAID 5: YYYYY MB: Optimal
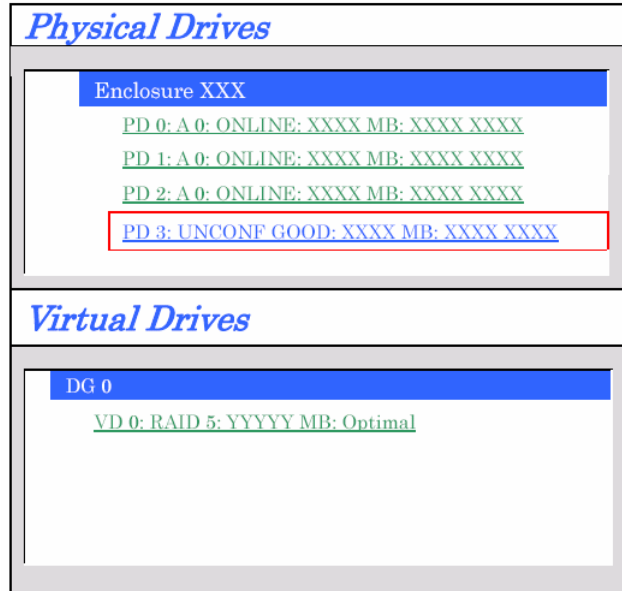
2. Select "PD3" (newly connected HDD) in [Physical Drives].

3. The properties for Physical Drive are displayed.

4. Select [Make Global HSP] or [Make Dedicated HSP] on the lower right of the screen, and then click [Go] on the lower centre of the screen.

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

Dedicated HSP: Indicates the Hot Spare Disk available only for the specific DG.
                    You need to specify the target DG.
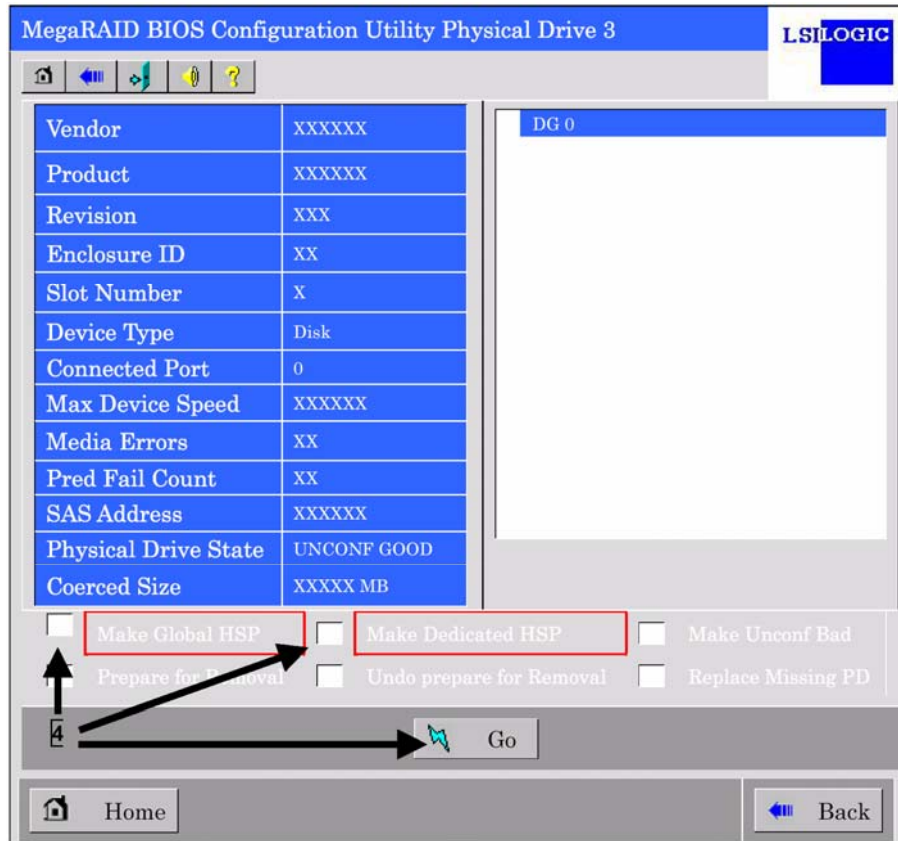
5. The status for the newly connected HDD changes to "HOTSPARE".

6. Click [Home] at the lower left of the screen to go back to WebBIOS top menu.
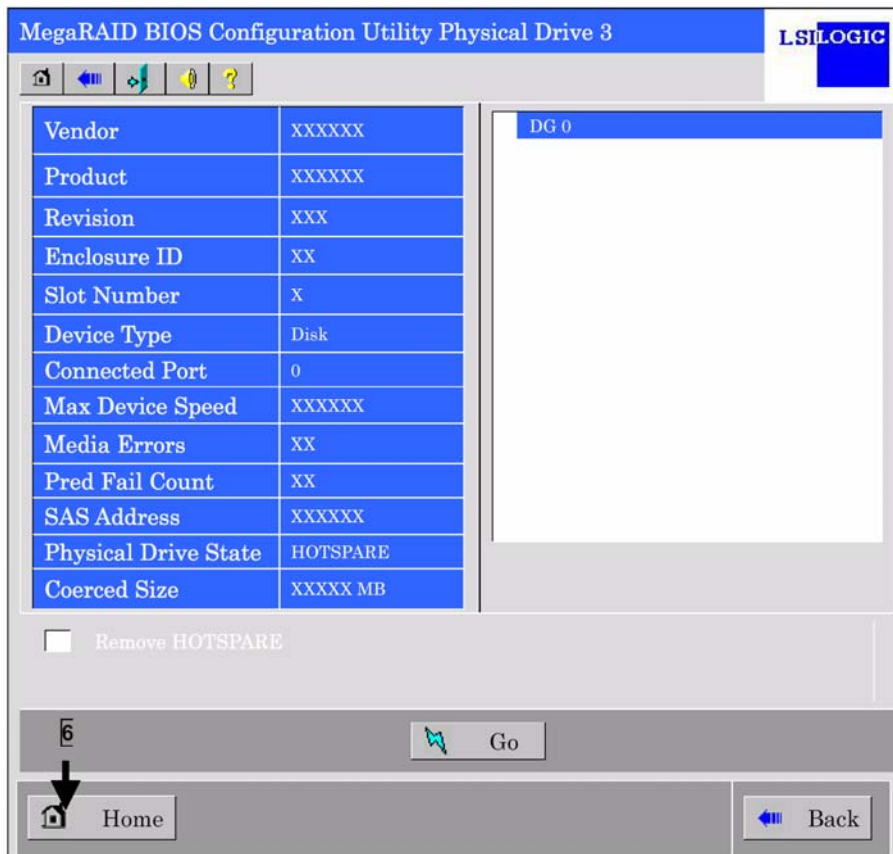
Reconstruction

Described below are procedures based on 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.
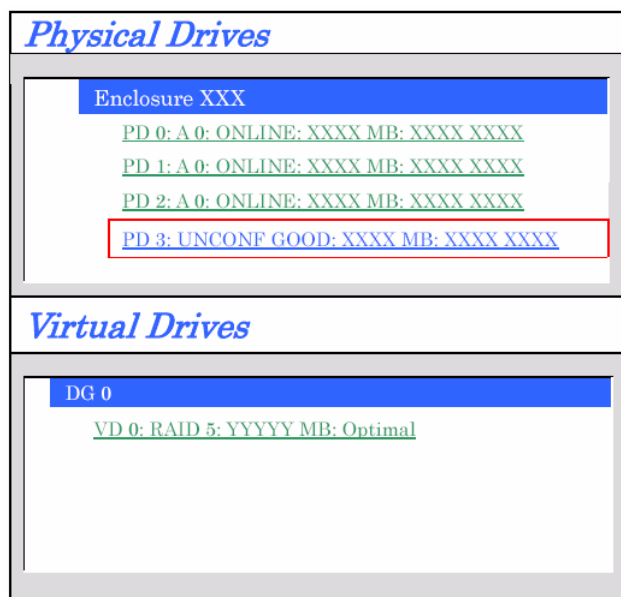
2. Select "VD 0" (already been constructed) in [Virtual Drives].

3.   Setting menu for VD 0 is displayed.
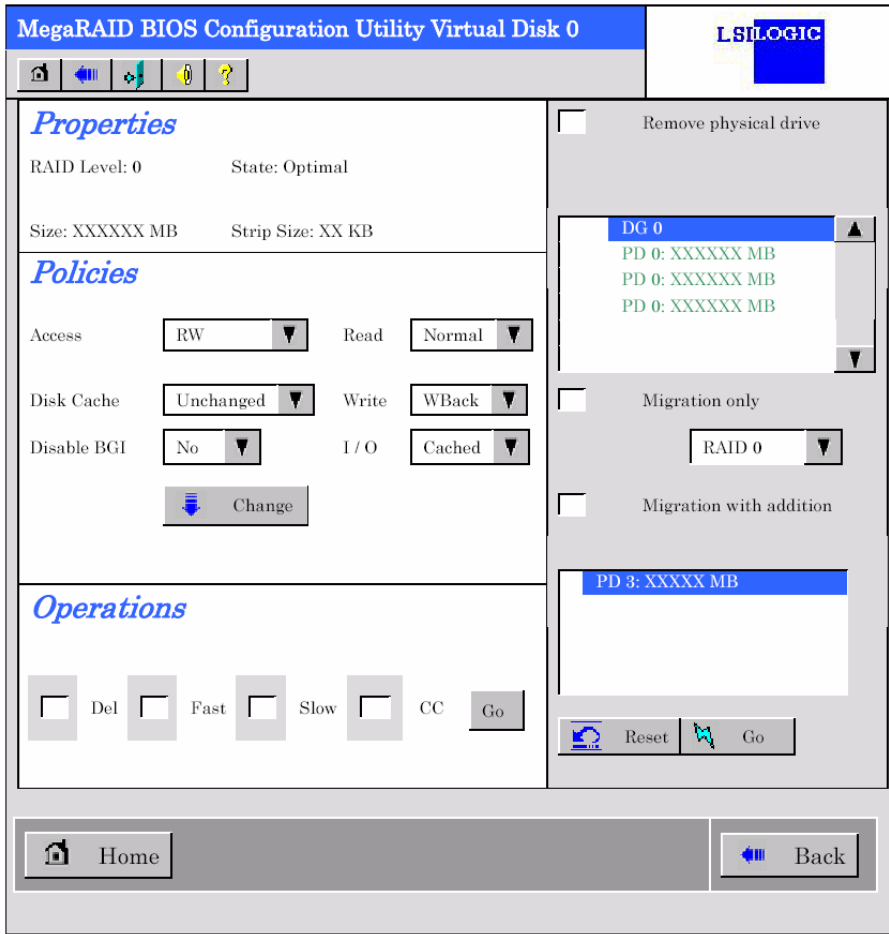
4.   On the right of the screen, items required for reconstruction are displayed.

Information of HDDs in
the disk group in
which a VD is defined
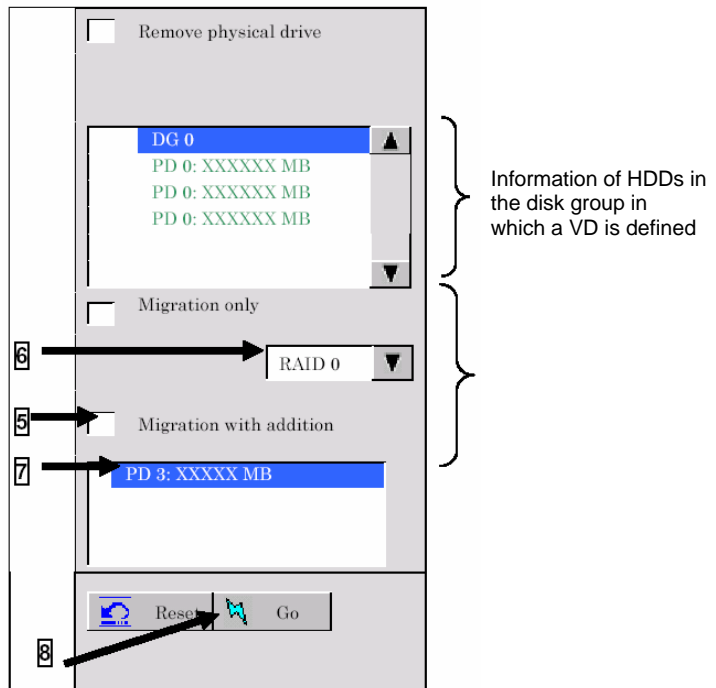
5.   Select "Migration with addition".

6.   Specify the RAID level used after reconstruction.

7. Select a HDD to be added.

8. When you finished steps 5 to 7, click [Go] at the lower right of the screen.

9. The progress of reconstruction is displayed on the lower left of the screen. Click [Home] at the lower left of the screen 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 the background task such as Consistency Check, Rebuild, or reconstruction is being executed. With the progress indication being displayed, the background task may be processed at slow rate.
>
> - When selecting an option from a pull-down menu, you cannot use a mouse. After you click the option, please use up/down cursor keys and then press enter key to choose the option instead of using a mouse.

Battery for Onboard RAID (MegaRAID ROMB)

This section describes the features operations of battery for onboard RAID (MegaRAID ROMB).

Features

The onboard RAID (MegaRAID ROMB) has factory-installed battery.

With the following features, the possibility of data loss due to an unexpected accident (e.g., an instantaneous power failure which may occur in Write Back mode) can be avoided.

- Backup of data in cache memory of disk array controller

- Improvement of reliability in Write Back mode

- Adoption of reusable nickel hydrogen battery

Checking Battery Status

Use the disk array management utility MegaRAID Storage Manager to check status of battery for onboard RAID (MegaRAID ROMB).

1. Start OS, and run MegaRAID Storage Manager (MSM).

2. If the battery is properly connected, the [Battery Backup Unit] icon is shown under the [Physical] tab at the left frame of MSM.
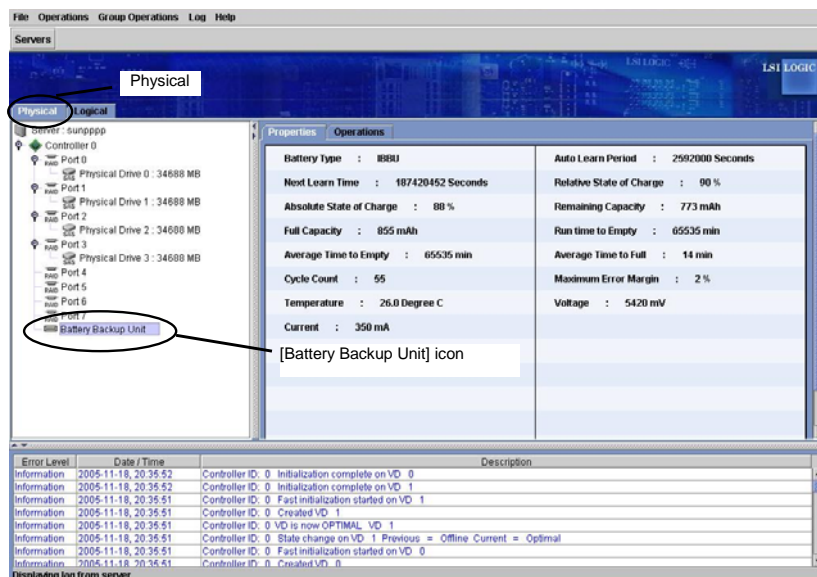
> **NOTE:** If the battery is properly connected, the status of "Battery Backup" is indicated as "Present" in [Adapter Properties] menu of WebBIOS.

3. Next, select the [Logical] tab, and then the desired [Virtual Disk].

4. Select [Properties] tab at the right frame of window.

   If the battery is fully charged, the Current Write Policy shows "Write Back".
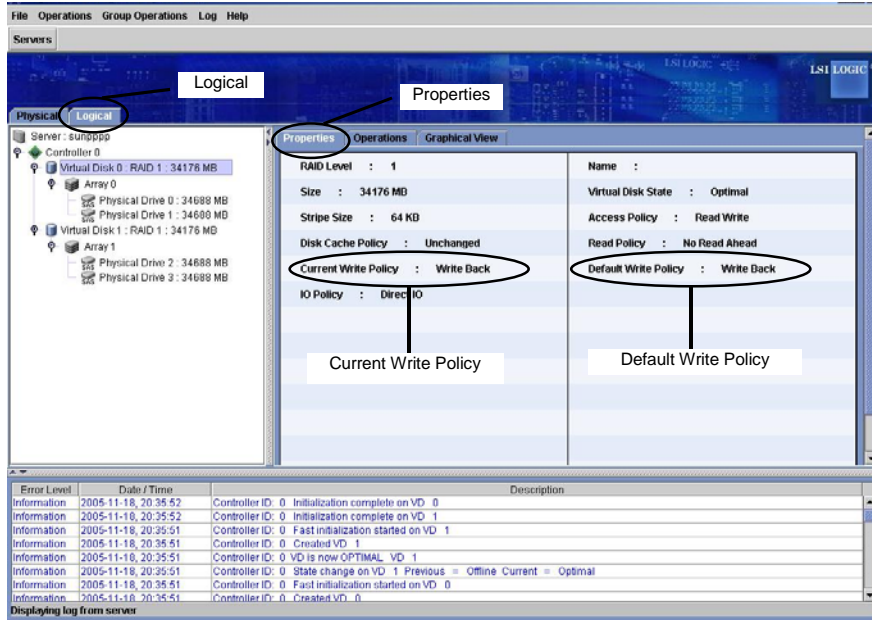
IMPORTANT:

- While the battery is being charged or discharged, "Write Through" is displayed in [Current Write Policy].
  At this time, the POST displays the message as follows:

  Your battery is bad or missing, and you have VDs configured for write-back mode. Because the battery is not usable, these VDs will actually run in write-through mode until the battery is replaced.
  The following VDs are affected: XX
  Press any key to continue.

- To check the charged rate of battery cell, select [Physical] → [Properties] → [Relative State of Charge] or [Absolute State of Charge] on MegaRAID Storage Manager.

NOTES:

- The Default Write Policy is factory-set to "Write Back".

- For more information of Write Policy, refer to the MegaRAID Storage Manager™ User's Guide stored in NEC EXPRESSBUILDER CD-ROM provided with the server.

Refresh Battery (Learn Cycle)

The disk array controller performs discharging and charging cycle at every 30 days to extend the service life of battery.

You can set the refresh operation (Learn Cycle) on Auto Learn Mode of MSM. Click the [Physical] tab and [Battery Backup Unit] in the left frame of MSM, then click the [Operations] tab in the right frame of MSM, as shown in the figure below.

The default setting of MSM is "Auto". This setting is recommended.
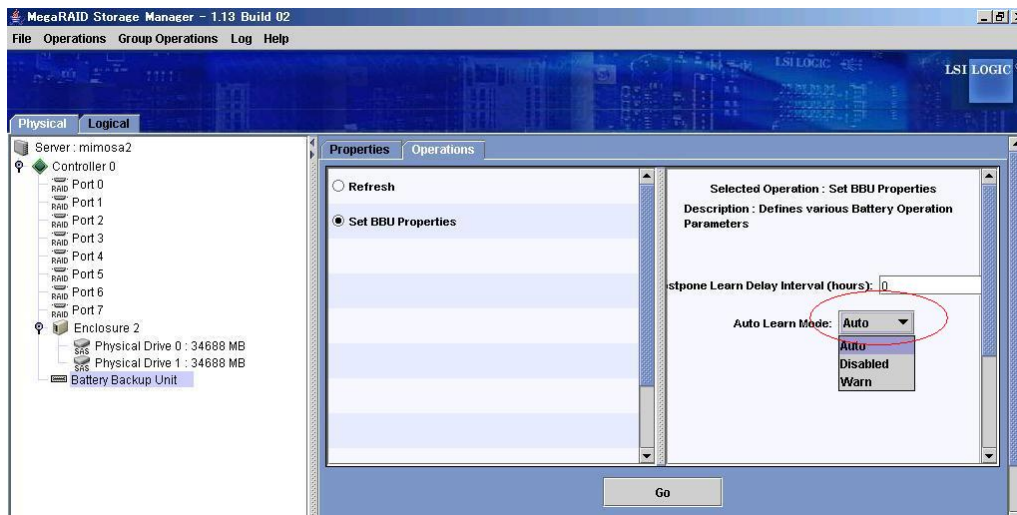
The Onboard RAID (MegaRAID ROMB) performs the following steps during refresh operation.

5. Discharges the battery.
   The following log is recorded in the MSM and the application log.

> Controller ID:x Battery relearn started
> Controller ID:x Battery is discharging
> Controller ID:x BBU disabled; changing WB logical drives to WT

6. The discharging completes.
   The following log is recorded in the MSM and the application log.

> Controller ID:x Battery relearn completed

7. Charges the battery again.
   When charging starts, the following log is recorded in the MSM and the application log.

   If charging does not start after certain time has passed, reboot the server to check if it starts charging or not.

> Controller ID:x Battery started charging

8. The charging completes.
   The following log is recorded in the MSM and the application log.

   Hereafter, the battery is discharged and charged in a regular basis (every 30 days).

> Controller ID:x Battery charge complete
> Controller ID:x BBU enabled; changing WT logical drives to WB

   POST displays the following message while the above steps are being performed.

> Your battery is bad or missing , and you have VDs configured for write-back mode. Because the battery is not
>
> usable , these VDs will actually run in write-through mode until the battery is replaced.
>
> The following VDs are affected : XXPress any key to continue.

- If the [Auto Learn Mode] is set to "Disabled", refresh operation is not performed.

- If the [Auto Learn Mode] is set to "Warn", refresh operation is not performed. However, if no refresh operation is performed for 30 days, the following log is recorded in MSM and application log at the system start-up, prompting you to perform Learn Cycle. If you perform Learn Cycle in manual mode, the log will no longer be recorded.

> Controller ID:x Battery requires reconditioning; please initiate a LEARN cycle

- When performing Learn Cycle in manual mode, select "Learn" appeared on MSM window, and then select "Go", as shown in the figure below.
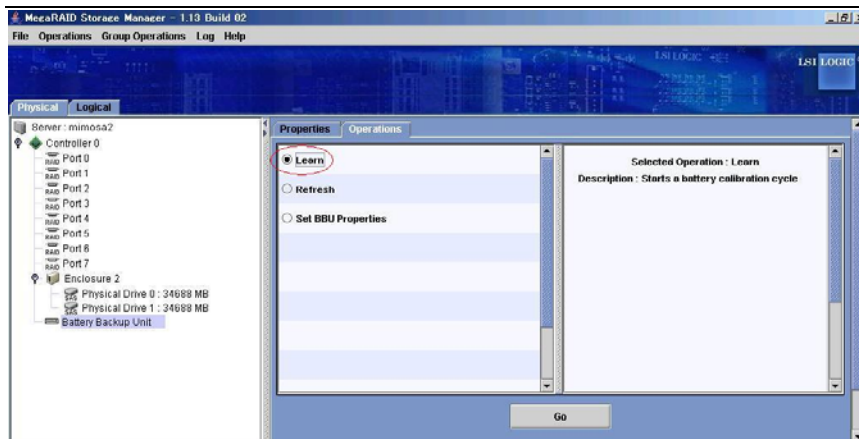
NOTES:

■ Before performing Learn Cycle in manual mode, set the Auto Learn Mode of MSM to "Warn"
   or "Disabled".

■ When you performed Learn Cycle in manual mode, be sure to set the Auto Learn Mode back to
   "Auto" before exiting the Learn Cycle.

■ Immediately after you changed the setting to "Auto" from "Disabled" or "Warn", the refresh operation starts.

IMPORTANT: If the following log is recorded in the MSM and the application log at every
system startup while the Auto Learn Mode is set to "Auto", perform Learn Cycle in manual mode.

Controller ID:x Battery requires reconditioning;
please initiate a LEARN cycle

REMOTE MANAGEMENT FUNCTION

Remote Management Function enables your system to monitor the status of power supply unit, fan and temperature of servers by BMC (Baseboard Management Controller) and a remote KVM (Keyboard, Video, Mouse) console feature by communicating through a management LAN PORT feature.

> **NOTE:** The screen which can be displayed by the remote KVM side becomes resolution 1024x768 and less than refresh rate 75Hz.
>
> Since a screen is not displayed by remote PC when a setup beyond this is performed, please set it as less than this.
>
> Moreover, if many numbers of colours of a screen are set up, an exact colour may be unable to be displayed by remote PC.
>
> When your server is connected to the network where broadcasting occurs frequently, the performance about remote control may be affected.

Default Network Settings

When linking the management LAN port at the rear of the server to a network, refer to the following for default settings.

```
IP Address  : 192.168.1.1
User Name   : administrator
Password    : (None)
Host Name   : ARMCXXXXXXXXXXXX
```

- Using a DHCP function, the host name in the case of performing automatic registration to a DNS server turns into the above-mentioned host name.

  Host Name: ARMCXXXXXXXXXXXX,
  where the 12Xs are the MAC address of the Management Card.

- When you link without a DHCP server, please access the above-mentioned IP address in the local network which can use a default IP address "192.168.1.1."

> **NOTE:** For security reasons, change these default settings (Password, an IP address, host name) by your network environment. See "BMC Configuration" described later for the setting method.

Server Setup

This section explains the contents which must be carried out by the server side, when using a Remote Management Feature.

Initial Setup

To use the Web server feature, change settings as shown below.

Start the EXPRESSBUILDER from the CD-ROM, and select [System Management] → [Set Advanced Remote Management Card] from the Tools menu.

On the [Set Advanced Remote Management Card], select [Remote Management Console] → [Enabled], and then select [Register].

> **IMPORTANT:** For security, the Web server feature of BMC is disabled at shipment.

Setting Graphics Accelerator Driver

■ When your server's operating system is Windows

Use the driver which is installed at initial setup by Express Setup or system update.

■ When a server's operating system is Linux

Since it may be automatic and a setup of a monitor/Driver/video memory may not be able to be performed by composition when operating system is Linux. We recommend you to use it in text mode.

Setting Mouse Properties

Clear the check box "Enhance pointer precision" in "Motion" in "Pointer Options" in "Mouse properties", when the server operating system is Windows Server 2003.

Please adjust "Select a pointer speed", when you cannot move a mouse pointer up to the bottom right side of the host server screen via the remote KVM console.
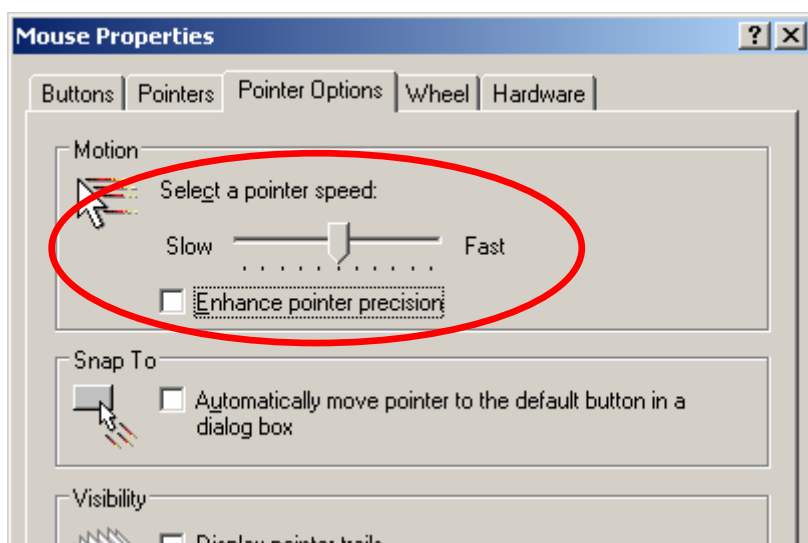
Configuring Management PC

This section provides information on what you need to do for management PCs and requirements of the browsers to establish connection.

Setting Your Browser

Make the following settings.

■ Enable SSL.

Supported Browsers

The following browsers are supported.

■ Microsoft Internet Explorer 6.0

■ Netscape 7.0

■ Mozilla 1.6

Java2 Runtime Environment

Java2 Runtime Environment, Standard Edition 1.4.2_04 or later, which you can download from the following, is required.

> http://java.sun.com/j2se/

If you access the login page without installing the product mentioned above, you may see a dialog box for security warning. Read the message and take actions according to the message.

Using Remote Management Console

Overview

You can control power-on/off of a server and use Remote KVM Console from a web browser by using the web server functions of BMC. This function is achieved through Java Applet.

Connecting to the Web Server from a Web Browser on the Management PC

Access the following URL from the web browser in the management PC.

> URL: http://BMC_HostPort/index.htm

NOTES:

- ■ "BMC_HostPort" is a colon and port number added after the BMC address or host name.
  If the http port number is 80h (default), you can skip a port number.

- ■ When you use DHCP functions as well as performing auto registration to the DNS server, the BMC default name is "ARMC"+MAC Address.
  There is the MAC address on the Management Main Card.

    ```
    IP address: 192.168.1.1
    User name: Administrator               Default host name
    Password : (none)
    Host name: ARMC00004C9FXXXX
    ```
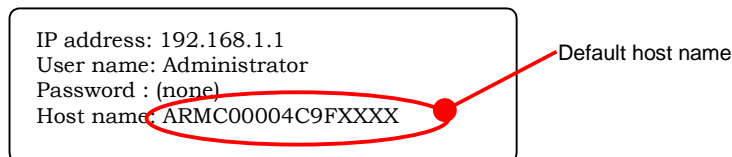
- ■ If you want to use the Remote Management Function with DHCP disabled, first use the default IP address "192.168.1.1" and make access in a local network where this IP address is available, and then adjust configurations such as IP address according to your network environment. For information on configuration, see "BMC Configuration" described later in this section.

When you use the Remote Management Function for the first time, you may see a dialogue box for security warning as shown below. Read the message well and click either "Yes" or "Always." If you are not sure about the information, select "No."
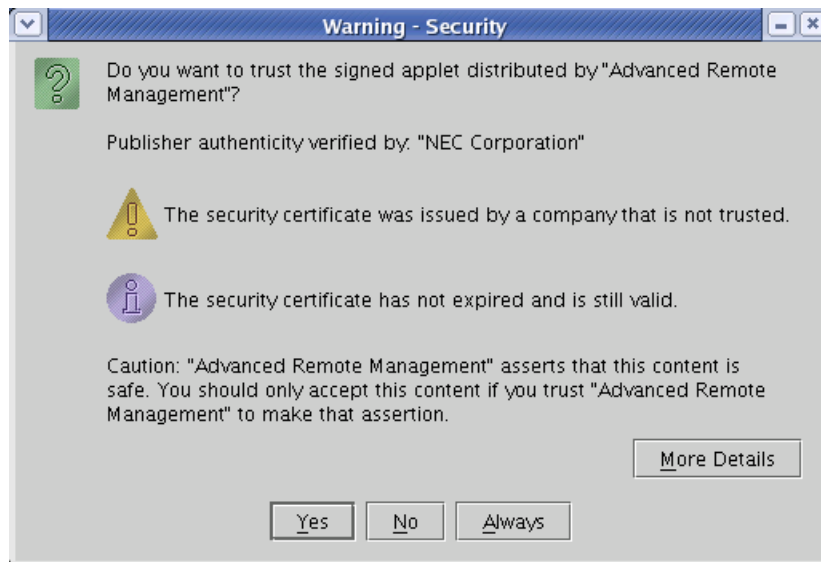
> **NOTE:** When a connection is done with SSL, you may see some security warning dialogue boxes.

Login and Logout

Login

When the login page appears, enter the user name and password, and then click [Login].

If you are logging in for the first time, use the following default user name and password.

> Default user name: administrator

> Default password: None (enter no information)

> **IMPORTANT:** Because no password is set by default, make sure to configure a password immediately after you log in.
> For security reasons, it is recommended to change the default user name as well.
> For information on configuration and modification, see "BMC Configuration" described later in this section.

When the password you entered is authorized, the following licensing agreement appears.
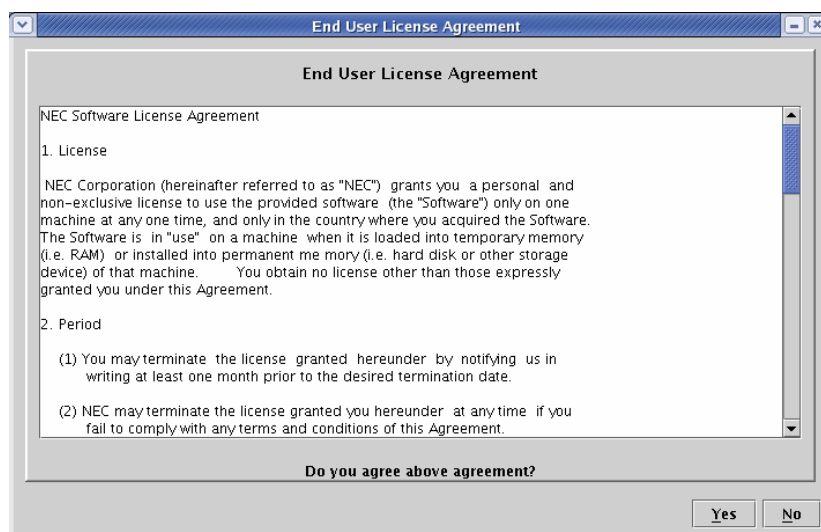
Read the information well and click "Yes" If you cannot agree, click "No", and you will return to the login window.

Logout

To log out, select "Exit" on the File menu.

When you log out, the main window closes and the login window for the browser appears.

Main Window
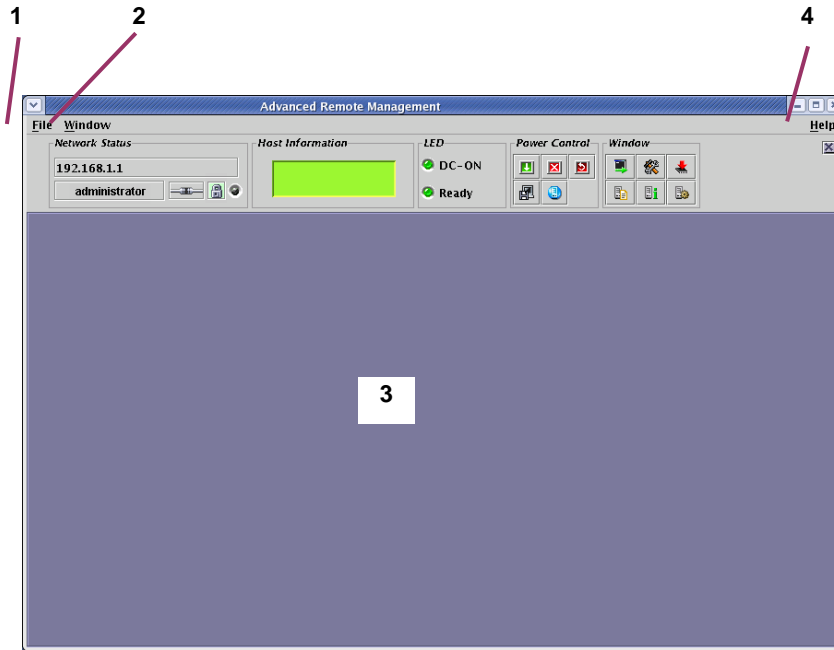
1   **File menu**
The File menu allows you to quit this applet.

2   **Window menu**
The Window menu allows you to open various windows including Remote KVM Console window.

3   **Main frame**
Various windows open here.

4   **Help menu**
With the Help menu, you can check the version of the Remote Management Console.

Control Panel

You can use Control Panel to see server status and to control power-on/off.

Control Panel also starts up various windows including Remote KVM Console.

Functions of Control Panel
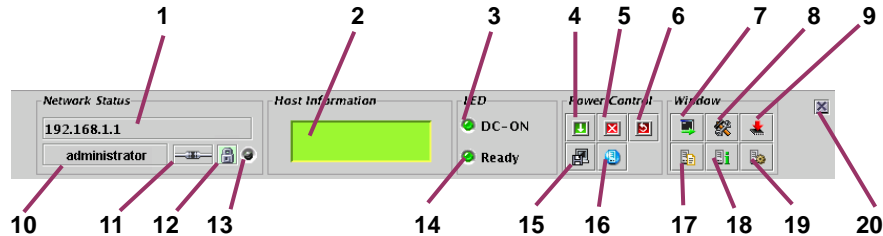
1	Shows the BMC host name.
2	Shows the server LCD.
3	Server power lamp that shows the server power-supply status.
4	Server power switch (Equivalent to the POWER switch on the server. This switch does not forcedly power off the server even when pressed for four seconds or longer.)
5	Forcefully powers off the server.
6	Forcefully resets the server.
7	Starts up Remote KVM Console.
8	Starts up BMC Configuration.
9	Starts up Firmware Update.
10	Displays a user name.
11	Indicates status of connection with BMC.
12	Indicates status of communication security.
13	Indicates network access status.
14	Server status lamp that shows server status.
15	Makes the server collect memory dump (provides the same functionality as achieved by pressing the DUMP switch in the server.)
16	Makes the server unit ID lamp flash.
17	Opens the window to show system event logs (SEL.)
18	Opens the window to show sensor data records (SDR).
19	Opens the window to show field replaceable unit (FRU) information.
20	Hides Control Panel.

Remote KVM Console

By using Remote KVM Console functions of BMC, you can transfer local console of a server to the browser in the management PC over network.

You can make full access from the management PC to the server by using video, keyboard and mouse.

NOTES:

- The following five resolutions are supported for a server.
  – 1024×768
  – 800×600
  – 640×480
  – 720×400
  – 720×350

- KVM is an acronym for Keyboard, Video, and Mouse.
  Unlike using a conventional serial console remotely, KVM allows you to remotely use graphics as they are.

- The remote KVM console cannot be used for connection via proxy.

Starting Up Remote KVM Console

When you click [🖥], the icon to start up Remote KVM Console, on Control Panel, the Remote KVM Console window opens.
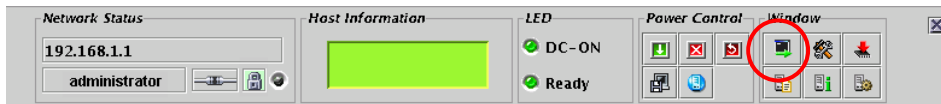
IMPORTANT: Never open Remote KVM Console if you have logged in BMC of the local server from the local console of a server. Otherwise entry by keyboard or mouse becomes disabled.

Names of Components in the Remote KVM Console Window
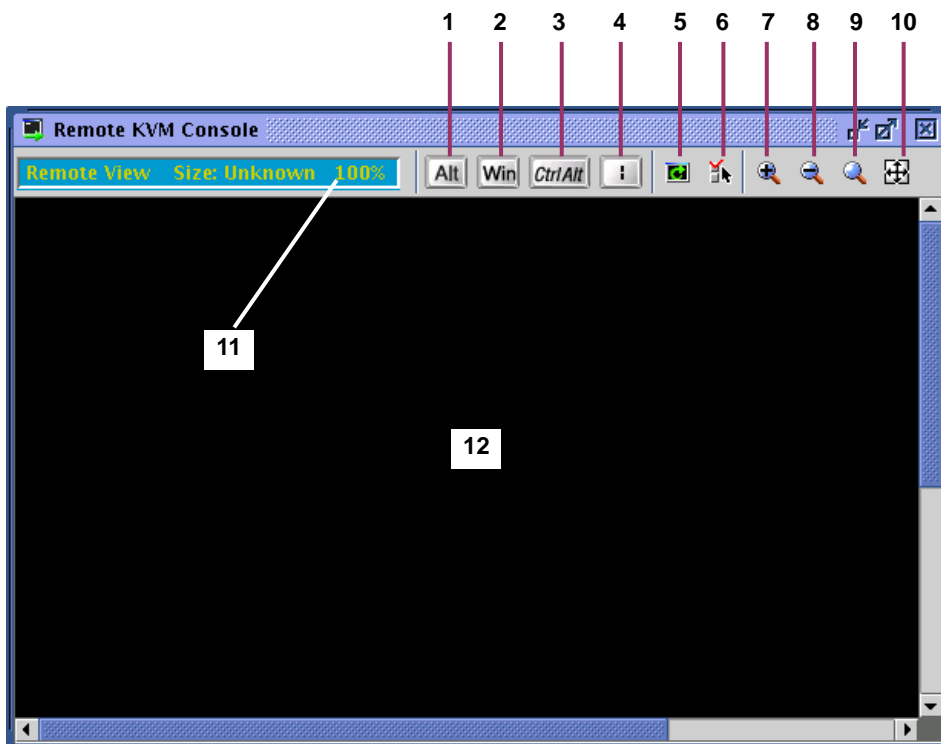
1, 2, 3, 4   Special key icon

5   Screen refresh icon

6   KVM properties icon

7   Zoom in icon

8   Zoom out icon

9   Default size icon

10   Window resize icon

11   KVM indicator

12   Remote KVM Console screen

> **IMPORTANT:** When pressing Shift + CapsLock on the remote KVM console, the indication may not be the same as the CapsLock LED on the management PC. In addition, the CapsLock status on the management PC may change after the remote KVM console has been used.

Entry via Special Keys

For special keys, even if you press these keys in a remote keyboard, it will not take effect in the host server. Using the following three special key icons will take effect in the host server.

Alt (raised state) and Alt (pressed-in state): toggles whenever clicked.

CtrlAlt (raised state) and CtrlAlt (pressed-in state): toggles whenever clicked.

> **IMPORTANT:** For example, to enter "**Ctrl** + **Alt** + **Del**", press the [CtrlAlt] icon and press **Delete** on your keyboard. By doing so "**Ctrl** + **Alt** + **Del**" takes effect in the host server. When this takes effect, click the [CtrlAlt] icon again to release the effect of entry of this special key. If you press **Delete** on the keyboard while the [CtrlAlt] icon has been selected, "**Ctrl** + **Alt** + **Del**" also takes effect in the host server.

Win (Windows key icon)

┆ ("|" pipe key icon)

Zoom In and Zoom Out

When you click [🔍] to zoom in, what is shown becomes larger.

When you click [🔍] to zoom out, what is shown becomes smaller.

When you click [🔍], the default size icon, what is displayed will be the same size as the host server.

When you click [⊞], the window resize icon, the size of the Remote KVM Console window is adjusted to the remote screen size.

Screen Refresh

When you click [🔄], the screen refresh icon, the Remote KVM Console screen will be refreshed. When the screen display is disturbed, refresh the screen.

Modifying Properties

When you click [🖱], the KVM properties icon, the KVM properties window appears. In this window, you can specify the screen refresh interval which is executed automatically.

> **NOTE:** By having a shorter refresh interval, garbage on the screen will be reduced. However, note that screen refresh will give burden. A too short refresh interval can slow response speed of terminals or affect traffic performance of the network.
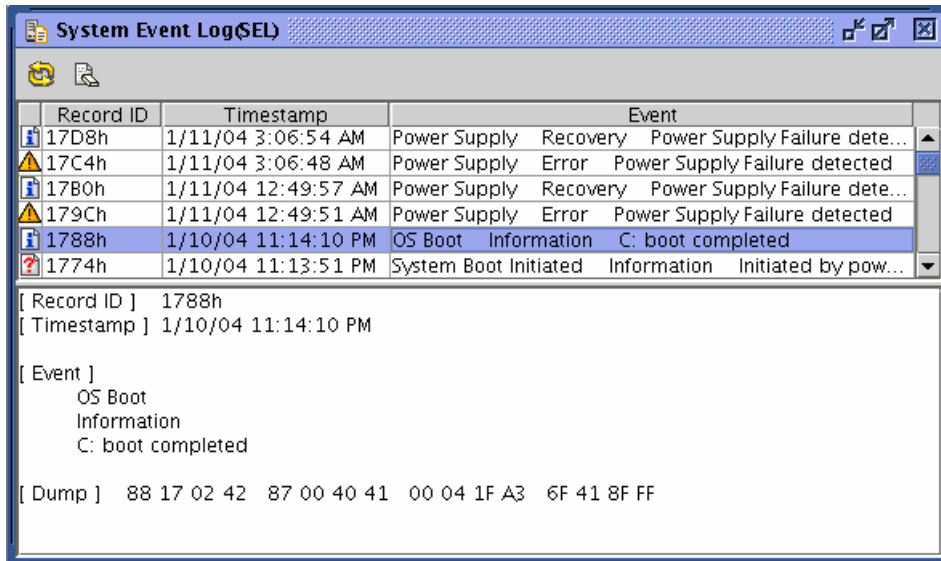
IPMI Information

You can see system event logs (SEL), sensor data records (SDR), and field replaceable units (FRU) information, which are called IPMI information. By using the IPMI information, you can see and examine troubles and events on the host server, and determine a part to be replaced.

Displaying System Event Logs (SEL)

When you click [🗐] to display system event logs (SEL) on Control Panel, SEL information is loaded from BMC, and the following window showing system event logs (SEL) opens.

On the upper part of the window, a list of logs appears. On the lower part of the window, detailed information of the entry selected from the list appears.

When you click [🔃] for reloading, the SEL information is reloaded from BMC, and you can update the information to latest.

Clearing SEL Information

You can clear the SEL information on BMC by clicking [🗐], the icon for SEL clearing. When you see the message for confirmation, click [Yes] if you want to clear SEL. If not, click [No] so that SEL clearing will not be performed.

Displaying Sensor Data Records (SDR)
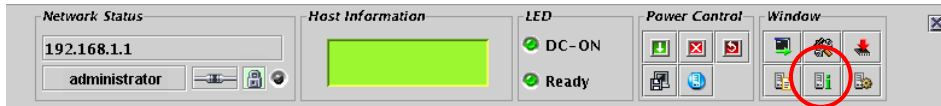
When you click [⊞i] to display sensor data records on Control Panel, SDR information is loaded from BMC, and the following window showing sensor data records appears.
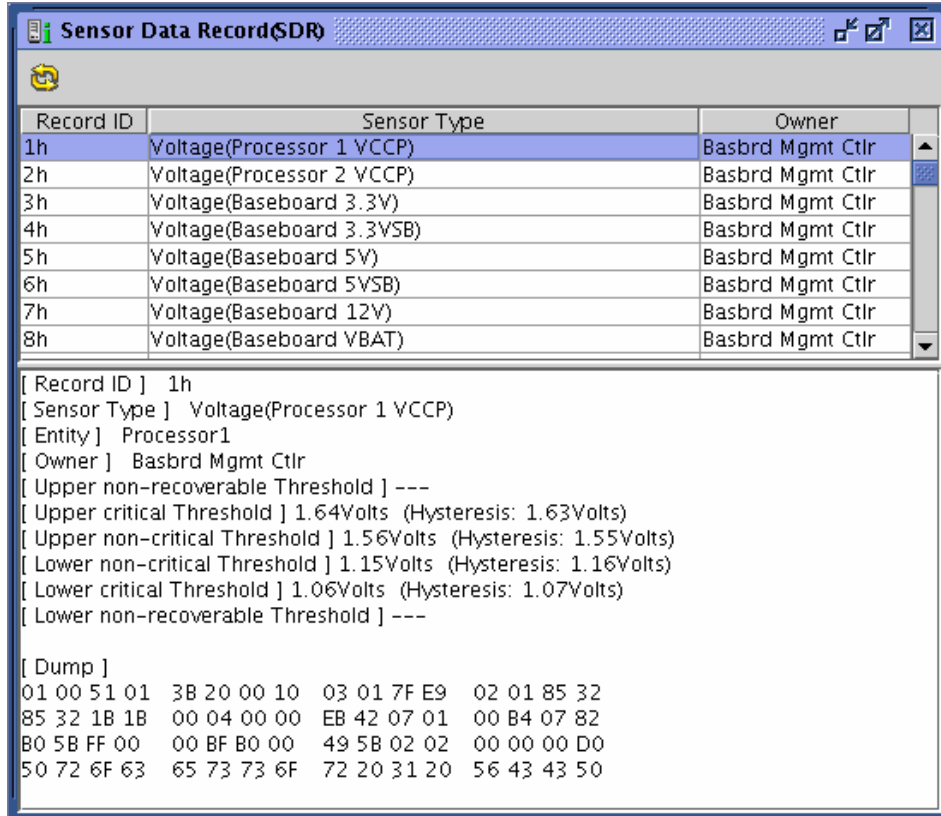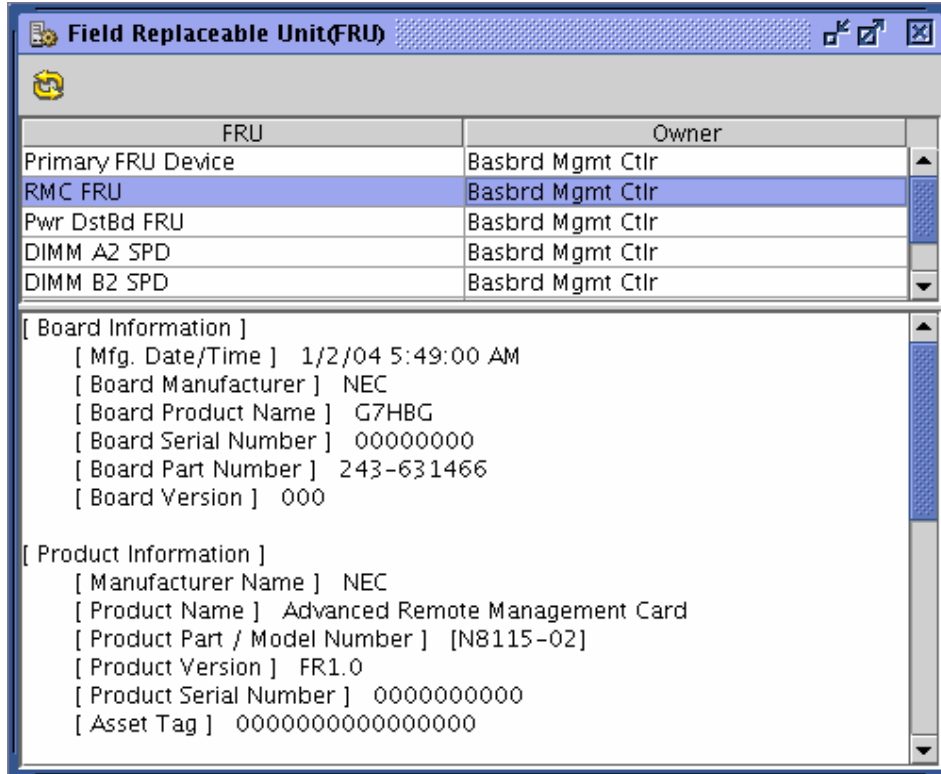

On the upper part of the window, a list of sensor data records appears. On the lower part of the window, detailed information of the entry selected from the list appears.

> **NOTE:** SDR information is information on definitions for each sensor on the server.
> BMC monitors server sensors according to this information.

Displaying Field Replaceable Units (FRU) Information
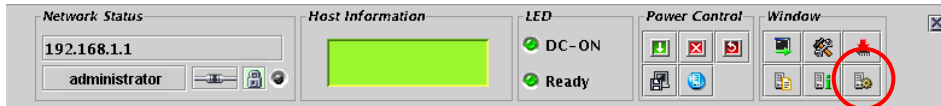
When you click [ ] to display field replaceable units (FRU) information on Control Panel, FRU information is loaded from BMC, and the following window showing field replaceable units (FRU) information appears.

On the upper part of the window, a list of FRUs appears. On the lower part of the window, detailed information of the entry selected from the list appears.
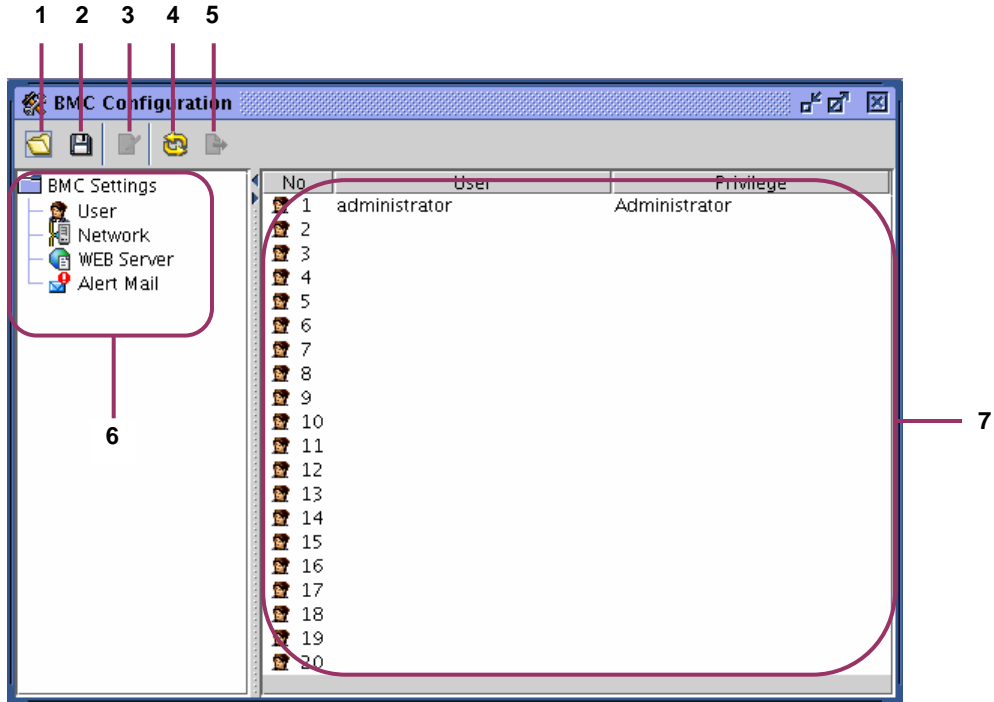
BMC Configuration

You can configure BMC settings.

Starting Up the BMC Configuration Window
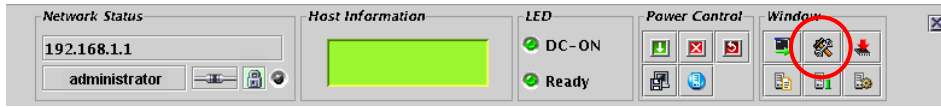
When you click [🔧], the icon to start up BMC Configuration on Control Panel, the BMC Configuration window appears as shown below.
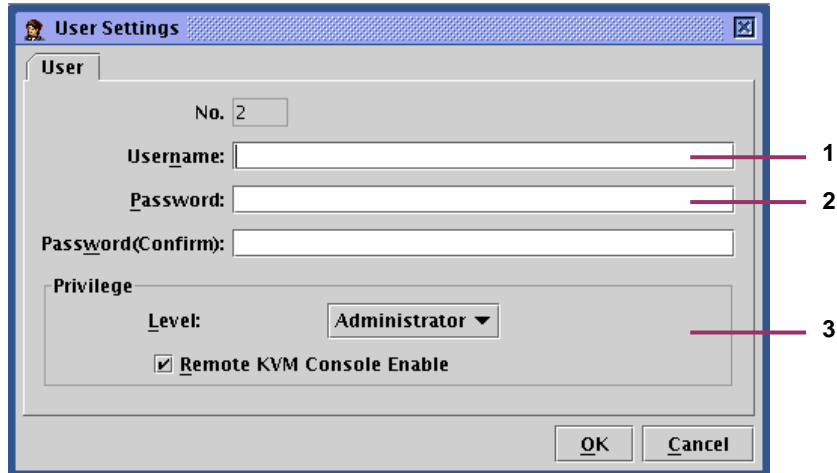
1	Loads a file	
2	Saves the file	
3	Edits information	
4	Reloads from BMC	
5	Makes global settings of BMC	
6	Item selection tree	
7	Currently configured values	

NOTE: Use "Global settings of BMC" when configuration information is loaded from a file.

User Configuration

By clicking [User Configuration] in the left pane of the BMC Configuration window, a list to show 20 accounts opens in the right pane and you can set up user accounts.

Choose the account you want to modify or add and click [🖊] to edit information. The User Configuration window to edit a user account as shown below opens.

1   Enter a user name.

2   Enter a password. To avoid a mistake, enter a password in two boxes.

3   Configure an access privilege.

Level :
Administrator: the user is allowed to do all operations.
User: the user can see information but is not allowed modify settings.
Remote KVM Console: Specify whether or not to enable Remote KVM Console.
If you select this check box, you can make Remote KVM Console enabled (permit)
settings.

NOTE: You can make settings of Remote KVM Console regardless of the access privilege levels. You can make "disable" settings for Administrator and "enable" settings for User.

When you click [OK], all the information in the User Configuration window will be written into BMC.

When you click [Cancel], the User Configuration window closes discarding what you have configured in the window.

Network Configuration

By clicking [Network Configuration] in the left pane of the BMC Configuration window, you will see a window as shown below and you can make network-related settings for BMC including IP address.
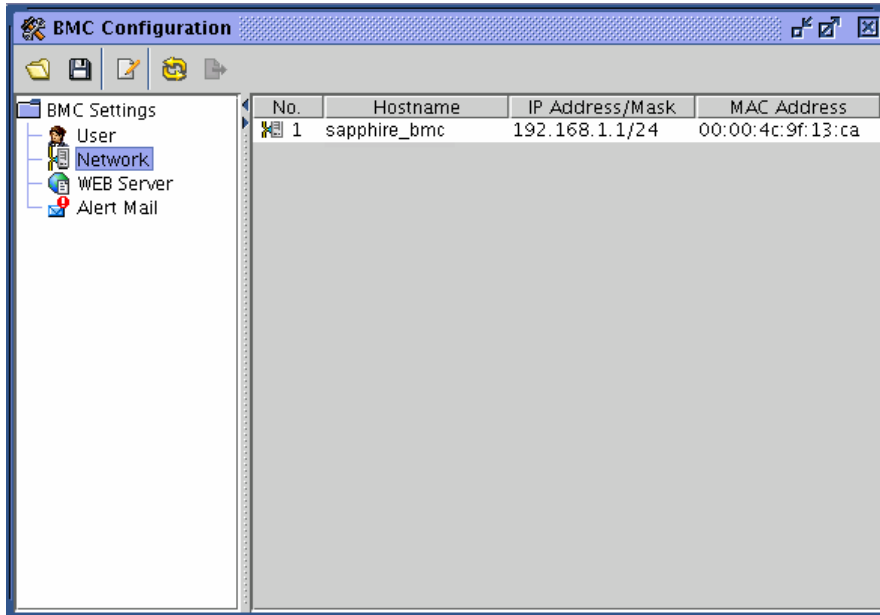
When you click [✎], the icon for editing information, in this window, the Network Configuration window as shown below appears.

The Network Configuration window has three tabs.
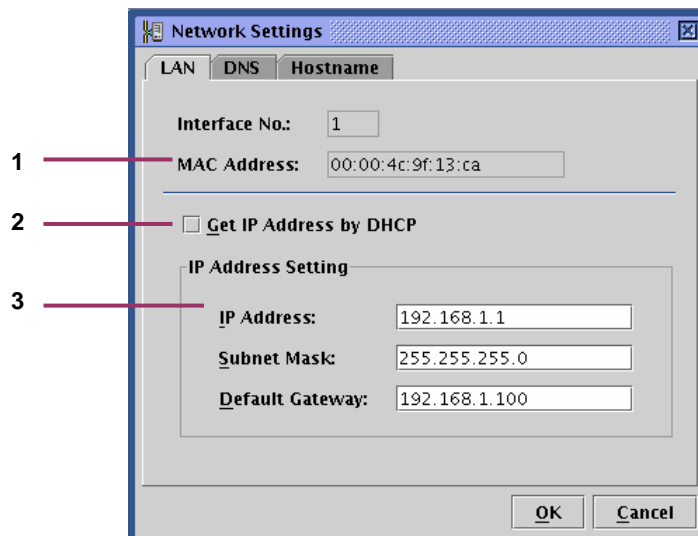
1 The MAC address owned by BMC appears in this box.

2 Choose whether or not to acquire an IP address automatically by DHCP.

3 If DHCP is not used to automatically acquire an IP address, make settings here.
   If DHCP is used, information automatically acquired appears here.

> **IMPORTANT:** When you change the IP address, the current connection will be disconnected after you click OK and settings of BMC is completed.
> Close the window once, and then enter the IP address (or host name) that has been newly configured in the browser to log in.
>
> Because the login page that remains to be displayed in the browser has been accessed by the old address, you cannot use it to log in.
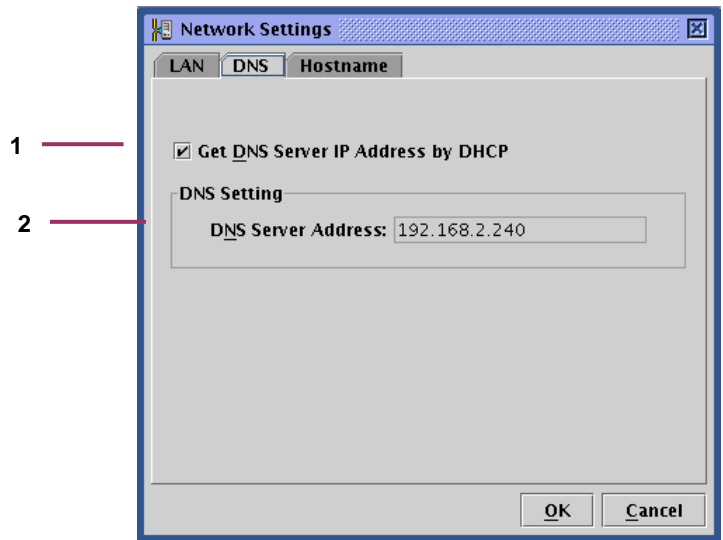
1   Choose whether or not to acquire the IP address of the DNS server automatically by DHCP.

2   If DHCP is not used to automatically acquire the IP address of the DNS server, make settings here. If DHCP is used, information automatically acquired appears here.
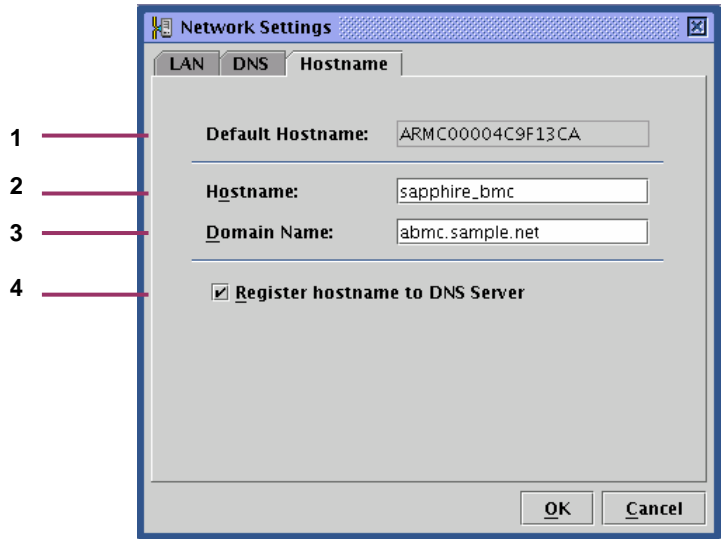
1   The default host name to be used when no host name is configured for using DHCP

2   Enter the host name of BMC. If nothing is set here, the default host name in the previous step will be used.

3   Enter the domain name of the network to which BMC belongs.

**4**   Choose whether or not to register the host name to the DNS server.

> **NOTE:** It is recommended to specify a name that is easy to imagine the host name in the server operating system (for Windows, a computer name) for a BMC host name.
> For example, if the host name on the server operating system is "sapphire", you may set BMC "sapphire_bmc" for a BMC host name.

> **IMPORTANT:** Because BMC uses a LAN controller independent of the server operating system, a BMC host name and a domain name cannot be exactly the same as those on the server operating system. If BMC belongs to a different network domain, you can have the same host name.

When you click [OK], all the information in the Network Configuration window with three tabs will be written into BMC.

When you click [Cancel], the Network Configuration window closes discarding what you have configured.

HTTP Configuration

By clicking [HTTP Configuration] in the left pane of the BMC Configuration window, you will see a window as shown below and you can make web server-related settings for BMC such as HTTP port.
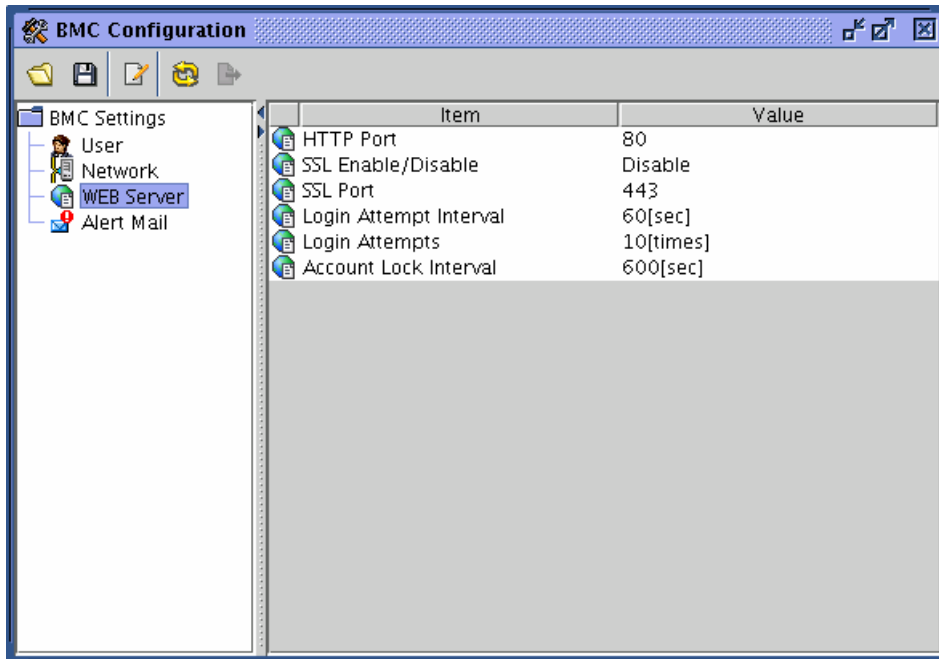
> **IMPORTANT:** If you change the settings of HTTP port number, Enable SSL, or SSL Port Number, the current connection will be disconnected.
> Close the window once, and then enter the port number that has been newly configured in the browser to log in.
> Because the login page that remains to be displayed in the browser has been accessed by the old address, you cannot use it to log in.

When you click [📝], the icon for editing information, in this window, the HTTP Configuration window as shown below appears.
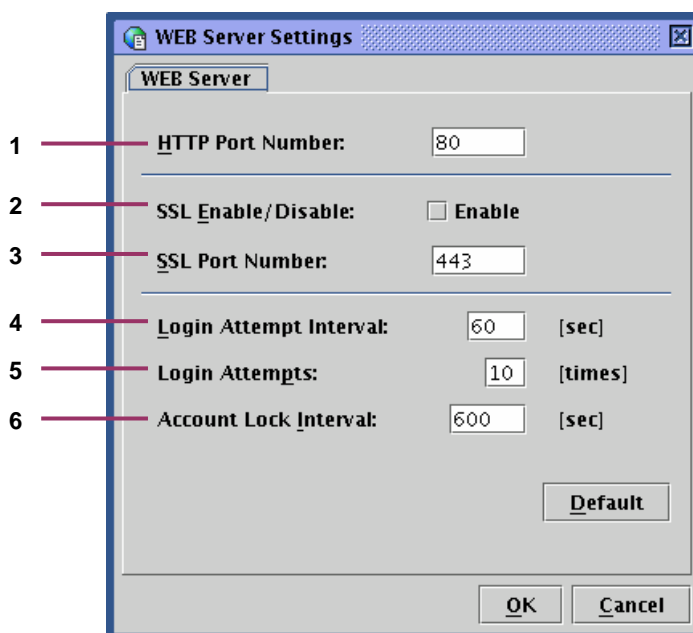
1 Specify an HTTP port number

2 Choose enable/disable SSL communication. If you select this check box, you can make SSL enabled settings. And, if you clear this check box, you can make SSL disabled settings.

> **NOTE:** Unless there is any specific reason such use of SSL not being allowed, it is recommended to use the HTTPS protocol, which is encrypted.
> By default, SSL is disabled.

3   Specify an SSL port number in this box.

4   In Login attempt period, specify a time period during which you can retry login if your attempt to log in has failed.

5   In Failed login attempts, specify the number of login attempts during the period specified in the previous step, exceeding which prompts to denial of login as specified in the following step.

6   In Account lock period, enter a time period during which login is denied.

> **NOTE:** The three configuration items mentioned above are effective to deny unauthorized login accesses that are attempted automatically. However, they cannot prevent such accesses completely.
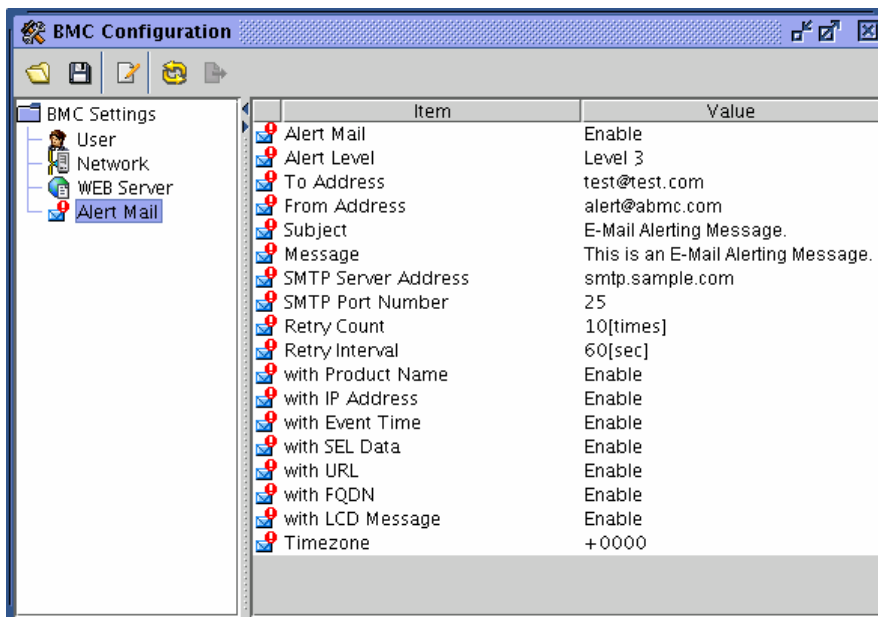
When you click [Default], default values for HTTP port number, SSL port number, Login attempt interval, Login attempts, and Account lock interval appear. But, SSL Enable/Disable check box is not changed.

When you click [OK], all the information in the HTTP Configuration window will be written into BMC.

When you click [Cancel], the HTTP Configuration window closes discarding what you have configured in the window.

Alert Mail Configuration

By clicking [Alert Main Configuration] in the left pane of the BMC Configuration window, you will see a window as shown below and you can make alert mail-related settings.

Item	Value
Alert Mail	Enable
Alert Level	Level 3
To Address	test@test.com
From Address	alert@abmc.com
Subject	E-Mail Alerting Message.
Message	This is an E-Mail Alerting Message.
SMTP Server Address	smtp.sample.com
SMTP Port Number	25
Retry Count	10[times]
Retry Interval	60[sec]
with Product Name	Enable
with IP Address	Enable
with Event Time	Enable
with SEL Data	Enable
with URL	Enable
with FQDN	Enable
with LCD Message	Enable
Timezone	+0000

BMC Configuration

- BMC Settings
  - User
  - Network
  - WEB Server
  - Alert Mail

When you click [🖊], the icon for editing information, in this window, the Alert Mail Configuration window as shown below appears. The Alert Mail Configuration window has four tabs.
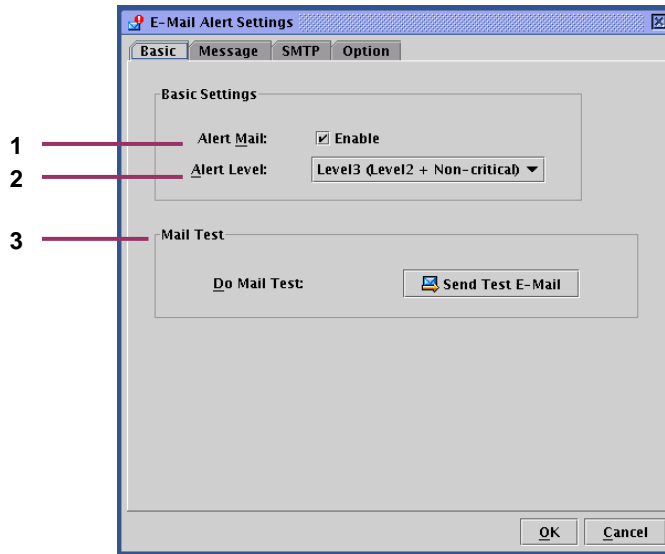
1   You can choose to enable or disable alert mail functions. If you select this check box, you can make mail-related settings.

2   Specify an alert level from six levels.
Alert levels are categorized according to severity of event causing an alert.

3   You can send a test mail by clicking the button in this box.

> **IMPORTANT:** If you want to send a test mail, complete all alert mail settings detailed in the following pages.
>
> Note that entering information in the Alert Mail Configuration window does not complete settings. When you have entered all the information you need to enter, click [OK], and the information will be written into BMC and settings will be completed.
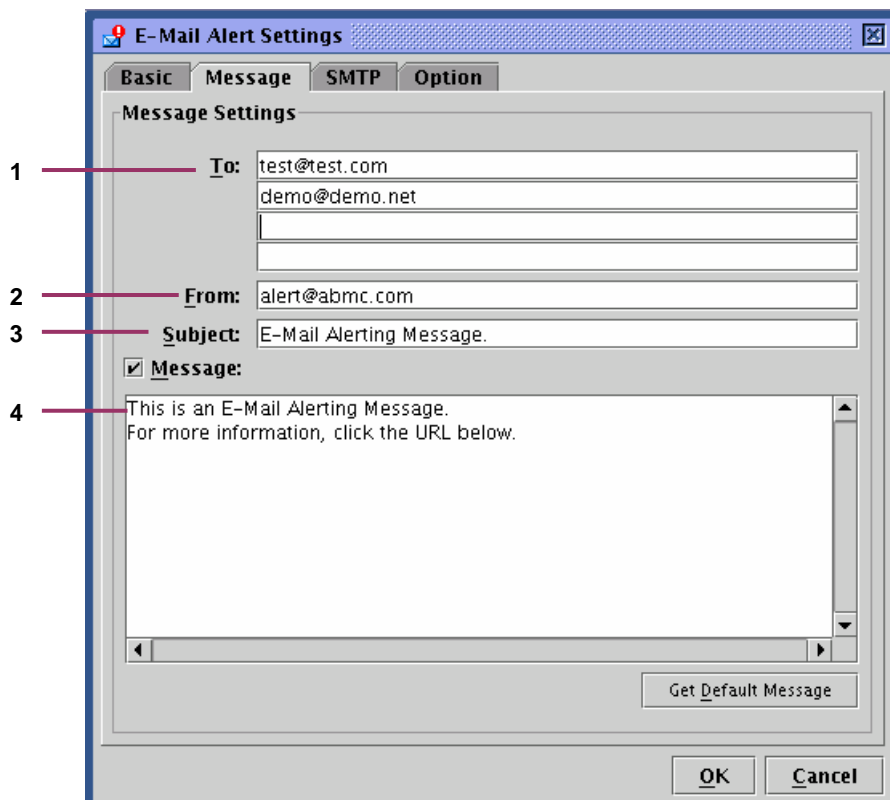
1   Specify email addresses of alert mail. You can specify up to four addresses.

2   Specify a sender's email address.

3   Type in a subject of alert mail.

4   Type in a message that appears in the message body of all alert mails. If you don't need such message, you can clear the check box. If you click "Acquire default message", the recommended message appears.

NOTE: The subject and message you configure here will be attached to all alert mails.

---
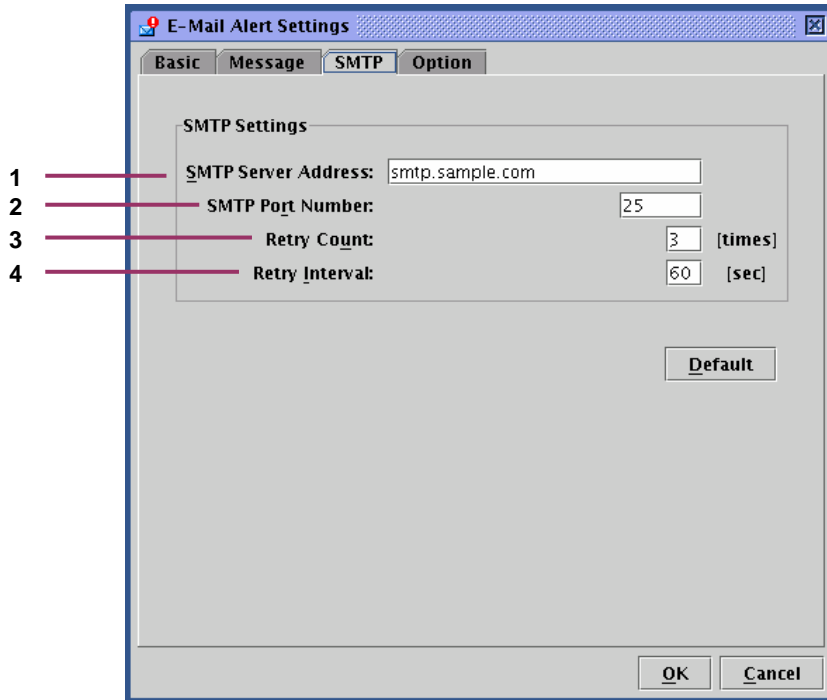
1   Specify the SMTP server address. You can use the IP address as well.

2   Specify the port number of the SMTP server.

3   Specify how many retries can be made when attempt to send the mail has failed.

4   Specify a retry interval that waits for the next retry when attempt to send the mail has failed.

When you click [Default], default values for SMTP port number, retry count, and retry interval appear. Unless there is any specific reason not to, it is recommended to use the default values.
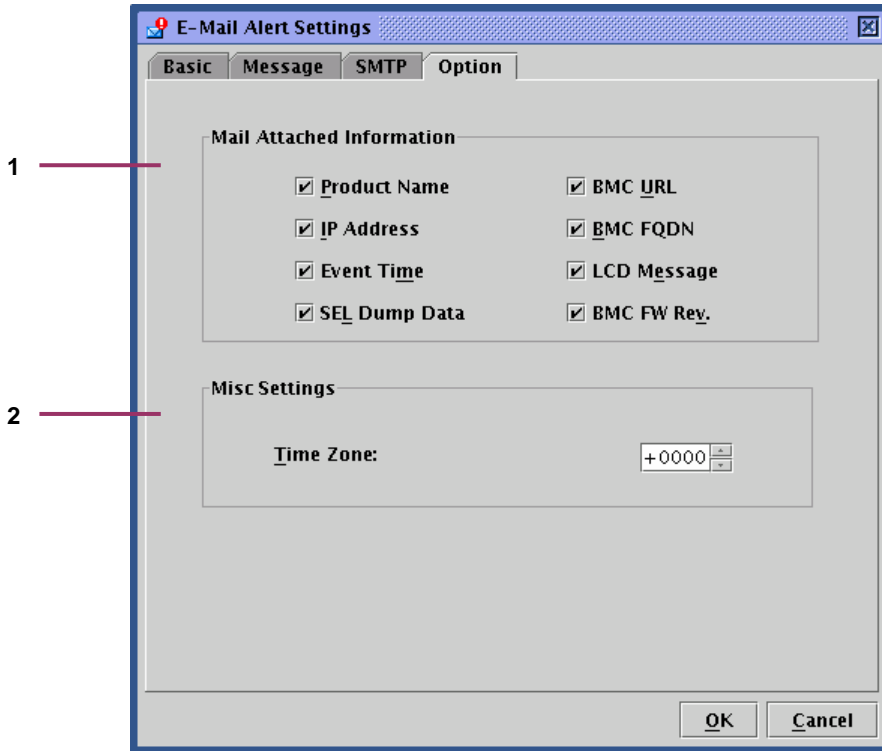
1   Specify information to be included in the body of alert mails.

Product Information	The product name, code and number of the server
IP Address	IP address of BMC
Event Time	The time the event occurred
SEL Dump Data	Data representing system event logs (SEL) in hexadecimal
BMC URL	URL of the ARMC login page
BMC FQDN	Full domain name of BMC
LCD Message	LCD message in the server at the time of event occurrence
BMC FW Rev.	Revision information of BMC firmware/SDR/PIA

2   The information here will appear in the Date field in the header of alert mails.

Firmware Update

You can update applet, KVM firmware, BMC firmware, sensor data records (SDR), and platform information (PIA)

Starting Up the Firmware Update Window
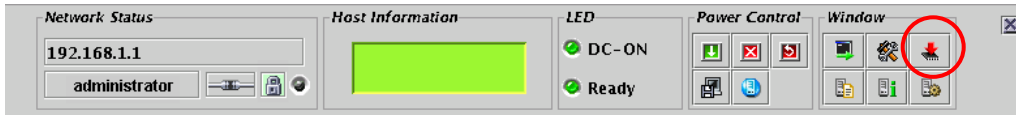
When you click [⚓], the icon to start up Firmware Update, on Control Panel, revision information is loaded from BMC, and the Firmware Update window as shown below appears.
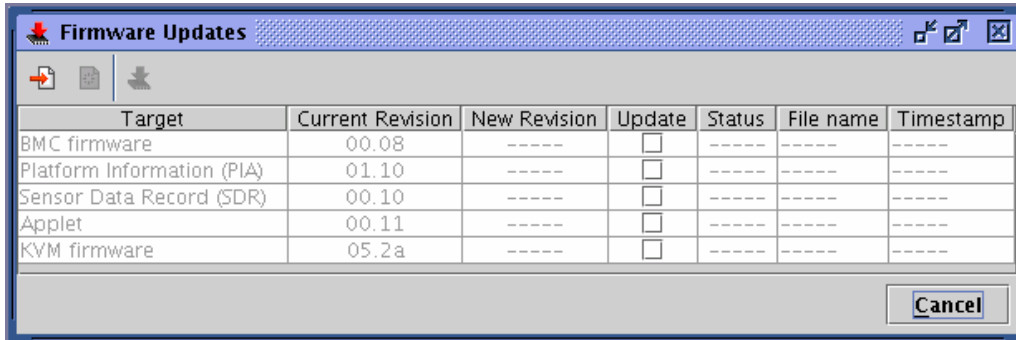
When you click [Cancel], the Firmware Update window closes without any changes made.

The following pages provide information about update procedures.

Loading Update Data Files

When you click [→] to add update files, a window as shown below opens prompting you to select files.
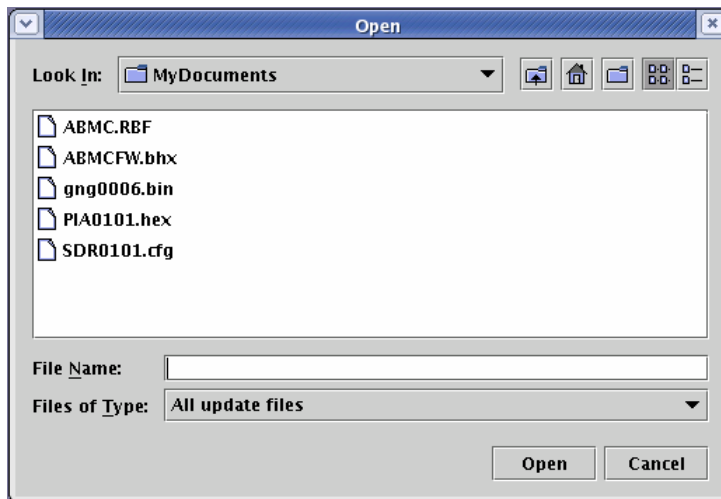
Select update data files.

When you click [Open] after specifying files, loading of the files begins.

It will take a little while for loading to be completed.

> **NOTE:** Because update can be made globally for each update target, make sure to load everything you need.
> You can specify multiple files to be loaded simultaneously.

Checking Revisions

When loading of data files is completed, the current revision and new revisions appear with information on files (file names and time stamps) in the Firmware Update window.

Check the revisions and information.
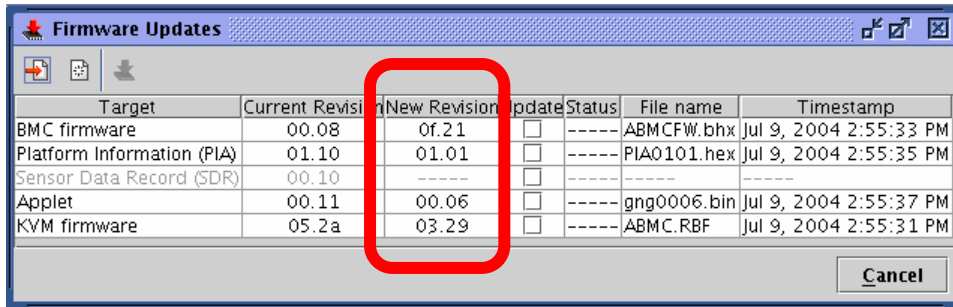
NOTE: Check each revision well because downgrade can be performed as well.

If you click [⊞] to clear update data, all data that has been loaded will be discarded. If you click [Cancel], the Firmware Update window closes discarding all information that has been loaded.

Selecting Update Target

Select update targets in the Update check boxes.
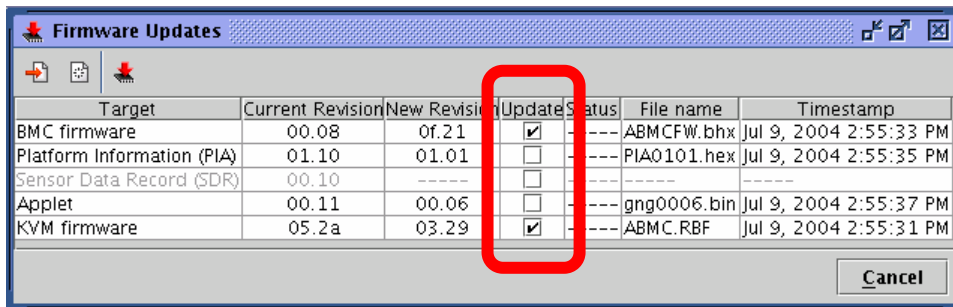
NOTE: Only what you specify here will be written into BMC.
Data will not be written for those items with file loaded but not specified here.

IMPORTANT: If you want to update both SDR and PIA, perform writing simultaneously. If you update SDR and PIA separately, the first update data will be cleared when the second update is performed.

Writing Update Data into BMC

When you click [⬇], update data will be written into BMC.
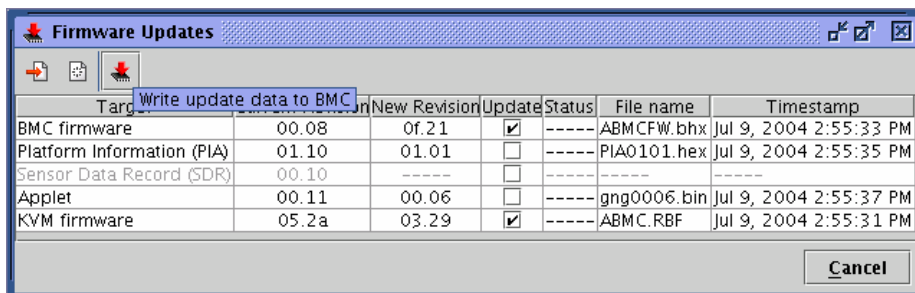
For each update target, the window showing update progress appears.
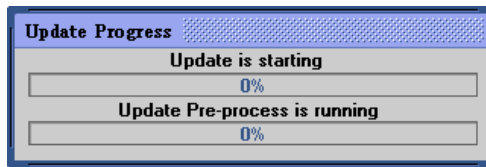
If any error is detected during update, an error message appears and the update is terminated.

Completion of Writing

When writing is completed, results appear in the [Status] column per [Target].
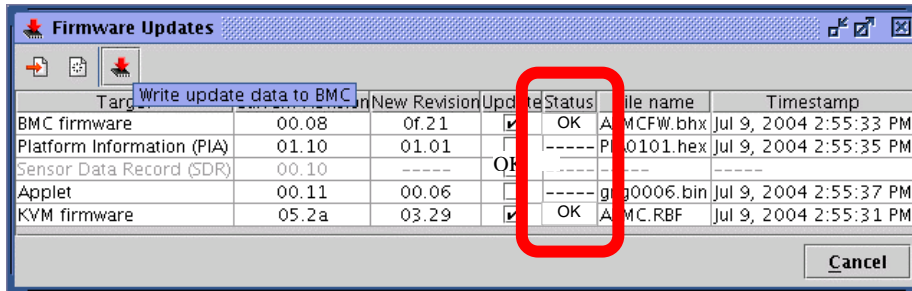
NOTES:

- For targets other than applet, reboot the server or power off and then on the server to apply the update.

- If you reboot the server or power on the server to apply the BMC firmware update, connection to BMC is disconnected. To continue using, log in again.

- To apply applet update, log out and shut down all browsers, and then log in again. You do not need to reboot the server.

Troubleshooting

Error messages

Fatal errors

No	Error Message	What to do
1	Fatal error. JavaVM quits.	Try logging in again. If the same message continues to appear, contact your service representative.
2	A fatal software error has occurred.	Try logging in again. If the same message continues to appear, contact your service representative.

Login error

No	Error Message	What to do
1	Authentication error	Check the user name and password, and then enter them again.

Access privilege error

No	Error Message	What to do
1	Unauthorized operation. You have no privilege to perform the operation.	Try performing the operation with administrator's privileges. Consult your administrator.

Network errors

No	Error Message	What to do
1	The HTTP communication failed.	Check the network environment and try again. Contact your service representative if the error persists.
2	Could not resolve the IP address.	Check the network environment. You cannot use Remote KVM Console for connections via proxy.
3	Unable to reach the target host.	Check the network environment. You cannot use Remote KVM Console for connections via proxy.
4	A network error occurred.	Check the network environment and try again. Contact your service representative if the error persists.
5	Failed to download applet.	Check the network environment and try again. When SSL has been enabled, more than one client cannot connect to the network simultaneously. Try again after a connection from other client is finished. Contact your service representative if the error persists.
6	The RMCP+ session is closed.	Check the network environment. If there is no network problem, contact your service representative.
7	Failed to establish the RMCP+ session.	Check the network environment. If there is no network problem, contact your service representative.
8	The RMCP+ transmission failed.	Check the network environment. If there is no network problem, contact your service representative.
9	The specified RMCP+ protocol cannot be used.	Check the network environment. If there is no network problem, contact your service representative.
10	BMC resources to establish a new RMCP+ session are insufficient.	Try again after a connection from other client is finished.
11	The RMCP+ session time-out occurred.	Check the network environment and server. If you don't find problem, contact your service representative.

BMC-related errors

No	Error Message	What to do
1	The IPMI request was aborted.	The network may be busy. Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
2	Received bad response from BMC.	Check the server. A failure may have occurred in BMC. If you don't find problem, contact your service representative.
3	BMC does not support IPMI 2.0 functions.	Contact your service representative.
4	Failed to run the IPMI command.	Check the server. A failure may have occurred in BMC. If you don't find problem, contact your service representative.
5	Failed to send the IPMI message.	Check the network environment. If the network has no problem, contact your service representative.
6	Illegal IPMI message was requested.	Contact your service representative.
7	Specified target is not present.	Check the server. A failure may have occurred in BMC. If you don't find problem, contact your service representative.

Remote KVM Console errors

No	Error Message	What to do
1	Failed to disable Remote KVM Console.	Check the network environment and try again. Contact your service representative if the error persists.
2	Failed to enable Remote KVM Console.	Check the network environment and try again. Contact your service representative if the error persists.
3	KVM packet transmission failed.	Check the network environment and server. If you don't find problem, contact your service representative.
4	The KVM request was aborted.	This is not a problem. Click OK and close the message box.
5	UDP packet transmission failed.	Check the network environment and server. If you don't find problem, contact your service representative.
6	Remote KVM console can not activate because it is disabled.	Make a remote KVM console enable. See "Remote KVM Console" in Chapter 4.
7	Remote KVM Console is used by other client.	Try again after the client has finished using Remote KVM Console.
8	Failed to shut down Remote KVM Console.	Use Remote KVM Console after waiting 3 or more minutes.
9	Failed to make settings.	Check the network environment and try again. Contact your service representative if the error persists.
10	The UDP connection is closed.	Check the network environment and server. If you don't find problem, contact your service representative.

System event logs (SEL) display errors

No	Error Message	What to do
1	Failed to clear session event logs of BMC.	The network may be busy. Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
2	Failed to acquire system event logs.	The network may be busy. Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.

Sensor data records (SDR) display error

No	Error Message	What to do
1	Failed to acquire sensor data records.	The network may be busy. Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.

Field replaceable unit (FRU) information display error

No	Error Message	What to do
1	Failed to acquire field replaceable units information.	The network may be busy. Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.

BMC configuration errors

| No	Error Message	What to do
1	Failed to make settings:	Check the network environment and try again. Contact your service representative if the error persists.
2	Failed to acquire BMC Configuration:	Check the network environment and try again. Contact your service representative if the error persists.
3	Used by other software program. Try again after a while.	Try again after a while.
4	Invalid BMC configuration file.	The BMC configuration file may be corrupted. Check the file.
5	The required XML tag is not found.	The BMC configuration file may be corrupted. Check the file.
6	Failed to write the file.	The BMC configuration file is not saved successfully. Change the location to save the file and try again.
7	Invalid user name	You can use only alphanumeric characters, minus sign (–), and underscore (_) for a user name. A user name should be 32 characters or less.
8	The user name is too long	A user name should be 32 characters or less.
9	The password is too long.	Use 16 or less characters.
10	Passwords are not matched.	Again, input passwords.
11	Invalid HTTP port number	You can use only numeric values.
12	Invalid SSL port number	You can use only numeric values.
13	HTTP/SSL should not be the same.	The same port number can't do them. Specify different value.
14	Invalid login attempt period	You can use only numeric values.
15	Invalid failed login attempts	You can use only numeric values.
16	Invalid account lock period	You can use only numeric values.
17	Invalid IP address	Use numerals and periods to specify an IP address.
18	Invalid subnet mask	Use numerals and periods to specify a subnet mask.
19	Invalid default gateway	Use numerals and periods to specify a default gateway.
20	Invalid DNS server IP address	Use numerals and periods to specify the IP address of DNS server.
21	Invalid host name	You can use only alphanumeric characters, minus sign (–), and underscore (_) for a host name. A host name should be 64 characters or less.
22	Invalid domain name	You can use only alphanumeric characters, minus sign (–), and underscore (_) for a domain name. A domain name should be up to 256 characters.
23	The SMTP server address is too long.	Specify within 256 characters.
24	Invalid SMTP port number.	You can use only numeric values.
25	Invalid retry count	You can use only numeric values.
26	Invalid retry interval	You can use only numeric values.
27	"To" is too long.	Specify within 256 characters.
28	"From" is too long.	Specify within 256 characters.
29	"Subject" is too long.	Specify within 512 characters. If you use Japanese characters, the number of characters you can use is less than half of 512 characters.
30	The message is too long.	The message should be up to 4064 characters. If you use Japanese characters, the number of characters you can use is less than half of 4064 characters.
31	Failed to open the file:	The specified file may not exist. Check the file name.
32	Failed to close the file:	The specified file may be corrupted.
33	Can't open the file:	The specified file may not exist. Check the file name.
34	Timeout has occurred.	Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.

Firmware update errors

No	Error Message	What to do
1	There are uncompleted update images on BMC as follows:	Reboot the server and complete the update.
2	Failed to acquire status of the update area.	The network may be busy. Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
3	Update data is too large:	Some update files may be corrupted. Acquire update files again.
4	Failed to prepare update	The network may be busy. Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
5	Invalid file size:	The update file may be corrupted. Acquire the update file again.
6	Could not find the revision information:	Some update files may be corrupted. Acquire update files again.
7	Failed to create rollback image.	Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
8	Failed to erase.	Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
9	Unsupported format version:	Some update files may be corrupted. Acquire update files again.
10	Failed to load the update image file.	Some update files may be corrupted. Acquire update files again.
11	Update has failed.	Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
12	Could not switch to the update mode.	Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
13	Could not find the update targets:	Some update files may be corrupted. Acquire update files again.
14	Invalid address:	Some update files may be corrupted. Acquire update files again.
15	Writing has failed.	Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
16	Unsupported token is detected:	Some update files may be corrupted. Acquire update files again.
17	Invalid segment information:	Some update files may be corrupted. Acquire update files again.
18	Invalid data length:	Some update files may be corrupted. Acquire update files again.
19	Failed to open the file:	The specified file may not exist. Check the file name.
20	Failed to close the file:	The specified file may be corrupted.
21	Invalid file checksum:	Some update files may be corrupted. Acquire update files again.
22	Failed to parse files.	Some update files may be corrupted. Acquire update files again.
23	Failed to parse files:	Some update files may be corrupted. Acquire update files again.
24	Failed to load files:	Some update files may be corrupted. Acquire update files again.
25	Could not find files:	Some update files may be corrupted. Acquire update files again.
26	Failed to verify	Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
27	Update will be stopped because interruption has occurred.	Check clients. A software program other than you are using may have interrupted.
28	Online update is now being used.	Try again as necessary after online update performed by other tool is completed.
29	Failed to acquire the current revision.	The network may be busy. Try again. If the error persists, contact your service representative because a failure may have occurred in BMC.
30	Failed to acquire lines:	Some update files may be corrupted. Acquire update files again.
31	Invalid line length:	Some update files may be corrupted. Acquire update files again.
32	Unexpected EOF is detected:	Some update files may be corrupted. Acquire update files again.
33	Unexpected token is detected:	Some update files may be corrupted. Acquire update files again.
34	PIA does not suit this server.	It is not Platform Information (PIA) of this server. Acquire update files again.

CONFIGURING I/O BOARD JUMPERS

With the pre-installed SETUP utility, you can set desired passwords to protect the data stored in the server against access from unauthorized users. When you forget the passwords, however, you may 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.

To clear passwords or the CMOS data, use the jumper switch on the IO board of the server.

The following describe the clearing procedure.

<table>
<tr><td colspan="2" align="center">⚠ WARNING</td></tr>
<tr><td>🚫🔺⚠</td><td>Do not disassemble, repair, or alter the server.

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

1. Record the current BIOS settings.
2. Power off the server and unplug the power cord.
3. Extend the server from the rack cabinet.
4. Remove the rear access cover from the server (see Chapter 9).
5. Remove the processor access cover from the server (see Chapter 9).
6. Change the desired jumper switch setting.

> **IMPORTANT:**
> - Do not change any other switch settings. Any change may cause the server to fail or malfunction.
> - Use the clip over jumper pins (pins 11 and 12) on the IO board.
> - Do not lose the clip.

The following figure illustrates the jumper switch location.

Pins for protecting/clearing the passwords.

Pins for protecting/clearing the CMOS data.

1 3 5 7 9 11

2 4 6 8 10 12

Jumper clip

- ■ Pins for protecting/clearing the passwords

  Short-circuit these two pins to clear the passwords.
  Open these two pins to protect the passwords (factory-setting).

- ■ Pins for protecting/clearing the CMOS data

  Short-circuit these two pins to clear the CMOS data.
  Open these two pins to protect the CMOS data (factory-setting).

7. Reassemble the server and press the POWER switch.

8. When the POST screen appears, power off the server and unplug the power cord.

9. Restore the jumper switch setting.

> **NOTE:** Place the clip over the jumper pins 11 and 12 after use to keep the pin. Placing the clip over any other pins may cause malfunction of the server.
>
>
>
> Pins 11 and 12
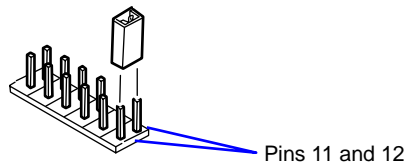
10. Reassemble the server and press the POWER switch.

11. Run BIOS setup utility and restore the parameter settings recorded in Step 1.

If you have cleared the password, set it again as needed.

12. Save and exit the utility.

Chapter 5

Installing the Operating System with Express Setup

This section describes information on using Express Setup to install and configure the following operating systems to the server.

- Microsoft® Windows Server™ 2003 Standard Edition / Microsoft® Windows Server™ 2003 Enterprise Edition
- Microsoft® Windows Server™ 2003 R2 Standard Edition / Microsoft® Windows Server™ 2003 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 set up utility "SETUP." See Chapter 4 for detail.

About Express Setup

"Express Setup" helps you to 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.

You can also use "Configuration disk" at "Express Setup" in order to save or backup parameters for installation.

The Configuration disk is able to have has some parameter files that include the configuration information for the server setup.

If you want to set up the server as before, execute the Express Setup with the parameter file you have saved before.

> **NOTES:**
> - The parameters file is not mandatory to set up the system.
> - If you want to create a parameters file, have a blank floppy disk (MS-DOS 1.44 MB 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 "Configuration Diskette Creator" included in EXPRESSBUILDER.

Microsoft® Windows Server™ 2003

This subsection provides information on installing Microsoft® Windows Server™ 2003 in the server. Read instruction in this section before proceeding to the installation.

> **IMPORTANT:** When using Windows Server 2003 with this equipment, surely apply Service Pack 1.

> **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.

Installation Notice

This section explains precautions and matters you should be aware of before beginning installation in order to install Windows Server™ 2003 correctly.

Supported Operating Systems on this Model

The server supports the following 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")

To install other operating systems, contact sales dealer or the maintenance service representative.

BIOS Specification

Before installing Windows Server 2003, check if the BIOS specification of the hardware is correct. See Chapter 4 to set-up them.

NEC ESMPRO Agent

NEC ESMPRO Agent requires installing the necras.sys driver on your Windows system.

If you install the Windows without using the Express Setup, run the Update the System in Master Control Menu.

Optional Boards Supported by EXPRESSBUILDER

EXPRESSBUILDER CD-ROM shipped with your system supports the following optional boards:

> **NOTE:** If you want to install other boards 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 "Configuration Diskette Creator" in Chapter 6.

- Supporting installation of operating system in EXPRESSBUILDER
  - LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB (Controller on the I/O board)
  - SecuRAID 321 Disk Array Controller (SCSI 2ch)
- Other optional boards
  - Adaptec 29160LP SCSI Controller

Windows Server 2003

Express Setup can install Windows Server 2003 operating system. However, note the following issue:

> **IMPORTANT:**
>
> - Before starting the installation, complete all the process of adding the optional device and the setup of NovaScale server mainframe (BIOS and optional board specification)
>
> - A document for installing Windows Server 2003 is also attached to the other software package which is sold separately, but refer to this document when you install Windows Server 2003 on this model.
>
> - After completing Express Setup, see "Setup for Solving Problems" described later to specify the settings for trouble recovery such as "Specifying Memory Dump".

Installing on the Mirrored Volume

If you want to install Windows Server 2003 on the volume that is mirrored using "Disk Management", invalid the mirroring before operating the installation to set back to the basic disk, and valid the mirroring again after the installation has completed.

Creating, invalid, delete mirror volume can be operated from "Disk Management" in "Computer Management".

Connecting MO Device

If you operate installing Windows Server 2003 with MO device connected, the installation may not be completed normally. In such case, disconnect MO device and then re-install the system from the beginning.

Media such as DAT

During the operating system installation, do not connect unnecessary media to the system, such as DAT.

Connecting Hard Disk

Connect the hard disk that operating system is not going to be installed after installing operating system.

> **NOTE:** If you connect the SecuRAID 321 or LSI Logic MegaRAID SAS 8480E board as a data disk, clear disk array controller's configuration information before you perform the Express Setup. The process for clearing configuration information is described in the manual delivered with the board.

Creating Partition Size

The size for the partition that 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 = 3500 MB (Windows Server 2003 R2)
                           = 3500 MB (Windows Server 2003 with Service Pack1)
                           = 4400 MB (Windows Server 2003 + Service Pack1 CD-ROM)
Paging File Size (Recommended) =   Mounted Memory Size * 1.5
Dump File Size =   Mounted Memory Size + 12 MB
Application Size =   Required Size

IMPORTANT:

- The above-mentioned paging file size is recommended for collecting debug information (memory dump).

- The paging file with 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 virtual memory shortage when the paging file is insufficient, so set an enough size of the paging file with the entire system.

- The maximum paging file size which can be set on one partition is 4095 MB. If the above paging file size exceeds 4095 MB, specify 4095 MB for the paging file size.

- The maximum dump file size for the system with more than 2 GB memory mounted is '2048 MB + 12 MB'.

- If you install any application program or the like, add necessary space to the partition to install these programs.

For example, if the mounted memory size is 512 MB, the partition size will be calculated by the above formula as follows:

3500 MB + (512 MB * 1.5) + (512 MB + 12 MB) + Application Size = 4792 MB + Application Size

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

You cannot re-install Windows Server 2003 with the current partition of the hard disk upgraded to Dynamic Disk kept remained.

If you want to keep the current partition remained, see Appendix E to re-install the system.

About maintenance partition (the area displayed as "MAINTE_P")

The maintenance partition for server maintenance is reserved in the head of Hard Disk Drive (a partition of approximately 55 MB). This area is for saving some maintenance utilities. Do not delete the maintenance partition.

Application of Service Pack

When using Windows Server 2003 with this equipment, surely apply Service Pack 1. When installing Windows Server 2003 R2, it is not necessary to apply Service Pack 1.

Setup Flow

This section visually describes the flow of the setup operated by Express Setup.
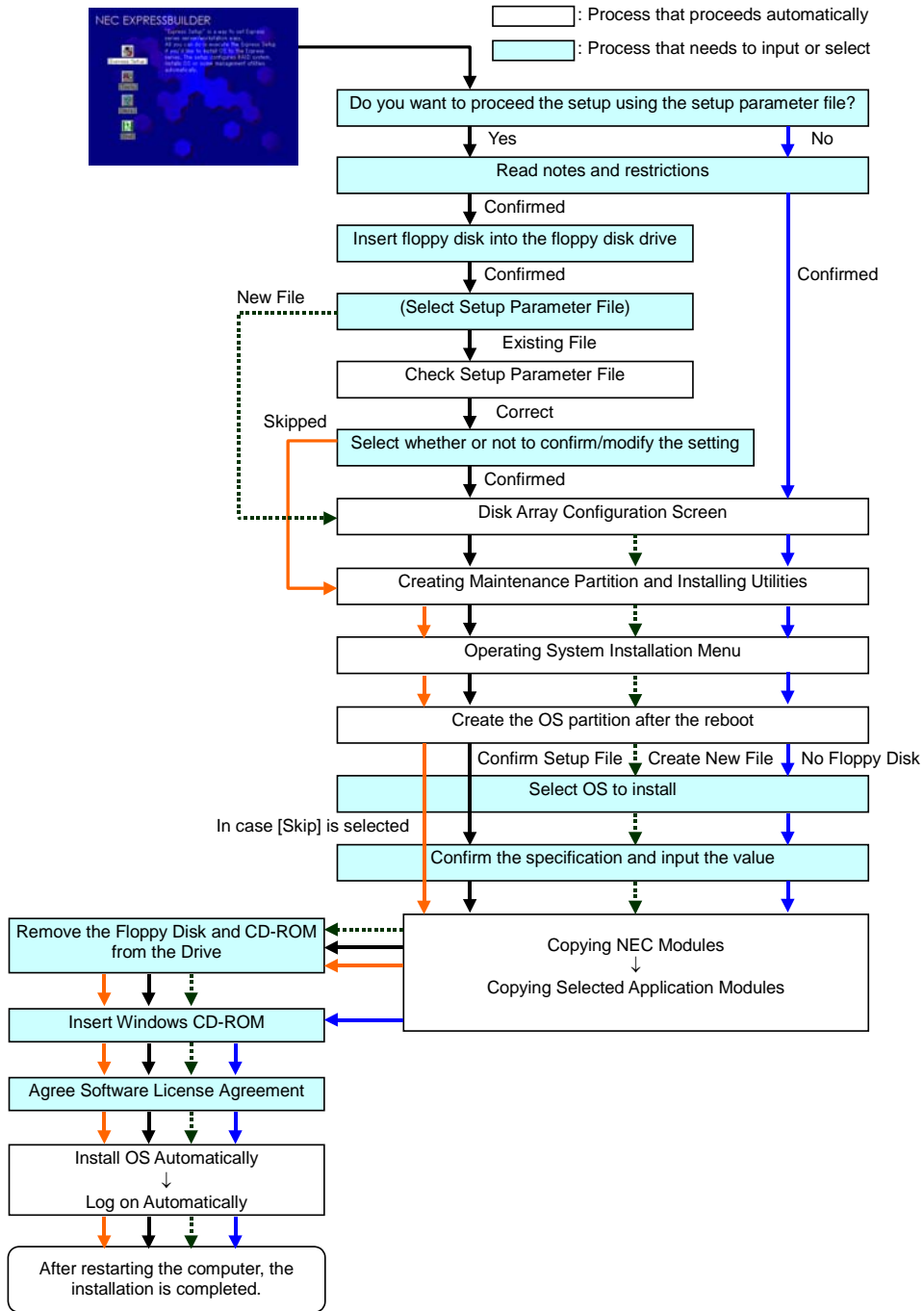
Installing Windows Server 2003

Express Setup proceeds to the setup by specifying the necessary information on the wizard. You can also save the setup information created on the wizard in a floppy disk as a setup file.

> **NOTE:** One floppy disk formatted by MS-DOS 1.44 MB is necessary to save the setup information. Please prepare a floppy disk by yourself before the installation.
>
> Using the same setup file you saved and used before allows you to omit specifying the setup information on the wizard.
>
> And if you use a floppy disk which is attached to the optional device such as disk array controller and contains device driver to install optional mass storage driver while processing the Express Setup, you have to save the setup information in the setup file. Please prepare one empty floppy disk for setup file in this case, too.

1. Turn the power of peripheral device on, and then turn on the server.

   > **NOTES:**
   > - If you operate installing Windows Server 2003 with MO device connected, the installation may not be completed normally. In such case, detach MO device and then re-install the system from the beginning.
   > - Connect the hard disk drive that operating system is not going to be installed after installing operating system.
   > - If you create multiple logical drives in your system, refer to "Reinstalling the operation system when multiple logical drives exist" (Appendix E).

2. Insert the EXPRESSBUILDER CD-ROM into the 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 CD-ROM and EXPRESSBUILDER starts.

4. Click [Express Setup].

5. The message, "Do you want to use the parameter file in order to set up the NovaScale Server or Workstation", will be displayed.

   If you use the setup parameter file, click [Yes] and if you do not use the setup parameter file, click [No].

6. "Note" will be displayed. Read the instruction carefully and click [Confirm].

7. Notes and restrictions are displayed.

   Read the messages carefully and click [Confirm].

   > **NOTE:** If some operating system has been installed on the hard disk already, the message which asks if you continue the installation appears.

   If you wish to continue the installation, click [Continue].

8. If you selected "Yes" at step 5, place a floppy disk into the floppy disk drive mounted on the server.

   If not, go on the next step.

   > **NOTE:** If you set the floppy disk at this step, do not remove the floppy disk from the server until the message as removing the floppy disk appears.

[Using the existing Configuration Disk]

The parameters files in the floppy disk are listed in dialogue-box.

1) Select a parameters file to use in the Express Setup, and then click [Use].

   After the parameters file is specified, the message "Do you want to review or modify the Setup File parameters?" appears.

2) If you want to modify or confirm the parameters file, click [Review]. If not, click [Skip].

   Click [Review] → Go to next step.

   Click [Skip] → Go to step 10.

[Using a blank disk]

1) Click the box under [Setup File Name: (A)] or press **A**.

   The dialogue box appears.

2) Input the file name and click [Use].

9. Confirm or modify the disk array configuration parameters.

[Configure RAID] screen appears. Confirm the specification, modify if necessary, and then click [OK].

NOTE: Choose RAID0 when you install it in one hard disk.

When the dialogue box is closed, the Express setup automatically performs the RAID configuration, creating Maintenance partition and installing several utilities.

10. Select the operating system to install.

Select "Windows" from the menu.

11. Next, [Basic Information] wizard appears. Confirm the parameters, modify if necessary, and then click [Next].

After that, click [Next], [Back], or [Help] on the screen to continue. Modify the parameters each time if necessary.

IMPORTANT:

- Reserve the partition to install the operating system more than the minimally required size.

- If you select "Use Existing Partition" as "System Partition", the contents of the first non-maintenance partition will be erased and formatted. The contents of other partitions will be retained. The figure below shows which partition will be deleted if a maintenance partition exists.

First Partition <Maintenance Partition> Retained	Second Partition Deleted	Third Partition Retained	Fourth Partition Retained

- You cannot re-install the system if the disk has been upgraded to Dynamic Disk. Do not select "Use Existing Partition" as "System Partition".

- If you specify other than 4095 MB for the "Installing Partition", it is necessary to convert to NTFS.

- If "Use Existing Partition" at "System Partition" is selected but the partition other than the one to install Windows Server 2003 does not exist (excluding maintenance partition), Express Setup will reserve the maximum area of the hard disk to install Windows Server 2003.

- You cannot go to the next screen if the specification is incorrect.

- On specification, an error may occur in relationship with the specified contents of the former screen and require to go back to modify the specification.

- During the setup, the screen to specify the partition that Windows Server 2003 is to be installed appears. The first 55 MB area displayed on the screen is a partition that is used to store the configuration information or utilities unique of the server. We do not recommend to delete this area but, if you do not want to reserve this 55 MB area, perform the installation by manual setup. It is impossible to delete this area by Express Setup.

- To specify the setup parameters, the number of characters must not exceed the limit as shown in the table below. (Double-byte character shall be counted as two characters.)

Item	Value specified	Max. number of characters
Create Users	User Name	19
	Group Name	20
	Full Name	63
	Explanation	47
Create Groups	Group Name	20
	Explanation (Group Name)	47

NOTES:

- If you click [OK] in [Role of Computer] screen, the setup automatically selects default value for the later specification to continue the installation.

12. Copy the modules for the optional mass storage driver.

If you want to install the optional mass storage driver, insert the floppy disk attached to mass storage driver into the floppy disk drive and follow the message to operate the installation.

NOTE: You can use this function only when the floppy disk drive is attached to the system.

13. Remove EXPRESSBUILDER CD-ROM from the DVD-ROM drive according to the message.

If you proceed to the setup by using setup parameter file, remove the floppy disk from the floppy disk drive.

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

[Agree Software License Agreement] screen appears.

14. Read the contents carefully and click [I agree.] or press **F8** if you do agree. If you do not agree, click [I disagree] or press **F3**.

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.

15. If you selected [Yes] on [Apply Service Pack] at Basic Information, follow the procedure below.

1) Follow the message to take Windows Server 2003 CD-ROM out of the DVD-ROM drive.

2) Follow the message to insert Windows Server 2003 Service Pack 1 or later into the DVD-ROM drive.

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

16. If you install Microsoft Windows Server 2003 R2, insert Microsoft Windows Server 2003 R2 Standard Edition DISK 2 or Microsoft Windows Server 2003 R2 Enterprise Edition DISK 2 into the DVD-ROM drive after the operating system installation.

Hereinafter, proceed to the operations according to the message.

When the installation has finished, remove Microsoft Windows Server 2003 R2 Standard Edition DISK 2 or Microsoft Windows Server 2003 R2 Enterprise Edition DISK 2 from the DVD-ROM drive, and restart the system.

Now the Setup using Express Setup has completed.

Installing and Setting Device Drivers

Follow these steps to install and configure the device drivers.

PROSet

PROSet is a utility that confirms the function of network contained in network driver.

Utilizing PROSet enables the following items:

- Confirm detailed information of the adapter.
- Diagnose loop back test, packet transmission test and so on.
- Setup of teaming.

Configuring several network adapters as one team provides the server a tolerant environment on any trouble and enhance throughput between the switches.

PROSet is necessary to use these features.

Follow the procedure below to install PROSet.

1.   Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

2.   The [Windows Explorer] dialog starts.

   *Procedure in the case of the standard start menu

       Click Start menu and click [Windows Explorer].

   * Procedure in the case of the classic start menu

       Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].

3.   Run "DXSETUP.EXE" in the following directory.

   <DVD-ROM Drive Letter>:\WINNT\DOTNET\NS4\PROSET\2KXPWS0

   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.   Choose "Typical" and click [Next].

7.   Click [Install].

8.   When [InstallShield Wizard Completed] window is displayed, click [Finish].

9.   Restart the system.

Network Driver

Specify the details of network driver.

Two standard network drivers that are mounted will be installed automatically, but the link speed and Duplex mode need to be specified manually.

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box appears.

    * Procedure in the case of the standard start menu

        1. Click Start menu, Click [Control Panel], Click [Network Connections], and Click [Local Area Connection].

    * Procedure in the case of the classic start menu

        1. Click Start menu, Click [Settings] and Click [Network Connections].

            The [Network Connections] dialog box appears.

        2. Right-click [Local Area Connection] and click [Properties] from pop-up menu.

2. Click [Configure].

    The property dialog box for network adapter appears.

3. Click the [Advanced] and specify the [Link Speed & Duplex] value the same as the value specified for HUB.

4. Click [OK] on the property dialog box for network adapter.

[When PROSet is installed]

1. The [Intel PROSet] dialog box appears.

    * Procedure in the case of the standard start menu

        Click Start menu, point to [Control Panel] and click [Intel PROSet].

    * Procedure in the case of the classic start menu

        1. Click Start menu, point to [Settings] and click [Control Panel].

        2. Double-click [Intel(R) PROSet] on the [Control Panel] window.

2. Click [(Network Adapter Name)] in the list.

3. Click the [Speed] and specify the [Link Speed & Duplex Settings] value the same as the value specified for HUB.

4. Click [Apply] and click [OK].

Specify the other network driver with the same process as above.

Also, add or delete any protocols and services if necessary.

You can operate the process on the property dialog box for local area network which can be appeared from [Network and Dial-up Connection].

> **NOTE:** We recommend you to 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 trouble. For information on how to install the tool, see the "Setting for Solving Problems" described later in this chapter.

Optional Network Board Driver (Intel® PRO/1000 PT Dual, Intel® PRO/1000 MT Dual or Intel® PRO/1000 XT)

If you want to use optional Network Board (Intel® PRO/1000 PT Dual, Intel® PRO/1000 MT Dual or Intel® PRO/1000 XT), install the driver stored in EXPRESSBUILDER CD-ROM.

"DVD-ROM Drive Letter:\WINNT\DOTNET\NS4\PRO1000\WS03XP2K"

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

Installation of the Optional Network Board Driver

1. Start Device Manager.

2. Click [Network adapters] and double-click [(Network Adapter Name)].

    [(Network Adapter Name) Properties] appears.

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

3. Click [Driver] tab and click [Update Driver...].

    [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 and specify:
    [DVD-ROM drive letter:\WINNT\DOTNET\NS4\PRO1000\WS03XP2K]

    Then click [Next].

7. Click [Finish].

Installing SCSI Controller Driver (Adaptec 29160LP)

If you use SCSI controller driver (Adaptec 29160LP), update your system with EXPRESSBUILDER CD-ROM attached to your system.

The SCSI controller driver will be installed automatically.

Installing Disk Array Controller Driver (SecuRAID 321)

To additionally install the SecuRAID 321 in a system containing Windows Server 2003, connect the controller and follow these steps to install the driver:

1. Start [Device Manager] from [Start] menu → [Control Panel] → [Administrative Tools] → [Computer Management].

2. Double-click [LSI Logic Megaraid SCSI 320-2] which Device Manager lists

3. Click the [Driver] tab and click [Update Driver...].

4. When the "Update Device Driver Wizard" appears, select "Install from a list or specific location [Advanced]" and click [Next].

5. Select the "Search for the best driver in these locations." and check the "Search removable media [floppy, CD-ROM...]" check box.

6. Insert "Windows Server 2003 OEM-DISK for EXPRESSBUILDER" into the floppy disk drive, and click [Next]

7. Copying of the driver is completed, and the [Completing the Hardware Update Wizard] dialog box appears. Click [Finish]

Graphics Accelerator Driver

Standard graphics accelerator drivers that are mounted will be installed automatically. The following is the procedure when it is necessary to install manually.

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

1.   Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

2.   Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].

3.   Run "SETUP.EXE" in the following directory.

<DVD-ROM Drive Letter>:\WINNT\DOTNET\VIDEO\SETUP.EXE.

4.   Follow the message to continue the installation.

If the dialog message "Digital Signature could not been found." appears, select [Yes] to continue.

5.   Remove the EXPRESSBUILDER CD-ROM from the DVD-ROM drive, follow the on–screen instructions and restart the system.

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

Many different switches will be available if you edit 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 4 GB in its installing, adding /PAE switch in Boot.ini file will enable the system to be installed with over 4 GB 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 4 GB 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 [Operating Systems] section in [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
```

This is the end of editing Boot.ini file.

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

Setting for Solving Problems

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

Memory Dump (Debug Information)

This section describes the procedures for collecting memory dump (debug information) in the server.

IMPORTANT: Cautions for the Memory Dump

■ The staff of maintenance service representative is in charge of collecting memory dump. Customers need only to specify the memory dump.

■ If any trouble occurs after specifying the process below, the message to inform that the system is in short of virtual memory may appear, but continue to start the system. If you re-start the system in such case, memory dump may not be stored correctly.

Follow the procedure below to specify.

1. Select [Control Panel] and click [System].

The [System Properties] dialog box appears.

2. Select [Advanced] tab.

3. Click [Settings] on the [Startup and Recovery] group box.

IMPORTANT:

Windows Server 2003 x64 Editions

■ Specifying "Complete Memory Dump" to write the debug information is recommended. If the mounted memory size is larger than 2 GB, "Complete Memory Dump" cannot be specified, then specify "Kernel Memory Dump" instead.

■ Specify a drive where there is a free area greater than the size of "the memory capacity mounted on NovaScale server + 1 MB".

■ In case the mounted memory size exceeds 2 GB due to the added memory, change the write debugging information to [Kernel Memory Dump] before adding memory. The size of debugging information (memory dump) to be taken also changes due to adding memory. Verify the size of the empty space in the debugging information (memory dump) write destination drive.

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■ Specifying "Complete Memory Dump" to write the debug information is recommended. If the mounted memory size is larger than 2 GB, "Complete Memory Dump" cannot be specified, then specify "Kernel Memory Dump" instead.

■ Specify a drive where there is a free area greater than the size of "the memory capacity mounted on NovaScale server + 12 MB" (in case the memory capacity is more than 2 GB, a free area of "2048+12 MB" or more).

■ In case the mounted memory size exceeds 2 GB due to the added memory, change the write debugging information to [Kernel Memory Dump] before adding memory. The size of debugging information (memory dump) to be taken also changes due to adding memory. Verify 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. 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 [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 the value larger than [Recommended], and click [Set].

    > **IMPORTANT:**
    >
    > ■ The above-mentioned paging file size is recommended for collecting debug information (memory dump). The paging file with 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 virtual memory shortage when the paging file is insufficient, so set an enough size of the paging file with the entire system.
    >
    > ■ For more information on "Recommended" value, see "Partition Size to be Created" described earlier.
    >
    > ■ In case the memory is expanded, re-specify the paging file to suit the new memory size.
    >
    > ■ To prepare for the situation when any trouble occurred, we recommend you to press dump switch to confirm that the dump will be collected normally in advance.

9. Click [OK].

    The message to restart the system may appear according to the modified specification. In such case, follow the message to 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 diagnostic information (log). Follow the procedure below and specify 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 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 cannot specify network pass. Specify the pass on local computer.

4. Specify the location of 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 function above, refer to the Online Help.

6. Click [OK].

Network Monitor

Using Network Monitor helps you investigating and managing network trouble. To use Network Monitor, you need to restart the system after the installation has completed, so we recommend installing Network Monitor before any network trouble may occur.

1. Point to [Settings] from 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 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 requests the install disk, insert Windows Server 2003 CD-ROM into the DVD-ROM drive and click [OK].

8. Click [Complete] in the [Windows Component Wizard] dialog box.

9. Click [Close] in the [Add/Remove Application] dialog box.

10. Close the [Control Panel] dialog box.

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

Installing Maintenance Utilities

Various maintenance utilities are contained in your EXPRESSBUILDER CD-ROM. See Chapter 6 for installing the utilities to your server or management workstations.

Updating the System

Update the system in the following situations:

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

Log on to the system with the account that has administrative authority (e.g. Administrator) and insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive of the server.

[Setup Software] in [Master Control Menu] screen appears, so left-click the item. Click [Update the System] from the menu and the setup will start. After that, follow the message to continue the setup 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 by the following process.

1. Insert the EXPRESSBUILDER CD-ROM in the DVD-ROM drive and reboot the system.

2. Select [Tools].

3. Select [Off-line Maintenance Utility].

4. Select [System Information Management].

5. Insert a floppy disk in the floppy disk drive.

6. Select [Save].

Installing with the OEM-FD for Mass Storage Device

This section explains how to setup with the OEM-FD. You usually do not have to do as follows. The detailed information is provided by the manual of the Mass Storage Device.

Installing a Mass Storage Device not Supported by Express Setup

If you want to install or re-install the operating system when the system has a new mass storage device not supported by EXPRESSBUILDER, do as follows.

1. Read the manual supplied with the mass storage device before setting the server.

2. If the mass storage device is disk array controller, configure the RAID system before running the EXPRESSBUILDER.

3. Boot the system from EXPRESSBUILDER CD-ROM.

4. (a) When the Disk array configuration dialogue appears, check "Use Existing Array".

   (b) Check "Apply OEM-FD for Mass storage device".

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

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

   Continue the Express Setup, referring to the on-screen messages.

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Chapter 6

Installing and Using Utilities

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

EXPRESSBUILDER

EXPRESSBUILDER has some maintenance utilities and management software. EXPRESSBUILDER also helps you to install NOS (Windows Server 2003).

> **NOTE:** Before using EXPRESSBUILDER for initial setup, complete the hardware configuration.

EXPRESSBUILDER has three executing modes depending on your operating environments. One is for using on Windows system, and the others are booted from EXPRESSBUILDER CD.

■ DOS-based with local console

The following menu appears on the local display after booting from EXPRESSBUILDER CD. You can install NOS or run the diagnostic program and so on.

■ DOS-based with remote console

This program is used to set up the server from the management workstation by accessing the server over the network or via COM B (serial) port.
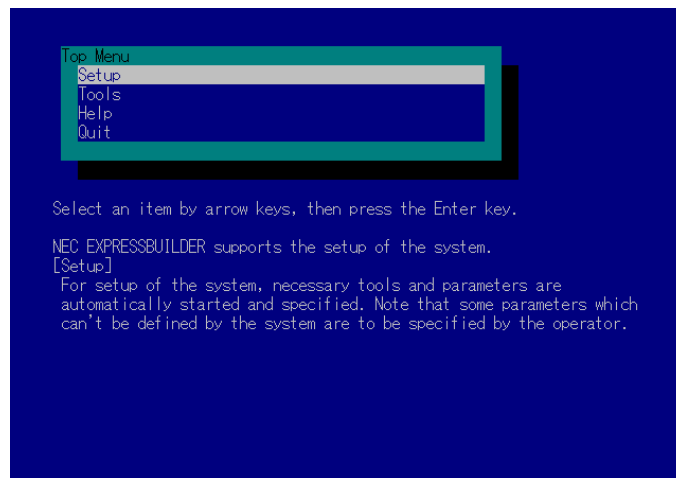
> **NOTE:** No keyboard connected to the server is permitted to run this program.

■ Windows-based

This program is called as "Master Control Menu" that can run under the Microsoft Windows system (Windows 95 or later and Windows NT 4.0 or later). You can install the several applications and read the documentation from the menu.
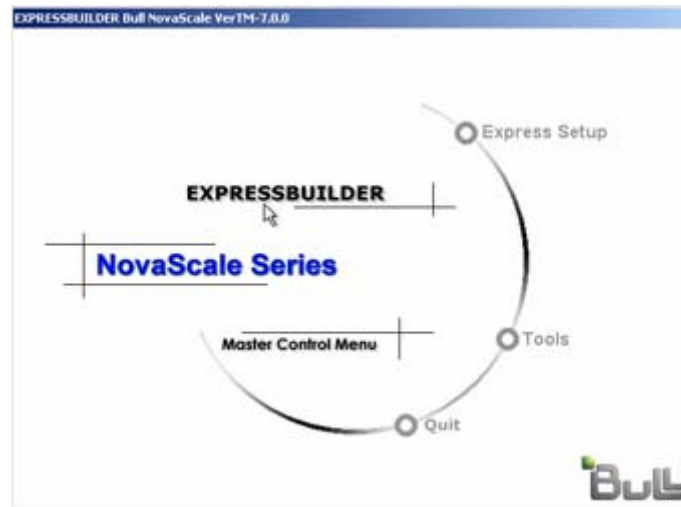
EXPRESSBUILDER for DOS-Based with Local Console

This subsection describes the procedures for using EXPRESSBUILDER for DOS-based with local console.

Starting EXPRESSBUILDER

The following procedure instructs you to start EXPRESSBUILDER.

> **IMPORTANT:** Do not remove the EXPRESSBUILDER CD-ROM while EXPRESSBUILDER is running.

1. Turn on peripheral devices and the server in this order.

2. Insert the EXPRESSBUILDER CD-ROM supplied with your server into the DVD-ROM drive of your server.

3. Ensure that the floppy disk drive is empty.

4. 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.)

    EXPRESSBUILDER boots up displaying the top menu.

Express Setup

"Express Setup" is intended for initial setup of the server. Its automatic installation mode guides the user easily through the process by detailing specific hardware features and providing screen prompts for software selection and configuration. The program loads the utilities and drivers, applies RAID settings, partitions the disk, and installs the desired operating system.

If you install Windows Server 2003, after a few tasks are completed, all that remains to be done is to remove the EXPRESSBUILDER CD-ROM and install the Windows CD-ROM, input a product ID number, and acknowledge the license agreement.

> **IMPORTANT:**
>
> - The Express Setup is intended for the initial setup of the server system and, therefore, the Express Setup clears the contents of the hard disk.
>
> - When the setup is started, do not turn off the server until the setup is completed, and also make sure not to remove the "Configuration Diskette" from the floppy disk drive until the message that allow you to remove it appeared.

Tools

"Tools" is also intended for initial setup of the server. It provides more installation options than Express Setup and permits the user to quickly create utility support disks, run the Off-line Maintenance Utility and system diagnostic utility, set up a maintenance partition, and update the various BIOS programs.

```
Tools Menu                                    RAID Board: Present
Save/Restore RAID Configuration Data          Total Drives: 1
Off-line Maintenance Utility                  Drives in Group: 1
System Diagnostics                            Hot Spares: 1
Create Support Disk                           RAID Level: 7
Setup Maintenance Partition                   Write Mode: WRITE_THRU
BIOS/FW/etc. Update                           Maint Part: Present
System Management
Help
Return to the Top Menu
```
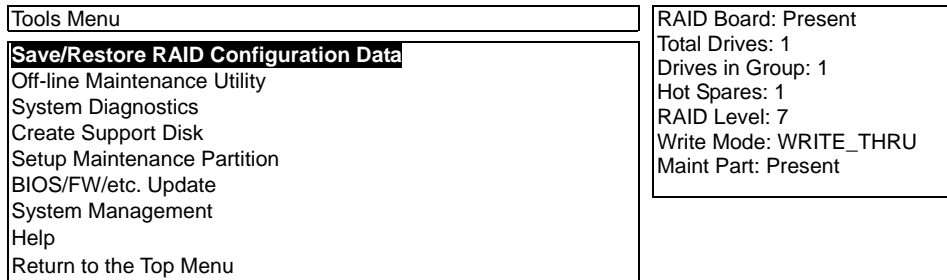
■ Save/Restore RAID Configuration Data

   The item allows the configuration information on the disk array system to be saved or restored from the floppy disk.

   – Save Disk Array Configuration Data

      The configuration information on the disk array controller is saved into the floppy disk. If you set or change RAID, always use this function to save the configuration information into a floppy disk.

   – Restore Disk Array Configuration Data

      The configuration information saved in a floppy disk is restored to NVRAM and hard disk on the disk array controller.

      If the configuration information is broken or changed by mistake, restore the configuration information.

      When the defected disk array controller is replaced, the configuration information on the hard disk must be saved into the disk array controller.

      However, if the configuration information on the new disk array controller is saved into a hard disk, use this function to restore the configuration information.

      IMPORTANT: Some Disk Array Controllers do not support this function. In that case, this menu will not be shown.

■ Off-line Maintenance Utility

   Off-line Maintenance Utility is an operating system-independent maintenance program that performs preventive maintenance and error analysis for your server. See Chapter 8 or online help for details.

■ System Diagnostics

   Executes various tests on the server system to check if the server functions are normal and if the connection between the server and additional board is normal. After the System Diagnostics is executed, a system check program assigned to each model starts. See Chapter 7 for details.

■ Create Support Disk

   EXPRESSBUILDER CD-ROM contains a number of device drivers and utilities that you can put on floppy disks and load onto your system.

   Using this menu creates a support disk by copying from the EXPRESSBUILDER CD-ROM. If your system has the Windows operating system, you may find it more convenient to use EXPRESSBUILDER for Windows-based to make support disks

   Write the displayed title on the floppy disk label, which is useful for management in the future. Customers have to provide a floppy disk to create a support disk.

   – Windows Server™ 2003 x64 Edition OEM-DISK for EXPRESSBUILER

      Creates a support disk for installing Windows Server™ 2003 Standard x64 Edition and Windows Server™ 2003 Enterprise x64 Edition.

– Windows Server™ 2003 OEM-DISK for EXPRESSBUILDER

Creates a support disk for installing Windows Server™ 2003 Standard Edition and Windows Server™ 2003 Enterprise Edition. (No need to create this disk when installing the operating system with the Express Setup.)

– ROM-DOS Startup FD

Creates a support disk for starting the ROM-DOS system.

– Off-line Maintenance Utility Bootable FD

Creates a support disk for activating the Off-line Maintenance Utility.

– System Management FD

Creates a support disk for activating the System Management.

■ Setup Maintenance Partition

Maintenance partition is a specific partition for the server and created on your system disk. About 55 MB of the maintenance partition includes the various maintenance utilities and executable commands. In this menu, you can create the maintenance partition, install the various utilities, and update the utilities. The maintenance utilities installed in the maintenance partition are system diagnostics, System Management, and Off-line Maintenance Utility.

> **IMPORTANT:**
>
> ■ Do not reset or turn off the server while running this menu. If the processing is discontinued, the system becomes unable to start.
>
> ■ The existence of the maintenance partition may be identified from the operating system. In order to retain the Configuration Data, do not delete the partition.

> **NOTES:**
>
> ■ The maintenance partition, once created, will not be recreated again.
>
> ■ When the maintenance partition does not exist, some menu items do not appear.

– Create Maintenance Partition

EXPRESSBUILDER creates about 55 MB of the maintenance partition on the system disk (or disk array system) as work area. The various utilities are installed when the maintenance partition is created successfully or when the maintenance partition is already created.

– Install Maintenance Partition Utilities

Various utilities are installed in the maintenance partition from the CD-ROM.

– Maintenance Partition Update

Various utilities are copied in the Maintenance Partition from the update disk. This menu is only used when the update disk is supplied from your service representative or attached with your system.

– FDISK

Execute FDISK command of ROM-DOS system. You can create/delete partitions, etc.

■ BIOS/FW/etc. Update

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 from our customer service representative.

After rebooting the system, an update program is started 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.

■ System Management

The parameters of BMC (Baseboard Management Controller) are set for remote control and alert.

■ Help

Displays explanations about various functions of EXPRESSBUILDER.

■ Return to the Top Menu

Choosing this menu returns to the Top Menu.

EXPRESSBUILDER for DOS-based with Remote Console

This subsection describes the procedures for using EXPRESSBUILDER for DOS-based with remote console.

EXPRESSBUILDER contains the 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.
>
> ■ When a keyboard is connected to the server, the remote console feature is disabled. The EXPRESSBUILDER determines that the server has a console. (Nothing is displayed on the management PC.)

Starting

The following two methods are available to start the server.

■ Running EXPRESSBUILDER from the management PC via LAN

■ Running EXPRESSBUILDER from the management PC via direct connection (COM2)

For the procedure for starting EXPRESSBUILDER for DOS-based with Remote Console, see "NEC DianaScope".

> **IMPORTANT:** Do not change the boot device order in BOOT menu in BIOS SETUP. EXPRESSBUILDER cannot be used if the DVD-ROM drive is not the first device to launch the system.
> To use this feature, you need 3.5-inch floppy disk. Please prepare the floppy disk.

> **NOTE:** The following items of BIOS setup information will be set as shown below.
>
> ■ LAN Controller 1 (10/100):   [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]
>
> ■ Serial Port Address: [On-board COM B]
>
> ■ Baud Rate: [19.2k]
>
> ■ Flow Control: [CTS/RTS]
>
> ■ Console Type: [PC ANSI]

Top Menu
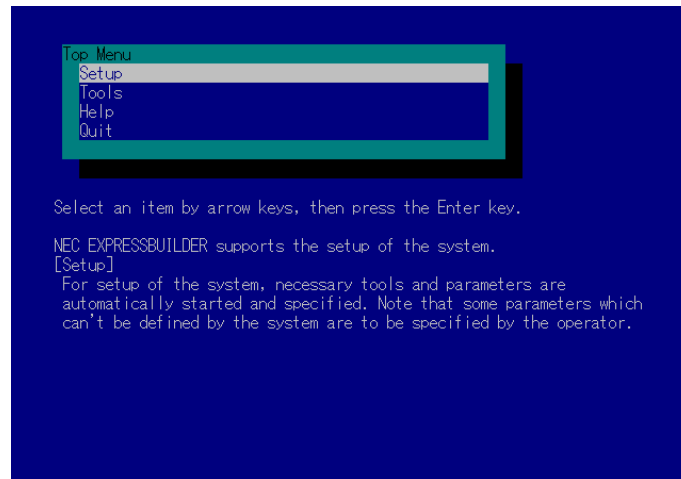
Shown below are the top menu items.

- Setup: Automatically sets up the server.
- Tools: Launch the features of EXPRESSBUILDER individually.
- Help: Help message on EXPRESSBUILDER.
- Quit: Quit EXPRESSBUILDER.

Setup

The EXPRESSBUILDER checks the hardware configuration of the server. The disk array and maintenance partition are automatically configured.

Tools

When you select the [Tools] on the Top Menu, the following screen appears.
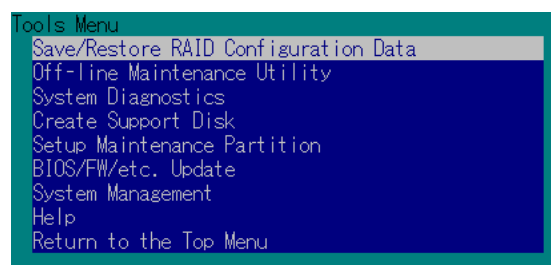
The menu items available only in remote console operation among those described in section "EXPRESSBUILDER for DOS-Based with Local Console" are displayed. See the previous subsection for detailed explanation of menu items.

IMPORTANT: The followings are varied from the [Tools] menu in the local console mode.

- Test items and operation method of System Diagnostics. See Chapter 7 for details.

EXPRESSBUILDER for Windows-Based (Master Control Menu)

The Master Control 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:**
>
> - Master Control Menu requires Microsoft® Windows® 95 (or later) or Windows NT® 4.0 (or later).
>
> - Some documents are provided in the PDF format. Use the Adobe Reader to view or print these documents.
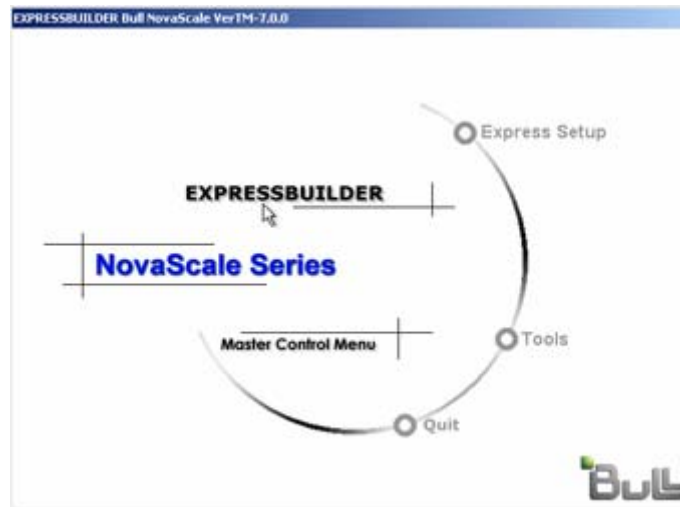
Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

Master Control Menu appears on the screen automatically. If the CD-ROM Autorun function is invalid in your system, run the \MC\1ST.EXE file in the CD-ROM directly.

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

To use Master Control Menu,

- Click [Online Document], [Setup] or [Quit], or

- Click the right mouse button on the Master Control Menu window.

CONFIGURATION DISKETTE CREATOR

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

If you use the Configuration Diskette created by the Express Setup and Configuration Diskette Creator to operate the setup, you can setup from the installation of operating system to several utilities automatically except for a few key input to confirm the specification. Also, you can install the system with the same specification as before when re-installing the system. We recommend you to create [Configuration Diskette] to setup the servers from EXPRESSBUILDER.

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

> **IMPORTANT:** You cannot create [Configuration Diskette] for Microsoft® Windows Server™ 2003 x64 Editions.

> **NOTE:** You can install Windows Server™ 2003 without [Configuration Diskette]. Also, you can modify/newly create [Configuration Diskette] during the setup with EXPRESSBUILDER.

Creating Configuration Diskette

This section describes about specifying setup information that is necessary for operating system installation and creating [Configuration Diskette]. Follow the procedure below.

> **NOTE:** In the procedure below, the folder name that is specified when installing Trekking command is assumed as [Configuration Diskette Creator].

1. Start the operating system.

2. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

    Master Control Menu will appear.

3. Right-click on the screen or left-click [Setup]. The menu will appear.

4. Click [Configuration Diskette Creator].

    Configuration Diskette Creator window is displayed.

5. Click [Create New Information files] from the [File] menu.

    The [Disk Environment] dialog box will be displayed.
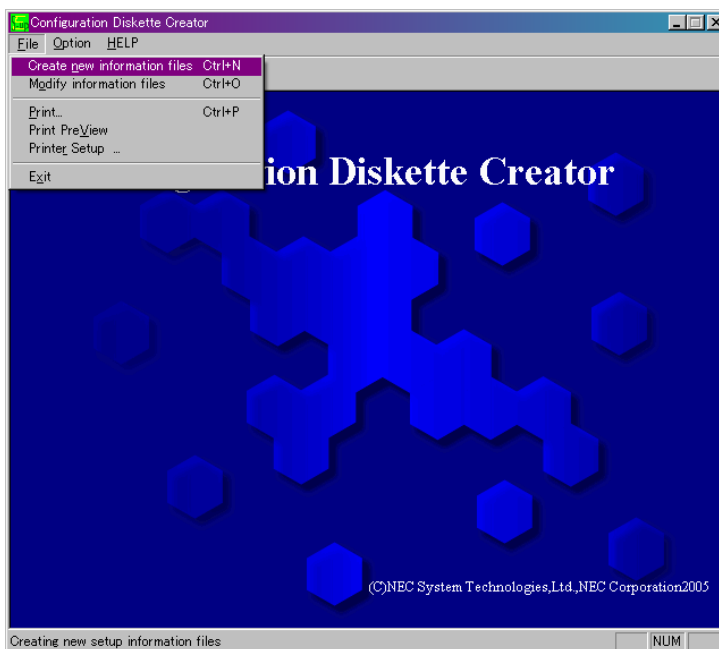
6. Specify each item and click [OK].

The dialog boxes to specify setup information will be displayed in order, such as [Basic Information] dialog box.
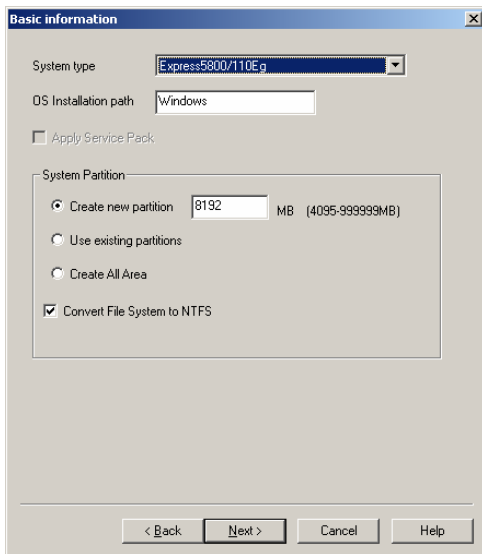
7. Follow the message to specify each item on the dialog box and click [Next].

> **NOTE:** If you click on [Cancel], all the input value will be deleted.

When completing the specification of setup information, the [Save Setup Information] dialog box will appear.

8. Confirm that the [Configuration Diskette] check box is checked and input file name for the Setup File in [File Name].
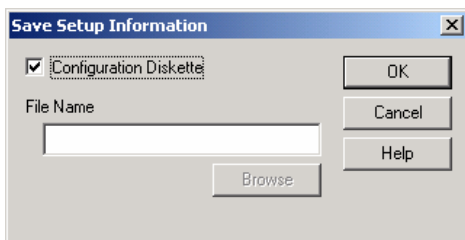
9. Insert a 1.44 MB formatted floppy disk into the floppy disk drive and click [OK].

Now [Configuration Diskette] has been created. [Configuration Diskette] is used when you install Windows Server 2003. Put a label and keep it in a secure place.

> **NOTE:** For information on the contents of each specifying item, refer to the Help.

If you want to modify the information file that already exists, click [Modify information files] on Configuration Diskette Creator window. Refer to the Help to modify the inf file.

Installing Optional Mass Storage Driver

To install optional Mass Storage Driver that is supported by the Express Setup, follow the procedure below to create [Configuration Diskette].

1. Display Configuration Diskette Creator window.

2. From the [File] menu, click [Create new information files].

   [Disk Environment] dialog box will be displayed.

3. Specify each item and click on [OK].

   The dialog boxes to specify setup information will be displayed in order, such as [Disk Environment] dialog box.
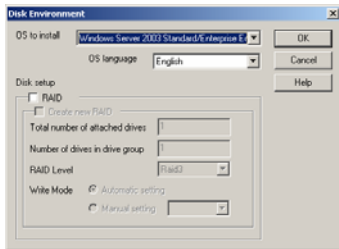
4. Follow the message to specify each item on the dialog box and click on [Next].

   > **NOTE:** If you click on [Cancel], all the input value will be deleted.

5. When [User and application setup] is displayed, check [Apply OEM-FD for mass storage device].
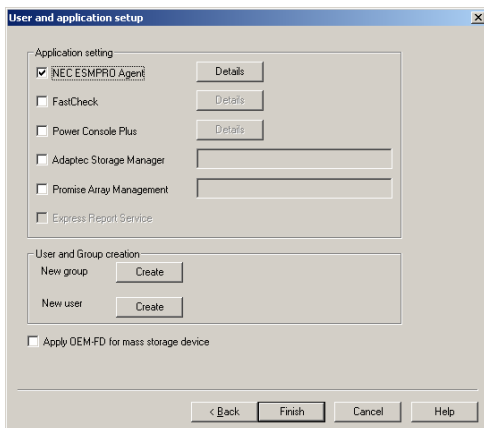
6. When the [Save Setup Information] dialog box is displayed, confirm that the [Configuration Diskette] check box is checked and input file name for the Setup File in [File Name].

7. Insert a 1.44 MB formatted floppy disk into the floppy disk drive and click on [OK].

NEC ESMPRO

The NEC ESMPRO lets a system administrator manage remote servers across a network. NEC ESMPRO monitors server hardware and software configurations, failures, and performance. With log data collected by NEC ESMPRO, a system administrator can track long-term and short-term performance, monitor server usage, create graphs to record trends, and check 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 NEC ESMPRO offers many functions and features for managing remote servers across a network. These features help the system administrator perform daily system operation, system extension, and transfer tasks. Some features of NEC ESMPRO Manager include:

- Hardware and software server configuration

  – Hardware resources mounted in servers, such as the processor, memory, disks, disk arrays, 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 action.

  – Failure data includes hardware failure information such as system board temperature, memory failure, crashes, and software failure information.

- Performance

  – NEC ESMPRO monitors server performance and displays server usage on the screen 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 document in the EXPRESSBUILDER CD-ROM.

Supplement

Note the following in addition to the NOTE that has been described to the online document for NEC ESMPRO.

- Indication on NEC ESMPRO Data Viewer after Hot-Add/Remove Memory

  If you add or remove a memory board dynamically by using hot-add/remove feature, the added or removed memory size will not be indicated correctly on Data Viewer of NEC ESMPRO Manager unless the system is rebooted.

NEC DianaScope

NEC DianaScope is software for the remote management of the server.

See the online documents for details on the functions and installation of NEC DianaScope.
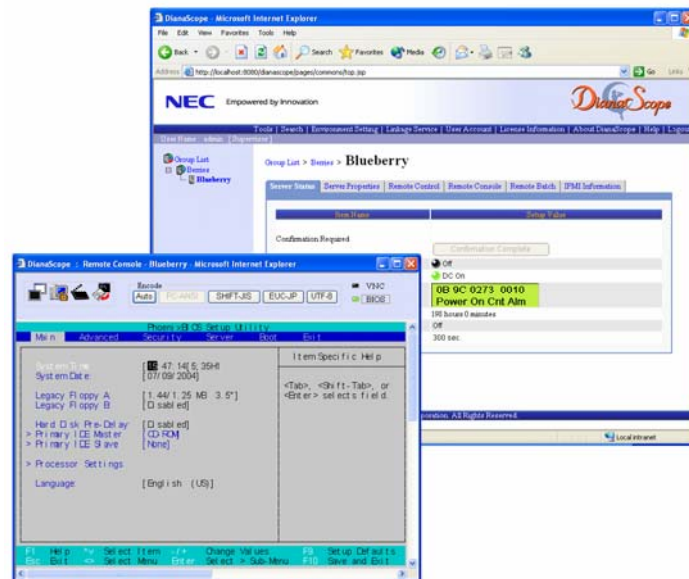
NOTES:

- One server license is required for each server to be managed remotely by using NEC DianaScope.

- Please contact your service representative in order to purchase this accessory.

MEGARAID STORAGE MANAGER™ (SERVER)

MegaRAID Storage Manager™ (hereinafter abbreviated to MSM) is an application to manage or monitor the LSI Logic MegaRAID SAS 8408E disk array controller. You can use MSM for management of arrays and error notification by event monitoring while the system is running.

Before attempting to operate MSM, read the "MegaRAID Storage Manager™ User's Guide" included in EXPRESSBUILDER CD-ROM. The manual explains the MSM installation procedure and notes on operating MSM.

Setup with Express Setup

You can install MSM with Express Setup contained in EXPRESSBUILDER CD-ROM. When you start the Express Setup, a dialog to specify an application appears. Select [MSM] on the dialog.

Manual Setup

See the online document "MegaRAID Storage Manager™ User's Guide contained in EXPRESSBUILDER CD-ROM for details.

MEGARAID STORAGE MANAGER™ (MANAGEMENT PC)

Install the MegaRAID Storage Manager™ (hereinafter abbreviated to MSM) in a management PC that manages servers via the network.

Before attempting to operate MSM, read the "MegaRAID Storage Manager™ User's Guide" included in EXPRESSBUILDER CD-ROM. The manual explains the MSM installation procedure and notes on operating MSM.

IMPORTANT:

Before using Configuration Wizard, Rebuild, or Reconstruction feature of MegaRAID Storage Manager, make sure the slot number of disk bays.

The slot number of 3.5-inch disk bay is not displayed when executing any of these features. You must select a Physical Drive number assigned for 3.5-inch disk drive. The Physical Drive number that appears in Physical view at the left of MegaRAID Storage Manager is not identical to the slot number of 3.5-inch disk bay. Check the slot number of 3.5-inch disk bay by viewing the Properties view of MegaRAID Storage Manager.
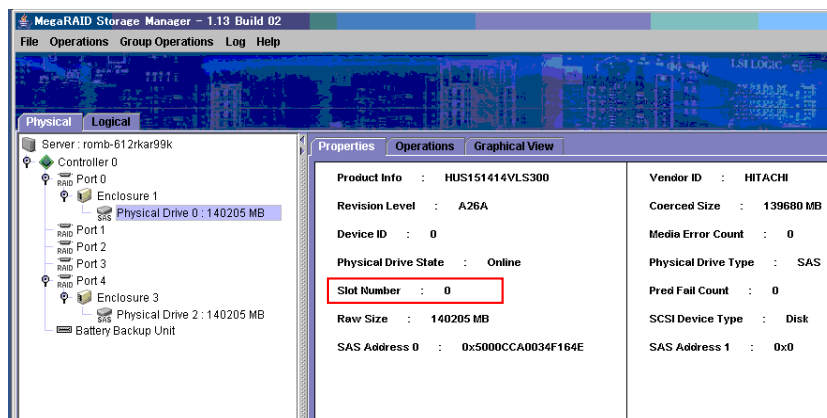
IMPORTANT:

- If you have executed Set Factory Defaults on Adapter Properties menu of WebBIOS, you must specify the Patrol Read feature again in MegaRAID Storage Manager. If Patrol Read feature is not used, set the scheduling of Patrol Read to "Disabled".

- To perform Reconstruction within MegaRAID Storage Manager, you must specify a hard disk drive you want to add or remove in Device ID field. Therefore, you need to check the slot number and Device ID on Disk Properties View of MegaRAID Storage Manager before performing Reconstruction.
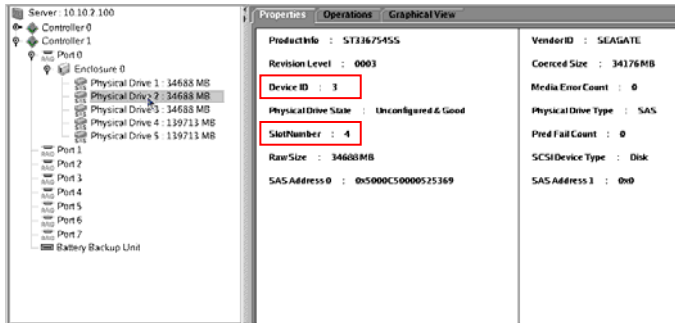
You can select the disk drive to be removed as shown below.
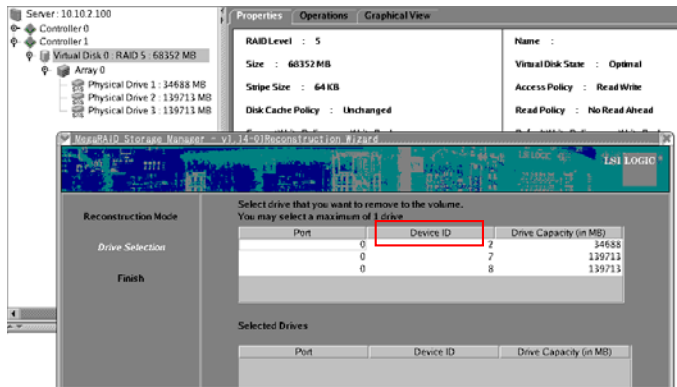
You can select the disk drive to be added as shown below.
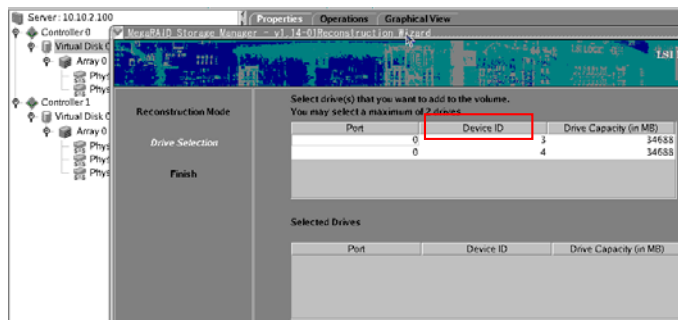
Power Console Plus

Power Console Plus is a utility to control the RAID system. Use of Power Console Plus enables operations (e.g., monitoring and maintenance) of RAID systems that are constructed on local servers and servers connected through networks (TCP/IP). The operations can be done online on graphical screens without the system being stopped.

Major Functions

Power Console Plus has the following features:

- Supporting the Wizard function to facilitate configuration
- Enabling the change of RAID levels
- Being compatible with SAF-TE
- Supporting the performance monitor
- Supporting enclosure functions such as temperature monitoring, power monitoring, and fan monitoring
- Enabling the settings of Write, Read, and Cache policies for each logical drive
- Supporting the save and restore functions for configuration
- Enabling the display of the SCSI transfer rate

Components

Power Console Plus consists of the following five components:

- SNMP Agent

  This function is not yet supported. Do not install SNMP Agent.

- MegaRAID Service Monitor

  Enables NEC ESMPRO to monitor the MegaRAID controller by registering event logs. Install MegaRAID Service Monitor in the Bull NovaScale server in which the MegaRAID controller is mounted.

- MegaRAID Client

  Controls the RAID system on graphical screens. Install MegaRAID Client in the Bull NovaScale server in which the MegaRAID controller mounted or in the management PC that is connected through the Bull NovaScale server and network.

- MegaRAID Server

  Enables control of the MegaRAID controller via the network. Install MegaRAID Server in the Bull NovaScale server in which the MegaRAID controller mounted.

- MegaRAID Registration Server

  Enables control of the MegaRAID controller via the network. Install in one of Bull NovaScale servers and management PCs that are connected through network. The above components must be installed correctly for establishing the environment to use Power Console Plus.

Power Console Plus components to be installed are different between the target servers and management PC.

- Server:

  Bull NovaScale server in which the MegaRAID controller is mounted

  Install the following two components in this server:

  – MegaRAID Service Monitor

  – MegaRAID Client

- Management PC:
  Management PC that monitors and controls servers via the network (TCP/IP)

  When managing array on Terminal Server working on Windows NT® Server Version 4.0 Terminal Server Edition, prepare PC, and install Management PC component. Management PC does not guarantee operation on Client, which used Terminal Server, Terminal Server Emulator, WBT.

  Start Power Console Plus of management PC, after the Power On machine that installed "Server" and "Management Server".

  Install the following component in this PC:

  – MegaRAID Client

- Management server:

  Machine that manages all servers that are monitored and controlled by management PCs

  Install the following components in one of the servers or management PCs:

  – MegaRAID Server

  – MegaRAID Registration Server

Server Setup

Operating Environment

This section explains the operating environment required for Power Console Plus to operate on a server.

- Hardware
  – Memory:

    Size large enough for operating system operation + 10 MB or more

  – Free space on the hard disk:

    10 MB or more

  – Display unit:

    Screen size 1024 × 768 or larger

  – Required peripheral equipment:

    Network Interface card

    CD-ROM unit

    Pointing device such as a mouse

Management PC Setup

This section explains Power Console Plus setup in a computer that manages servers via the network (TCP/IP).

Operating Environment

This section explains the operating environment required for Power Console Plus to operate on a management PC.

- Hardware
  – Machine:

    This server

    PC/AT-compatible machine (which contains Intel® Pentium® or a processor at least equivalent to it)

  – Memory: Size large enough for operating system operation + 10 MB or more

  – Free space on the hard disk: 10 MB or more

– Display unit: Screen size 1024×768 or larger

– Required peripheral equipment: Network Interface card, CD-ROM unit, Pointing device such as a mouse

BMC ONLINE UPDATE

The BMC firmware is updated with the BMC Firmware file.

> **IMPORTANT:** Do not turn off the DC power during while updating the BMC Firmware. The updated BMC firmware becomes valid after restarting the system.

Hardware Requirement

- Hard disk drive

  2 MB

- Supported operating systems

  Windows® 2000 Server

  Windows® 2000 Advanced Server

  Windows Server™ 2003 Standard Edition

  Windows Server™ 2003 Enterprise Edition

  Red Hat Linux Enterprise Linux ES 3

  Red Hat Linux Enterprise Linux AS 3

Installation
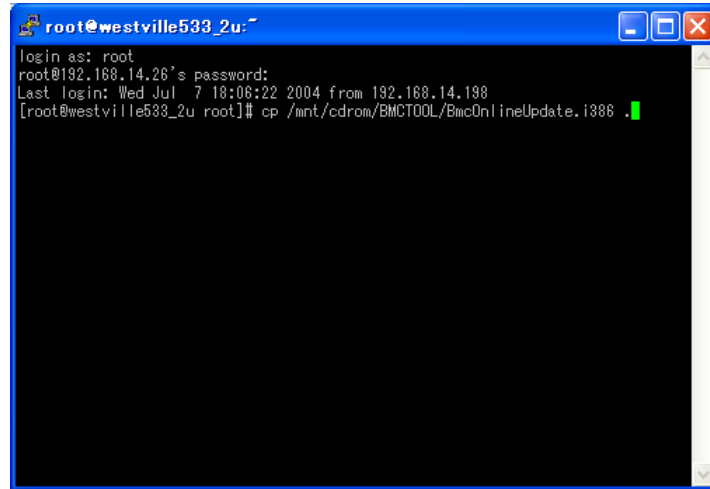
Windows Server 2003

1. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

   Master Control Menu of EXPRESSBUILDER starts automatically.

2. Select [BMC Online Update].

   BMC Online Update installer starts. Follow the installer directions to install.
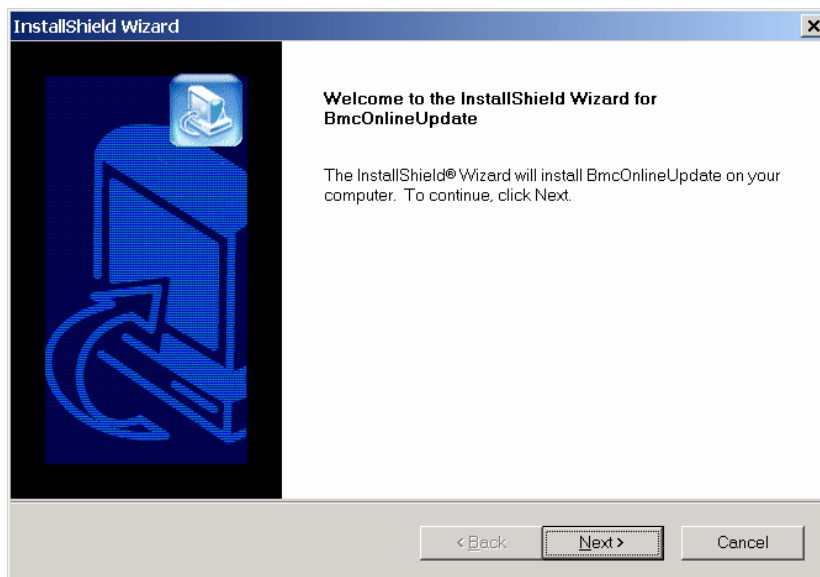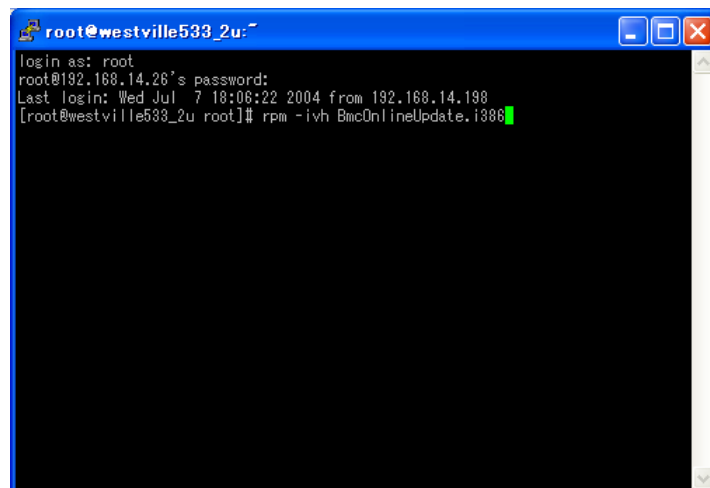
Linux

1. Copy the following file in the suitable directory from CD-ROM.

cp /mnt/cdrom/BMCTOOL/OnlineUp/BmcOnlineUpdate.i386.

2. Expand the rpm file.

rpm –ivh BmcOnlineUpdate.i386

Start-up

Windows Server™ 2003

Select [All Programs] → [BmcOnlineUpdate] → [BmcOnlineUpdate].
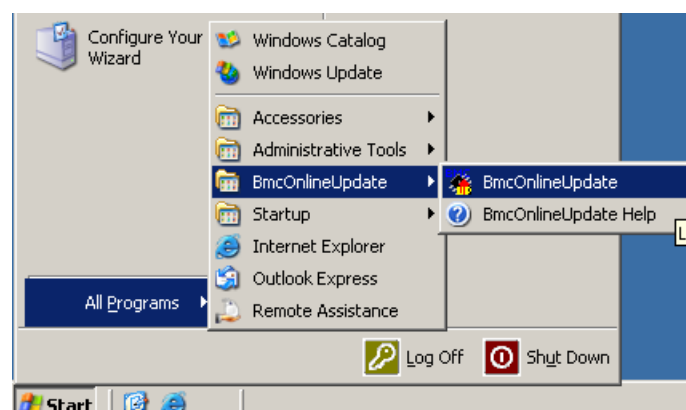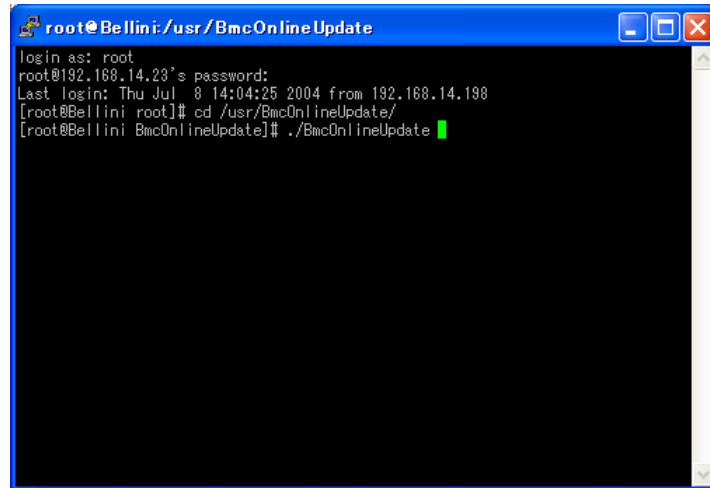
Linux

Enter the following command to start the program.

cd /usr/BmcOnlineUpdate

./BmcOnlineUpdate

Uninstallation

Windows Server™ 2003

1. Select [All Programs] → [Control] → [Add or Remove Programs].

2. Click [BmcOnlineUpdate].

Linux

1. Enter the following command to remove the file.

rm /usr/BmcOnlineUpdate/*

2. Enter the following command to remove the directory.

rmdir /usr/BmcOnlineUpdate
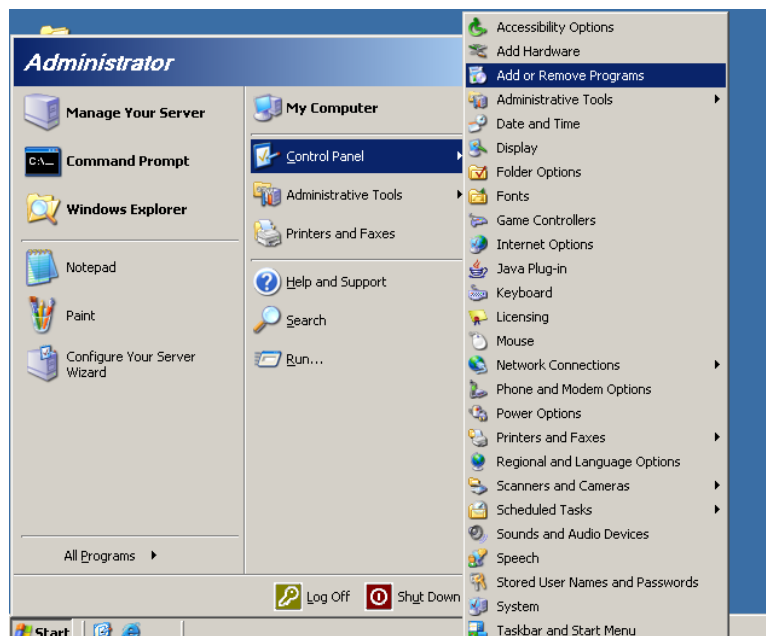
Error Messages

Message	Action
Update isn't necessary.	The firmware is in up-to-date state.
Illegal data.	The data is not for the target device. Update the firmware with the data of the target device.
BMC information can't be acquired.	Check if the remote management card is correctly installed. Update the firmware after making sure that the card is correctly installed.
Cannot enter the online mode.	BMC is possibly in Busy state. Try again several minutes later.
Failed to save the current data.	
Cannot enter the update mode.	
An error was occurred while data is being updated.	
Termination process failed.	
The IPMI Driver not found.	Install the IPMI driver.
BMC is not supported.	The BMC does not support the update function. Updating by this tool is unavailable.

If updating still fails, contact your service representative.

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Chapter 7

Maintenance

This chapter describes the daily maintenance of the server and precautions when relocating or storing the server.

MAKING BACKUP COPIES

It is recommended that you make backup copies of your valuable data stored in hard disks of the server on a regular basis. For backup storage devices suitable for the server and backup tools, contact 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 disk array configuration data if your system is in the array configuration. When your hard disks have been auto-rebuilt due to a failure, it is recommended to 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 disk array controller board. Refer to the manual supplied with the board.

CLEANING

Clean the server on a regular basis to keep the serer in a good shape.

⚠ 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 disassemble, repair, or alter the server. Do not look into the DVD-ROM drive. Do not remove the lithium battery. Disconnect the power plug before cleaning with 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. High temperature Make sure to complete board installation.

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 colour 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 off-powered (the POWER/SLEEP lamp goes off).

2. Unplug the power cord of the server from a power outlet.

3. Wipe off dust from the power cord plug with a dry cloth.

4. Soak a soft cloth in 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

One of the most important items in a good maintenance program is regular and thorough cleaning of the interior of the server, especially around the I/O board.

Dust build-up inside the server can lead to several problems. As dust acts as a thermal insulator, a build-up can prevent proper system cooling. Excessive heat will shorten the life of server components. Also, dust may contain conductive or corrosive materials that can cause short circuits or corrosion of electrical contacts.

How often you should clean the interior of the server depends on the environment in which it is located. For most office environments, you probably should clean the server every 12 months. For more severe environments, clean the interior every 6 months.

Cleaning the interior of the server entails powering off the server and removing the left side cover. You will need a small vacuum cleaner (with plastic tipped nozzle and electrostatic protection), computer grade canned air, and a small brush for cleaning the interior.

Follow the procedure below to clean the interior 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.

1. Turn off the server and unplug all power cables.

2. Remove the top cover. (See Chapter 9.)

3. Use a small brush to loosen any dust and debris on the I/O board.

4. Use computer grade canned air to blow dust off components on the I/O board.

5. Use a small vacuum cleaner with plastic tip to vacuum out dust and debris from the interior of the server.

6. Reinstall the top cover. (See Chapter 9.)

7. Reconnect all power cables and turn on the server.

Cleaning the Keyboard/Mouse

Make sure that the server and peripheral devices are all off-powered (the POWER lamp goes off), 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 to clean the mouse regularly:

1. Prepare cold or lukewarm water, neutral detergent, alcohol, two dry soft clothes, and cotton swabs.

2. Make sure that the server is off-powered (the POWER/SLEEP lamp goes off).

3. Turn the mouse upside down, and rotate the mouse ball cover counter clockwise 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.
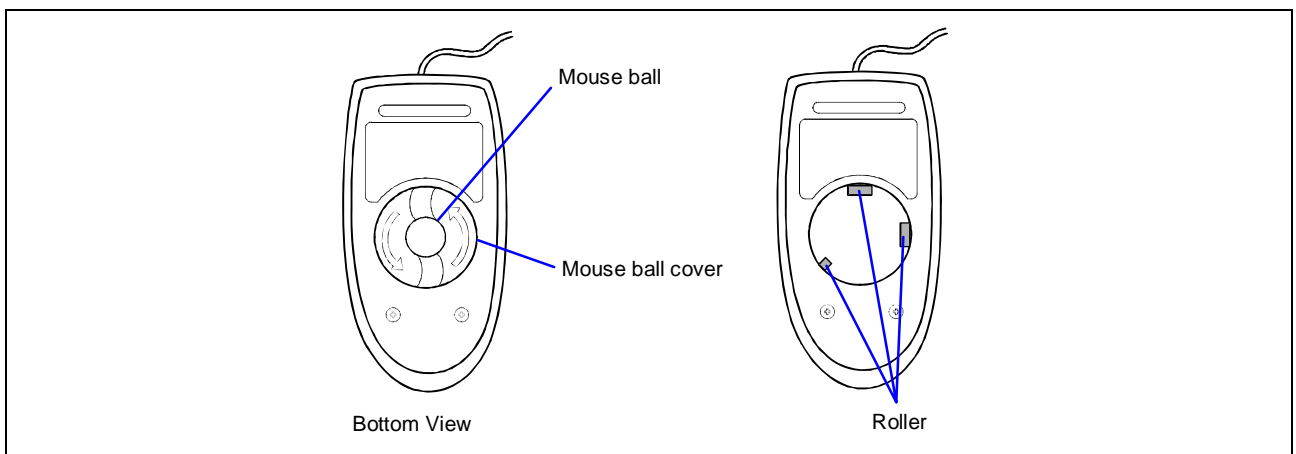
5. Soak a soft cloth in neutral detergent that is diluted with cold or lukewarm water, and squeeze it firmly.

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 three small rollers inside the mouse with a cotton swab soaked with alcohol. Wipe stains slowly and carefully by rotating 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 is locked.

Cleaning CD/DVD-ROM

A dusty CD/DVD-ROM or dust-accumulated tray causes the device to fail to read data correctly.

Follow the procedure below to clean the tray and CD/DVD-ROM regularly:

1. Make sure that the server is powered (the POWER/SLEEP lamp is lit).

2. Press the Eject button on the front of the DVD-ROM drive.
The tray comes out.

3. Hold the CD/DVD-ROM lightly and take it out from the tray.

> **NOTE:** Do not touch the signal side of the CD/DVD-ROM with your hand.

4. Wipe the tray with a dry soft cloth.

> **IMPORTANT:** Do not wipe the lens of the DVD-ROM drive. Doing so may damage the lens and may cause a malfunction of the drive.

5. Press the Eject button or gently push on the tray front to close the tray.

6. Wipe the signal side of the CD/DVD-ROM with a dry soft cloth.

> **IMPORTANT:** Wipe CD/DVD-ROMs from the centre to the outside. Use only CD/DVD-ROM cleaner if necessary. Cleaning a CD/DVD-ROM with record spray/cleaner, benzene, or thinner causes damage to the CD/DVD-ROM contents. At worst, inserting the CD/DVD-ROM into the server may cause failure.

OK   NG
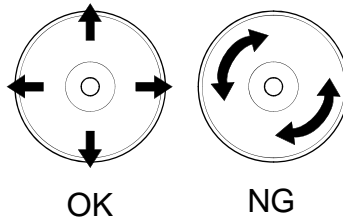
SYSTEM DIAGNOSTICS

The System Diagnostics runs several tests on the server.

Select [Tools] - [System Diagnostics] in the EXPRESSBUILDER to diagnose the server.

Test Items

The following items are tested in system diagnostics.

- Memory
- Processor cache memory
- Hard disk used as a system

> **IMPORTANT:** When executing the System Diagnostics, make sure to disconnect the LAN cable. Executing the System Diagnostics with the LAN cable connected, the network may be influenced.

> **NOTE:** On checking the hard disk, no data is written into the disk.

Starting and Ending the System Diagnostics

There are two ways to diagnose the server: to use the local console (keyboard) of the server itself, and to use the management PC via serial port (remote console).

> **IMPORTANT:** Two methods of LAN and the serial port are mentioned in "EXPRESSBUILDER" of Chapter 6 "Installing and Using Utilities" in the way of communicating in remote console. Use the serial port to execute System Diagnostics with remote console. The LAN connection is not for System Diagnostics.

Procedures to start the diagnostics program are as follows:

1. Shutdown the OS, and turn off the server. Then, unplug the power cord.

2. Disconnect all the LAN cables from the server.

3. Plug the power cord and turn on the server.

4. Use the EXPRESSBUILDER CD-ROM to reboot the server.

   See Chapter 6 «EXPRESSBUILDER" for details.

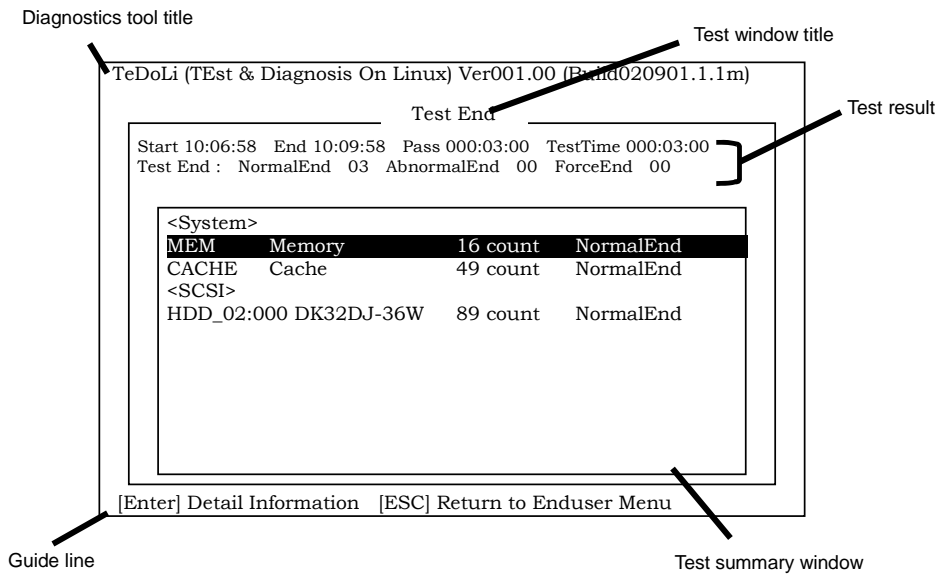   The following menu is displayed when starting the server using the EXPRESSBUILDER.
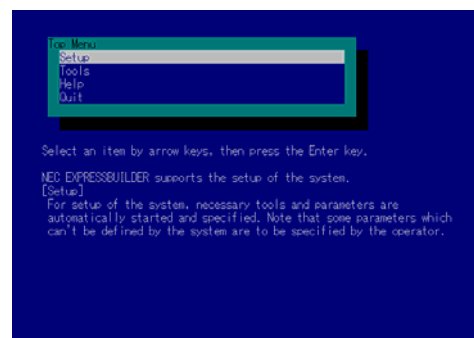
Local console   Remote console

5. Select [Tools].

6. Select [System Diagnostics].

The System Diagnostics starts and will be completed in approximately three minutes.

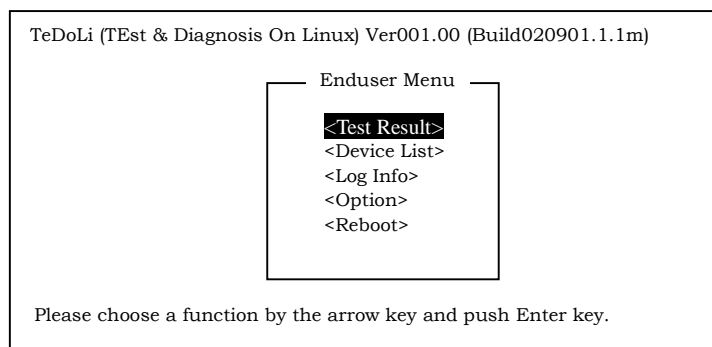When the diagnostics is completed, the screen of the display changes as shown below.

Diagnostics tool title

Test window title

Test result

```
TeDoLi (TEst & Diagnosis On Linux) Ver001.00 (Build020901.1.1m)
                          Test End
   Start 10:06:58  End 10:09:58  Pass 000:03:00  TestTime 000:03:00
   Test End :  NormalEnd  03  AbnormalEnd  00  ForceEnd  00

      <System>
      MEM        Memory         16 count    NormalEnd
      CACHE      Cache          49 count    NormalEnd
      <SCSI>
      HDD_02:000 DK32DJ-36W     89 count    NormalEnd




   [Enter] Detail Information   [ESC] Return to Enduser Menu
```

Guide line

Test summary window

Diagnostics tool title: Shows the name and version of the diagnostic tool.

Test windows title: Shows the progress of the diagnostics. "Test End" is displayed when the diagnostics completes

Test Result: Shows the start, end, and elapsed time and completion status of the diagnostics.

Guide line: Shows a description of keys to navigate in the window.

Test summary window: Shows the results of each test that executed the diagnostics. Move the cursor and press **Enter** to view 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 **ESC.**

The [Enduser Menu] below is displayed.

```
TeDoLi (TEst & Diagnosis On Linux) Ver001.00 (Build020901.1.1m)

                        Enduser Menu

                      <Test Result>
                      <Device List>
                      <Log Info>
                      <Option>
                      <Reboot>


   Please choose a function by the arrow key and push Enter key.
```

<Test Result> Shows the diagnostics completion screen of the above diagnostics.

<Device List> Shows a 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> Changes the output destination of a log.

> **<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 EXPRESSBUILDER, and remove the CD-ROM from the DVD-ROM drive.

10. Power off the server and unplug the power cord from the receptacle.

11. Reconnect all the LAN cables that have been disconnected in Step 2 to the server.

12. Plug the power cord.

This completes the System Diagnostics.

RELOCATING/STORING THE SERVER

Follow the procedure below to relocate or store 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.
Do not connect/disconnect any interface cable with the power cord of the server plugged to a power source.

IMPORTANT:

■ If the server needs to be relocated/stored due to a change in the floor layout to a great extent, contact the service representative.

■ Make sure to make a backup copy of your valuable data in the hard disk, if any.

■ Make sure not to apply a shock to hard disks when relocating the server if it contains any.

■ It is recommended that the server and the internal devices should be stored in a place where the room temperature can be maintained. It is important for the server or internal devices to work normally after storage. Store the device in the place where temperature ranges between -10 to 55°C and humidity ranges between 20 to 80%, without dew condensation.

■ If you use the server after transported or relocated, check the system timer and adjust it if necessary. If the system timer advances or delays remarkably with the passage of time, contact your service representative to repair it.
The server or internal option device may be dewed if it is brought to a warm place from a cold place suddenly. Using a server or an internal device with dew attached may cause malfunction or failure.
Make sure to adapt them to the operating environment before using them.

1. Take a floppy disk and a CD/DVD-ROM out of the server, if any.

2. Power off the server (the POWER lamp goes off).

3. Disengage the power cord from the lock spring.

4. Unplug the power cord of the server from a power outlet.

5. Remove all the cables from the server.

6. Remove the server from the rack cabinet.

See Chapter 3 for details.

7. Hold the server by its bottom with at least another person to carry the server.

8. Protect the server with the shock-absorbing materials, and pack it securely.

Chapter 8

Troubleshooting

If your server does not operate as expected, read this chapter before assuming a failure.

> **NOTE:** For provision against an unexpected failure, it is recommended to install the Off-line Maintenance Utility, NEC ESMPRO, to the server and client computers.

SYSTEM VIEWERS

Monitor the occurrence of fault by NEC ESMPRO during the system operation.

Especially take note on whether any alert is reported to NEC ESMPRO Manager on the language PC. Check whether any alert is reported on the Operation Window, Data Viewer, or Alert Viewer of NEC ESMPRO Manager.

[Example]

NEC ESMPRO Manager
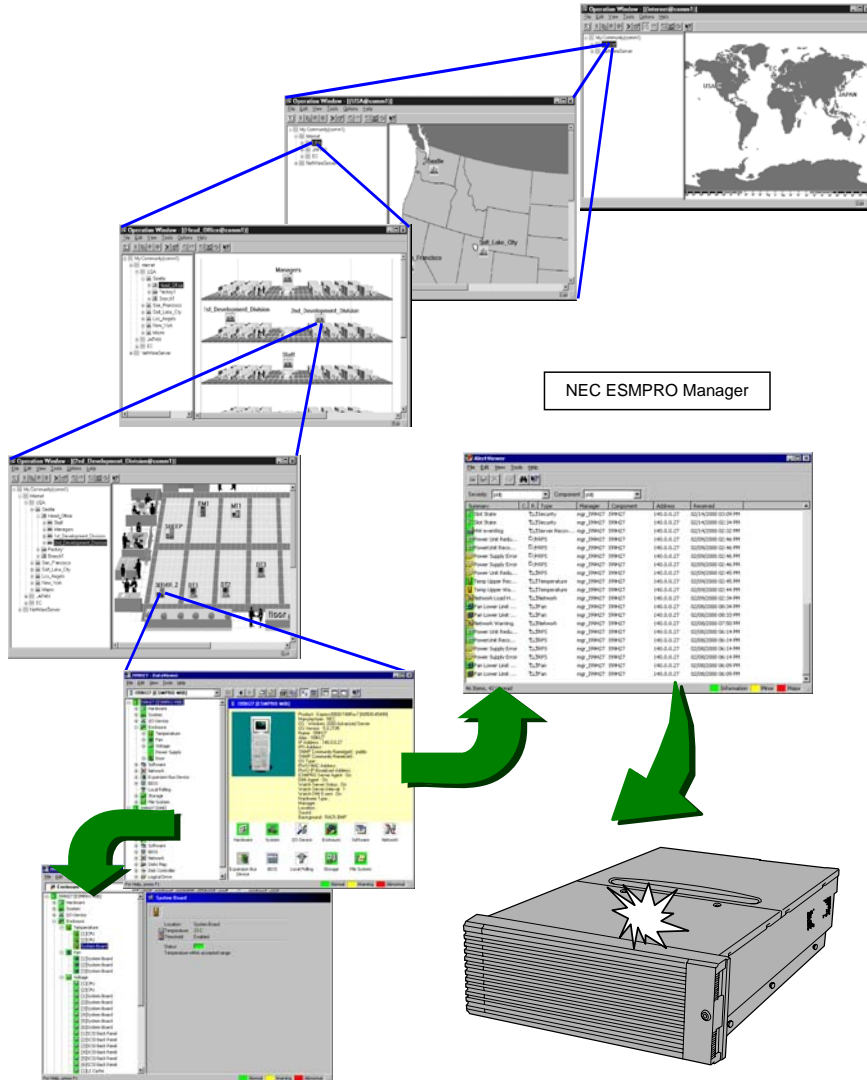
EXPRESSSCOPE MONITORS

The following describes lamps on the server and their indications.

POWER/SLEEP Lamp
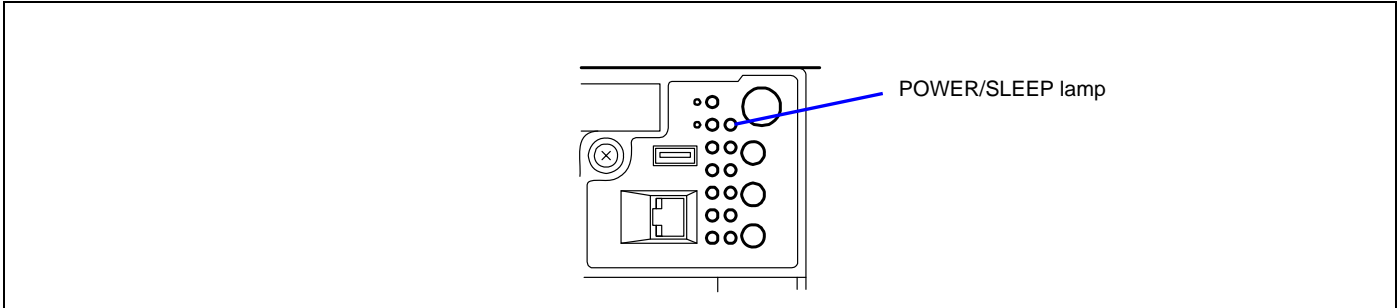
The green POWER/SLEEP lamp lights to indicate normal operation while the server is powered. When the server is off-powered, the POWER/SLEEP lamp stays unlit.

The POWER/SLEEP lamp indicates that the server is running in the power-saving mode (sleep mode). If the operating system supports the power-saving mode such as Windows 2003, pressing the SLEEP switch blinks the POWER/SLEEP lamp in green and place the server in the power-saving mode. Press the POWER switch to turn out the POWER/SLEEP lamp and place the server back in the normal mode.

The power-saving mode is only available when the operating system supports the power-saving feature. Some operating systems allow you to set the server to automatically turn in 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.

STATUS Lamp

The STATUS lamp stays lit in green when the server is in successful operation. When the STATUS lamp is unlit, flashing in green or lit/flashing in amber, it indicates that the server has failed.

The following table lists indications of the STATUS lamp, descriptions, and actions to take.

NOTES:

- If the server has the NEC ESMPRO or Off-line Maintenance Utility installed, you can view the System Event Log (SEL) to identify the cause of a trouble.

- To cycle power to the server, shut down the server from the operating system and reboot it, if available. If the shutdown from the operating system is not available, reset or execute the forced shut down or disconnect and connect the power cord to reboot the server.

| STATUS lamp indication	Description	Action
Flashing in green	The server is in operation with its processor degraded.	Contact your service representative. Start the BIOS SETUP and select [Main] - [Processor Settings] to identify the degraded processor and replace it as soon as possible. Or, start the BIOS SETUP and select [Main] - [Processor Settings] - [Processor Retest] - [Yes], and then select [Exit] - [Exit Saving Changes] to solve the problem.

STATUS lamp indication	Description	Action
Flashing in green	The server is in operation with its memory degraded.	Contact your service representative. Start the BIOS SETUP and select [Advanced] - [Memory Configuration] to identify the degraded memory (DIMM) and replace it as soon as possible. Or, start the BIOS SETUP and select [Advanced] - [Memory Configuration] - [Memory Retest] - [Yes], and then select [Exit] - [Exit Saving Changes] to solve the problem.
	A correctable memory or bus error was detected.	The system can continue operation if the status lamp flashes green. However, consult with your service representative.
Unlit	The server is off-powered.	Power on the server.
	POST is in progress.	Wait for a while. The STATUS lamp will light in a few seconds after POST completion.
	A processor error occurred (IERR).	Cycle power to the server. If POST displays an error message, take a note on the message and contact your service representative.
	A processor thermal error was detected. (Thermal-Trip)	
	A watchdog timer has timed out.	
	A PCI system error occurred.	
	A PCI parity error occurred.	
	An uncorrectable memory error was detected.	
	An uncorrectable bus error was detected.	
	POST terminates with error.	
	Memory dumping is requested.	Wait until memory dumping completes.
Lit in amber	A thermal error (critical) was detected.	Check internal fans for dust or debris. Also make sure that the fans are firmly connected. If this error indication persists, contact your service representative.
	A voltage error (critical) was detected.	Contact your service representative.
	A power supply (ies) failed to operate.	Contact your service representative.
Flashing in amber	A power alarm was detected in a power supply unit.	Identify the failed power supply unit and contact your service representative.
	A fan alarm was detected.	Make sure that the fan units are firmly connected. If this error indication persists, contact your service representative.
	A thermal error (warning) was detected.	Check internal fans for dust or debris. Also make sure that the fan units are firmly connected. If this error indication persists, contact your service representative.
	A voltage error (warning) was detected.	Contact your service representative.

DISK ACCESS Lamp

The DISK ACCESS lamp indicates the state of hard disks in the 3.5-inch disk bay.

This lamp lights in green every time any of such hard disks is accessed.

When the DISK ACCESS lamp is lit in amber, it indicates that a hard disk error occurred. To identify a failed hard disk, see the lamps provided for each hard disk.
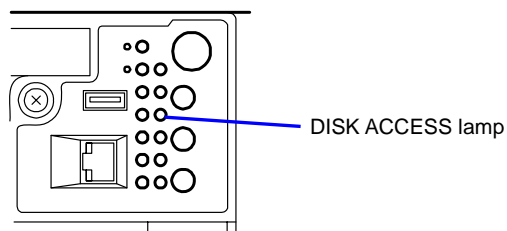
DISK ACCESS lamp

LAN1/LAN2 ACCESS Lamp

The LAN1/LAN2 ACCESS lamp is lit green when the server is connected to LAN. The lamp blinks while the server is accessed through the LAN (for packet transmission). The value next to the icon indicates the number of the network port on the rear panel.


LAN1 ACCESS lamp

LAN2 ACCESS lamp
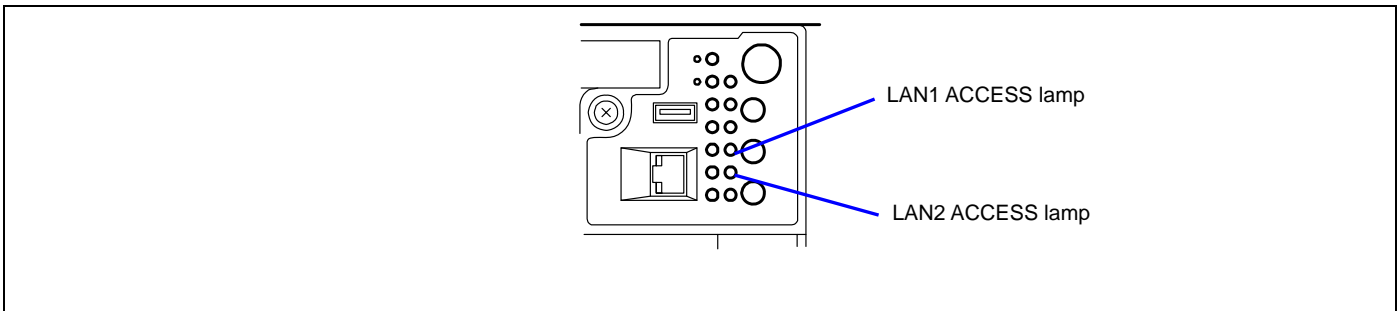
UID Lamp

Pressing the UID switch turns the UID lamp located on the front and rear of the server on and off. The UID lamp is visible through the rear of the chassis and allows you to locate the server you're working on from the rear of the servers on a rack.

Pressing the UID switch again turns off the UID lamp.

You can make NEC ESMPRO Manager, NEC DianaScope, or the remote management feature of Web server to flash the UID lamp. When you finished working, turn off the UID lamp.


UID lamp

UID switch

UID lamp
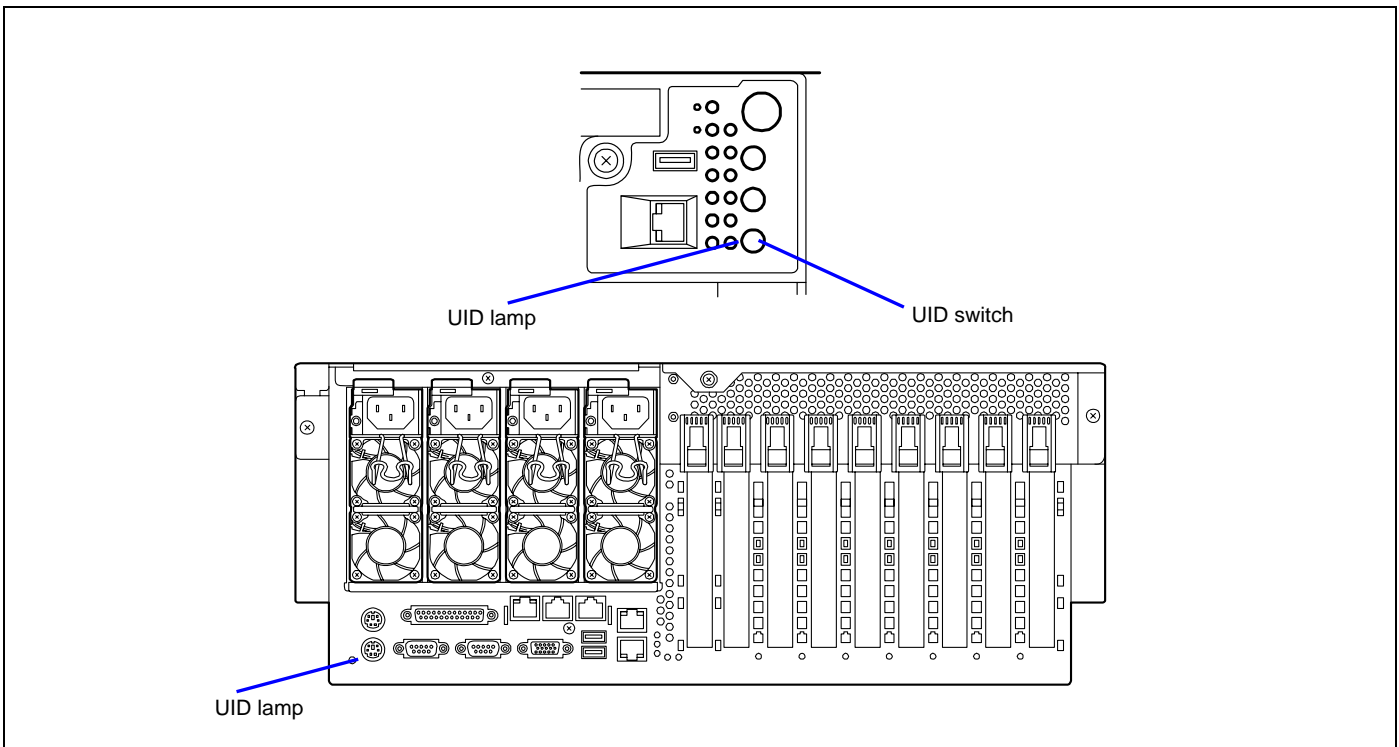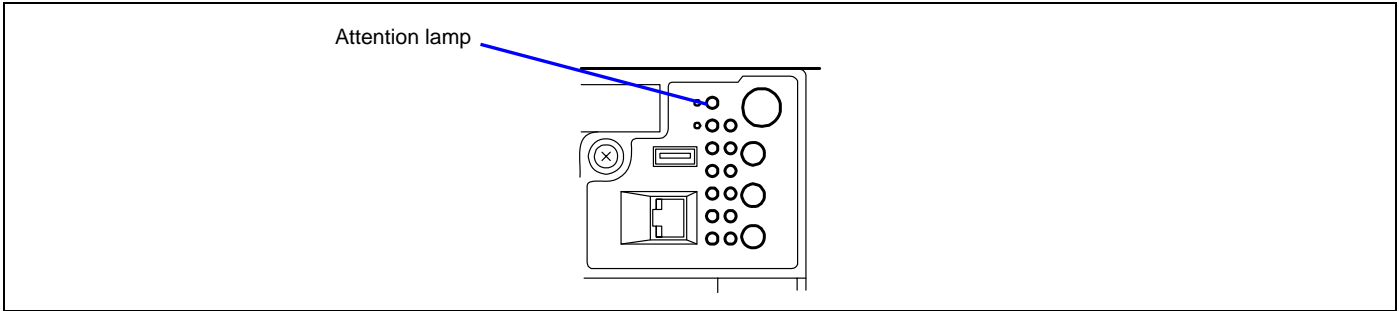
Attention Lamp

The Attention lamp lights amber when location where an error occurred cannot be identified automatically or errors occurred in two or more locations. Check the error log to identify the location.

Processor Board Error Lamp
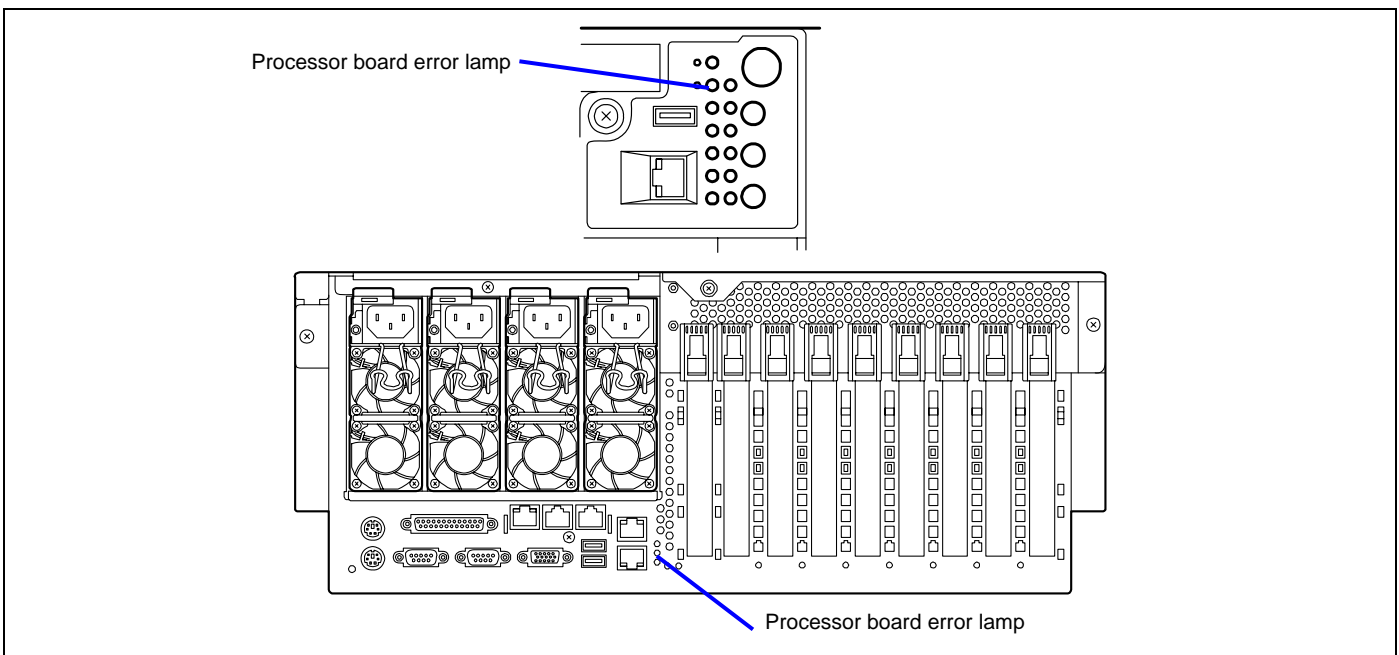
Two processor board error lamps are located at the front and the rear of the server. These lamps light amber when an error occurs on processor board. If the lamp lights, check the lamp indication on processor/VRM error lamp in front of the processor board. The lamp being lit amber indicates that the relevant processor or VRM fails.

Processor/VRM error lamps

Memory Board Error Lamp
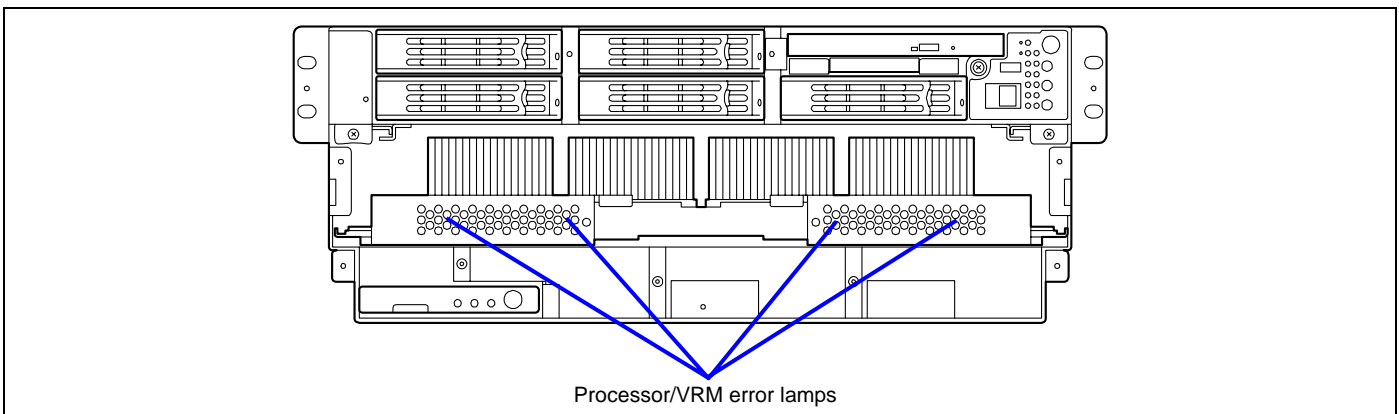
Memory board error lamp
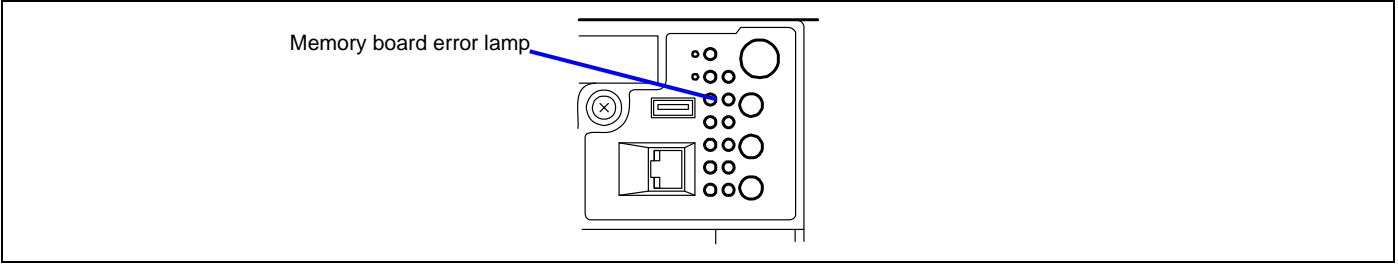
The memory board error lamp lights amber if an error occurs on memory board or on DIMM installed in memory board.
Check the memory board Attention lamp being lit amber to identify the failed memory board.
In addition, when you press the switch for DIMM slot error lamp on the failed memory board, the DIMM slot error lamp lights amber. Then, you can identify the slot containing the failed DIMM.

Switch for DIMM slot error lamp

DIMM slot error lamps

FRONT

Memory board Attention lamp

I/O Board Error Lamp

I/O board error lamp
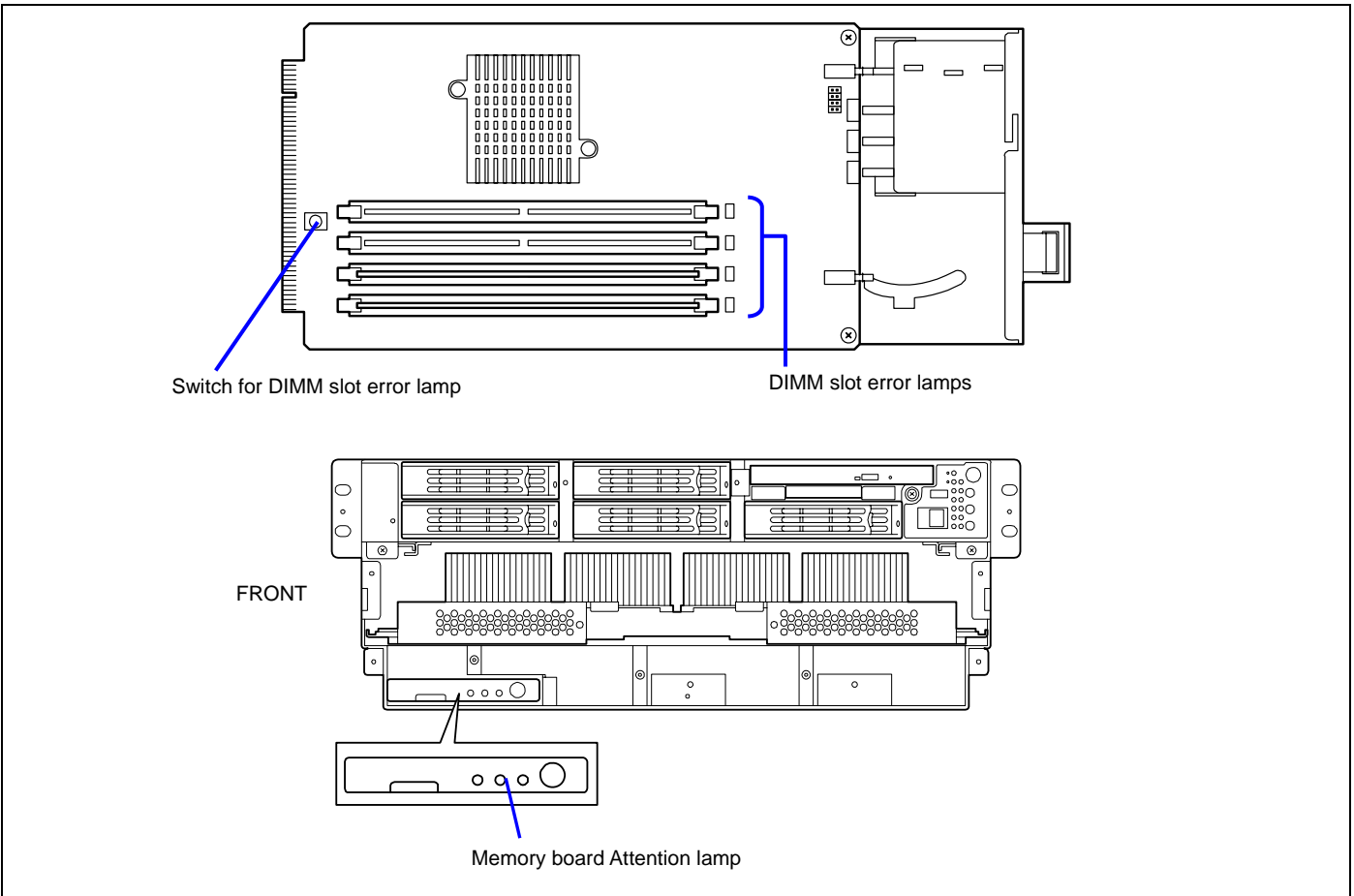
I/O board error lamp
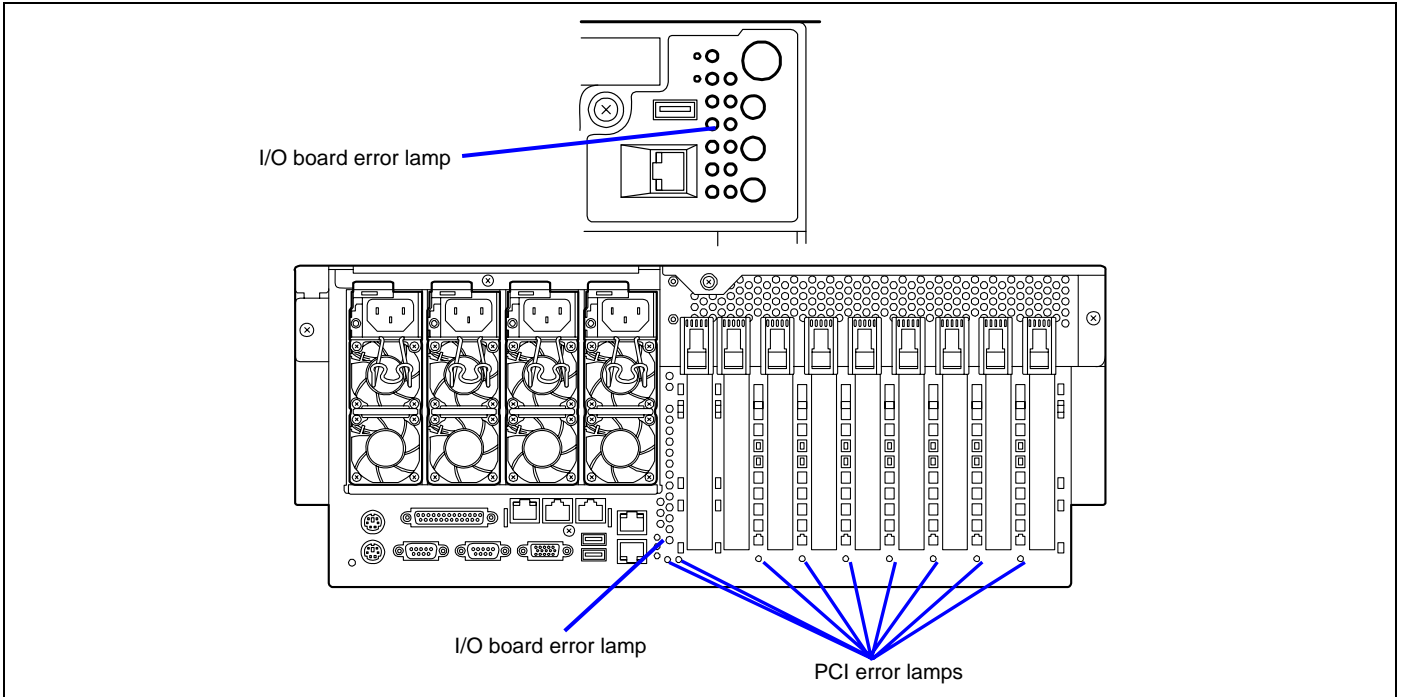
PCI error lamps

The front I/O board error lamp lights amber when an error occurs on I/O board or PCI board installed in your server. Check the lamp indication on the rear of the server.

When the rear I/O board lamp lights amber, the I/O board may be failed. When any of the PCI slot error lamps below the PCI slots light amber, the relevant PCI board or I/O board slot itself may be failed.
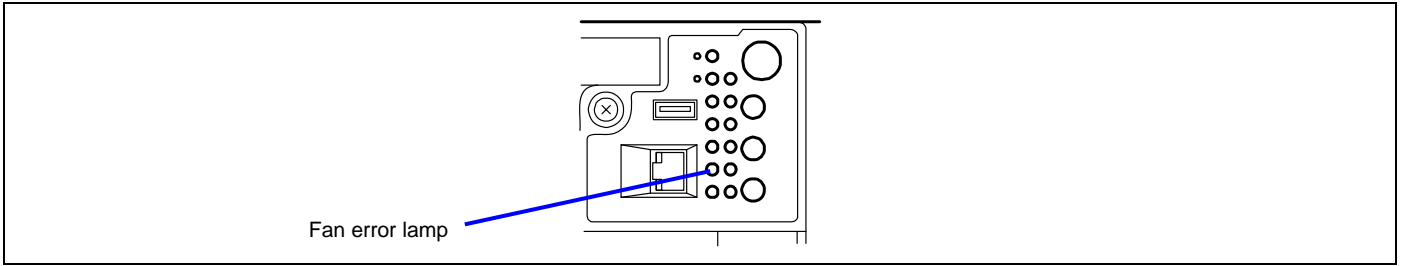
Power Unit Error Lamp

Power unit error lamp
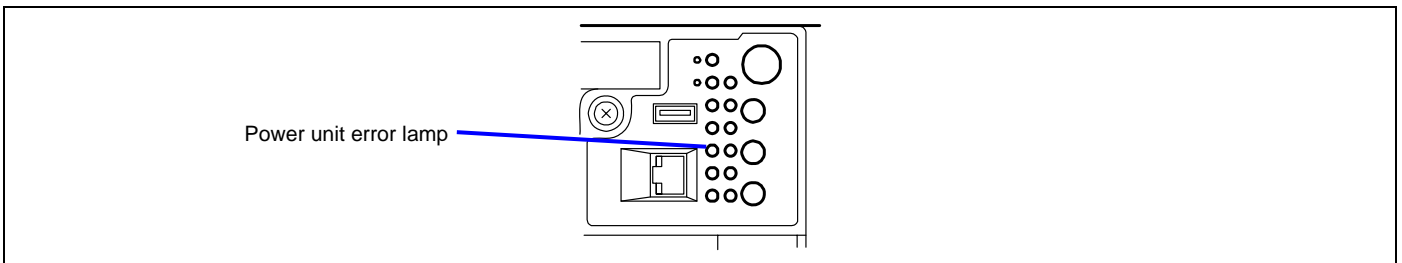
The Power unit error lamp lights amber when an error occurs on the power supply unit.
Check the power unit error lamp to identify the failed power supply unit.

Power unit error lamps
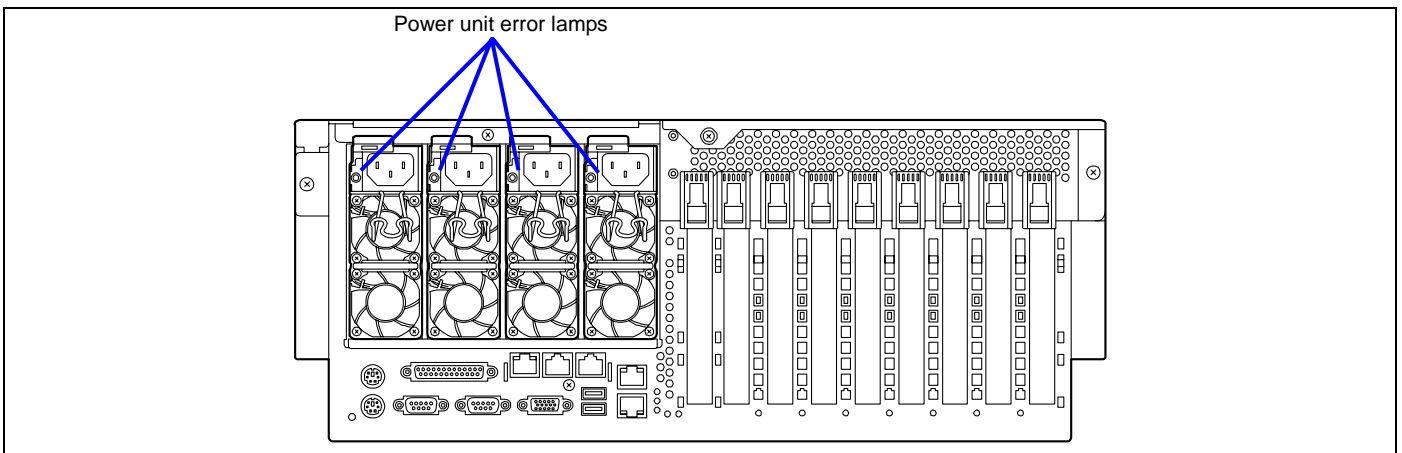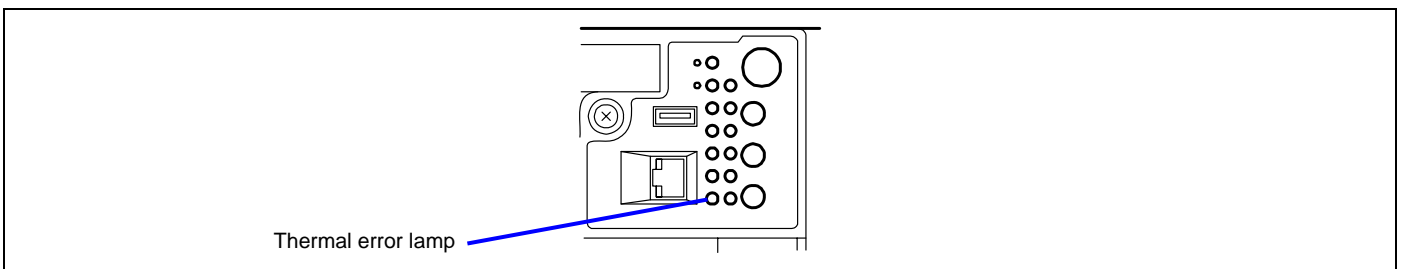
Fan Error Lamp

Fan error lamp

The fan error lamp lights amber when an error occurs on the fan. Check the Fan Fault lamp being lit red to identify the failed fan (see "FAN Fault Lamps" described later).
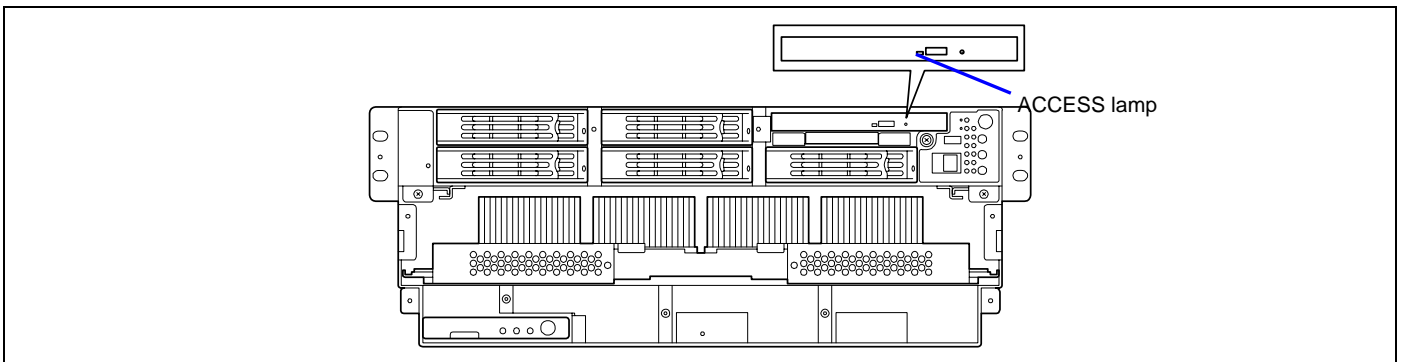
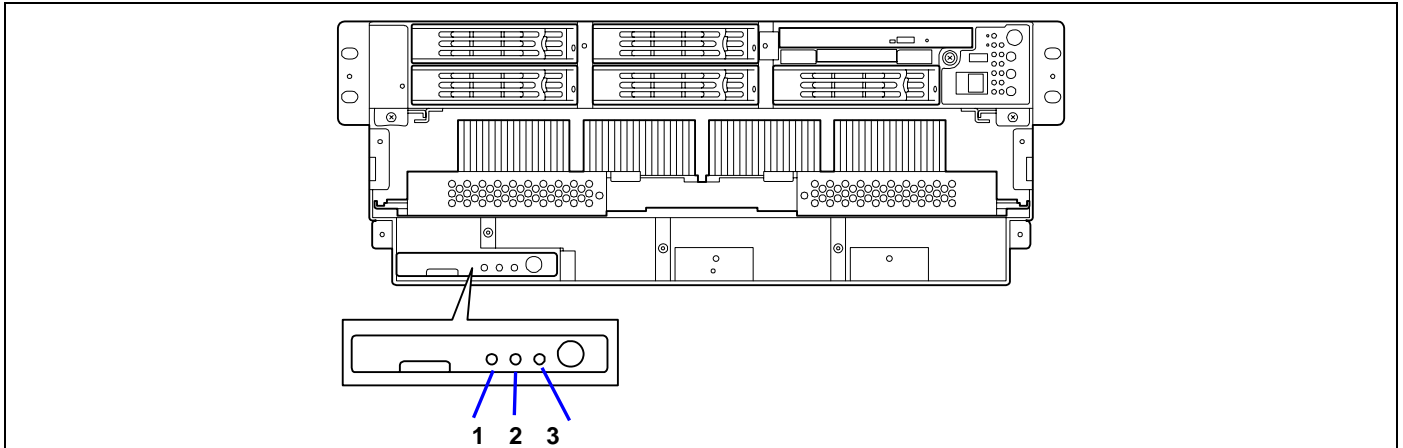## Thermal Error Lamp

Thermal error lamp

The thermal error lamp lights amber when an abnormal temperature in the server is detected. Check the room temperature where the server is installed.

Access Lamp

The access lamps for the DVD-ROM drive lights when access is made to a media in the drive.

ACCESS lamp

Memory Board Lamps

1   **Memory board POWER lamp**
Lights green during power-on. Flashes green during rebuilding (e.g., memory board is hot-added).
2   **Memory board Attention lamp**
Lights amber when an error occurred on memory board or DIMM.
3   **Memory board Redundancy lamp**
Lights green in memory mirroring or memory RAID configuration.

Hard Disk Drive Lamp (DISK Lamp)

The disk lamp on the 3.5-inch disk bay has different meanings depending on the display status.

DISK lamps
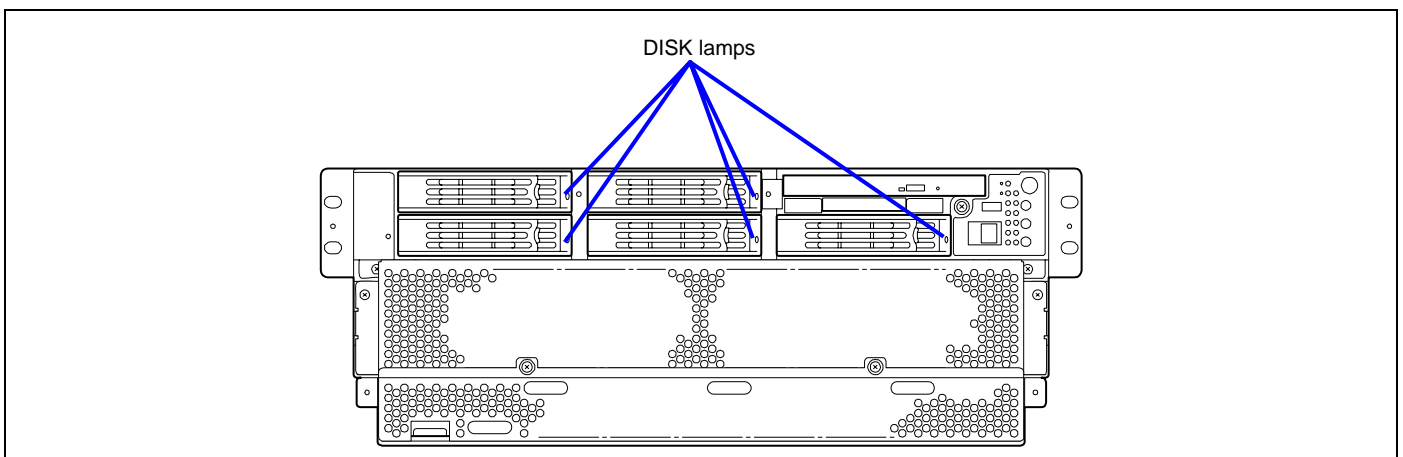
■ Lighting green

The hard disk is installed and powered on.

■ Blinking green

Indicates that the hard disk is accessed.

■ Lighting amber

Indicates that the installed hard disk is defected in the disk array configuration.

> **NOTE:** While hard disks are in the disk array configuration (RAID1/RAID5 or RAID0+1), a single failed hard disk does not affect the operation of the server. However, it is recommended to replace the failed hard disk and auto-rebuild (reconfigure) the hard disks as soon as possible. (You can hot-swap such a failed hard disk.)

■ Alternate lighting green or amber

Indicates that the hard disk is being rebuilt (this status is not a failure). If the defected hard disk is replaced with a new one in the disk array configuration, the data is automatically rebuilt (auto rebuild function). During the rebuild operation, the lamp is lit green or amber alternatively.

The lamp goes off when the rebuild is terminated normally. The lamp goes on amber if the rebuild fails.

> **IMPORTANT:** To abort rebuilding, power off the server. In such a case, restart the server, hot-swap the failed hard disk, 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 disks, the auto-rebuild feature will not start.)
>
> ■ When you removed a hard disk, wait at least 90 seconds before installing the hard disk back again.
>
> ■ Do not replace another hard disk while rebuilding is in progress.

LAN Connector Lamps

LAN1 and LAN2 connectors on the rear panel have two lamps as follows.
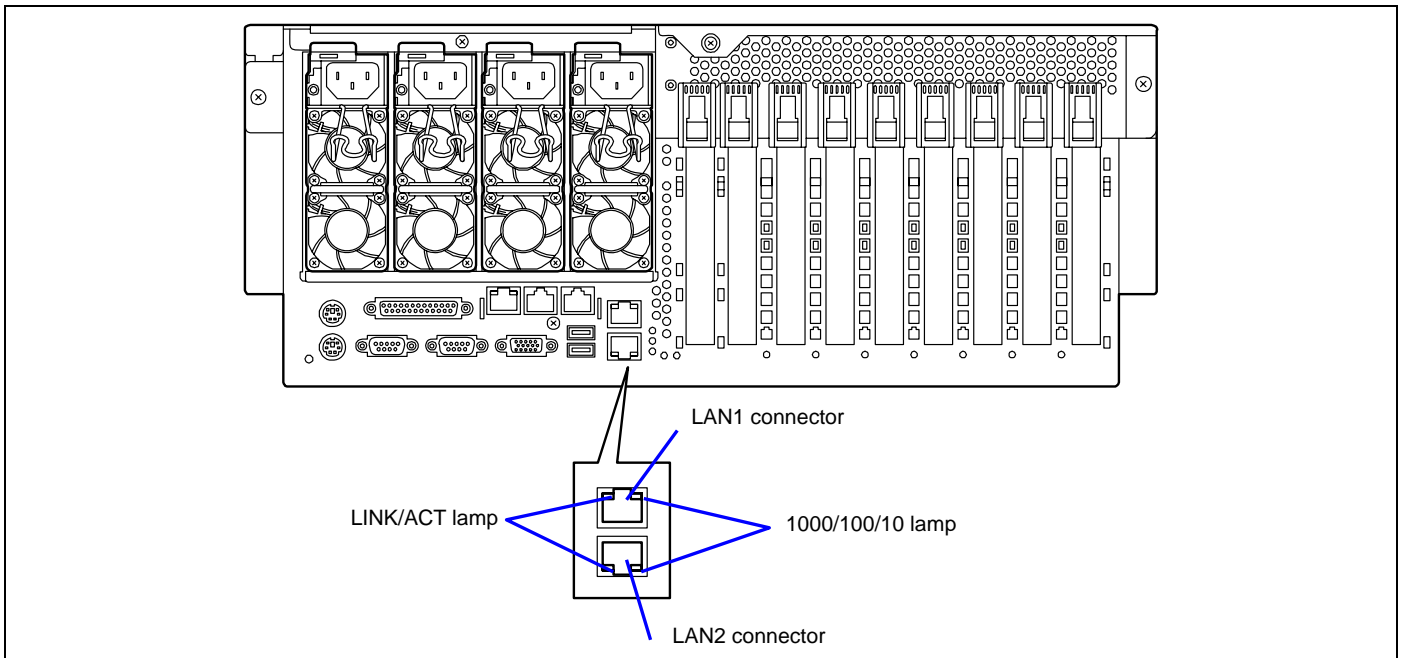

■ LINK/ACT lamp

The link/ACT lamp indicates the state of each network port normally equipped with the server. If the power is supplied to the server and the hub and they are correctly connected with each other, the lamp is lit green (LINK state). If information is transmitted through a network port, the lamp blinks green (ACT state).

If the lamp is not lit in the LINK state, check the network cable and the cable connection. If the lamp is not lit still after the checking, the network (LAN) controller may be faulty. Contact your service representative.

■ 1000/100/10 lamp

The 1000/100/10 lamp indicates whether the LAN2 port normally equipped with the server is operated through the 1000BASE-T, 100BASE-TX or 10BASE-T network interface. If the lamp is lit amber, the network port is operated through 1000BASE-T. If the lamp is lit green, the network port is operated through 100BASE-TX. If the lamp is off, the network port is operated through 10BASE-T.

PCI Slot Lamps
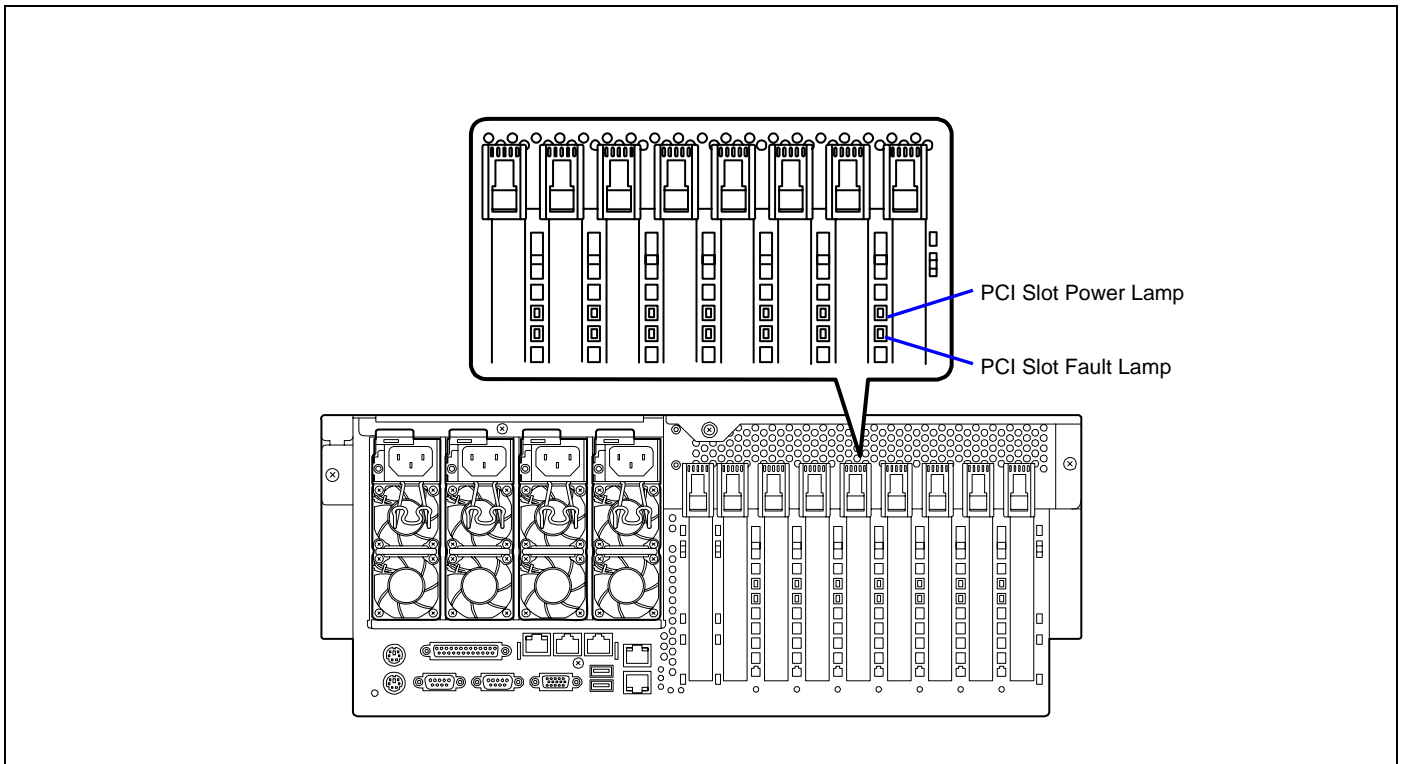
PCI Slot Power Lamp

When the server is powered on, the power is supplied to the PCI board slot that contains the board, and PCI slot power lamps light green.

PCI Slot Fault Lamp

This lamp is available only when the operation system is Windows Server 2003.
If the driver of a Hot Plug PCI board is stopped and then the PCI board is logically disconnected from the system, PCI slot fault lamp blinks in amber.
If an error occurred on PCI board or the slot installed the PCI board, this lamp lights in amber.

FAN Fault Lamps

FAN Fault lamp is adjacent to each fan module. If a fan fails, the lamp lights in red. The failed fan may be hot-swapped.

> **IMPORTANT:** Do not remove the fan that is normally operating. Ask your service representative for replacement of the cooling fan. If a cooling fan fails, do not continue to operate the system, but ask your service representative for replacement as soon as you can.

FAN Fault lamp
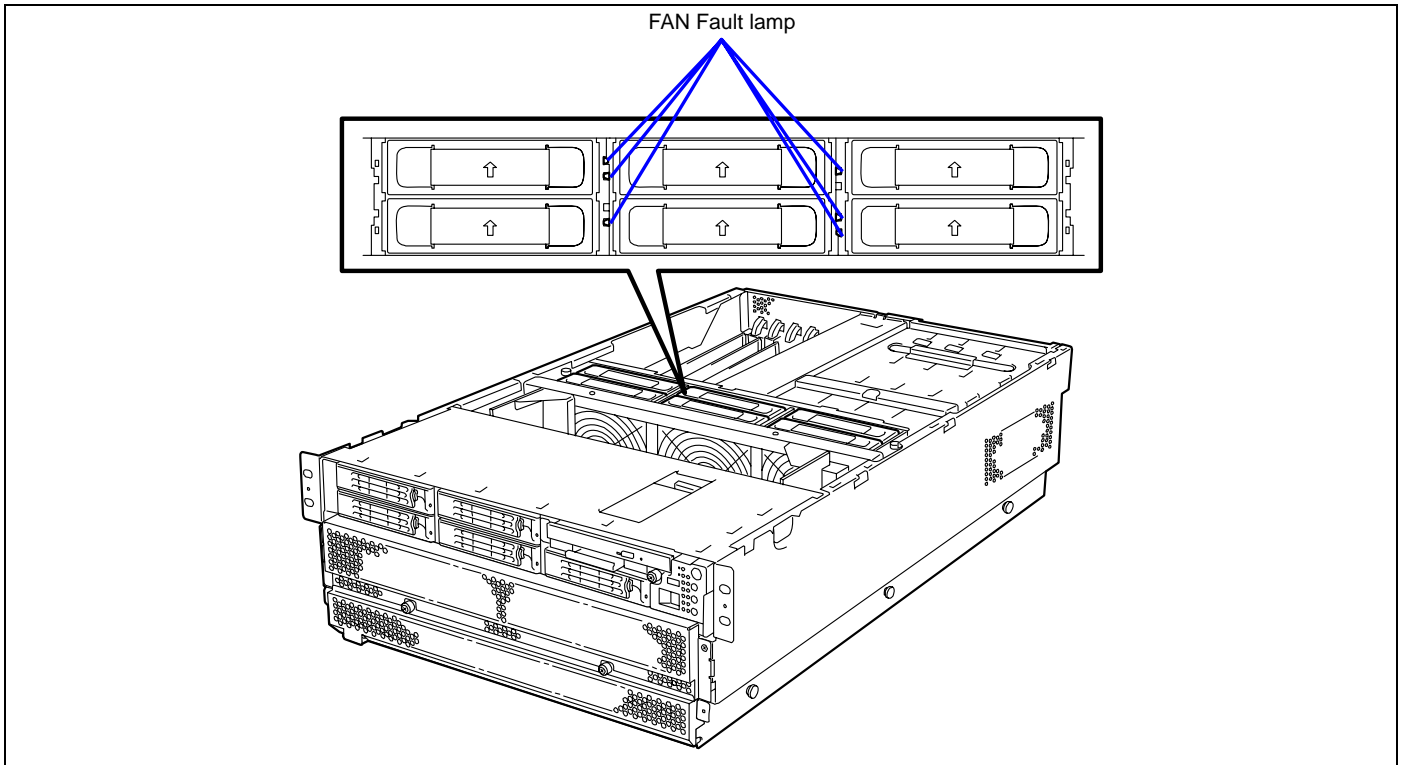
ERROR MESSAGES

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 its measure on the display unit.

Follow the table below to troubleshoot such errors. However, even when there is no hardware failure, use of the keyboard or mouse at the following timing causes the POST to assume a keyboard controller error and stop processing.

- Immediately after the server is powered

- Immediately after the system is rebooted in response to a keyboard instruction (simultaneous key entry of **Ctrl** + **Alt** + **Delete**)

- Immediately after the system is rebooted in response to an operating system instruction

- During hardware initialization following restart of the POST

When the POST detects a hardware failure due to the above reason, restart the server once again. If the same error message reappears, you may 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 on the screen following the server power-on.

- Do not make any keyboard entry or use the mouse before the start-up message of the SCSI Configuration Utility appears on the screen following the server reboot.

> **IMPORTANT:** Take a note on the on-screen message before contacting your service representative. The alarm indication would be a great help for maintenance.

POST Error Messages

When POST detects an error, it displays an error message on the display unit screen. The following table lists error messages, descriptions, and actions to take.

> **IMPORTANT:** Take a note on the messages displayed before consulting with your service representative. Alarm messages are 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.
0212	Keyboard Controller Failed.	• Restart the system. If the error cannot be corrected, contact your service representative.
0213	Keyboard locked - Unlock key switch.	Release the lock of the key switch. If the error cannot be corrected in spite of the release of the lock, contact your service representative.
0220	Monitor type does not match CMOS - Run SETUP.	Start the SETUP. If the error cannot be corrected in spite of the start of SETUP, 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 setting again.)
0251	System CMOS checksum bad - Default configuration used.	The default values have just been set. Start the SETUP to provide the setting again. If the error cannot be corrected, contact your service representative.
0252	Password checksum bad - Passwords cleared.	The password has just been cleared. Start the SETUP to provide the setting again.
0260	System timer error.	Start the SETUP to set the date and time again. If the same 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	Contact your service representative.
02B0	Diskette drive A error.	Start the SETUP to set the "Legacy Floppy A" and "Legacy Floppy B" in the Main menu again. If the same error occurs successively in spite of the resetting, contact your service representative.
02B1	Diskette drive B error.	
02B2	Incorrect Drive A type - run SETUP.	Start the SETUP to provide the setting again. If the error cannot be corrected, contact your service representative.
02B3	Incorrect Drive B type - run SETUP.	
02D0	System cache error - Cache disabled.	The cache cannot be used. Contact your service representative.
02D1	System Memory exceeds the CPU's caching limit.	Contact your service representative.
02F5	DMA Test Failed.	
02F6	Software NMI Failed.	
02F7	Fail-safe Timer NMI Failed.	
0500	Expansion ROM not initialized - PCI Slot 01	
0501	Expansion ROM not initialized - PCI Slot 02	
0502	Expansion ROM not initialized - PCI Slot 03	
0503	Expansion ROM not initialized - PCI Slot 04	
0504	Expansion ROM not initialized - PCI Slot 05	
0505	Expansion ROM not initialized - PCI Slot 06	
0506	Expansion ROM not initialized - PCI Slot 07	
0507	Expansion ROM not initialized - PCI Slot 08	
0508	Expansion ROM not initialized - PCI Slot 09	

Error code	Error message	Recommended Action
0611	IDE configuration changed.	Contact your service representative.
0613	COM A configuration changed.	
0614	COM A config. error - device disabled.	
0615	COM B configuration changed.	
0616	COM B config. error - device disabled.	
0617	Floppy configuration changed.	
0618	Floppy config. error - device disabled.	
0619	Parallel port configuration changed.	
061A	Parallel port config. error - device disabled.	
0B00	Rebooted during BIOS boot at Post Code.	
0B1B	PCI System Error on Bus/Device/Function.	
0B1C	PCI Parity Error on Bus/Device/Function.	
0B28	Unsupported Processor detected on Processor 1.	Make sure that the server supports the processor. If you are not sure, contact your service representative to request the maintenance.
0B29	Unsupported Processor detected on Processor 2.	
0B2A	Unsupported Processor detected on Processor 3.	
0B2B	Unsupported Processor detected on Processor 4.	
0B30	Fan 1 Alarm occurred.	A fan failure or fan clogging may occur. Contact your service representative to request the maintenance.
0B31	Fan 2 Alarm occurred.	
0B32	Fan 3 Alarm occurred.	
0B33	Fan 4 Alarm occurred.	
0B34	Fan 5 Alarm occurred.	
0B35	Fan 6 Alarm occurred.	
0B50	Processor #1 with error taken off line.	The processor is degraded. Contact your service representative.
0B51	Processor #2 with error taken offline.	
0B52	Processor #3 with error taken offline.	
0B53	Processor #4 with error taken offline.	
0B5F	Forced to use Processor with error	Because an error is detected in every processor, the system is forcibly started. Contact your service representative.
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	
0B66	DIMM group #7 has been disabled	
0B67	DIMM group #8 has been disabled	
0B70	The error occurred during temperature sensor reading.	
0B71	System Temperature out of the range.	A fan failure or fan clogging may occur. Contact your service representative to request the maintenance.
0B74	The error occurred during voltage sensor reading.	Contact your service representative.
0B75	System voltage out of the range.	
0B78	The error occurred during fan sensor reading	
0B7C	The error occurred during redundant power module confirmation	Contact you service representative to replace the power supply unit.
0B7D	The normal operation can't be guaranteed with use of only one PSU	Contact you service representative to add an additional power supply unit or replace the existing power supply unit.
0B80	BMC Memory Test Failed.	Turn off the power once and then on again to start the server. If the error cannot be corrected, contact your service representative.
0B81	BMC Firmware Code Area CRC check failed.	
0B82	BMC core hardware failure.	
0B83	BMC IBF or OBF check failed.	
0B8A	BMC SEL area full.	
0B8B	BMC progress check timeout.	
0B8C	BMC command access failed.	

Error code	Error message	Recommended Action
0B8D	Could not redirect the console - BMC Busy -	Turn off the power once and then on again to start the server. If the error cannot be corrected, contact your service representative.
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.	All the commands and functions other than the FRU command and the EMP function can be used. This is not a fatal error. Turn off the power once and then on again to restart the server. If the error cannot be corrected, contact your service representative.
0B93	BMC SDR Repository empty.	Turn off the power once and then on again to restart the server. If the error cannot be corrected, contact your service representative.
0B94	IPMB signal lines do not respond.	All the functions other than the function of accessing to SMC through IPMB can be used. This is not a fatal error. Turn off the power once and then on again to restart the server. If the error cannot be corrected, contact your service representative.
0B95	BMC FRU device failure.	All the commands and functions other than the FRU command and the EMP function can be used. This is not a fatal error. Turn off the power once and then on again to restart the server. If the error cannot be corrected, contact your service representative.
0B96	BMC SDR Repository failure.	Turn off the power once and then on again to start the server. If the error cannot be corrected, 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.	
0B9C	BMC internal exception.	
0B9D	BMC A/D timeout error.	
0B9E	SDR repository corrupt.	
0B9F	SEL corrupt.	
0BB0	SMBIOS - SROM data read error.	Contact your service representative.
0BB1	SMBIOS - SROM data checksum bad.	
0BC0	POST detected startup failure of 1st Processor.	Contact your service representative to replace the processor.
0BC1	POST detected startup failure of 2nd Processor.	
0BC2	POST detected startup failure of 3rd Processor.	
0BC3	POST detected startup failure of 4th Processor.	
8120	Unsupported DIMM detected in DIMM group #1.	Contact your service representative to replace the two DIMMs in the relevant group.
8121	Unsupported DIMM detected in DIMM group #2.	
8122	Unsupported DIMM detected in DIMM group #3.	
8123	Unsupported DIMM detected in DIMM group #4.	
8124	Unsupported DIMM detected in DIMM group #5.	
8125	Unsupported DIMM detected in DIMM group #6.	
8126	Unsupported DIMM detected in DIMM group #7.	
8127	Unsupported DIMM detected in DIMM group #8.	
8130	Mismatch DIMM Type detected in DIMM group #1.	See the labels put on the DIMMs to make sure that the DIMMs of the same type are installed in groups. If DIMMs of different types are installed in one or more groups, contact the service representative to replace DIMMs properly.
8131	Mismatch DIMM Type detected in DIMM group #2.	
8132	Mismatch DIMM Type detected in DIMM group #3.	
8133	Mismatch DIMM Type detected in DIMM group #4.	
8134	Mismatch DIMM Type detected in DIMM group #5.	
8135	Mismatch DIMM Type detected in DIMM group #6.	
8136	Mismatch DIMM Type detected in DIMM group #7.	
8137	Mismatch DIMM Type detected in DIMM group #8.	

| Error code	Error message	Recommended Action
8140	DIMM group #1 with error is enabled.	Contact your service representative to replace the two DIMMs in the relevant group.
8141	DIMM group #2 with error is enabled.	
8142	DIMM group #3 with error is enabled.	
8143	DIMM group #4 with error is enabled.	
8144	DIMM group #5 with error is enabled.	
8145	DIMM group #6 with error is enabled.	
8146	DIMM group #7 with error is enabled.	
8147	DIMM group #8 with error is enabled.	
8150	NVRAM Cleared By Jumper.	Turn off the power. Then recover the jumper setting to the original setting.
8151	Password Cleared By Jumper.	
8160	Mismatch Processor Speed detected on Processor 1.	Check the frequency of the processor. If it is unknown, contact your service representative.
8161	Mismatch Processor Speed detected on Processor 2.	
8162	Mismatch Processor Speed detected on Processor 3.	
8163	Mismatch Processor Speed detected on Processor 4.	
8170	Processor 1 not operating at intended frequency	
8171	Processor 2 not operating at intended frequency	
8172	Processor 3 not operating at intended frequency	
8173	Processor 4 not operating at intended frequency	
817F	All processors not operating at intended frequency	
81A0	Cache Cautionary status detected on Processor 1.	This is not a fatal error. Turn off the power once and then on again to restart the server. If the error cannot be corrected, contact your service representative.
81A1	Cache Cautionary status detected on Processor 2.	
81A2	Cache Cautionary status detected on Processor 3.	
81A3	Cache Cautionary status detected on Processor 4.	
8200	Online Spare Memory was not ready.	DIMM type mismatch is detected when the online spare memory feature is enabled. Contact your service representative.
8201	Mirroring Memory was not ready.	DIMM type mismatch is detected or unnecessary installation in group #2 is detected when the memory mirroring feature is enabled. Check the DIMM type or installation. If the error cannot be corrected, contact your service representative.
8202	Memory RAID was not ready.	Check if capacity, type, and installation status of all DIMMs are correct.
8300	Secondary BIOS is corrupted.	Contact your service representative.
8400	Onboard PCIE#1 Link Failure	Turn off the power once and then on again to restart the server. If the error cannot be corrected, contact your service representative.
8401	Onboard PCIE#2 Link Failure	
8412	PCI Slot#3 PCIE Link Failure	
8413	PCI Slot#4 PCIE Link Failure	
8414	PCI Slot#5 PCIE Link Failure	
8420	Onboard PCIE#1 Link Width Error	This is not a fatal error, but performance may be reduced. Turn off the power once and then on again to restart the server. If the error cannot be corrected, contact your service representative.
8421	Onboard PCIE#2 Link Width Error	
8432	PCI Slot#3 PCIE Link Width Error	
8433	PCI Slot#4 PCIE Link Width Error	
8434	PCI Slot#5 PCIE Link Width Error	

Other POST Errors

The following message does not appear on the screen; however, it is recorded in the system event log.

| Error code	Description	Recommended Action
8301	A BIOS Checksum error was detected in the early stage of BIOS boot-up (Bootblock). The control was transferred to the secondary BIOS. (See Chapter 2 "Recovering BIOS Data".)	Contact your service representative.

The following figures show the location of specific components referenced in the POST error codes and messages table listed above.

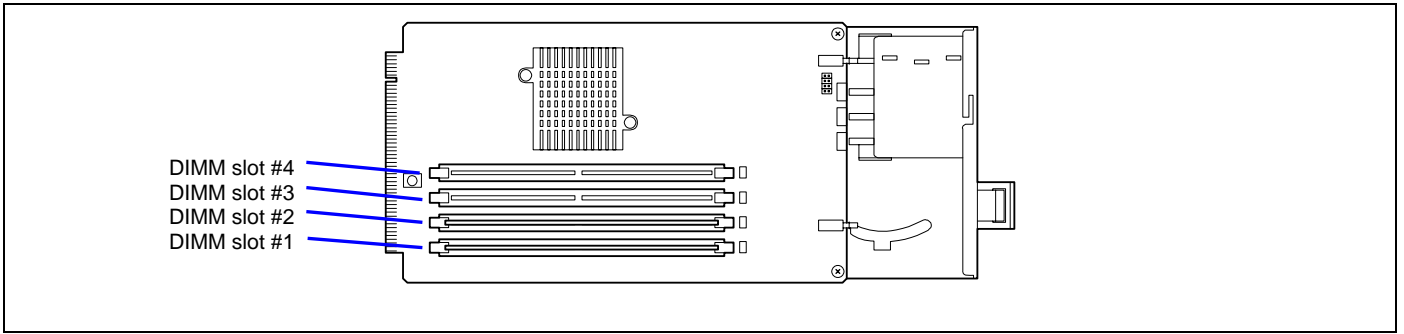> **NOTE:** Failed processor or memory boards can be also identified with the BIOS SETUP utility.

■ Fans
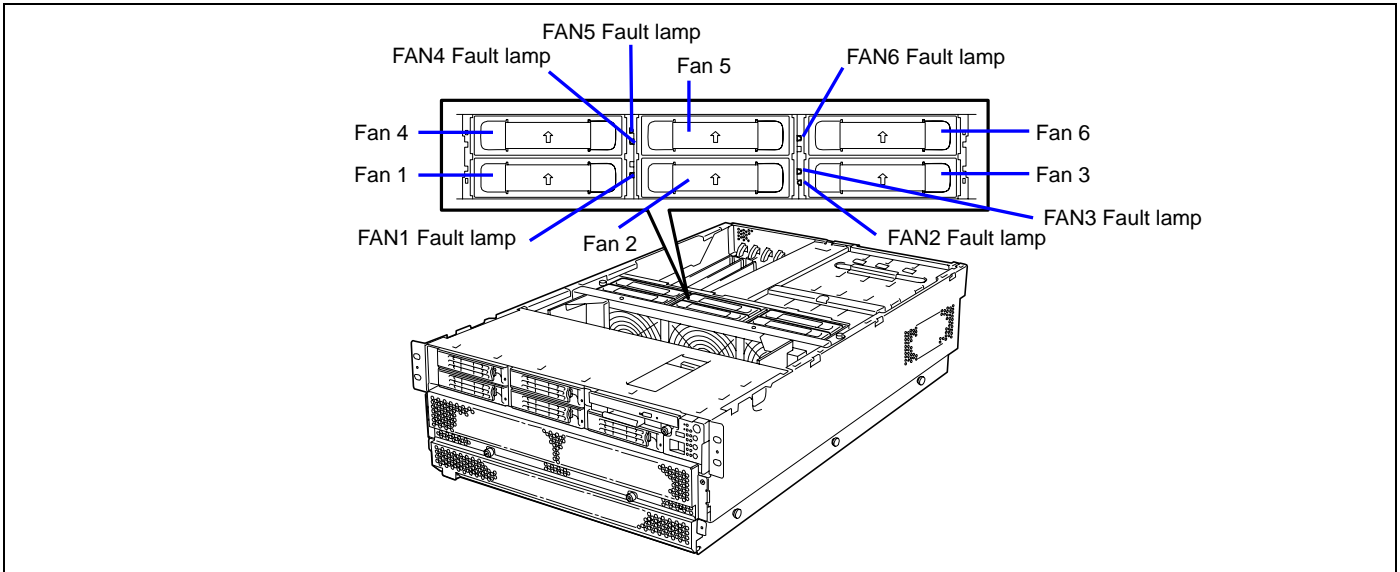
■ Processors
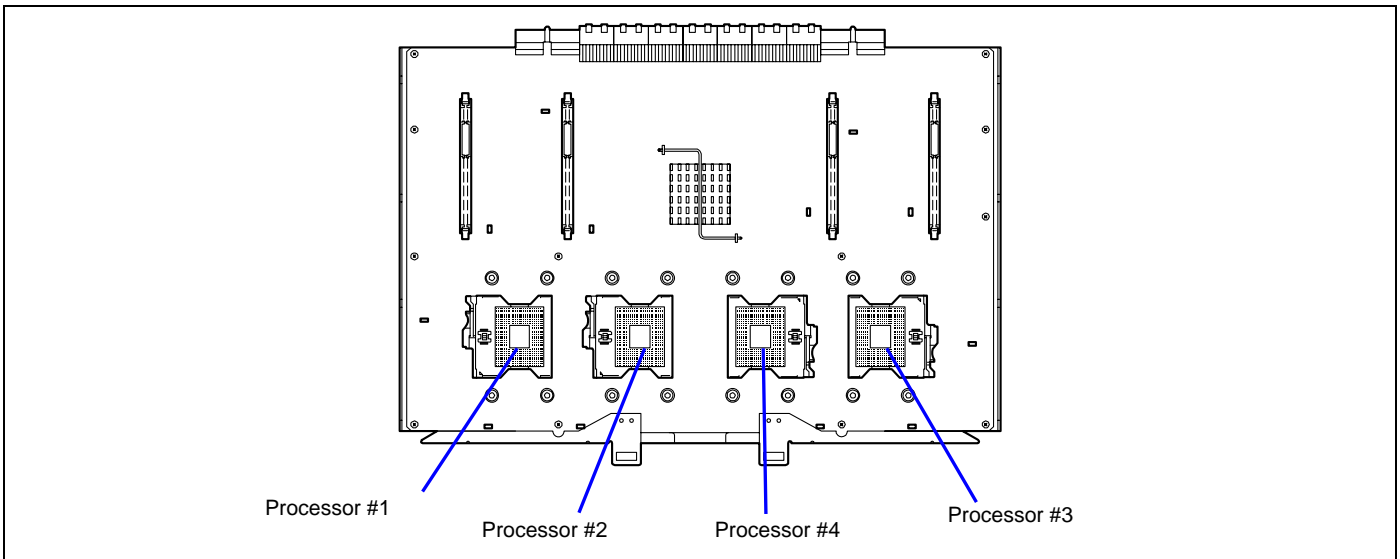
■ Memory board

The DIMM group consists of two DIMM boards.

	Memory board slot #1		Memory board slot #2		Memory board slot #3		Memory board slot #4	
1	DIMM #1	DIMM Group #1	DIMM #1	DIMM Group #3	DIMM #1	DIMM Group #5	DIMM #1	DIMM Group #7
2	DIMM #2		DIMM #2		DIMM #2		DIMM #2	
3	DIMM #3	DIMM Group #2	DIMM #3	DIMM Group #4	DIMM #3	DIMM Group #6	DIMM #3	DIMM Group #8
4	DIMM #4		DIMM #4		DIMM #4		DIMM #4	

Beep Codes

If an error occurs during the POST, the server beeps, indicating the type of error.

Each number indicates the number of short beeps, and a hyphen indicates a pause. For example, the beep interval 1-3-1-3 indicates 1 beep, pause, 3 beeps, pause, 1 beeps, pause, and 3 beeps notifying that the keyboard controller error.

Beep code	Description	Recommended action
1-2	Video BIOS initialization error	If nothing is displayed, check if the connector of the display unit is properly connected. If the error persists, contact your service representative to replace the I/O board.
1-2	Option ROM initialization error	If an expansion of Option ROM for 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 I/O board or PCI board.
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 I/O board.
1-3-3-1	Memory is not detected. Or, DIMM type is incorrect.	Check if the DIMM and memory boards are properly connected. If the error persists, contact your service representative to replace DIMM or memory board.
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	Processor fails to start.	Check if the processor is properly installed. If the error persists, contact your service representative to replace processor or processor board.
1-5-2-2	No processor error	
1-5-2-3	Processors of various types and voltages coexist.	Check if the additionally installed processor is supported by the server. Check also the installation of processor. If the error persists, contact your service representative to replace the processor or processor board.
1-5-4-4	Power failure	Internal board may be faulty. Contact your service representative to identify the faulty board and replace it with new one.
2-2-3-1	Unexpected interrupt test error	Contact your service representative to replace the I/O board.

NOTE: Beep code 1-5-4-2 informs you that AC power supply is interrupted due to power failure or momentary voltage drop and the system is restarted. This is not an error.

## Error Messages on Virtual LCD

The remote management feature of DianaScope and Web Server allows the managed server to display the virtual LCD (16 digits x 2 lines) and status lamps.
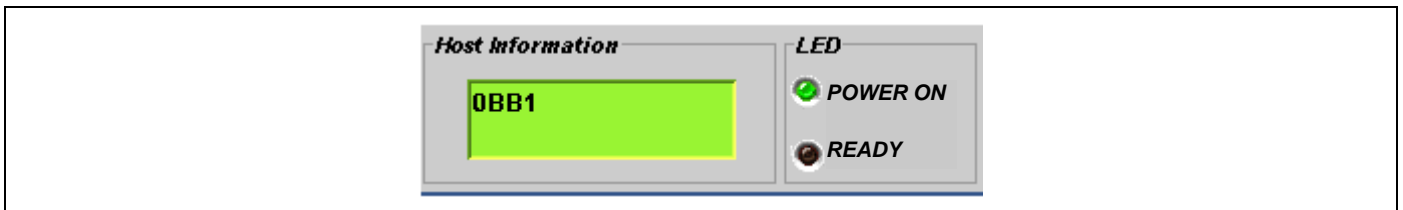
The virtual LCD displays the followings:

- POST progress
- Error occurred during operation or DC OFF (AC power is being on)

When POST detects an error, the POST error code is displayed on the virtual LCD upon completion of POST. See the table for POST error codes for details.
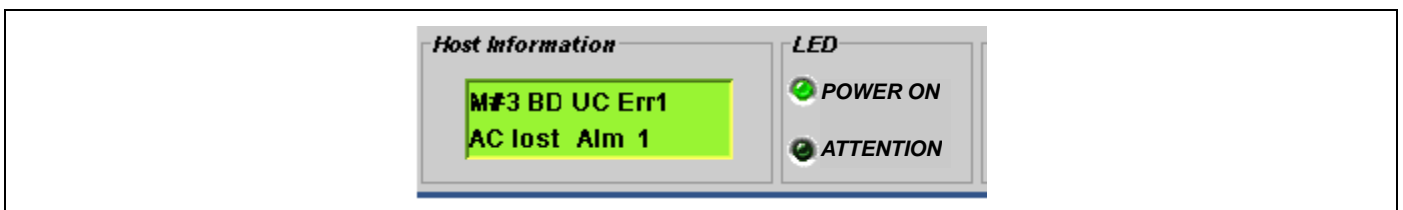
POST Progress
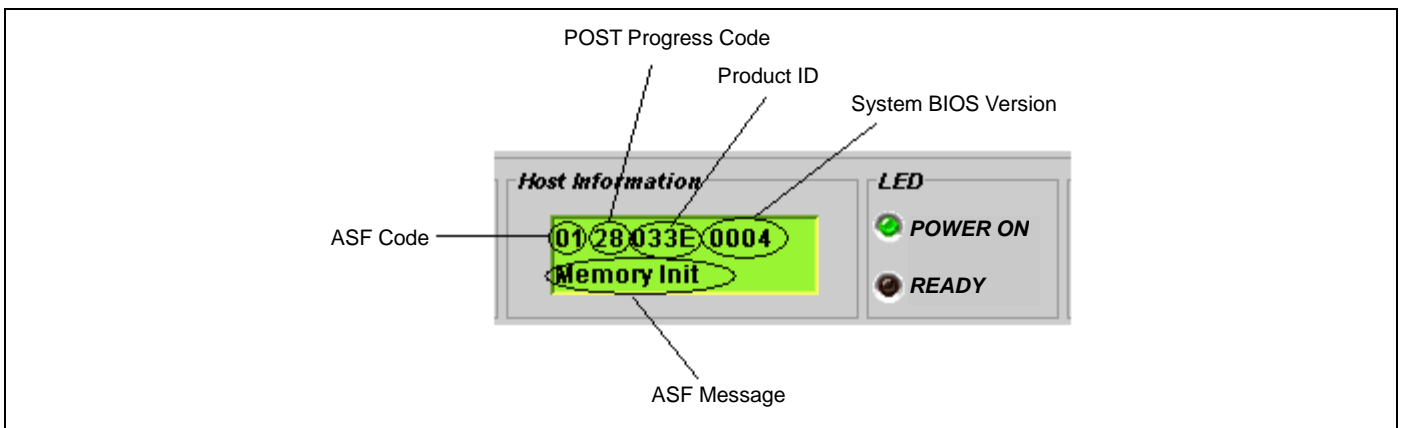
POST Error Code

Other Messages

Messages displayed on upper line

On-screen message	Description	Action
Prepare To Boot	POST completes normally.	This is not an error.
CPU Reconfigured	POST completes with processor degraded.	Contact your service representative. Try the following steps to cancel the error. 1. Start BIOS SETUP. 2. Select [Main] - Processor Settings] - [Processor Retest] - [Yes]. 3. Select [Exit] - [Exit Saving Changes].
Mem Reconfigured	POST completes with memory degraded.	Contact your service representative. Try the following steps to cancel the error. 1. Start BIOS SETUP. 2. Select [Advanced] - [Memory Configuration] - [Memory Retest] - [Yes]. 3. Select [Exit] - [Exit Saving Changes].
M#1 D#1 C Err	A correctable error frequently occurs in DIMM #1 on memory board #1.	The system can continue operation. However, consult with your service representative.
M#1 D#2 C Err	A correctable error frequently occurs in DIMM #2 on memory board #1.	
M#1 D#3 C Err	A correctable error frequently occurs in DIMM #3 on memory board #1.	
M#1 D#4 C Err	A correctable error frequently occurs in DIMM #4 on memory board #1.	
M#2 D#1 C Err	A correctable error frequently occurs in DIMM #1 on memory board #2.	
M#2 D#2 C Err	A correctable error frequently occurs in DIMM #2 on memory board #2.	
M#2 D#3 C Err	A correctable error frequently occurs in DIMM #3 on memory board #2.	
M#2 D#4 C Err	A correctable error frequently occurs in DIMM #4 on memory board #2.	
M#3 D#1 C Err	A correctable error frequently occurs in DIMM #1 on memory board #3.	The system can continue operation. However, consult with your service representative.
M#3 D#2 C Err	A correctable error frequently occurs in DIMM #2 on memory board #3.	
M#3 D#3 C Err	A correctable error frequently occurs in DIMM #3 on memory board #3.	
M#3 D#4 C Err	A correctable error frequently occurs in DIMM #4 on memory board #3.	
M#4 D#1 C Err	A correctable error frequently occurs in DIMM #1 on memory board #4.	
M#4 D#2 C Err	A correctable error frequently occurs in DIMM #2 on memory board #4.	
M#4 D#3 C Err	A correctable error frequently occurs in DIMM #3 on memory board #4.	
M#4 D#4 C Err	A correctable error frequently occurs in DIMM #4 on memory board #4.	

On-screen message	Description	Action
M#1 D#1 UC Err	An uncorrectable error occurs in DIMM #1 or DIMM #2 on memory board #1.	The system can continue operation if the status lamp flashes green. However, consult with your service representative.
M#1 D#2 UC Err		
M#1 D#3 UC Err	An uncorrectable error occurs in DIMM #3 or DIMM #4 on memory board #1.	
M#1 D#4 UC Err		
M#2 D#1 UC Err	An uncorrectable error occurs in DIMM #1 or DIMM #2 on memory board #2.	
M#2 D#2 UC Err		
M#2 D#3 UC Err	An uncorrectable error occurs in DIMM #3 or DIMM #4 on memory board #2.	
M#3 D#4 UC Err		
M#3 D#1 UC Err	An uncorrectable error occurs in DIMM #1 or DIMM #2 on memory board #3.	
M#3 D#2 UC Err		
M#3 D#3 UC Err	An uncorrectable error occurs in DIMM #3 or DIMM #4 on memory board #3.	
M#3 D#4 UC Err		
M#4 D#1 UC Err	An uncorrectable error occurs in DIMM #1 or DIMM #2 on memory board #4.	
M#4 D#2 UC Err		
M#4 D#3 UC Err	An uncorrectable error occurs in DIMM #3 or DIMM #4 on memory board #4.	
M#4 D#4 UC Err		
M#1 BD C ErrX	A correctable error frequently occurs on memory board #1.	The system can continue operation. However, consult with your service representative.
M#2 BD C ErrX	A correctable error frequently occurs on memory board #2.	
M#3 BD C ErrX	A correctable error frequently occurs on memory board #3.	
M#4 BD C ErrX	A correctable error frequently occurs on memory board #4.	
M#1 BD UC ErrX	An uncorrectable error occurs on memory board #1.	The system can continue operation if the status lamp flashes green. However, consult with your service representative.
M#2 BD UC ErrX	An uncorrectable error occurs on memory board #2.	
M#3 BD UC ErrX	An uncorrectable error occurs on memory board #3.	
M#4 BD UC ErrX	An uncorrectable error occurs on memory board #4.	
PROC BD C ErrX	A correctable error frequently occurs on processor board.	The system can continue operation. However, consult with your service representative.
PROC BD UC ErrX	An uncorrectable error occurs on processor board.	The system can continue operation if the status lamp flashes green. However, consult with your service representative.
IO BD C ErrX	A correctable error frequently occurs on I/O board.	The system can continue operation. However, consult with your service representative.
IO BD UC Err1	An uncorrectable error occurs on I/O board.	Consult with your service representative.
PCI S#3 C Err	A correctable error frequently occurs on PCI board slot #3.	The system can continue operation. However, consult with your service representative.
PCI S#4 C Err	A correctable error frequently occurs on PCI board slot #4.	
PCI S#5 C Err	A correctable error frequently occurs on PCI board slot #5.	
PCI S#1 Err	A fatal error occurs on PCI board slot #1.	Consult with your service representative.
PCI S#2 Err	A fatal error occurs on PCI board slot #2.	
PCI S#3 Err	A fatal error occurs on PCI board slot #3.	
PCI S#4 Err	A fatal error occurs on PCI board slot #4.	
PCI S#5 Err	A fatal error occurs on PCI board slot #5.	
PCI S#6 Err	A fatal error occurs on PCI board slot #6.	
PCI S#7 Err	A fatal error occurs on PCI board slot #7.	
PCI S#8 Err	A fatal error occurs on PCI board slot #8.	
PCI S#9 Err	A fatal error occurs on PCI board slot #9.	

Messages displayed on lower line

On-screen message	Description	Action
Proc Missing	Processor is not found.	
240VA Power Down	POWERGOOD dropped during power-on.	
Power On Cnt Alm	POWERGOOD signal error occurred at power on/off.	
Proc1 VccpAlm XX	VCCP voltage alarm occurred on processor #1.	
Proc2 VccpAlm XX	VCCP voltage alarm occurred on processor #2.	
Proc3 VccpAlm XX	VCCP voltage alarm occurred on processor #3.	
Proc4 VccpAlm XX	VCCP voltage alarm occurred on processor #4.	
BB +3.3v Alm XX	+3.3V voltage alarm occurred on I/O board.	
BB +3.3vs Alm XX	+3.3Vs voltage alarm occurred on I/O board.	
BB +5.0v Alm XX	+5.0V voltage alarm occurred on I/O board.	
BB +5.0vs Alm XX	+5.0Vs voltage alarm occurred on I/O board.	
BB +12v Alm XX	+12V voltage alarm occurred on I/O board.	
BB -12v Alm XX	-12V voltage alarm occurred on I/O board.	
VBAT Alm XX	Voltage alarm in lithium battery occurred.	
BB +1.25v Alm XX	+1.25V voltage alarm occurred on I/O board.	
BB +1.5v Alm XX	+1.5V voltage alarm occurred on I/O board.	
BB +1.8v Alm XX	+1.8V voltage alarm occurred on I/O board.	
BB VTT Alm XX	+1.150V voltage alarm occurred on I/O board.	
VDD TNB Alm XX	+1.500V voltage alarm occurred on processor board.	
VCACHE1 Alm XX	VCACHE1 voltage alarm occurred on processor board.	
VCACHE2 Alm XX	VCACHE2 voltage alarm occurred on processor board.	
Proc 1 T-Trip	Thermal Trip occurred on processor #1.	
Proc 2 T-Trip	Thermal Trip occurred on processor #2.	
Proc 3 T-Trip	Thermal Trip occurred on processor #3.	
Proc 4 T-Trip	Thermal Trip occurred on processor #4.	
Processor 1 IERR	IERR occurred on processor #1.	
Processor 2 IERR	IERR occurred on processor #2.	Contact your service representative.
Processor 3 IERR	IERR occurred on processor #3.	
Processor 4 IERR	IERR occurred on processor #4.	
SB1 +3.3v Alm XX	+3.3V voltage alarm occurred on SCSI backplane 1.	
SB1 +5.0v Alm XX	+5.0V voltage alarm occurred on SCSI backplane 1.	
SB1 +12v Alm XX	+12V voltage alarm occurred on SCSI backplane 1.	
SB2 +3.3v Alm XX	+3.3V voltage alarm occurred on SCSI backplane 2.	
SB2 +5.0v Alm XX	+5.0V voltage alarm occurred on SCSI backplane 2.	
SB2 +12v Alm XX	+12V voltage alarm occurred on SCSI backplane 2.	
SCSI A-1 Alm XX	SCSI channel-A voltage error occurred.	
SCSI A-2 Alm XX	SCSI channel-A voltage error occurred.	
SCSI A-3 Alm XX	SCSI channel-A voltage error occurred.	
SCSI B-1 Alm XX	SCSI channel-B voltage error occurred.	
SCSI B-2 Alm XX	SCSI channel-B voltage error occurred.	
SCSI B-3 Alm XX	SCSI channel-B voltage error occurred.	
Proc1 TempAlm XX	Processor #1 thermal error occurred.	
Proc2 TempAlm XX	Processor #2 thermal error occurred.	
Proc3 TempAlm XX	Processor #3 thermal error occurred.	
Proc4 TempAlm XX	Processor #4 thermal error occurred.	
BB Temp Alm XX	I/O board thermal error occurred.	
FP Temp Alm XX	Front panel thermal error occurred.	
OS shutdown Alm	Operating system shutdown alarm occurred.	
WDT timeout	Watchdog timer timeout error occurred.	
DUMP Request!	Dump switch is pressed.	
SMI timeout	SMI timeout occurred.	
AC lost Alm 1	AC lost occurred on power unit #1.	
AC lost Alm 2	AC lost occurred on power unit #2.	
AC lost Alm 3	AC lost occurred on power unit #3.	
AC lost Alm 4	AC lost occurred on power unit #4.	

On-screen message	Description	Action
Power Unit 1 Alm	Power unit #1 Failure occurred.	Contact your service representative.
Power Unit 2 Alm	Power unit #2 Failure occurred.	
Power Unit 3 Alm	Power unit #3 Failure occurred.	
Power Unit 4 Alm	Power unit #4 Failure occurred.	
Predictive Alm 1	Predictive Failure occurred on power unit #1.	
Predictive Alm 2	Predictive Failure occurred on power unit #2.	
Predictive Alm 3	Predictive Failure occurred on power unit #3.	
Predictive Alm 4	Predictive Failure occurred on power unit #4.	
CPU Fan Alarm	CPU FAN alarm occurred.	
PWR Fan Alarm	Power unit FAN alarm occurred.	
Sys Fan 1 Alarm	FAN#1 alarm occurred.	
Sys Fan 2 Alarm	FAN#2 alarm occurred.	
Sys Fan 3 Alarm	FAN#3 alarm occurred.	
Sys Fan 4 Alarm	FAN#4 alarm occurred.	
Sys Fan 5 Alarm	FAN#5 alarm occurred.	
Sys Fan 6 Alarm	FAN#6 alarm occurred.	

SOLVING PROBLEMS

When the server fails to operate as expected, see the following to find out your problem and follow the instruction given before asking for repair.

If the server still fails to operate successfully after solving your problem, take a note on the on-screen message and contact your service representative.

Problems with Server

No screen display appears with beep:

- Are DIMMs installed securely?

    → Check whether DIMMs are connected to the mating connectors firmly.

    → Check whether DIMMs of different specifications are installed in the specific group. See Chapter 9 for the DIMMs specifications.

Fail to power on the server:

- Is the server is 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 broken shield or bent plugs.

    → Make sure 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 and it outputs power. See the manual that comes with the UPS for details.

    Power supply to the server may be linked with the connected UPS using the BIOS setup utility of the server.

    <Menu to check: [Server] - [AC-LINK]>

- Did you press the POWER switch?

    → Press the POWER switch on the front of the server to turn on the power
    (the POWER/SLEEP lamp   lights).

Fail to power off the server / SLEEP switch is disabled:

- Is the POWER switch or SLEEP switch enabled?

    → Restart the server and start the BIOS setup utility.

    <Menu to check: [Security] - [Power Switch Inhibit]>

- Is the server running in the Secure Mode?

    → The POWER switch and the SLEEP switch are disabled in the Secure Mode. (Forced shutdown is also not available.) To release the Secure Mode, enter the password specified with the BIOS setup utility.

POST fails to complete:

- Is the DIMM board installed?

    → At least four DIMM boards are required for operation.

- Is the memory size large?

    → The memory check may take a few seconds 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, POST may accidentally detect a keyboard controller error and stops proceeding. In such a case, restart the server once again. Do not perform any keyboard or mouse operation until the BIOS start-up message appears when you restart the server.

- Does the server have contains appropriate memory boards or PCI devices?

  → Operation of the server with unauthorized devices is not guaranteed.

Fail to access to internal or external devices (or such devices fail to operate):

- Are cables properly connected?

  → Make sure that the interface cables and power cord are properly connected. Also make sure that the cables are connected in the correct order.

- Is the power-on order correct?

  → When the server has any external devices connected, 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 BIOS configuration correct?

  → When the server has PCI devices connected, make sure to set the PCI device interrupt and others with the BIOS setup utility of the server. (Most PCI devices generally do not require any change to the configuration, but some boards do require specific settings. Refer to the manual that comes with the board for details to make correct settings.

    <Menus to check: [Advanced] - [Advanced Chipset Control] - [PCI Device]>

  → Some devices connected to the 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.

    <Menu to check: [Advanced] - [Peripheral Configuration]>

USB device fail to operate:

- Did you connect the USB2.0 device to the USB connector on the front panel?

  → The USB connector on the front panel is dedicated to USB1.1. Use the USB connector on the rear panel to connect the USB2.0 device.

Management PC cannot detect the server:

- Is Java2 Runtime Environment, Standard Edition 1.4.2_04 or later used for management PC?

  → Download Java2 Runtime Environment, Standard Edition 1.4.2_04 or later from http://java.sun.com/j2se/.

- Is LAN or ICMB cable properly connected?

  → Make sure that the cable is properly connected to the management LAN port or ICMB port. If the cables are incorrectly connected, the sensor of the server will not be monitored. Also check if the cables are connected to LAN connector or serial port connector by mistake.

- Is the IP address unique in the network?

  → The IP address for management LAN port is factory-set to 192.168.1.1. If the same address exists in the same network, the server will not be detected correctly. Change the IP address appropriately.

- Is the server specified to be monitored by NEC ESMPRO Agent?

  → Change setting of NEC ESMPRO Agent.

Start NEC ESMPRO Agent from Windows control panel, select [System] → [Express5800 Server] → [Monitor]. (The default is [Does not monitor].) Monitoring starts automatically. You do not need to restart the system; however, reconfigure the tree may be needed if the server is not detected.

- Is any error message displayed?

    → See page 4-94 for details.

The server console is not displayed on remote KVM console:

- Is the resolution correctly set?

    → To display the server console on the remote KVM console, the resolution must be within 1024x768, and the refresh rate 75Hz. or less.

- Do you use the remote KVM console in text mode?

    →Under the Linux, monitor, driver, and video memory settings may fail in graphical display such as X-Windows. We recommend using the Linux in text mode.

Forgotten the login name/password to use the remote management feature through Web browser:

    → If you have forgotten the login name or password, restore the factory default including password by changing the BMC configuration jumper switch.

IMPORTANT: Restoring the factory default clears BMC configuration that is used for NEC DianaScope to connect with the server.

If you are using the NEC DianaScope, you need to save the configuration data into the floppy disk before clearing password.

BMC can be configured and saved with NEC DianaScope Agent and the system management feature of EXPRESSBUILDER.

---

1. Power off the server and unplug the power cord.

2. Change the BMC configuration jumper switch setting as shown below. (See "I/O Board" in Chapter 2 for details.)

Factory-set jumper switch location   Jumper switch location for clearing password

JP2   JP2
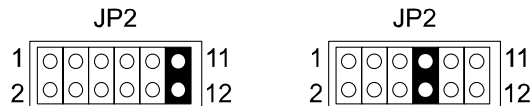
3. Connect the power cord.

4. Wait at least 30 seconds with the power being off, and then unplug the power cord.

5. Restore the BMC configuration jumper switch setting and power on the server for reconfiguration.

The keyboard or mouse fails to operate:

- 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 does not operate if it is connected when the server is powered (not applicable to USB devices). Power off the server first and connect it properly.

- Is BIOS configuration correct?

    → The keyboard and mouse may be disabled with the BIOS setup utility of the server. Check the settings with the BIOS setup utility.

    <Menus to check: [Advanced] - [Peripheral Configuration] - [PS/2 Mouse], [Advanced] - [Numlock]>

- Are the server drivers installed?

    → Refer to the manual that comes with your operating system to check that the keyboard and mouse drivers are installed. (These drivers are installed along with the operating system.) Some Operating

systems allow you to change the keyboard and mouse settings. Refer to manual that comes with your operating system to check that the keyboard and mouse settings are correct.

- Is the server in the Secure Mode?

    → In the Secure Mode, the keyboard and mouse are disabled. To release the Secure Mode, enter the password specified with the BIOS setup utility.

Fail to access (read or write) to the floppy disk:

- Does the floppy disk drive contain a floppy disk?

    → Insert a floppy disk into the floppy disk drive until it clicks.

- Is the floppy disk write-protected?

    → Place the write-protect switch on the floppy disk to the "Write-enabled" position.

- Is the floppy disk formatted?

    → Use a formatted floppy disk or format the floppy disk in the floppy disk drive. Refer to the manual that comes with the operating system for formatting a floppy disk.

- Is BIOS configuration correct?

    → The USB device may be disabled with the BIOS setup utility of the server.
    ([Legacy Floppy] must have been disabled.)
    Check the setting with the BIOS setup utility.

    <Menus to check:

    [Main] - [Legacy Floppy A]

    [Advanced] - [I/O Device Configuration] - [USB Controller]

    [Advanced] - [I/O Device Configuration] - [Legacy USB Support]

    [Security] - [Floppy Write Protect]>

- Is the server in the Secure Mode?

    → In the Secure Mode, write access to the floppy disk may be disabled. To release the Secure Mode, enter the password specified with the BIOS setup utility.

Fail to access to the CD/DVD-ROM:

- Is the CD/DVD-ROM properly set in the DVD-ROM drive tray?

    → The tray is provided with a holder to secure the CD/DVD-ROM. Make sure that the CD/DVD-ROM is placed properly in the holder.

- Is the CD/DVD-ROM applicable to the server?

    → A CD/DVD-ROM for Macintosh is not fit for use on this system.

Fail to access to the CD-R disk:

- Is the mounting surface correct?

    → Take out the CD-R disk from the tray, and then set it again with its labelled surface upward.

- Is there any soil or crack on CD-R disk?

    → Make sure there is no soil due to fingerprint or others on the disk surface. Also make sure that there is no crack on the disk surface. Clean the disk surface if it is soiled.
    If read-out still fails, set another disk of which data has been successfully read out to check if the drive can read the disk.

- Is the CD-R disk closed?

    → Close the session or set the disk in closed status, and try to read again.

- Are the CD-R disk and writing software appropriate to the disk drive?

  → The DVD-ROM drive of the server may fail if the combination of disk drive, writing software, and CD-R is not correct.

Inserted the correct CD-ROM but the message like the following 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 injured?

  → Take the CD-ROM out of the DVD-ROM drive, confirm that it is not dirty or injured, reset and click [OK].

Fail to access the hard disk:
(Refer to the documentation supplied with the disk array controller.)

- Is the hard disk applicable to the server?

  → Operation of any device that is not authorized by is not guaranteed.

- Is the hard disk properly installed?

  → Make sure to lock the hard disk with the lever on its handle. The hard disk is not connected to the internal connector when it is not completely installed (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 is not guaranteed.

- Is the cable connection changed?

  → The SCSI connector (B) on the I/O board in the machine can be used for either built-in file devices or external SCSI devices. The connection to external devices must be switched by modifying cable connection properly.

- Are SCSI devices properly configured?

  → When the server has external SCSI devices connected, device settings, including SCSI ID and terminator, are required. Refer to the manual that comes with the SCSI device for details.

- Are the SCSI controllers (including optional controllers) properly configured?

  → Use the BIOS setup utility for proper configuration of SCSI devices connected to the SCSI connector on the I/O board. When the server has an optional SCSI controller installed and SCSI devices connected to it, use the BIOS setup utility that comes with the optional SCSI controller for proper configuration. See the manual that comes with the optional SCSI controller for details.

There are some cases that an event log shown below is registered in MegaRAID Storage Manager (MSM) every time you power on the server.

> Controller ID:a Unexpected sense PD=b:255 , CDB=0x1c, …, Sense=0x70, 0x00, 0x06, 0x00, 0x00, 0x00,
> 0x00, 0x0a, 0x00, 0x00,0x00, 0x00, 0x29,…

a: Controller number of LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB
    Normally, the controller ID is "0". It depends on the number of disk array controller cards LSI Logic MegaRAID SAS 8480E installed in PCI-Express slot.

b: SAS port number of LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB
    (1: Port 0-3, 2: Port 4-7)

  → It is not a problem in operating the system.

There are some cases that an event log shown below is registered in application log of Event Viewer every time you power on the server.

Event Source: MR_MONITOR

Event Type: Warning

Event ID: 113

Description: Controller ID:a Unexpected sense PD=b:255 , CDB=0x1c, …,
Sense=0x70, 0x00, 0x06, 0x00, 0x00, 0x00, 0x00, 0x0a, 0x00, 0x00,0x00, 0x00, 0x29,…

a: Controller number of LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB
Normally, the controller ID is "0". It depends on the number of disk array controller cards LSI Logic MegaRAID SAS 8480E installed in PCI-Express slot.

b: SAS port number of LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB
(1: Port 0-3, 2: Port 4-7)

→ It is not a problem in operating the system.

During operation, there are some cases that a warning message concerning SAS device is registered in MegaRAID Storage Manager™ (MSM) log.

Controller ID:a Unexpected sense PD=b:c , CDB=0xXX, …, Sense=0xXX, …

a: Controller number of LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB
Normally, the controller ID is "0". It depends on the number of disk array controller cards LSI Logic MegaRAID SAS 8480E installed in PCI-Express slot.

b: SAS port number of LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB
(1: Port 0-3, 2: Port 4-7)

c: Slot number for the device

- ⑧ This message indicates that the command issued to SAS device is abnormally ended.

    → Normally the command is retried, therefore, it is not a problem in operating the system.

- ⑧ This message may be logged when SAS hard disk drive that has not been configured is removed from the slot.

    → It is not a problem in operating the system.

- ⑧ If the message is displayed again for the specific hard disk drive, check if the hard disk drive is connected correctly.

    → If the same error message appears repeatedly, contact your service representative to replace the hard disk drive.

There are some cases that an event log concerning the SAS device is registered in application log of Event Viewer during operation.

Event Source: MR_MONITOR

Event Type: Warning

Event ID: 113

Description: Controller ID:a Unexpected sense PD=b:c , CDB=0xXX, …,
Sense=0xXX, …

a: Controller number of LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB
Normally, the controller ID is "0". It depends on the number of disk array controller cards LSI Logic MegaRAID SAS 8480E installed in PCI-Express slot.

b: SAS port number of LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB
(1: Port 0-3, 2: Port 4-7)

c: Slot number for the device

- ⑧This message indicates that the command issued to SAS device is abnormally ended.

  → Normally the command is retried, therefore, it is not a problem in operating the system.

- ⑧This message may be logged when SAS hard disk drive that has not been configured is removed from the slot.

  → It is not a problem in operating the system.

- ⑧If the message is displayed again for the specific hard disk drive, check if the hard disk drive is connected correctly.

  → If the same error message appears repeatedly, contact your service representative to replace the hard disk drive.

There are some cases that an event log is registered in MegaRAID Storage Manager (MSM) log at startup of OS after rebuilding the hard disk drives with WebBIOS.

Controller ID:x VD is now DEGRADED VD x.

→ It is not a problem in operating the system.
A popup message may appear if the notification feature for NEC ESMPRO Manager is enabled.

There are some cases that an event log is registered in application log of the Event Viewer at startup of OS after rebuilding the hard disk drives with WebBIOS.

Event Source: MR_MONITOR

Event Type: Error

Event ID: 251

Description: Controller ID:x VD is now DEGRADED VD x.

→ It is not a problem in operating the system.
A popup message may appear if the notification feature for NEC ESMPRO Manager is enabled.

Problems with Windows Server™ 2003 x64 Editions

There are some cases that 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 in operating the system.

There are some cases that 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.

→   When this event is not registered by rebooting the system, it is not a problem in operating the system.

Problems with Windows Server 2003 R2

There are some cases that 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.

→ If you use "Hardware Management" which is provided by Windows Server 2003 R2, above-shown event log will be registered.

Problems with Windows Server™ 2003

Cannot install the operating system correctly:

- Did you confirm the notes on installing the operating system?

  → See Chapter 6.

During Windows 2000 installation, the following warning is registered in the System Log of the Event Viewer:

> Error detected on the device \Device\CdRom0 during the paging operation.

  → There is no problem on this issue.

Fail to start the operating system:

- Is a floppy disk in the floppy disk drive?

  → Take out the floppy disk and restart the server.

- Is the EXPRESSBUILDER CD-ROM in the DVD-ROM drive?

  → Take out the EXPRESSBUILDER CD-ROM and restart the server.

- Is the operating system broken?

  → Use recovery process to recover the system.

The operating system presents unstable operation:

- Did you update the system?

  → Installing a network drive after installation of the operating system may cause unstable operation. Use the EXPRESSBUILDER CD-ROM to update the system. (See Chapter 6.)

When any trouble occurred, the system does not run according to the specification of "Restart automatically":

  → When any trouble occurred on Windows 2003, the system may not restart automatically even if "Restart automatically" is specified. In such case, restart the system manually.

Cannot turn the power OFF at the blue screen:

  → If you want to turn off the power at the blue screen, execute forced power off (forced shut down: continue to press POWER switch for 4 seconds). The power will not be turned off if you press the switch just one time.

The server is not found on the network:

- Is the LAN cable connected?

  → Make sure to connect the LAN cable to the network port on the rear of the server. Also make sure that the LAN cable to use conforms to the network interface standard.

- Is BIOS configuration correct?

  → The internal LAN controller may be disabled with the BIOS setup utility of the server. Check the setting with the BIOS setup utility.

  <Menus to check:

  [Advanced] - [PCI Configuration] - [Embedded NIC 1], [Embedded NIC 2]>

- Have the protocol and service already 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 property dialog box in control panel to specify the "Link Speed & Duplex" value the same as the value specified for HUB.

The processor name displayed in [General] tab of [System Property] is not in correct position.

→ There is no problem for operation.

The system displays the message below and fails to log in.

→ In Windows Server 2003, the following message will be displayed if you use the operating system without executing the license authentication. Select "Yes", and execute the procedure for license authentication.

```
┌────────────────────────────────────────────────────────────┐
│              Windows Product Activation                     │
│                                                             │
│   This copy of Windows must be activated with Microsoft before you can │
│        continue, You cannot log on until you activate Windows.       │
│             Do you want to activate Windows now?                     │
│                                                             │
│          To shut down the computer, click Cancel.           │
│                                                             │
│                  YES   NO   Cancel                          │
└────────────────────────────────────────────────────────────┘
```
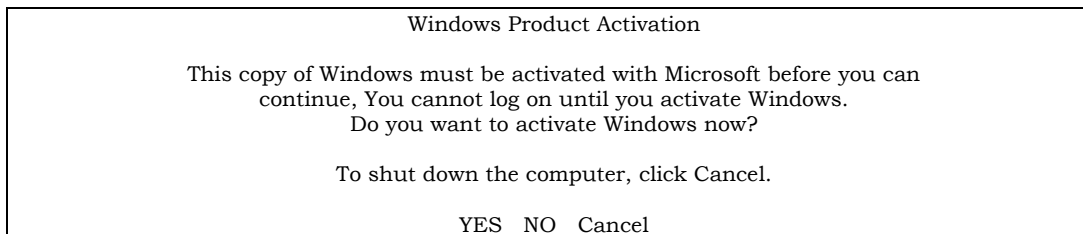
About System Log when re-starting the system on Windows Server 2003

Type: Warning
Source: E100B
Event ID: 4
Description: Adapter Intel(R) PRO/100 Network Connection: Adapter Link Down

→ When re-starting the system without connecting the network cable, this log may be found in system event log.
But this has no effect on the behaviour of LAN driver.
Confirm that the system is connected with the LAN cable properly.
If 100Base LAN port is not utilized, disable 100Base LAN on device manager or disable it on BIOS configuration. Then, the log will not be registered.

Event logs in using SNMP Service in Windows Server 2003

Event Type:	Warning
Event Source:	EvntAgnt
Event Category:	None
Event ID:	1015
Description:	TraceLevel parameter not located in registry;
	Default trace level used is 32.

Event Type:	Warning
Event Source:	EvntAgnt
Event Category:	None
Event ID:	1003
Description:	TraceFileName parameter not located in registry;
	Default trace file used is.

→ The system will not be affect by these event logs. SNMP will not be affected either, so that you can ignore these logs.

A PCI board is not recognized.

- Is the PCI board installed correctly?

  → Confirm that the PCI board is installed in the slot correctly.

- Is the proper IRQ assigned for the board?

  → Assign the proper IRQ by referring to the Chapter 4.

- Is "Disabled" specified in [Option ROM] for the slot to install SCSI card (excluding the array board used for operating system boot)?

  → Check the settings with the BIOS setup utility.

    <Menus to check: [Advanced] - [PCI Configuration] - [PCI Slot n] (n: PCI slot number of installed board) - [Option ROM Scan]>

- Is "Disabled" specified in [Option ROM] for the slot for added network board which is not used for network boot?

  → Check the settings with the BIOS setup utility.

    <Menus to check: [Advanced] - [PCI Configuration] - [PCI Slot n] (n: PCI slot number of installed board) - [Option ROM Scan]>

PCI hot-plug fails:

- Is BIOS configuration correct?

  → You must change the BIOS configuration to use the PCI hot-plug feature.

    <Menus to check: [Advanced] - [PCI Configuration] - [Hot Plug PCI Control] - [Minimum/Middle/Maximum*]>

    * Setting value depends on the board to be installed. See Chapter 4 for details.

The driver of a PCI board cannot be stopped from the operating system when Hot Remove or Hot Replace is executed for the PCI board:

- Is another software application using the PCI board for which Hot Remove or Hot Replace is to be executed?

  → If another software application is using the PCI board for which Hot Remove or Hot Replace is to be executed, the driver of the PCI board cannot be stopped.
  Terminate the software, then stop the driver of the PCI board. If executing Hot Replace, restart the software after having mounted a new PCI board.

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 Start menu, point to [Control Panel] and click [Computer Management] and then click the [Services] to specify whether the Telnet Service is registered.

   * When the installation of Telnet Service is finished, there is no problem if the computer name is set to 15 characters or more.

Problems with EXPRESSBUILDER

When the server is not booted from the EXPRESSBUILDER CD-ROM, 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, an error message will appear or the operating system 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 DVD-ROM drive first.

  <Menu to check: [Boot]>

- Is an error message appeared?

  → When an error occurs while the EXPRESSBUILDER is in progress, the following message appears.

  After this message appears, check the error and take the appropriate corrective action according to the message listed in the table below.

Message	Cause and Remedy
This machine is not supported.	This EXPRESSBUILDER version is not designed for this server. Run the EXPRESSBUILDER on the compliant server.
NvRAM access error.	An access to the non-volatile memory (NvRAM) is not acceptable.
Hard disk access error.	The hard disk is not connected or it is failed. Check whether the hard disk is correctly connected.
The system-specific information does not exist on the I/O board. Please restore the backup data or write the data by using [System Information Management] of the Off-line Maintenance Utility. Only the authorized personnel are allowed to do this operation.	The system-specific information cannot be acquired in the I/O board exchange and so on.

Problems with Express Setup

Express Setup can not be used

→ Express Setup does not support the installation of Microsoft Windows Server 2003 x64 Editions. If you want to perform re-setup, see Appendix D and perform "Manual Setup".

Following message appeared when you tried to install Express Setup to the hard disk that has smaller capacity than the specified partition size:

> The specified partition size has exceeded the capacity of the hard disk.
> The setup created the partition at the maximum size that can be reserved on the hard disk.
> Setup will continue the process.
> OK

- → It is not an abnormal condition. Press **Enter** to continue the installation.

The message can not be displayed correctly when copying the files from CD-ROM or checking CD-ROM:

- → Press **R**. When any messages appear again even if you press **R**, restart the Express Setup from the beginning. In case the same result occurred after the restart of installation, contact Maintenance Service Company and ask them to check the DVD-ROM drive.

Express Setup terminated and asks to input setup information.

- → There are some errors on the specified setup information.
  Follow the instruction to input the correct value. It is not necessary to cancel the installation. On Windows, you might be asked to press Enter again after the last reboot of the setup.

[OK] appears on the [Role of Computer] screen.

- → If you click [OK] here, the setup will select the default value of Express Setup for the later specification to continue the process.

- <The Default Value for Windows Server 2003>

  The specification of network protocol
Protocol :	TCP/IP[DHCP Specified]
Service :	Select sharing Microsoft network files and printer.
Client :	Microsoft network client.
Component :	SNMP
Application :	NEC ESMPRO Agent
	MegaRAID Storage Manager
	Power Console Plus (When disk array system)

-

[OK] does not appear on [Role of Computer] screen.

- → The [OK] does not appear if the Setup File that has already been created is loaded.

- → [OK] appears only when you first entered the [Role of Computer] screen.
  Once you go to the next screen from [Role of Computer], the [OK] will not appear even if you click [Back] to go back to the [Role of Computer] screen.

Select [Use Existing Partition] as [System Partition], but the operating system is installed in the whole area of the disk.

- → Is there any other partition than the partition to re-use (excluding maintenance area)? If the partition other than the one to re-use does not exist, the setup will reserve the whole area of the disk to install Windows.

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 Workgroup. Open [System] in Control Panel to specify joining the Domain.

Specified large value as partition size, but when Windows is actually started, the system partition is created by 4095 MB.

- → Is the [Partition Size] specified by the value larger than the real area? If you want to create one partition in all area of the hard disk (excluding the maintenance area) to install the operating system, specify [All Area].

Entered the incorrect Product ID/CD key.

- → Even if you entered the incorrect Product ID/CD key, Express Setup will start. However, the setup will stop and asks you to re-enter the correct value. Also in this case, input request will occur when rebooting after GUI setup completed during Express Setup. If these 2 inputs are done correctly, there is no problem on Windows setup.

Unable to specify the details of Network adapter.

- → In Express Setup, you can not specify the details of Network adapter. Specify them from Control Panel after starting Windows.

Windows is started with Network adapter that has not been specified during Express Setup

- → Windows will install the recognized Network adapter specified as default value. If you want to modify the specification, it can be done from Control Panel after starting Windows. Also, the Network adapter that has been specified during Express Setup but that is not connected will not be setup, though the protocol will only be installed.

Connected more than two Network adapter and specified different protocol for each adapter, but all the protocols are specified on either adapter.

- → It's a design. Each adapter is specified so that all the installed protocols can be used.
  The value that can not be specified during Express Setup will all be specified by default value.

When more than two Network adapters are specified, the detailed specification of TCP/IP protocol are all set to use DHCP.

- → When more than two Network adapters are specified, the detailed specification of the protocol may all be set by default value. Re-specify the details from Control Panel.

Not more than two Network adapters are connected, but the detailed specification of the protocol are all set by default. (e.g. Specified IP Address on TCP/IP, but DHCP is specified)

- → Are you specifying more than two protocols?
  In this case, the situation will be the same as connecting more than two Network adapter, so the detailed specification of the protocol are all set by default.
  Re-specify the details from Control Panel after starting the operating system.

Changed the giga driver speed from 1000 Mbps to 100 Mbps. But the changed speed is not properly displayed in Network Details of NEC ESMPRO data viewer (still 1000M bps is indicated):
- → It does not affect the operation of LAN driver.

Setup is interrupted at "Creating a working partition" process during the Express Setup.

- • Did you connect the hard disk drive that operating system is not going to be installed?

    → Disconnect the hard disk drive that operating system is not going to be installed, and perform the Express Setup.

Error Message during Disk Array Configuration

If the server configured with disk array does not work correctly or utility program fails, check the following and take an appropriate action.

The operating system cannot be installed:

- • Is configuration of the disk array controller performed?

    → Perform configuration properly by using MegaRAID Configuration Utility or WebBIOS.

The operating system cannot be started:

- • Is the BIOS setting for the disk array controller changed?

    → Set it properly by using MegaRAID Configuration Utility.

- • Does POST recognize the disk array controller?

    → Check that the disk array controller is connected correctly and then turn the power ON.

    → When the disk array is connected correctly but is not recognized, it may be faulty. Contact the maintenance service agent that you are contracted with or the dealer that you purchased this controller from.

Rebuilding cannot be performed:

- • Is the capacity of the hard disk to be rebuilt insufficient?

    → Use a hard disk of the same capacity as the faulty one.

- • Is the RAID configuration RAID0?

    → RAID0 does not have redundancy thus rebuilding cannot be performed. Replace the "DEAD" hard disk, create configuration information again, perform initialization and then restore using the backup data.

Auto-rebuild cannot be performed:

- • Is the interval enough when hot swap are executed?

    → Take interval more than 60 seconds when hot swap are executed.

- • Is the BIOS setting for the disk array controller correct?

    → Check the BIOS setting for disk array controller by using MegaRAID Configuration Utility. Select "Objects" → "Adapter" → "Auto Rebuild" from the TOP menu.

A hard disk goes into "FAIL" status:

- → Contact the maintenance service agent that you are contracted with or the dealer that you purchased it from.

Consistency Check cannot be performed:

- • ⑧Is virtual disk indicated as "Degraded"?

    → Replace the failed hard disk drive and execute rebuild process.

- • ⑧Is RAID level of virtual disk "RAID0"?

    → The Consistency Check does not work on RAID0 because it has no redundancy.

Error Message for Battery for On-board RAID (MegaRAID ROMB)

The battery is discharged and charged in a regular basis (every 30 days by the default). The following error message may be registered in event log (application log); however, it is not a problem in operating the system.

- ■ MegaRAID Storage Manager (MSM) log

  Controller ID:x Battery is discharging.

- ■ Application event log

  Event Source: MR_MONITOR

  Event Type: Warning

  Event ID: 148

  Description: Controller ID:x Battery is discharging.

- ■ MegaRAID Storage Manager (MSM) log

  Controller ID:x BBU disables; changing WB logical drives to WT.

- ■ Application event log

  Event Source: MR_MONITOR

  Event Type: Warning

  Event ID: 195

  Description: Controller ID:x BBU disables; changing WB logical drives to WT.

The battery is charged and discharged when it is replaced or at installation of the system. The following error message may be registered in event log (application log); however, it is not a problem in operating the system.

- ■ MegaRAID Storage Manager (MSM) log

  Controller ID:x Battery requires reconditioning – please initiate a LEARN cycle.

- ■ Application event log

  Event Source: MR_MONITOR

  Event Type: Warning

  Event ID: 253

  Description: Controller ID:x Battery requires reconditioning – please initiate a LEARN cycle.

The battery is discharged and charged in a regular basis (every 30 days by the default). While performing this cycle, the following error message may appear on POST screen, however, it is not a problem in operating the system.

```
Your battery is bad or missing, and you have VDs configured for write-back
mode. Because the battery is not usable, these VDs will actually run in
write-through mode until the battery is replaced.
The following VDs are affected : xx,xx,xx,xx,xx,xx
```

The battery is charged and discharged when it is replaced. While performing this cycle, the following error message may appear on POST screen; however, it is not a problem in operating the system.

```
Your battery is bad or missing, and you have VDs configured for write-back
mode. Because the battery is not usable, these VDs will actually run in
write-through mode until the battery is replaced.
The following VDs are affected : xx,xx,xx,xx,xx,xx
```

Following message appears during POST:

```
The battery hardware is missing or malfunctioning, or the battery is unplugged.
If you continue to boot the system, the battery-backed cache will not function.
Please contact technical support for assistance.
Press 'D' to disable this warning (if your controller does not have a battery).
```

→ The battery of on-board RAID (MegaRAID ROMB) may be faulty.
  Contact your service representative.

The battery of on-board RAID (MegaRAID ROMB) is not recognized, or the following message appears during POST:

```
Your battery is bad or missing, and you have VDs configured for write-back mode.
Because the battery is not usable, these VDs will actually run in write-through mode until the battery is
replaced.
The following VDs are affected: xx
Press any key to continue.
```

- ⑧ The battery charging rate may be low.

    → Power on the server for several hours to charge battery. After that, check the POST message again. You can use WebBIOS to check the status on Battery Status screen.
    If the battery is still not recognized, the battery may be faulty or dead. The life of battery is approximately two years. Contact your service representative.

Problems with Master Control Menu

The master control menu fails to appear:

- Is your system Windows NT 4.0 or later, or Windows 95 or later?

    → The Master Control menu is supported by Windows NT 4.0 and Windows 95.

- Is **Shift** pressed?

    → Setting the 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 CD-ROM. In such a case, start the Explorer and run \MC\1ST.EXE in the CD-ROM.

Problems with Configuration Diskette Creator

The bit map of the Configuration Diskette Creator window is not displayed correctly during setting of setup information. (When the Trekking command is used)

- →   If the specified number of colours is fewer than 256 in the display setting, the bit map is not displayed correctly, but the setup information can be displayed correctly.

The Point to Point tunnelling protocol cannot be set.

- →   The protocol is not supported at present. After installation, set the protocol through Control Panel. In this case, rebooting is not necessary.

The details of a network adapter cannot be set.

- →   Configuration Diskette Creator is unable to set the details of network adapters. Start Windows, and set the details through Control Panel.

COLLECTING EVENT LOG

This section describes on how to collect the log of various events that occurred on the server.

> **IMPORTANT:** If STOP error, system error, or stall occurred, follow the procedure below after restarting the system.

> **NOTE:** The different revision processor may be mixed in additional CPU kit. When Windows is used, following message may be appeared in the System Log of the Event Viewer after extension the different revision of two or more processors in the Bull NovaScale server. If this message is logged, it is no problem for operation.
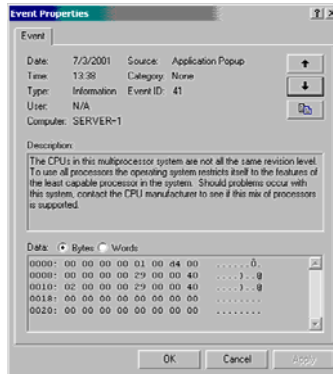
1. Click [Management Tool] → [Event Viewer] from the Control Panel.

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 occurred at the item which configures Windows system is archived.

3. Click [Save as...] in the [Run] menu.

4. Input the file name of 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 CONFIGURATION INFORMATION

This section describes on how to collect the information on hardware configuration and inside specification.

In order to collect information, "Diagnostic Program" is used.

> **IMPORTANT:** If 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 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 necessary information.

If you saved the dump to DAT, write down that it is saved as "NTBackup" or "ARCServe" on the label. You can specify the location to save the diagnostic information as you like. For more information, refer to "Specifying Memory Dump (Debug Information (refer to Chapter 5 for detail)".

> **IMPORTANT:**
>
> ■ Consult with your service representative before dumping the memory. Dumping the memory while the server is in the successful operation may affect the system operation.
>
> ■ Restarting the system due to an error may display a message indicating insufficient virtual memory. Ignore this message and proceed. Restarting the system may result in dumping improper data.

Preparing for Memory Dumping

Memory dumping with the DUMP switch may disable the server to restart. In such a case, it is required to force the server to shut down. This forced shutdown, however, is not available if "Enable" is selected for "Power Switch Inhibit" on the Security menu of the BIOS setup utility, SETUP, because this setting disables POWER switch operation.

Follow the procedure below to change the setting to enable the forced shutdown and restart of the server.

1. Power on the server and start the BIOS setup utility, SETUP.

2. Select "Disable" for "Power Switch Inhibit" in the Security menu.

3. Save the configuration data and exit the SETUP.

Saving the Dump File

Press the DUMP switch to save the dump file when an error occurs. Insert a metal pin (a straightened large paper clip will make a substitute) into the switch hole to press the DUMP switch.
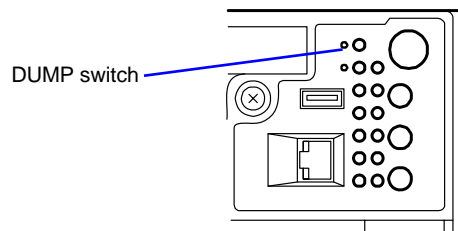
Pressing the DUMP switch saves the dump file in the specified directory. (Memory dumping may not be available when the processor stalls.)

> **IMPORTANT:** Do not use a toothpick or plastic stick that is easy to break. Use a pin having the length of 1 inch (25 mm) or longer.

25 mm or longer
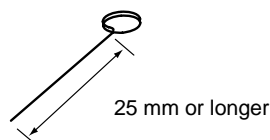
Recovery for Windows Server 2003 x64 Editions and Windows Server 2003

If the system fails to start by some reasons, recover the system with the recovery console. However, recovery using this method should be performed only by system administrator or a user who has an expert knowledge. See Online Help for details.

OFF-LINE MAINTENANCE UTILITY

The Off-line Maintenance Utility is an operating system-independent maintenance program. When you are unable to start the operating system-dependent NEC ESMPRO to troubleshoot a problem, the Off-line Maintenance Utility can be used.

> **IMPORTANT:**
>
> - The Off-line Maintenance Utility is intended for use of your sales agent. The EXPRESSBUILDER CD-ROM and the Off-line Maintenance Utility Bootable FD you have created contain a file that describes operation of the utility, but do not attempt to use the utility by yourself. Contact your sales agent and follow instructions.
>
> - Starting the Off-line Maintenance Utility disables any access from a client to the server.

Starting the Off-line Maintenance Utility

The Off-line Maintenance Utility may be started in the following ways.

- From the CD-ROM

   Insert the EXPRESSBUILDER CD-ROM in the DVD-ROM drive and reboot the system.

   After the menu is displayed on the screen, select "Tools" - "Off-line Maintenance Utility".

   The Off-line Maintenance Utility program starts from the CD-ROM.

- From the floppy disk

   Insert the Off-line Maintenance Utility Bootable FD in the floppy disk drive and reboot the system.

   The Off-line Maintenance Utility program starts from the boot disk.

   The Off-line Maintenance Utility Bootable FD is created by selecting "Tools" - "Create Support FD" on the EXPRESSBUILDER.

- Manual start (by pressing **F4**)

   When the Off-line Maintenance Utility is installed, press **F4** while the start-up screen of the server is on screen. The Off-line Maintenance Utility starts from the hard disk.

Features of Off-line Maintenance Utility

The Off-line Maintenance Utility provides the following features. (Available features vary depending on the way you started the Off-line Maintenance Utility.)

> **IMPORTANT:** See the on-line help for details of the Off-line Maintenance Utility. For further information, ask your sales agent.

■ IPMI Information Viewer

Provides the functions to view the System Event Log (SEL), Sensor Data Record (SDR), and Field 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

Provides the functions to export the current configuration data defined with the SETUP utility to a text file.

■ System Information Viewer

Provides the functions to view information on the processor and the BIOS and export it to a text file.

■ System Information Management

Provides the function 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.

■ Start of Utilities

With the EXPRESSBUILDER, you can start the following utilities installed in the maintenance partition.

- • – System Management
- • – System Diagnostics
- • – Maintenance Partition Update

■ Chassis Identify

This function can distinguish the machine with the lamp or buzzer of the machine.

This is convenient if you have to distinguish a machine among many machines on the rack.

RESETTING THE SERVER

■ If the server halts before starting the operating system, press and hold **Ctrl** and **Alt** and press **Delete**. This restarts the server.

■ Pressing the RESET switch on the front panel reboots the server.

RESET switch
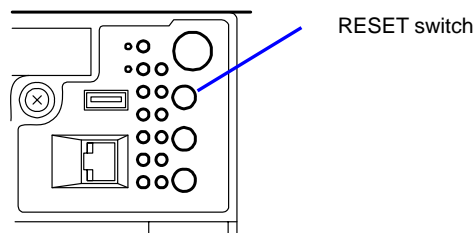
> **IMPORTANT:** Resetting the server clears the DIMM memory and the data in process. To reset the server when it is not frozen, make sure that no processing is in progress.

FORCED SHUTDOWN

Use this function when an operating system command does not shut down the server, the POWER switch does not turn off the server, or resetting does not work.

Press and hold the POWER switch on the server for at least four seconds. The power is forcibly turned off. To turn on the power back again, wait approximately 10 seconds after turning off the power (forced shutdown).

Press and hold the POWER switch at least 4 seconds.
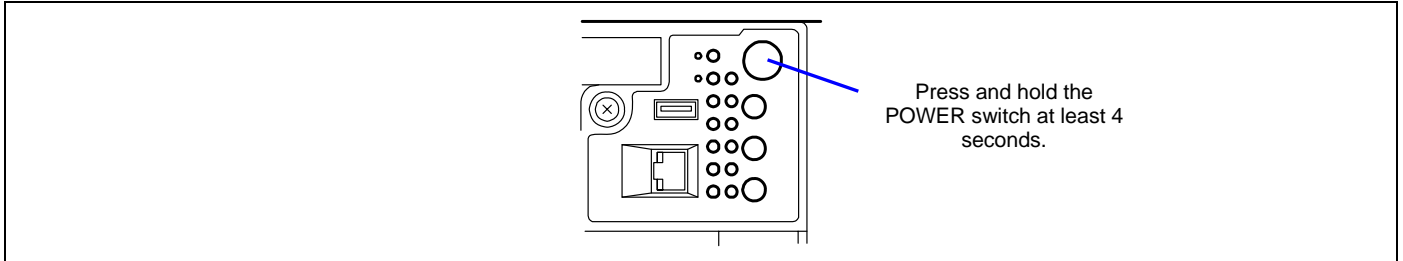
IMPORTANT: If the remote power-on function is used, cycle the power once to load the operating system, and turn off the power again in the normal way.

Chapter 9

Upgrading Your Server

This chapter describes internal optional devices available for the server, procedures for install or removing such optional devices, and notes on using them.

IMPORTANT:

- Optional devices described in this chapter may be installed or removed by any user. However, Bull does not assume any liability for damage to optional devices or the server or malfunctions of the server resulting from installation by the user. Bull recommends you ask your service representative for installing or removing any optional devices.

- Make sure to use only optional devices and cables authorized by Bull. Repair of the server due to malfunctions, failures, or damage resulted from installing inappropriate devices or cables will be charged.

- When you made any change 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.

<table>
<tr><td colspan="2" align="center">⚠ WARNING</td></tr>
<tr>
<td></td>
<td>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 disassemble, repair, or alter the server.
Do not look into the DVD-ROM drive.
Do not remove the lithium, and/or NiMH battery.
Disconnect the power plug before working with the server.</td>
</tr>
</table>

<table>
<tr><td colspan="2" align="center">⚠ CAUTION</td></tr>
<tr>
<td></td>
<td>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 lift the server only by a single person.
Make sure to complete board installation.
Do not install the server on the rack leaving the cover removed.
Do not pinch your fingers with mechanical component.
High temperature
Put a connector cover on an unused connector.</td>
</tr>
</table>

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 a wrist strap (an arm belt or anti-static glove).

   Wear a wrist strap on your wrist. If no 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 the anti-static or concrete floor.

   – When you work with the server on a carpet where static electricity is likely to be generated, make sure take anti-static measures beforehand.

- Use a work table.

   Place the server on an anti-static mat to work with it.

- Cloth

   – Do not wear a wool or synthetic cloth to work with the server.

   – Wear anti-static shoes to work with the server.

   – Take off any jewels (a ring, bracelet, or wrist watch) before working with the server.

- 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.

PREPARING FOR INSTALLATION AND REMOVAL

Follow the procedure below to prepare for installing or removing components.

1. Shut down the operating system.

2. Press the POWER switch to power off the server (the POWER/SLEEP lamp goes off).

3. Unplug the power cord from the AC inlet on the server (the AC Standby lamps on the front of the server go off).

4. Remove all the cables connected to the server on the rear panel.

5. Make the clearance of 1m to 2m in the front and rear sides and left and right sides of the server.

> **NOTE:** Make sure to disconnect the power cord from the outlet before installing or removing the option devices. If you remove the internal cable with the power cord being connected, the STATUS lamp will light in amber when the server is powered. Disconnect the power cord, connect it again, and then restart the server.

DEVICE INSTALLATION OR REMOVAL PROCEDURE

Install or remove a component from the server in the following procedure.

3.5-inch Hard Disk Drive

The 3.5-inch device bay on the front of the server contains five slots on which hard disk drives can be installed. The device bay is not equipped with any hard disk drives (excluding when one or more built-in hard disk drives are ordered). Purchase the hard disk drives additionally if required.

> **IMPORTANT:**
> - Do not use any hard disk drives that are not authorized by Bull. Installing a third-party's hard disk drive may cause a failure of the server as well as the hard disk drive
> - The supported RAID level depends on the disk array controller to be used.
>   – Onboard RAID:
>   RAID0, RAID1, and RAID5 (See "Disk Array Configuration" in this chapter.)
>   – Optional disk array controller:
>   Refer to the manual that comes with the disk array controller. (If you purchased the board by BTO (built-to-order), the manual is provided with the server.)

All five slots may contain a hard disk drive approximately 25.4 mm (1 inch) high.
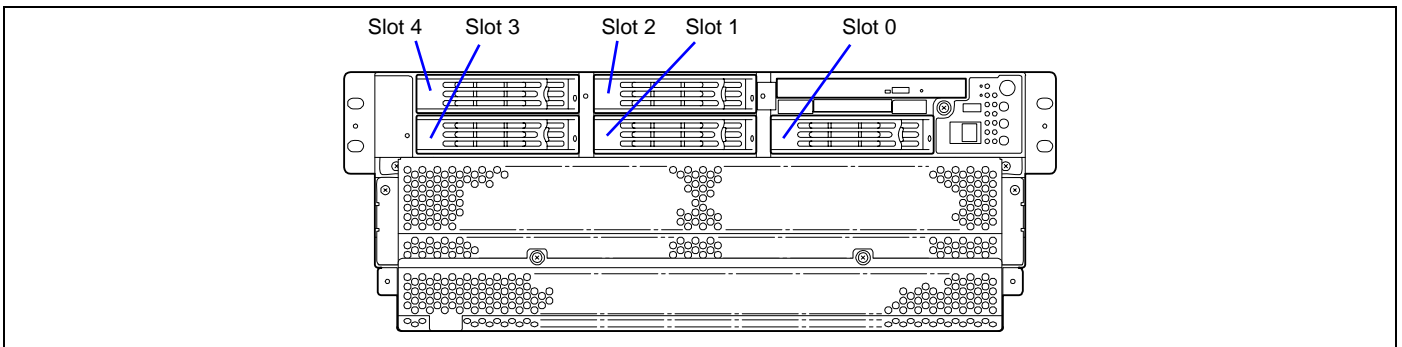
In the disk array configuration, use the same model of hard disk drives.

Installation

Take the following steps to install a hard disk drive. This procedure applies to all the slots.

> **NOTE:** Any hard disk drive can be installed or removed in or from the server only by removing the front bezel without pulling out the server from the rack. In RAID1 or RAID5 configuration, the hard disk drive can be installed or removed while the server is being powered.

> **IMPORTANT:** In the disk array configuration, use the same model of hard disk drives.

1. See the section "Preparing for Installation and Removal" described earlier to prepare (except for disk array configuration).

2. Unlock the front bezel with the security key, and remove the front bezel.

3. Locate the slot in which you are going to install a hard disk drive.

   The server has five slots.

4. Unlock the hard disk drive.
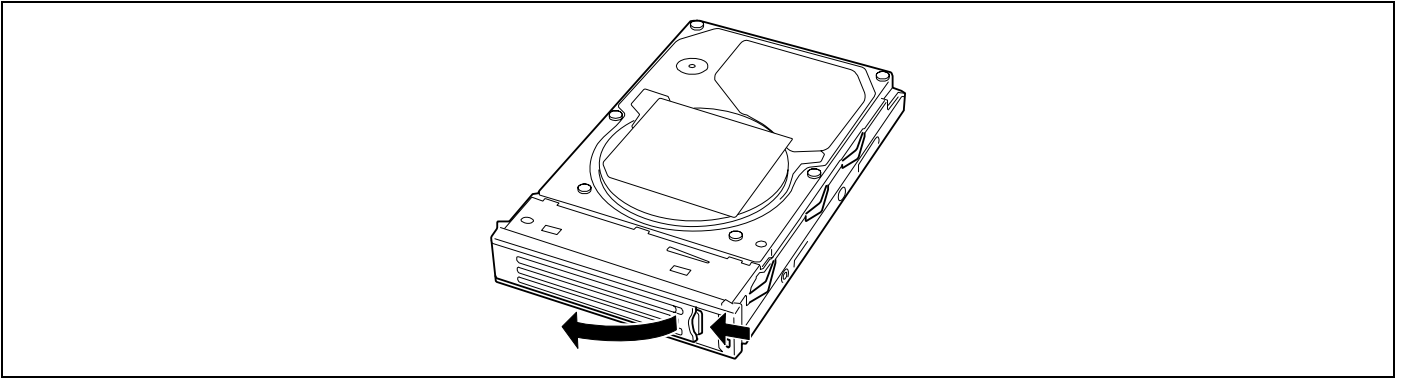
5. Firmly hold the additional hard disk drive and handle, and insert it into the slot.

IMPORTANT:

- Push the hard disk drive until the handle hook butts to the frame.
- Carefully hold the hard disk drive with both hands.
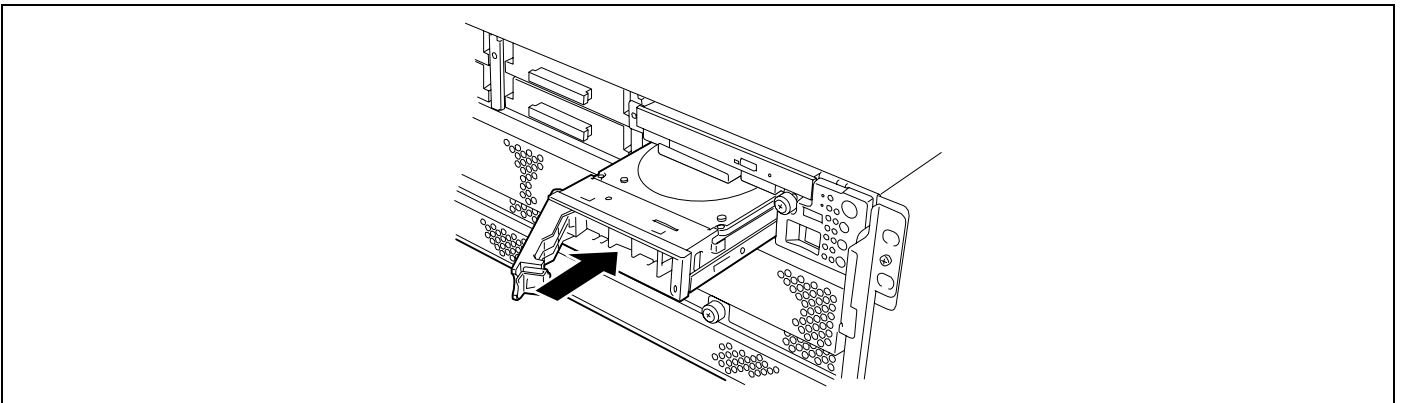
6. Slowly close the handle.

The handle is locked when a "click" is heard.

IMPORTANT: Be careful not to get your finger caught between the handle and tray.

NOTE: Confirm that the handle is hooked to the frame when having inserted the hard disk drive.
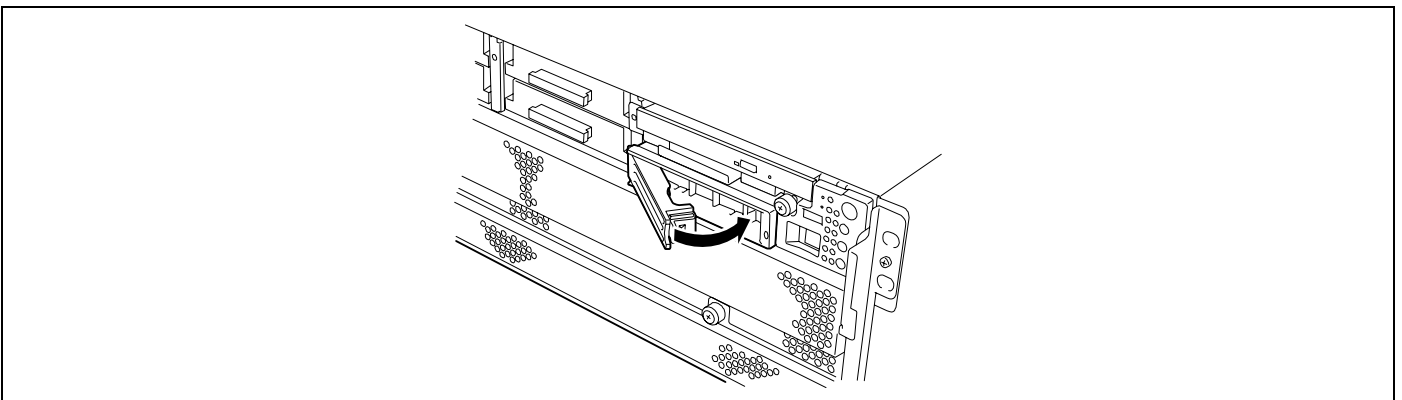
7. Install the front bezel that was removed in step 2.

Removal

Take the following steps to remove the hard disk drive. To use the server with the hard disk drive removed, insert the empty drive carrier into the slot.

1. Shutdown the system and press the POWER switch to turn off the power.

2. Unlock the hard disk drive.
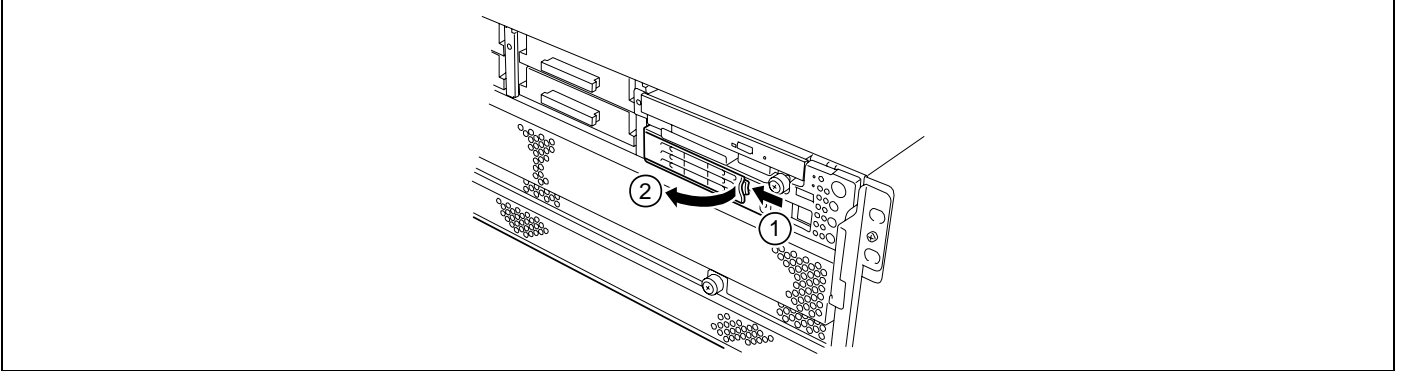
3. Firmly hold the additional hard disk drive and handle, and then take them out.
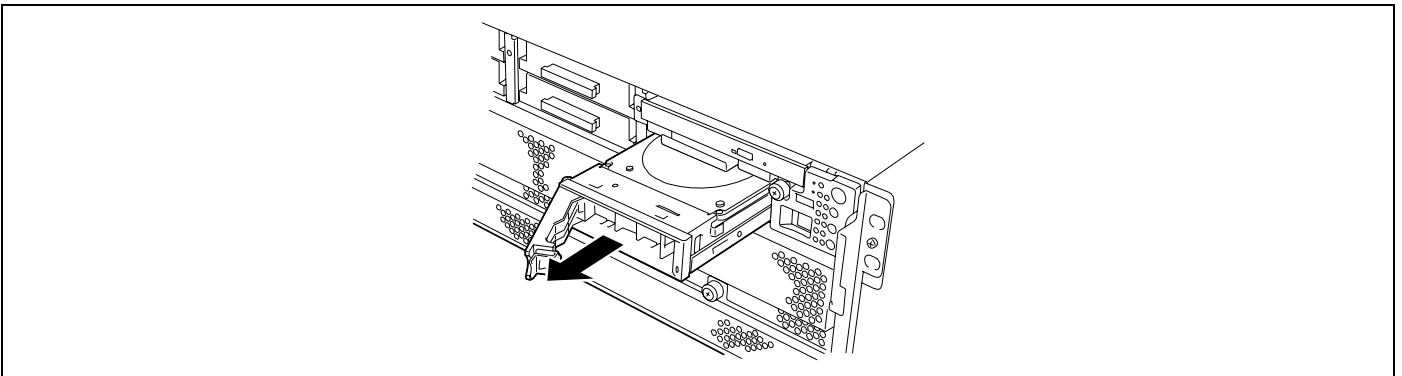
NOTE: If removing a failing hard disk drive, confirm the slot in which the DISK lamp of the hard disk drive is amber before starting the removal.

DISK lamps
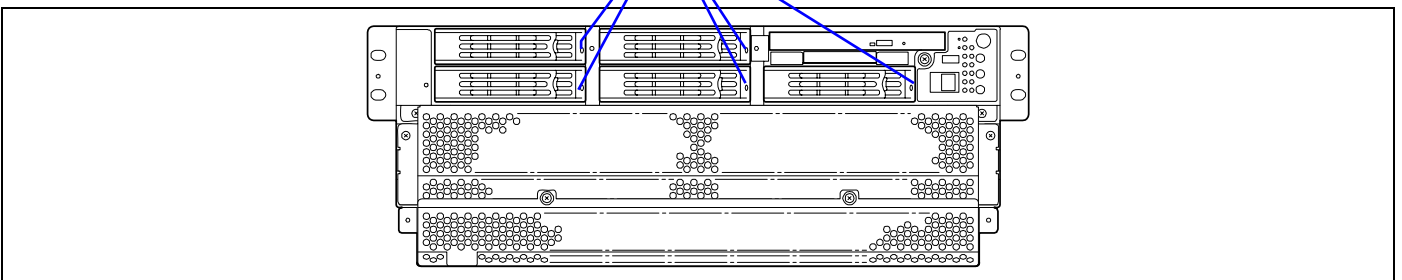
When the hard disk drives are in the disk array configuration, you can restore the state before an error using the auto-rebuild feature that stores the data in the old hard disk drive into a new one.
The auto-rebuild feature may be enabled or disabled depending on the RAID level.

Auto-rebuild is automatically carried out when you hot-swap a failed hard disk drive with a new one (replace the disk while the server is powered). While auto-rebuild is in progress, the DISK lamp flashes green and amber alternatively to indicate it.

> **IMPORTANT:** When auto-rebuild fails, the DISK lamp lights in amber. Remove and install the hard disk drive again to restart auto-rebuild. (If the disk array monitoring utility is installed, check the status through MegaRAID Storage Manager.)

Observe the following notes for auto-rebuild.

- Do not power off the server in the period between a hard disk drive error and completion of auto-rebuild.

- When you removed a hard disk drive, wait at least 60 seconds before installing the hard disk drive back again.

- Do not replace another hard disk drive while rebuilding is in progress. (The DISK lamp flashes in green and amber alternatively while rebuilding the hard disk drive.)

Power Supply Unit

Even if a single power supply unit fails, the server can continue its operation without interruption when an additional power supply unit is installed (in the redundant configuration).

If the four power supply units are used, AC power can be divided into two lines with a pair of power supply units. With the AC power redundant configuration, the server can continue its operation without power interruption even if either of AC power line fails.

Installation

Take the following steps to install a power supply unit:

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Remove the screw securing the blank cover.
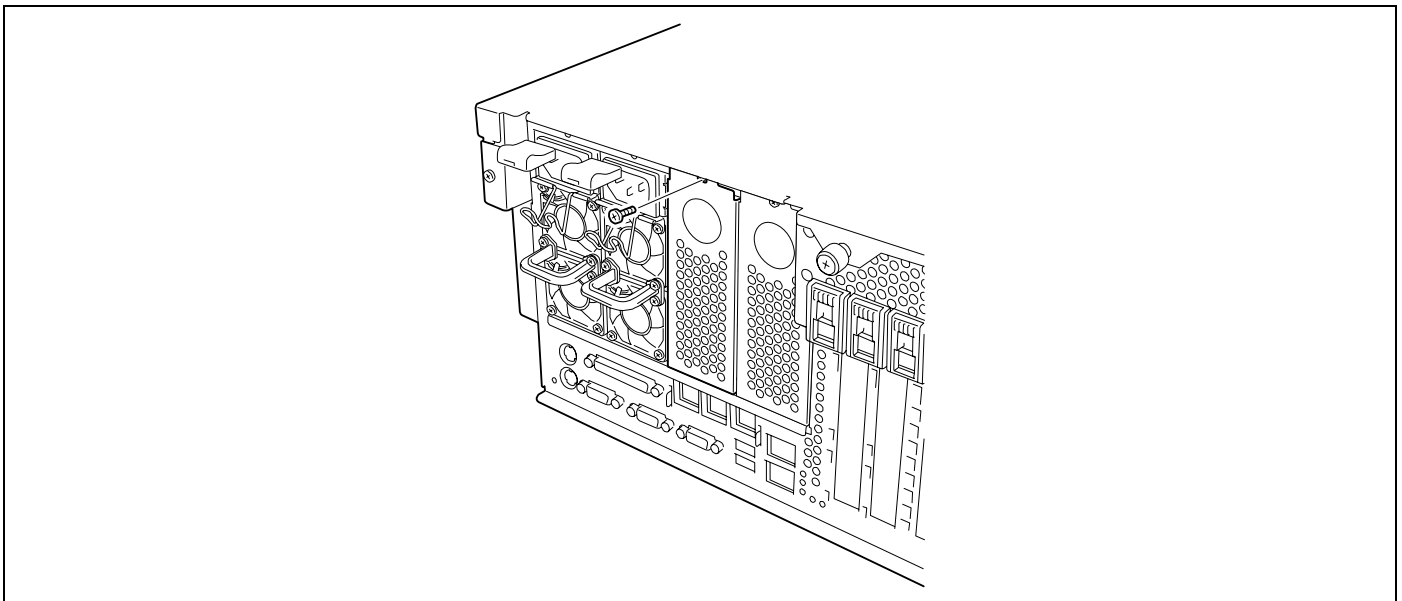
3. Remove the blank cover.

> **IMPORTANT:** Keep the removed blank cover for future use.
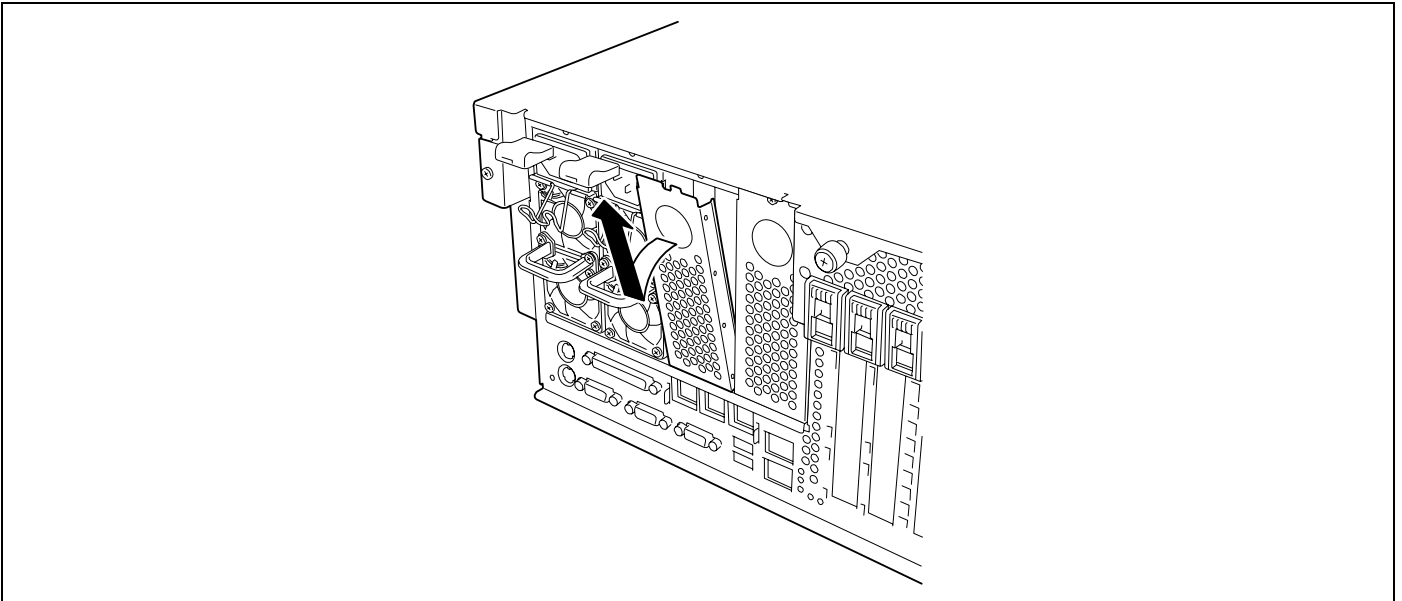
4. Insert the power supply unit into the slot.
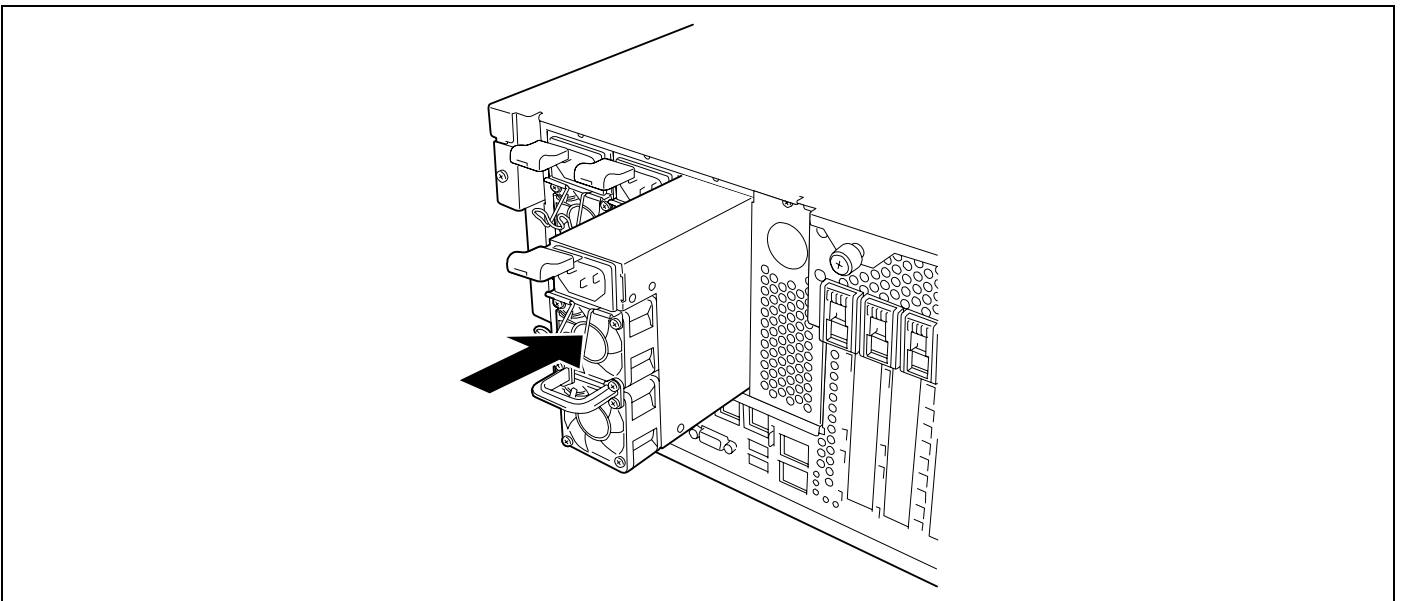
> **IMPORTANT:** Be sure to push straight the power supply unit. To avoid damaging the power supply unit, do not tilt or twist the unit as you push it into the connector.

> **NOTE:** Make sure that the power supply unit is pushed in to an end securely.

5. Connect two power cords to AC inlet.

Use the power cord provided with the power supply unit and the one provided with the optional unit.

> **IMPORTANT:** A blank cover is attached to the slot for additional power supply unit. Keep the removed blank cover for future use.

AC inlet   AC inlet for additional power supply unit
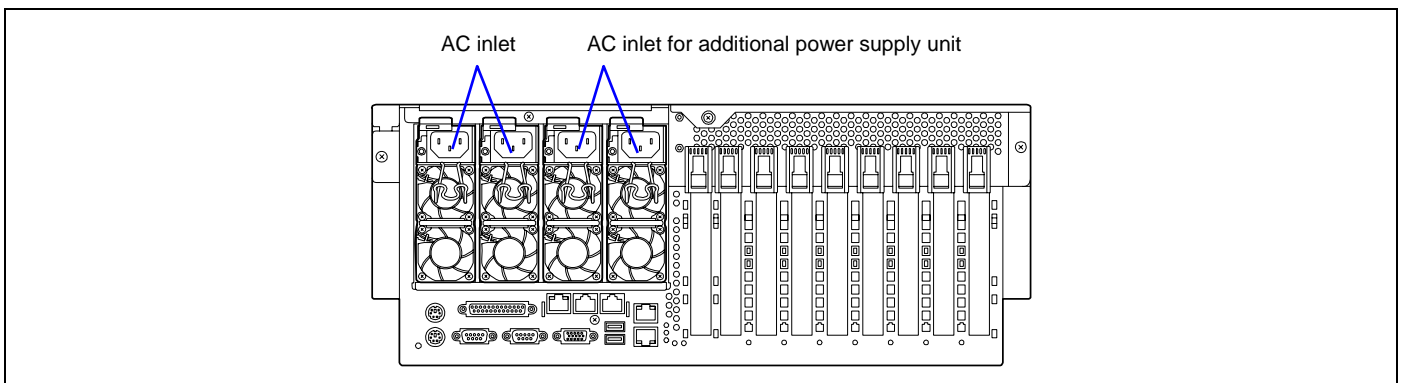
6. Power on the server.

The POWER lamp on the power supply units goes on.

7. Confirm, by the STATUS lamp or on the POST diagnostic screen, that there are no errors related to the power supply units.

See Chapter 8 for details on the error messages.

If the POWER lamps are off, reinstall the power supply units. If the POWER lamps are still off, contact your service representative.

Replacing a Failing Power Supply Unit

Replace only a failing power supply unit.

> **IMPORTANT:** Do not remove a power supply unit operating normally.

> **NOTE:** If two power supply units work normally while the server contains three or four power supply units in a redundant configuration, the failing power supply unit can be replaced with the system operating (power-on state). (Skip step 2.)

1. Check the POWER lamp on the power supply unit and determine which unit needs to be replaced.

The lamp of the failing power supply unit is off.

2. Shutdown the system, and turn off the server.

3. While pressing down on the locking tab, grasp the handle and carefully pull the power supply unit out of the power supply bay.

> **IMPORTANT:** To avoid damaging the power supply unit and/or connector, do not tilt or twist the unit as you pull it from the power supply bay. Use even, steady force to remove the unit.
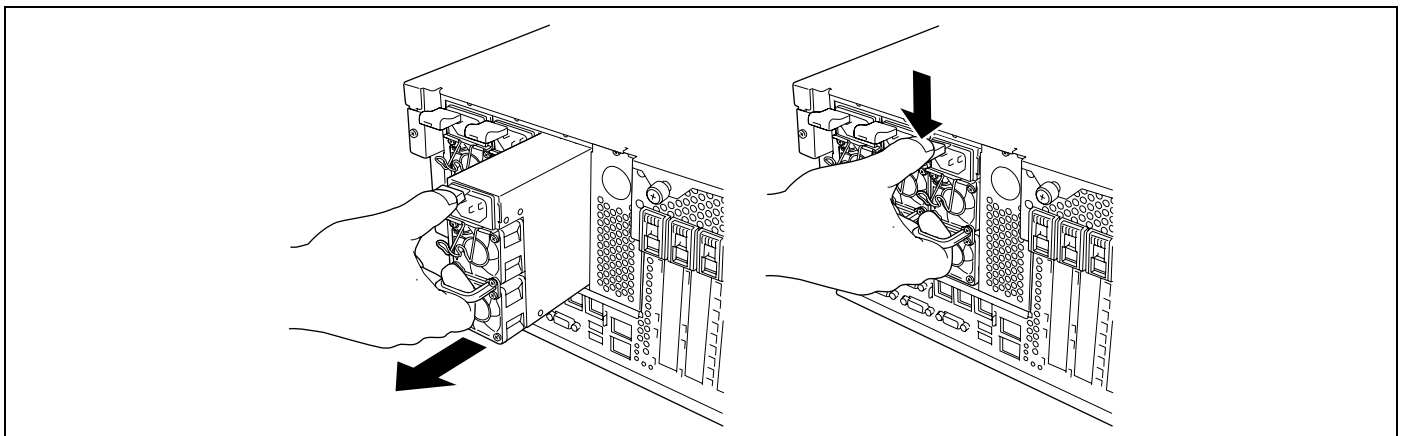
4. If you are not going to install a replacement power supply unit, you must install a blank cover you removed in step 2 of installation procedure to vacant slot.

> **IMPORTANT:** To maintain the cooling effect in the server, install the blank cover in the vacant slot of the power supply bay.

5. Install the new power supply unit taking steps 3 to 6 of "Installation", and confirm that the power supply unit is installed normally.

> **NOTE:** If one of the three or four power supply units of the server is replaced while the power is on, the POWER lamp of the new power supply unit goes on. (If it is replaced while the power is off, the lamp goes on after the power is turned on.)

Server ~ Pulling Out from the Rack Cabinet~

The server needs to be pulled out from the rack for installing/removing any components other than the hard disk drives and power supply units.

⚠ CAUTION
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 install the server on a rack with leaving covers removed. Do not pinch your finger with mechanical components. Note high temperature. Do not pull out a device from the rack if the rack is unstable. Do not leave more than one device being pulled out from the rack.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Remove the front bezel.
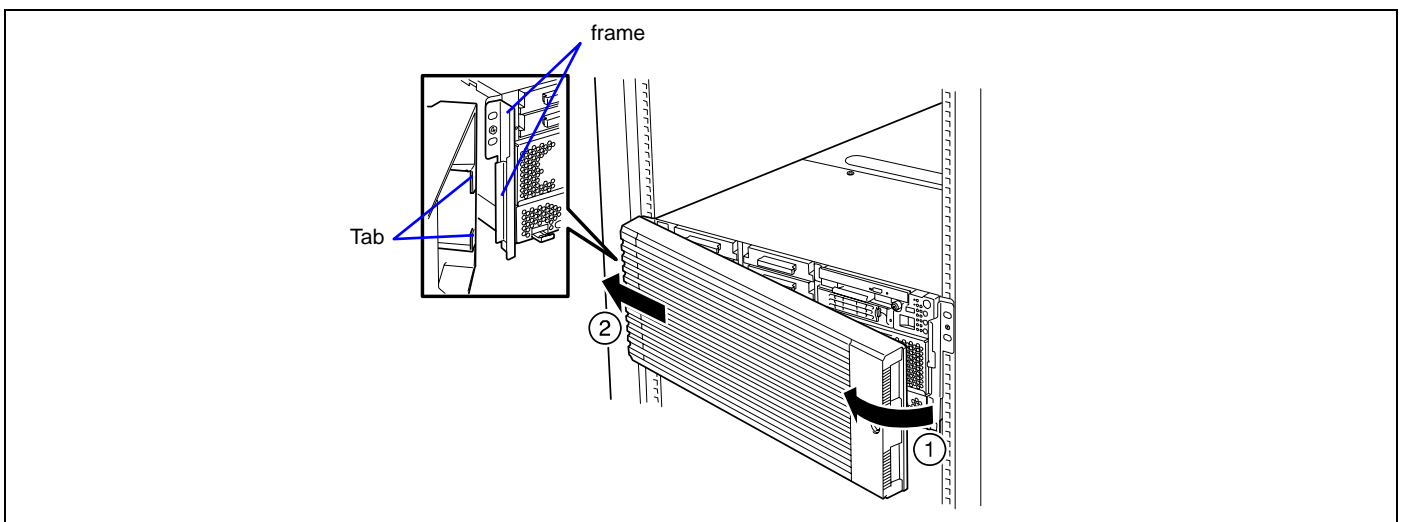
3. Loosen the four screws from the front of the server.

Screws   Screws
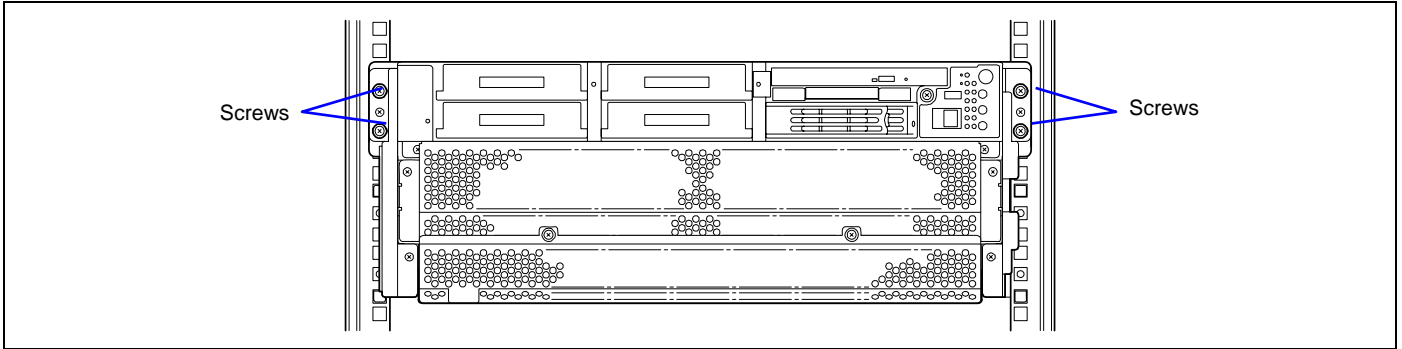
4. Slowly pull out the server from the rack while pushing the release lever. The server is latched when a "click" is heard.

When inserting the server back into the rack, push the release levers on the rails on the sides of the server to unlatch the server. Be very careful not to get your finger caught in doing so.

> **IMPORTANT:** Push the release lever using a screwdriver or the like. Pushing the lever with your finger may hurt your finger.

Release lever
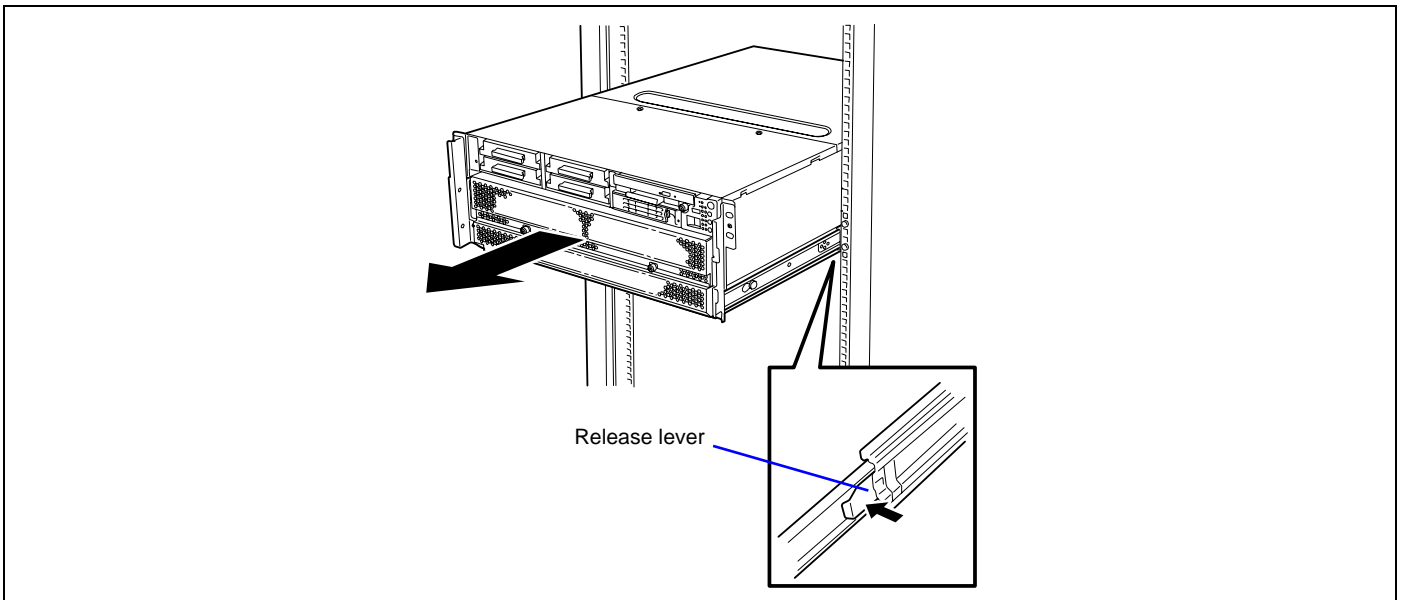
3.5-inch Device

If you purchased the server with the additional HDD cage (with 3.5-inch bay) being built-in, one slot for backup device such as a magnetic tape drive is provided.

The additional HDD cage (with 3.5-inch bay) is a factory-installed option. You cannot purchase it separately.

Available Devices

The 3.5-inch device slot can contain a single-height SCSI device.

■ Setting of SCSI ID

Refer to the manual that comes with the SCSI controller.

– Setting of terminator

Set the terminator to "OFF".

> **IMPORTANT:** No tape device can be connected to on-board SCSI interface. To use a tape device, connect it to optional SCSI controller.

Installation

Take the following steps to install the 3.5-inch device.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Unlock the front bezel with the security key, and remove the front bezel.

3. Remove a screw and remove the additional tray.
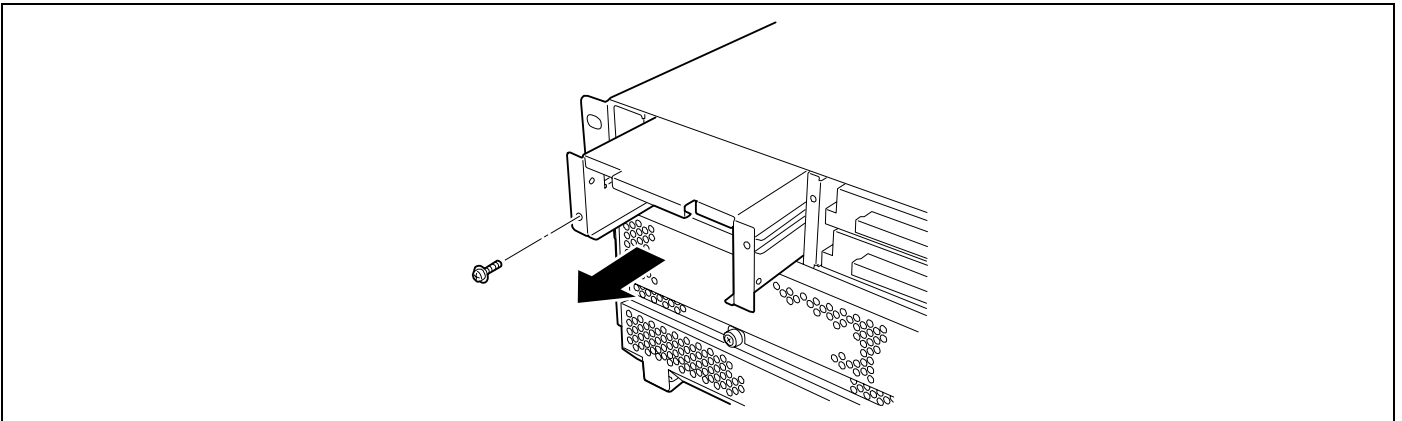
4. Pull the SCSI cable and power cable being formed in 3.5-inch device bay out of the server.
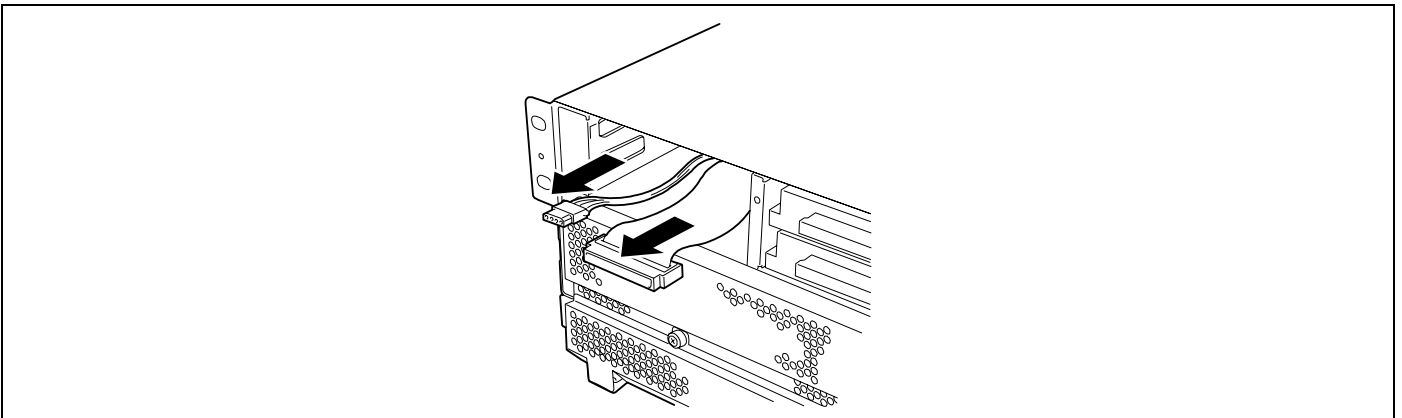
5. Insert the device into the additional tray and secure it with four screws.
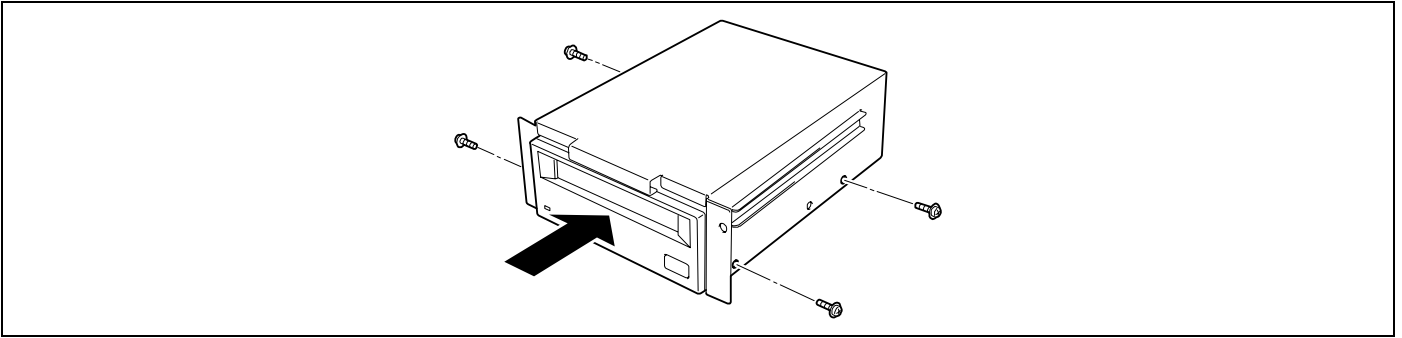
6. Remove the connector covers from the SCSI cable and power cable, and connect the cables to the device.

> **IMPORTANT:** Keep the removed connector covers for future use.
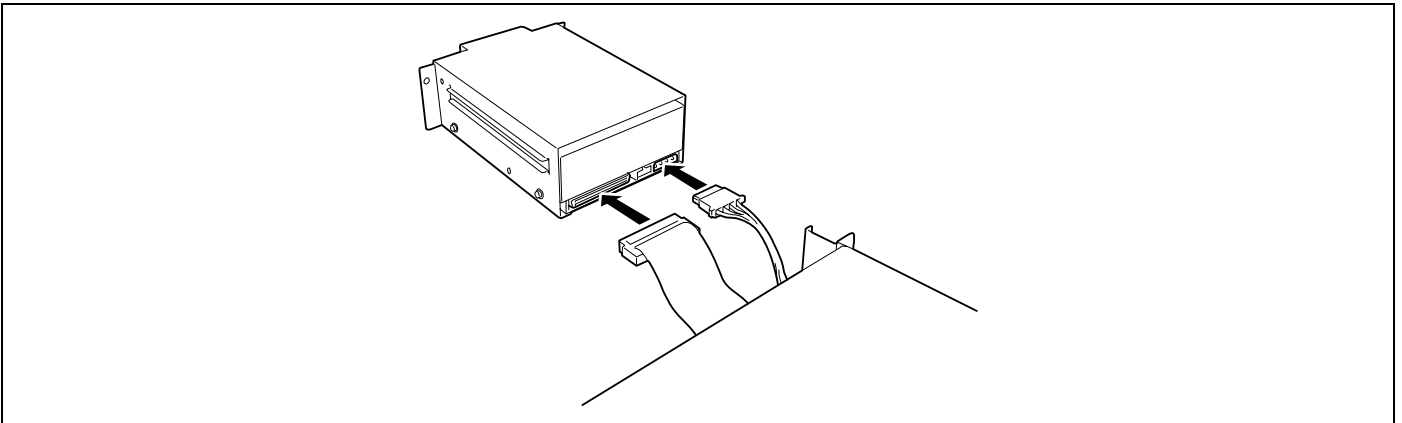
7. Insert the device into the 3.5-inch device bay, and secure it with a screw.
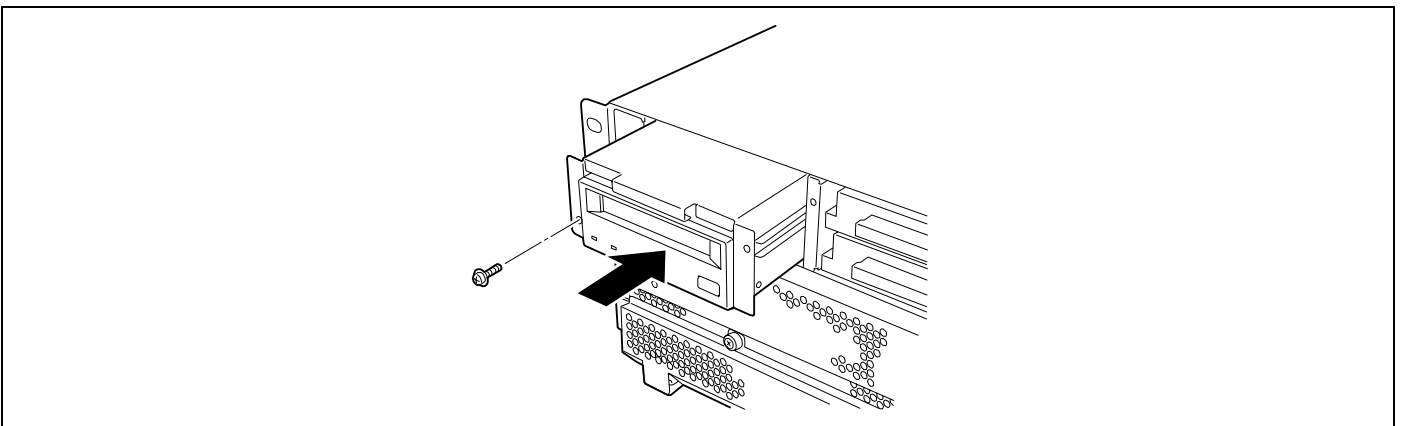
8. Install the front bezel.

Removal

Remove the 3.5-inch device in the following procedure.

1. Shutdown the system and press the POWER switch to turn off the power.

2. See the section "Preparing for Installation and Removal" described earlier to prepare.

3. Unlock the front bezel with the security key, and remove the front bezel.

4. Remove a screw and pull the device with tray out from the 3.5-inch device bay.
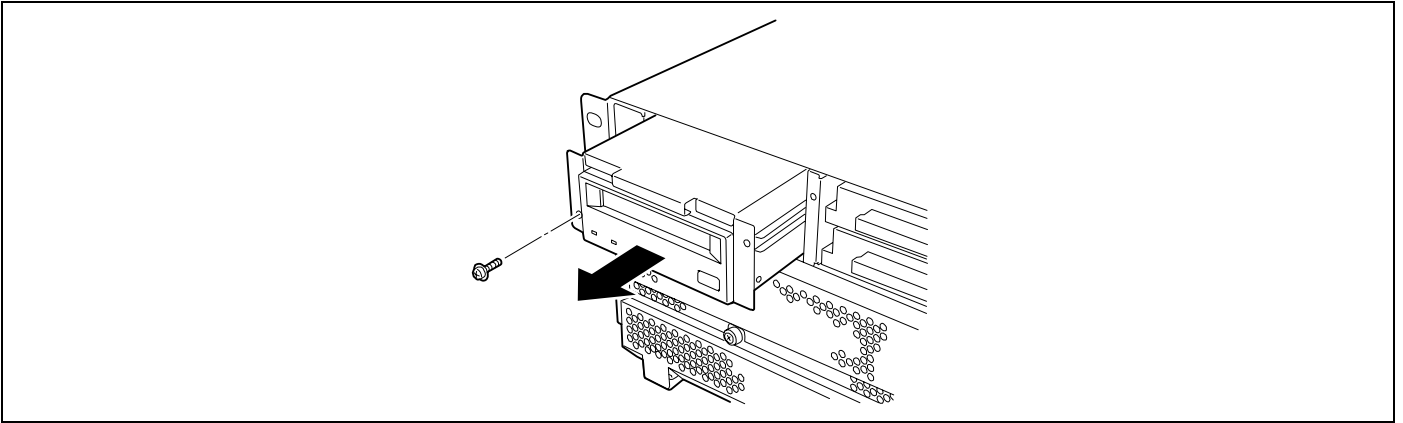
5. Disconnect the SCSI cable and power cable from the device, and attach the connector covers to them.
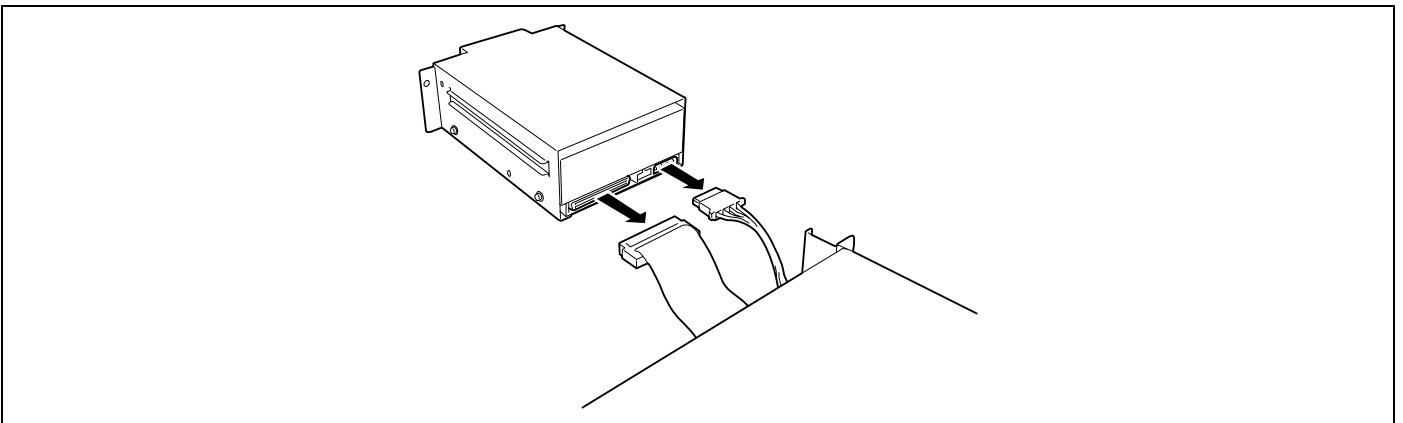
6. Remove the device from the additional tray.
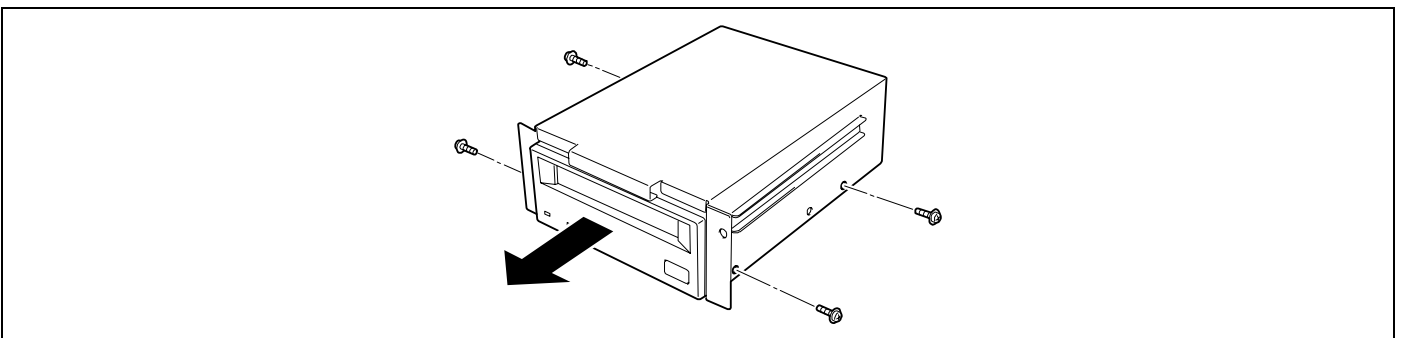
7. Insert the additional tray into the 3.5-inch device and secure it with a screw.
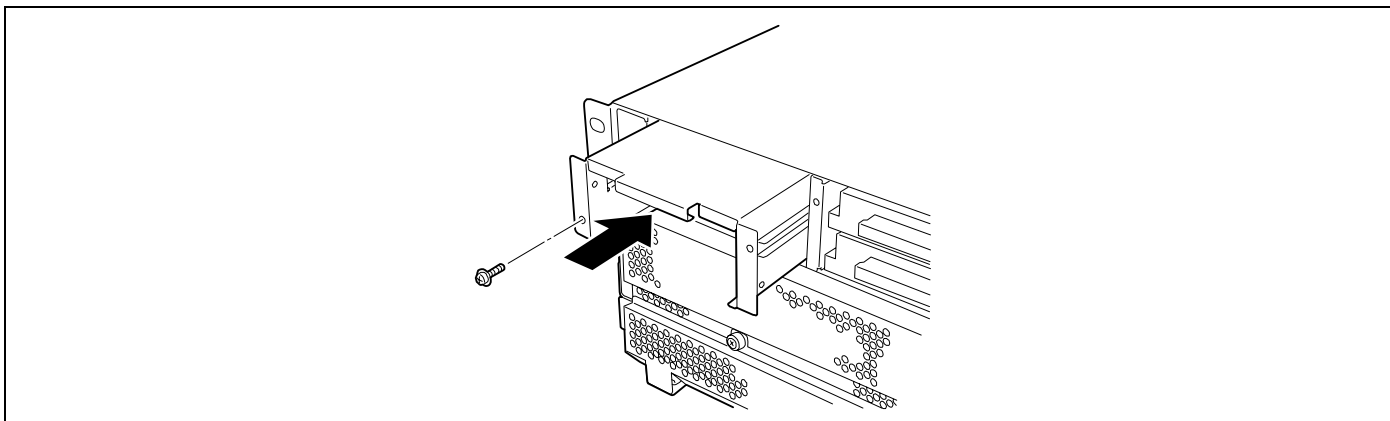
8. Install the front bezel.

Rear Access Cover

To install or remove the PCI board, or to change cable connections of internal cable, you will need to remove the rear access cover.

⚠ CAUTION
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.   Be sure to power off the server before removing the rear access cover.

Removal

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Pull out the server from the rack.

3. Loosen the captive screws located on the rear of the cover.

4. Slide the rear access cover toward the rear of the chassis.

5. Lift the cover up and off of the chassis.

Captive screw
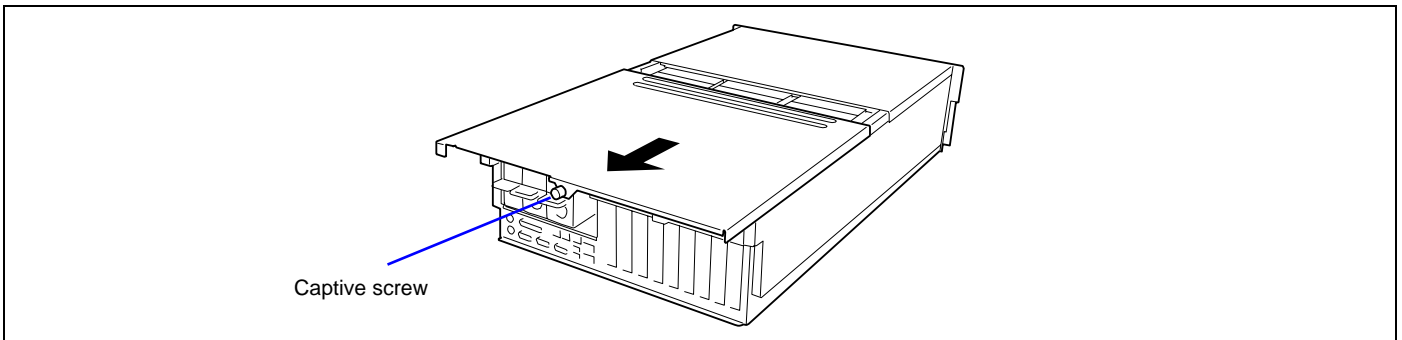
Installation

> **IMPORTANT:** Before installing the rear access cover, check that you have not left tools or loose parts inside the system.

1. Position the cover on the chassis so that the cover tabs align with the chassis slots.

2. While lightly pressing down on the cover, slide it toward the front of the chassis.

3. Attach the cover to the chassis with the captive screws located on the rear of the cover.

Captive screw
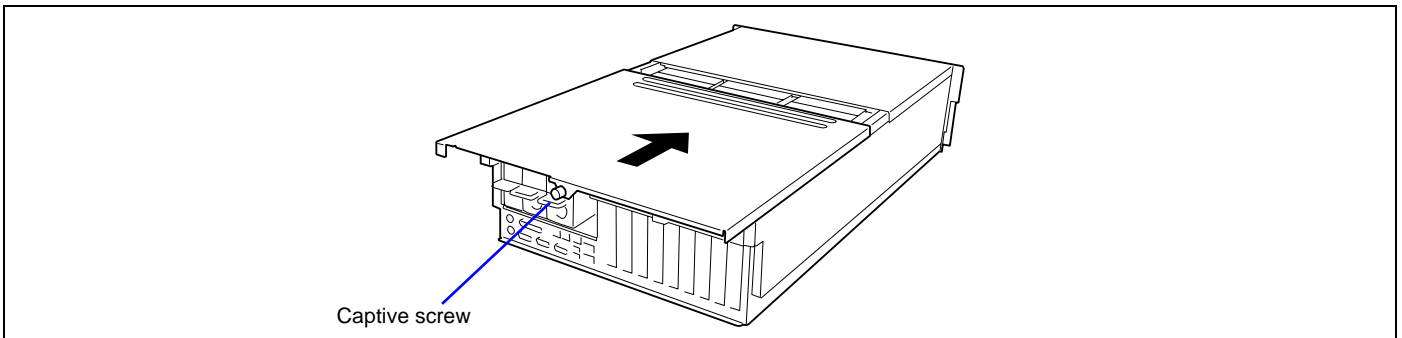
PCI Access Cover

To install or remove a non-hot-swap PCI board, remove the PCI access cover inside the server. You need not to remove the PCI access cover when you work with hot-swap PCI slot.

Removal

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Pull out the server from the rack.

3. Remove the rear access cover.

4. Loosen the screw securing the PCI access cover.

5. Hold the end of the cover (the end where the screw is loosened), and take out the cover slowly and gently.
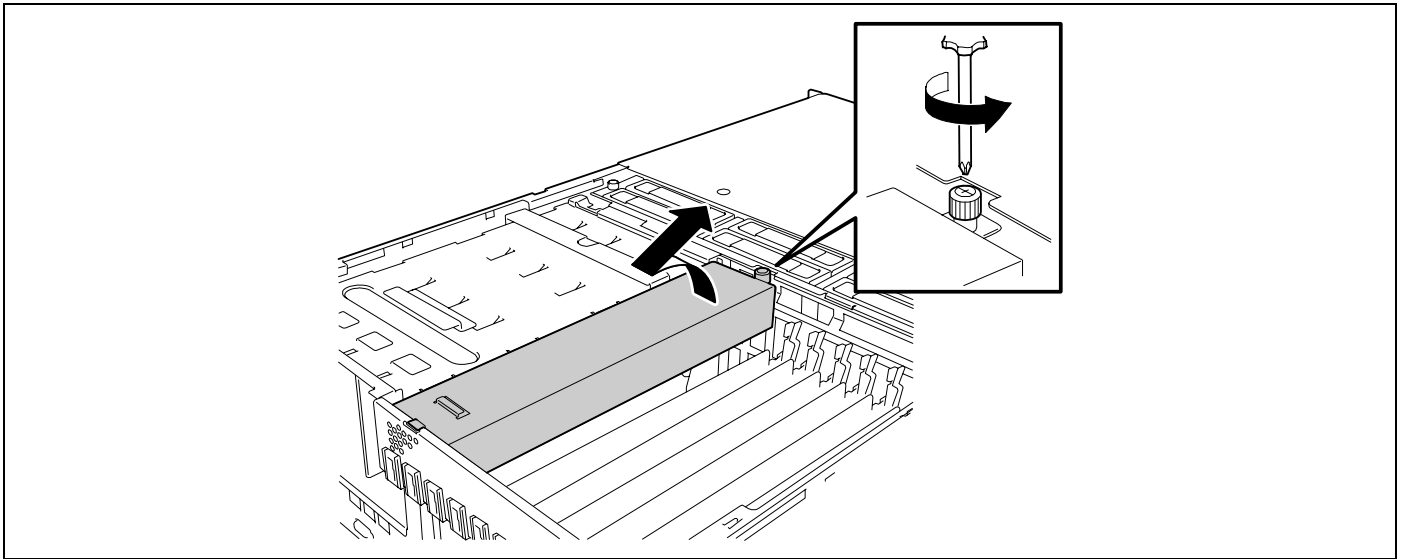
Installation

Take the following steps to install the PCI access cover.

1. Orient the PCI access cover with the screw toward the front of the server.

2. Insert the tab on the rear side of the PCI access cover into the chassis slot.

3. Slowly and gently put the cover on the chassis, and secure it with a screw.

PCI Board

The server contains six slots for PCI board, and three slots for PCI-Express board.

Some PCI boards support the hot-plug function by which they may be installed or removed with the power of the server being on. Your server supports the hot-plug function if Windows Server 2003 is used as operating system. The PCI boards supporting the hot-plug function only include the 100BASE-TX Adapter and the 1000BASE-T Adapter.

> **IMPORTANT:** The PCI board is extremely sensitive to static electricity. Make sure to touch the metal frame of the server to discharge static electricity from your body before handling the PCI board. Do not touch the PCI board terminals or on-board parts by a bare hand or place the PCI board directly on the desk. For static notes, see the section "Anti-static Measures".

> **NOTE:** The tab on the PCI board slot indicates hot-plug or non-hot-plug by its colour. Hot-plug slot has a green tab (PCI slot #4 through #9), and non-hot-plug slot has a blue tab (PCI slot #1 through #3).
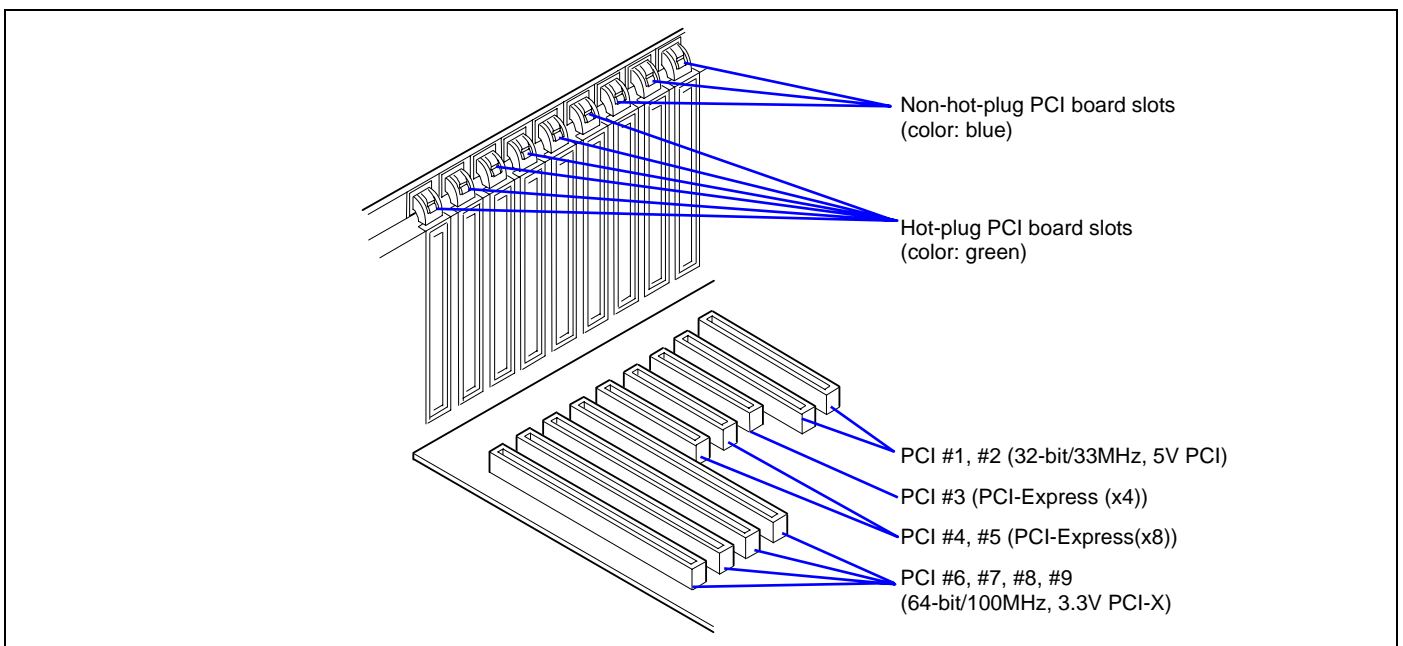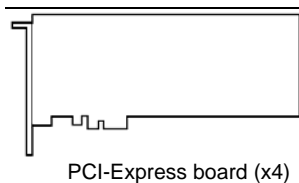

There are three types of PCI boards: 5V PCI boards, 3.3V PCI boards, and universal PCI boards.

A 5V PCI board must be installed in the 5V PCI slot, and a 3.3V PCI board must be installed in the 3.3V PCI slot. A universal PCI board can be installed in any PCI slot.
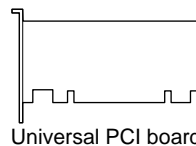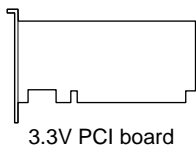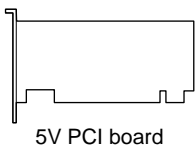
The PCI-Express boards are x1, x4, x8, and x16. The server can contain x1, x4, and x8 PCI-Express board.
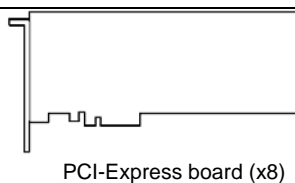
RAID Controller Considerations

Note the following about the configuration of a disk array by using the on-board or optional disk array controller.

- To change the disk array configuration or the RAID, the hard disk drives must be initialised. If important data is saved in the hard disk drives used to constitute a disk array, first back up the data in other hard disk drives before installing boards and configuring the disk array.

- More than one hard disk drive is required to configure a disk array.

- Hard disk drives used in the disk array configuration should have the same disk revolution rate and capacity.

- See the table on the next page for the slot in which an optional board can be installed.

- Up to three disk array controller boards can be installed in the server.

- Several RAID (Redundant Arrays of Inexpensive [Independent] Disks) levels can be set for the disk array configuration in the server. See "Disk Array Configuration" described later for available RAIDs, data transfer rate, and array configuration.
  For optional disk array controller, refer to the documentation coming with the disk array controller for details.

- The available capacity of the hard disk drives in the disk array configuration is lower than the total capacity of the hard disk drives configuring the disk array while the disk reliability is improved (for RAID 1, 5, 10, or 50).

- Set "Option ROM Scan," a parameter of the slot in which a hard disk is installed, to "Disabled" in "PCI Configuration" on the Advanced menu of the BIOS utility SETUP. ("Enabled" is factory-set.) If two or more disk array controllers are installed, set only the slot containing the board to boot-up to "Enabled". Do not set "Option ROM Scan" for embedded SAS to "Disabled".

- Replacement of I/O board or optional disk array controller board

  Back up the disk array configuration information in the disk array controller board to the floppy disk and restore it to the replaced disk array controller board. Refer to the manual that comes with the disk array controller for details.

  When more than one disk array controller board are installed in the server, install the disk array controller board to which the system disk is connected in the PCI slot having the highest boot priority.

  Boot priority: PCI#3 → PCI#4 → PCI#5 → PCI#8 → PCI#9 → PCI#6 → PCI#7 → PCI#1 → PCI#2

  For example, if three disk array controller boards are installed in PCI slots #7 to #9, the system disk should be connected to the board installed in PCI slot #8.

- For configuration information of onboard RAID (MegaRAID ROMB), you can use Tools menu in EXPRESSBUILDER to store or restore the information in/from the floppy disk.

List of Optional Devices and their Available Slots

Commercial Name	Product Type	PCI		PCI Express			PCI-X			
		#1	#2	#3	#4	#5	#6	#7	#8	#9
		Bus A		Bus B	Bus C	Bus D	Bus E		Bus F	
		32-bit/33MHz		x4	x8		64-bit/100MHz			
	Slot size	Full-height								
	PCI board type	5V		x8 socket			3.3V			
	Available board size	Long/short								
	Hot-plug	Hot-plug		Non-hot-plug			Hot-plug			
Adaptec 29160LP	SCSI controller (64bit/133MHz PCI-X) [5]	√	√	–	–	–	√	√	√	√
SCSI U160 PCI-ATX-64b 1	SCSI controller (64bit/133MHz PCI-X) [5]	√	√	–	–	–	√	√	√	√
SecuRAID 321	Disk array controller (64bit/66MHz PCI) [4]	–	–	–	–	–	√	√	√	√
Emulex LP1050	Fibre Channel controller (2Gbps/Optical) (64bit/133MHz PCI-X) [4]	–	–	–	–	–	√	√	√	√
Intel® PRO 1000 PT Dual	1000BASE-T Adapter (2ch)(64bit/133MHz PCI-X) [1]	–	–	–	–	–	√	√	√	√
Intel® PRO/1000 MT 64-bit PCI	1000BASE-T Adapter (64bit/133MHz PCI-X) [1]	–	–	–	–	–	√	√	√	√
Intel® PRO/1000 XT 64-bit PCI	1000BASE-SX Adapter (64bit/133MHz PCI-X) [1]	–	–	–	–	–	√	√	√	√

√: Can be installed. –: Cannot be installed.

*1 Only one card can be installed per a PCI-X bus.
*2 Up to two cards can be installed.
*3 Up to three cards can be installed.
*4 Up to four cards can be installed.
*5 Up to six cards can be installed.

> **NOTE:** The system BIOS initializes the PCI slots in the order shown below. The order may be changed according to the types and number of PCI cards.
>
> PCI#3→PCI#4→PCI#5→PCI#8→PCI#9→PCI#6→PCI#7→PCI#1→PCI#2

Onboard LAN Controller Considerations

It is possible to configure the Teaming function of AFT (Adapter Fault Tolerance)/ALB (Adaptive Load Balancing) in a standard network controller (on board LAN controller).

But it is also impossible to configure the Teaming function of the same AFT/ALB on a standard network controller and an optional LAN board.

Restriction on Teaming among Onboard LANs

When teaming is configured among onboard LANs, the following system event log appears when Windows starts. You can ignore this message and continue operation.

source: iANSMiniport

event IDs: 11/13/16/22

Non-hot-plug PCI Boards

This section describes the procedure of installing or removing a non-hot-plug PCI board.

Installation

Take the following steps to install a board in a PCI board slot.

> **IMPORTANT:**
> - PCI board slots #6 to #9 can accept 3.3V and universal PCI boards.
> - PCI board slots #1 and #2 can accept 5V and universal PCI boards.

> **NOTES:**
> - Before installing the PCI board, make sure that the terminal section of the board mates with the connector of the PCI board slot.
> - The insulators are installed between the PCI board slots. They are for protecting the PCI board already been installed. Take care not to remove or damage the insulator when installing or removing the PCI board. If the insulator is taken off, reinstall the insulator in place.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

   > **IMPORTANT:** To avoid damage to the system and devices, always turn off the system before installing the non-hot swap board.

2. Pull out the server from the rack.

3. Remove the rear access cover.

4. Locate the slot to install a board.

5. Press the retention tab at the tip of the additional slot cover to unlock and open the tab.

   > **IMPORTANT:** Do not open the retention tab to 90 degrees or more. Doing so could damage the tab.
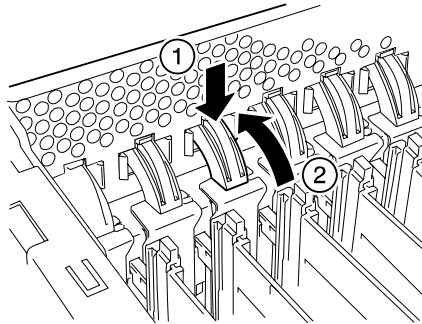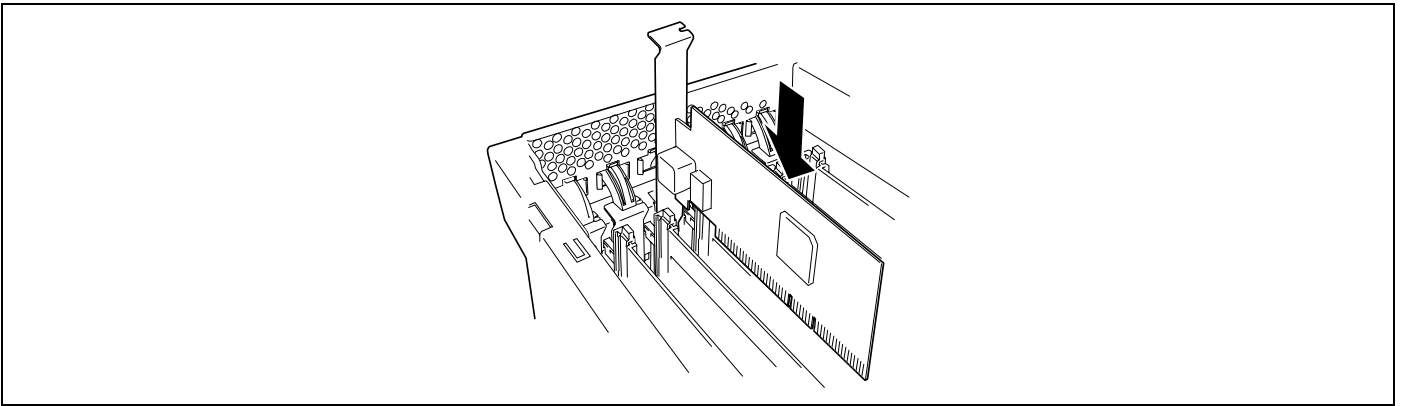
6. Remove the blank plate.

> **IMPORTANT:** Keep the blank plate being removed for future use.
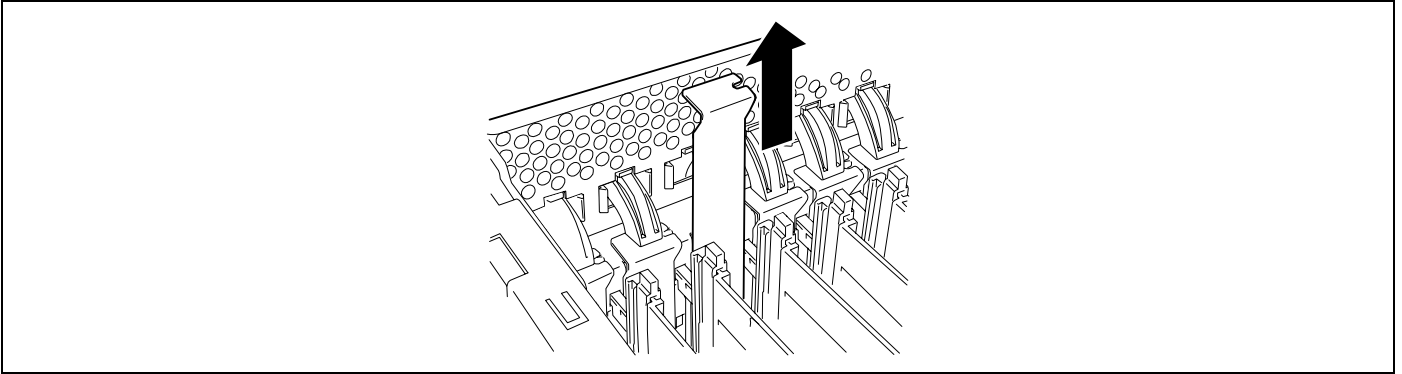
7. Align the board with the grooves of the guide rail, and insert the board slowly and gently.
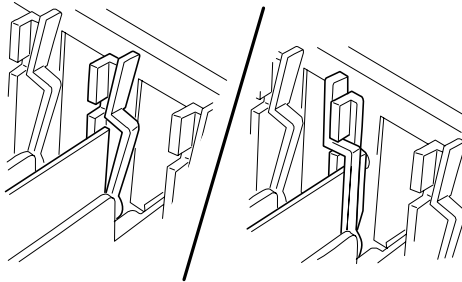
8. Carefully push the board until it engages and fully seats in the slot connector.

> **IMPORTANT:** If the board cannot be installed easily, remove the board once and then reinstall it. Excess force added to the board may cause the board to be broken.

NOTES:

- After installed the long board, secure it with the lock on the upper part of the guide rail.

- Insulators are installed between the PCI board slots. They are for protecting the PCI board already been installed. Take care not to remove or damage the insulator when installing or removing the PCI board. If the insulator is taken off, reinstall the insulator in place.

9.   Slowly close the tab to secure the PCI board.

> **NOTE:** Make sure that the tab is firmly locked. If the tab is unlocked, the PCI board and/or I/O board may be damaged due to unstable PCI board.
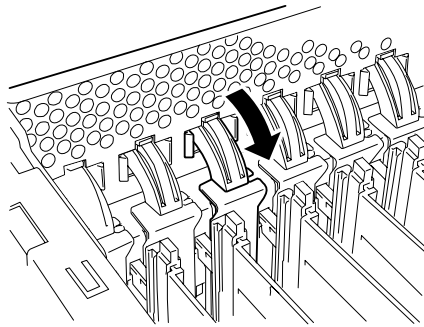
10.   Reinstall the removed components.

11.   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 review the error message list in Chapter 8.

12.   Start 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

Remove the board in the reverse procedure of the installation.

Hot-plug PCI Board

On the PCI board slots #6 through #9, you can replace or add a hot-plug PCI board while the server is operating.

Only the 100BASE-TX Adapter, the 100BASE-TX Adapter and the 1000BASE-T Adapter support the Hot-plug PCI function.

The PCI hot-plug function includes the following functions:

- **Hot Add:**   Use Hot Add to install a Hot Plug PCI board while the server is operating.
- **Hot Remove:**   Use Hot Remove to remove a Hot Plug PCI board while the server is operating.
- **Hot Replace:** Use Hot Replace to replace a Hot Plug PCI board while the server is operating.

> **IMPORTANT:**
> - Before removing a PCI board, be sure to stop the driver of the slot (containing the PCI board) from the operating system (Windows Server 2003). Failure to do so may cause the system to fail.
> - For Windows Server 2003, do not use a function in inactive state after executing the PCI Hot-plug function. The system fails to return to the original state when a function in inactive state is restarted. Use the BIOS Setup utility to set the following before executing the PCI Hot Plug function: Select [Advanced] $\rightarrow$ [PCI Configuration] $\rightarrow$ [Hot-plug PCI Control] $\rightarrow$ [Reserving memory space for PHP] $\rightarrow$ Select memory space for installed board*[1].
>   *1   The memory capacity appears to be less than the actually installed memory capacity.
> - To execute the PCI Hot-plug function, be sure to login the system as Administrator.
> - The board available for the hot add varies depending on the clock rate previously set by PCI slots #6 and #7 or #8 and #9. If a PCI board operating at a different clock rate is subject to the hot addition, the PCI slot fault lamp goes on and the hot plug cannot be performed correctly. However, restarting the system allows BIOS to ignore the setting value and automatically operate the system with the optimum setting.

Requirements for Hot Add

■ **No boards installed in the same bus**

Verify the available slot according to "List of Optional Devices and their Available Slots", and then hot-add the PCI card.

■ **PCI boards installed on the same bus**

Provide Hot Add for PCI boards operating at the same clock.

Status Lamps

Two LED indicators on the back panel indicate the status of the hot-plug PCI add-in boards. You can check the indication by lamps on the I/O board.
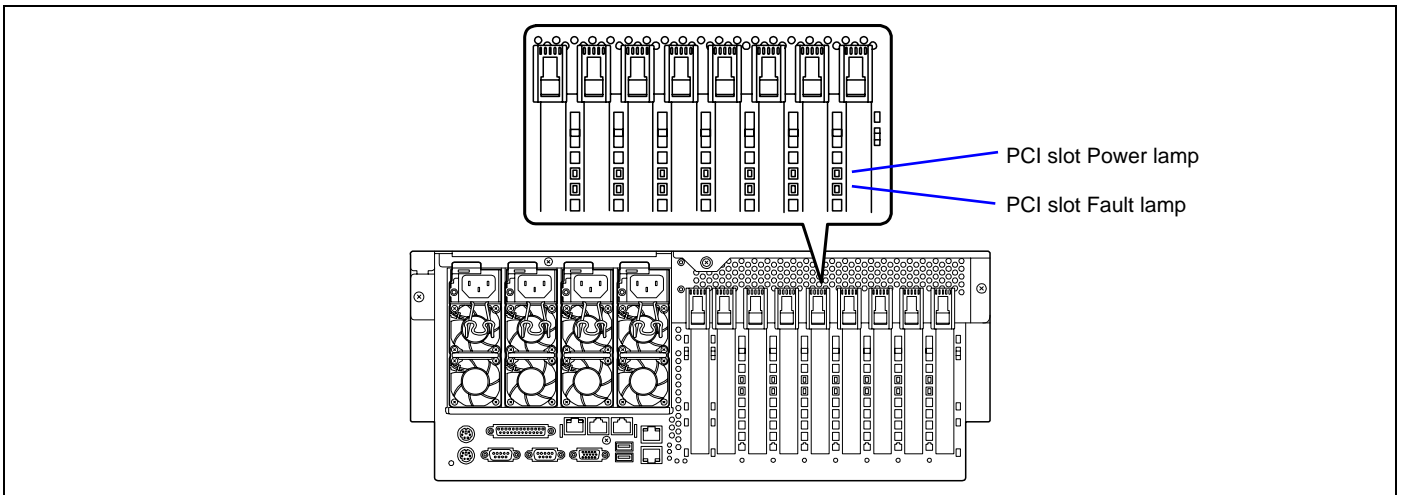
■ **PCI slot Power lamp (green)**

Lights when power is supplied normally to the PCI board installed.

■ **PCI slot Fault lamp (amber)**

Lights when an error occurs on PCI board or the slot containing the PCI board.

Flashes when the driver is stopped from Windows Server 2003 for Hot Remove or Hot Replace.

PCI slot Power lamp

PCI slot Fault lamp

Hot Add

Take the following procedure to execute Hot Add:

1. Pull out the server from the rack with the power being on.

2. Remove the rear access cover.

3. Locate the slot in which you are going to install an additional board.

> **NOTE:** Confirm that the PCI Slot Power lamp of the slot in which you are going to install the PCI board is off.
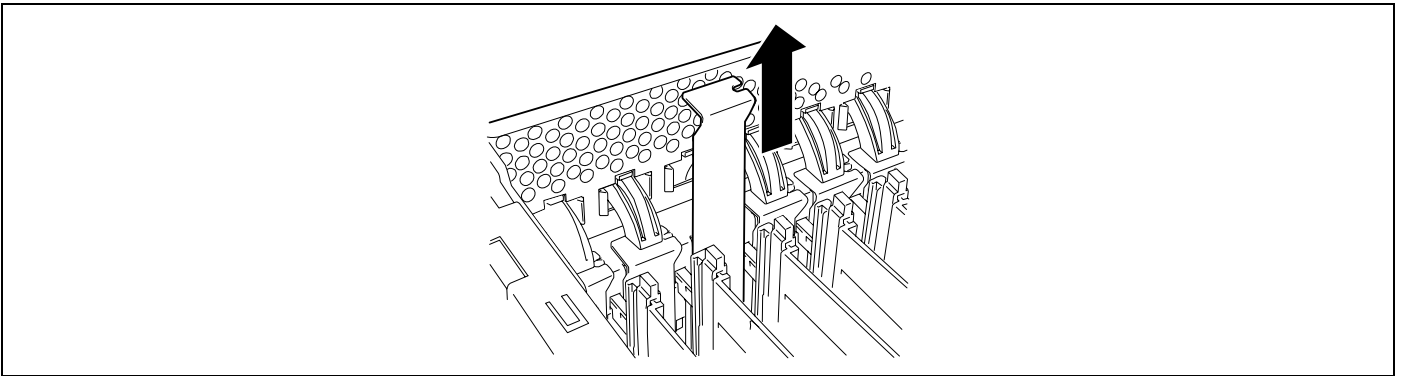
4. Push the tab at the tip of the additional slot cover of the slot in which you are going to install the PCI board to unlock the tab. Open the tab.

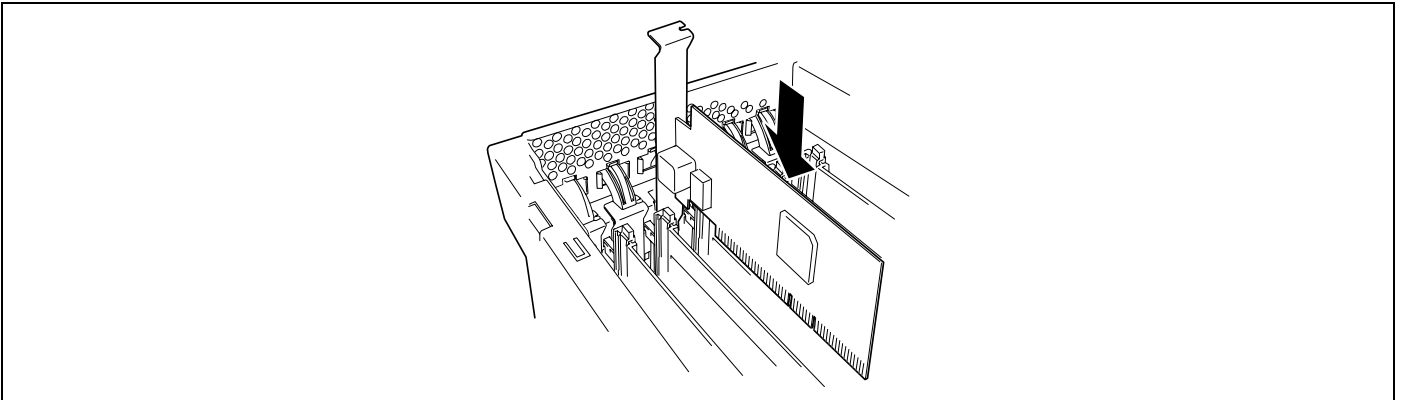> **IMPORTANT:** Do not open the retention tab to 90 degrees or more. Doing so could damage the tab.
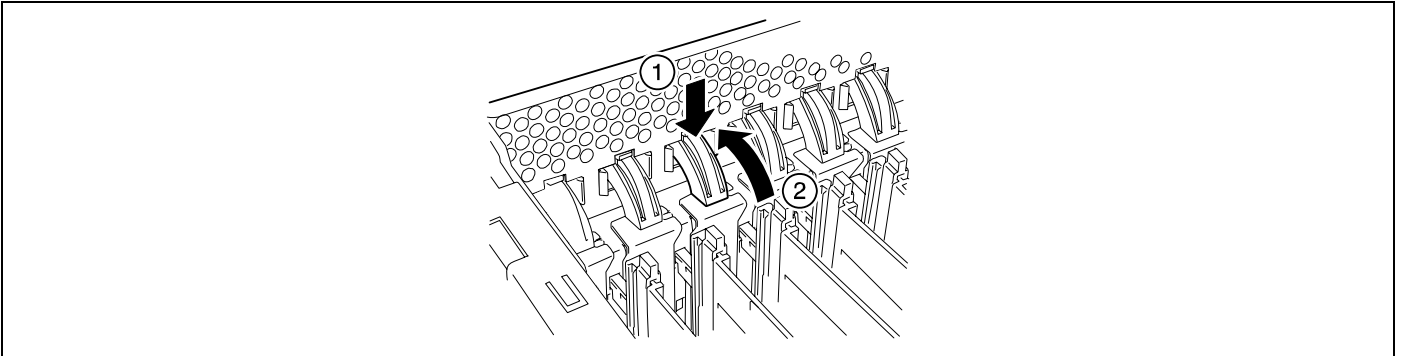
5. Remove the additional slot cover.

> **IMPORTANT:** Keep the removed additional slot cover for future use.

6. Push the PCI board slowly and carefully into the slot.


7. Push the PCI board until the connection part of the board is firmly connected into the slot.

> **IMPORTANT:** If failing to install the PCI board correctly, reinstall it. Be careful not to apply excess force to the PCI board when handling it. Applying excess force may cause damage to the PCI board.

NOTES:

After installed the long board, secure it with the lock on the upper part of the guide rail.
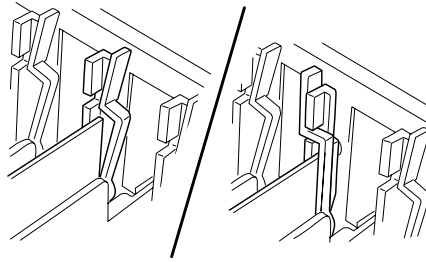
■ The insulators are installed between the PCI board slots. They are for protecting the PCI board already been installed. Take care not to remove or damage the insulator when installing or removing the PCI board. If the insulator is taken off, reinstall the insulator in place.

8. Connect the cables to the PCI board while firmly holding the PCI board with your hand.

9. Slowly close the tab to secure the PCI board.

10. Press the PCI Hot Plug switch. The PCI Slot Power lamp flashes once and then, goes on.

NOTES:

■ If the server runs on Windows Server 2003, the operating system automatically recognizes the additionally installed PCI board and installs the driver.

■ If an error occurred in the installed board or slot, the PCI Slot Fault lamp goes on (amber).
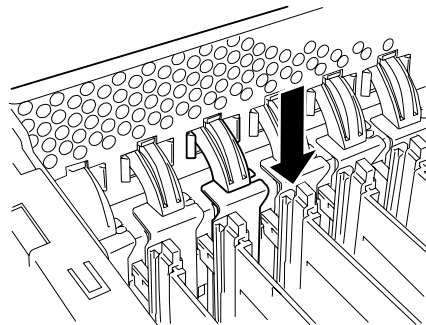
11. Reinstall the rear access cover and place the server into the rack.

12. Take the following steps to check if the additionally installed PCI board is recognized and operating properly:

(1) Select [Control Panel], [Administrative Tools], [Computer Management], and [Device Manager] in the order to start the Device Manager.

(2) Move the cursor to the added board.
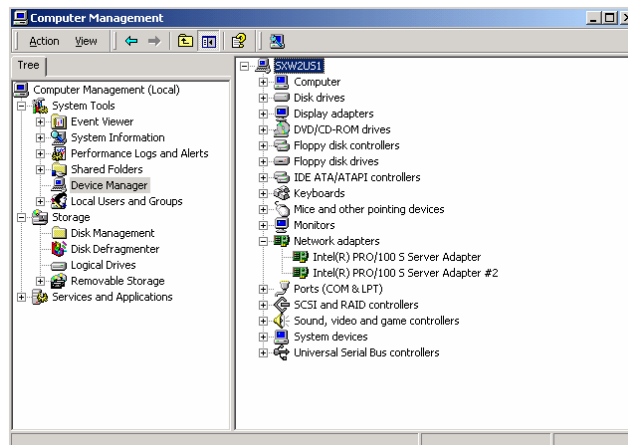
(3) Click the [General] tab to display the property to confirm that the device is normally operated.
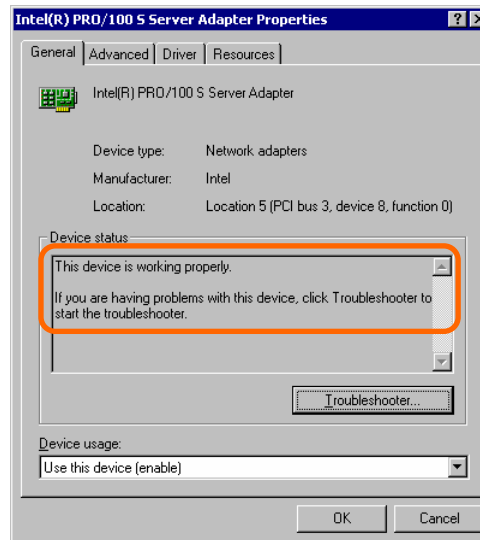
* The message in the "property" depends on the location of the PCI board slot.

Hot Remove

Take the following procedure to execute Hot Remove:

1. Take the following steps to stop the device driver used by the Hot-plug PCI board you want to remove:
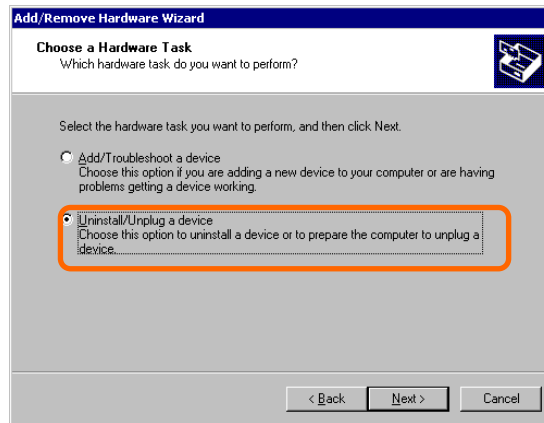
> **IMPORTANT:** Before removing a PCI board, be sure to stop the driver of the slot (containing the PCI board) from the operating system. Failure to do so may cause the system to fail.

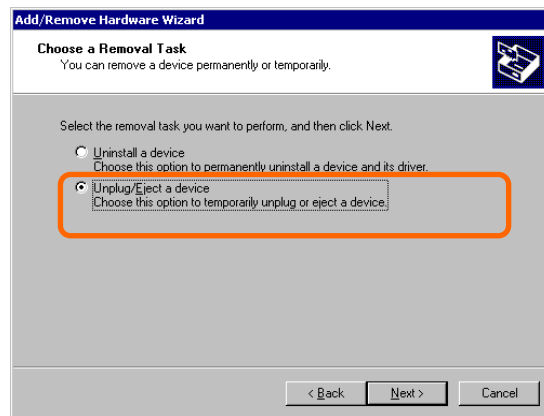To stop the device driver from the operating system window:

(1) Open [Add/Remove Hardware] in [Control Panel].

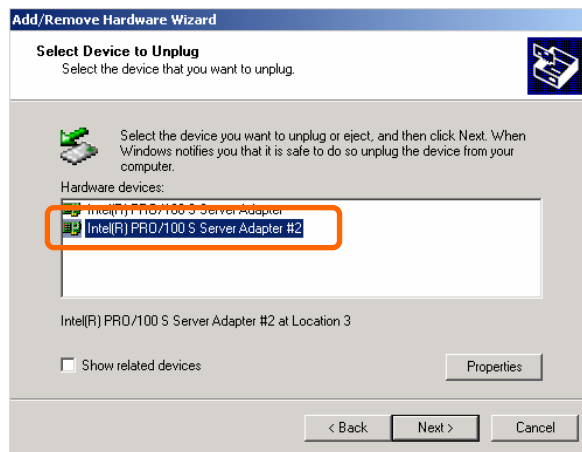The [Add/Remove Hardware Wizard] starts.
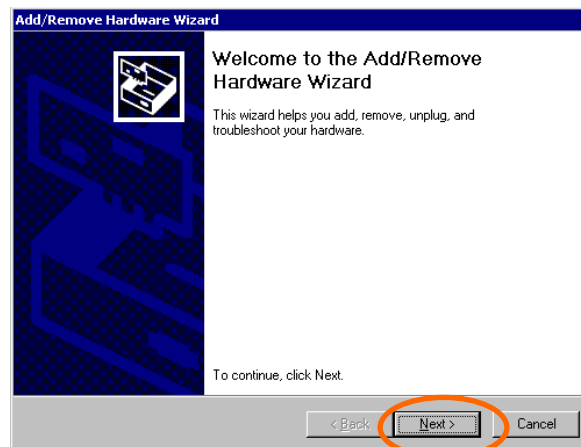
(2) Click [Next].

(3)   Select [Uninstall/Unplug a device] for hardware task, then click [Next].
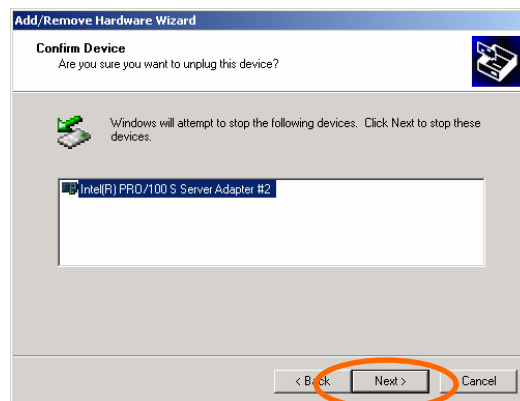

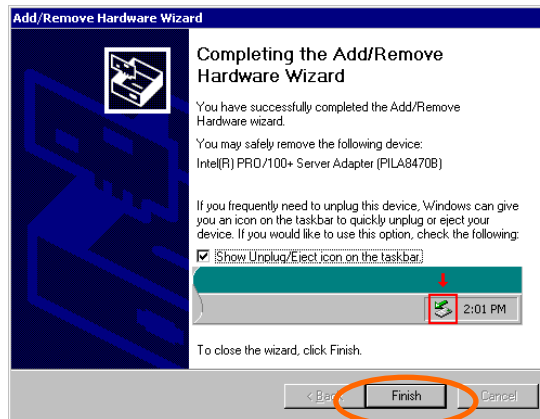(4)   Select [Unplug/Eject a device] for removal task, then click [Next].

(5)   Select the target device, then click [Next].

(6)   Confirm that the driver is used by the device you want to remove, then click [Next].
       The [Add/Remove Hardware Wizard] closes.

(7) Click [Finish].

(8) Pull out the server from the rack with the power being on.

(9) Remove the rear access cover and locate the board to be removed.

NOTE: Confirm that the PCI Slot Power lamp of the target PCI slot is off.

To stop the device driver using the PCI hot-plug switch:

(1) Pull out the server from the rack with power being on.

(2) Remove the rear access cover and confirm the slot to remove the PCI board.

(3) Press the PCI hot-plug switch on the slot from which the PCI board is to be removed.

NOTE: Confirm that the PCI Slot Power lamp of the target PCI slot is off.

2. Disconnect all the cables from the PCI board.

3. Push the tab to unlock it, slowly open the tab, and then remove the PCI board.

IMPORTANT: Do not open the retention tab to 90 degrees or more. Doing so could damage the tab.
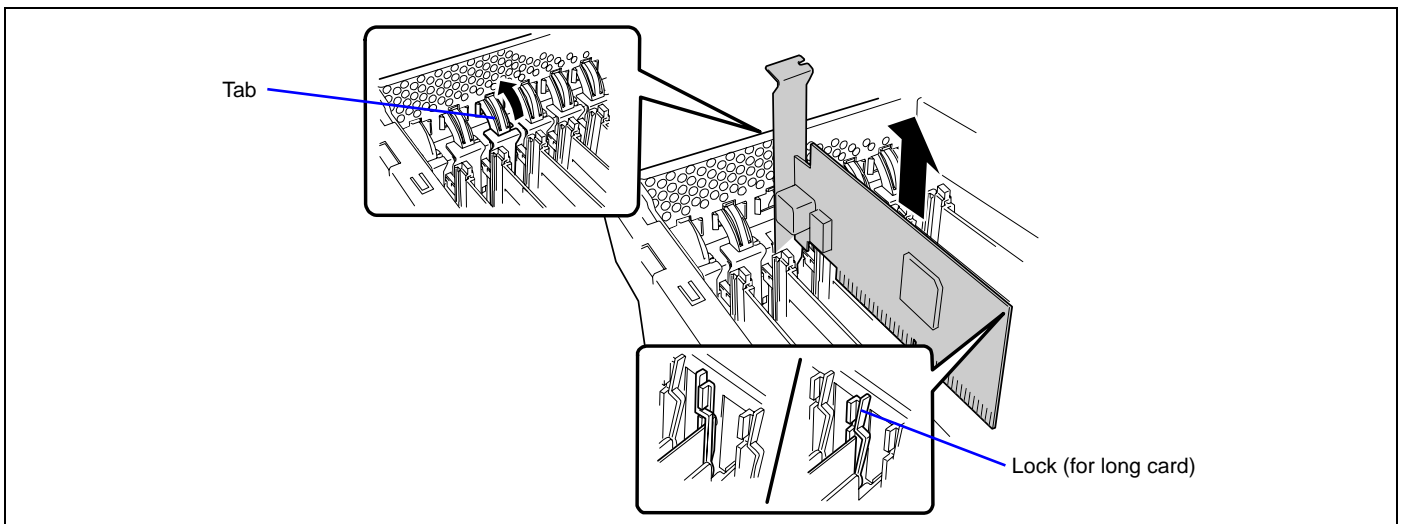
4. Install the additional slot cover on the slot from which you remove the PCI board, and then slowly close the tab.

> **IMPORTANT:** To maintain the dust-proofing and electromagnetic radiation characteristics and cooling performance of the server, be sure to install the blank plate on the slot from which you removed the PCI board.
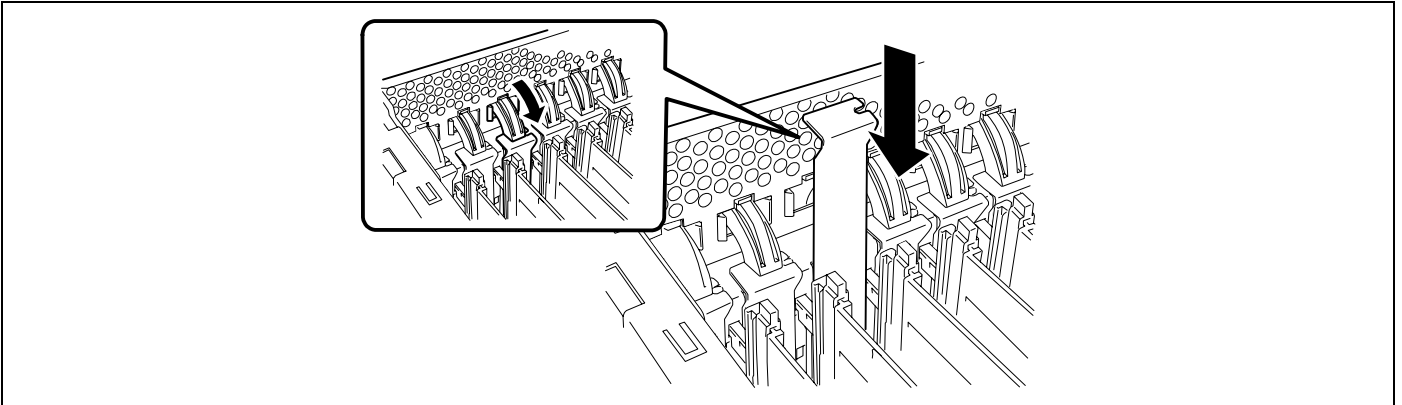
5. Reinstall the rear access cover and place the server into the rack.

Hot Replace

Take the following procedure to execute the Hot Replace:

1. Take the following steps to stop the device driver used by the Hot Plug PCI board you want to replace:

> **IMPORTANT:** Before removing a PCI board, be sure to stop the driver of the slot (containing the PCI board) from the operating system. Failure to do so may cause the system to fail.

To stop the device driver from the operating system window:

(1) Open [Add/Remove Hardware] in [Control Panel].

The [Add/Remove Hardware Wizard] starts.

(2) Click [Next].

(3)   Select [Uninstall/Unplug a device] for hardware task, then click [Next].

(4)   Select [Unplug/Eject a device] for removal task, then click [Next].

(5)   Select the target device, then click [Next].

(6)   Confirm that the driver is used by the device you want to remove, then click [Next].
       The [Add/Remove Hardware Wizard] terminates.
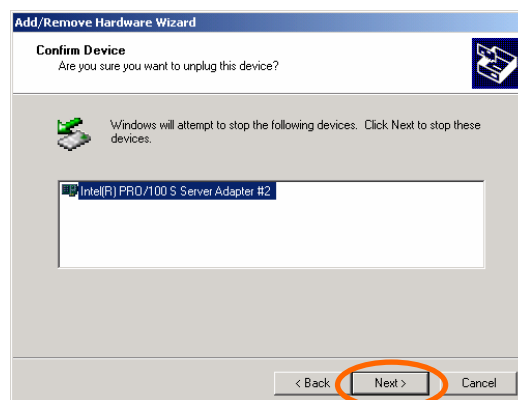
(7)   Click [Finish].
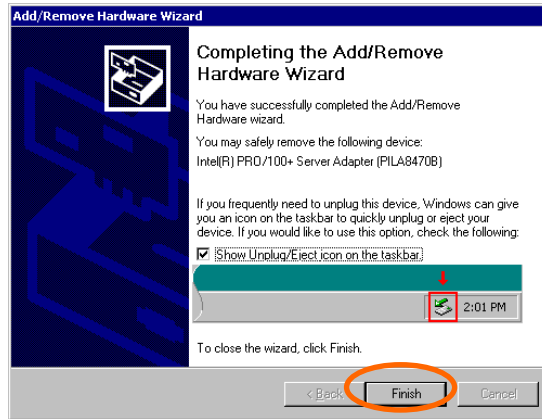
(8)   Pull out the server from the rack with the power being on.

(9)   Remove the rear access cover and locate the board to be removed.

> **NOTE:** Confirm that the PCI Slot Power lamp of the target PCI slot is off.

2.   Disconnect all the cables from the PCI board.

3.   Push the tab to unlock it, slowly open the tab, then remove the PCI board.

> **IMPORTANT:** Do not open the retention tab to 90 degrees or more. Doing so could damage the tab.
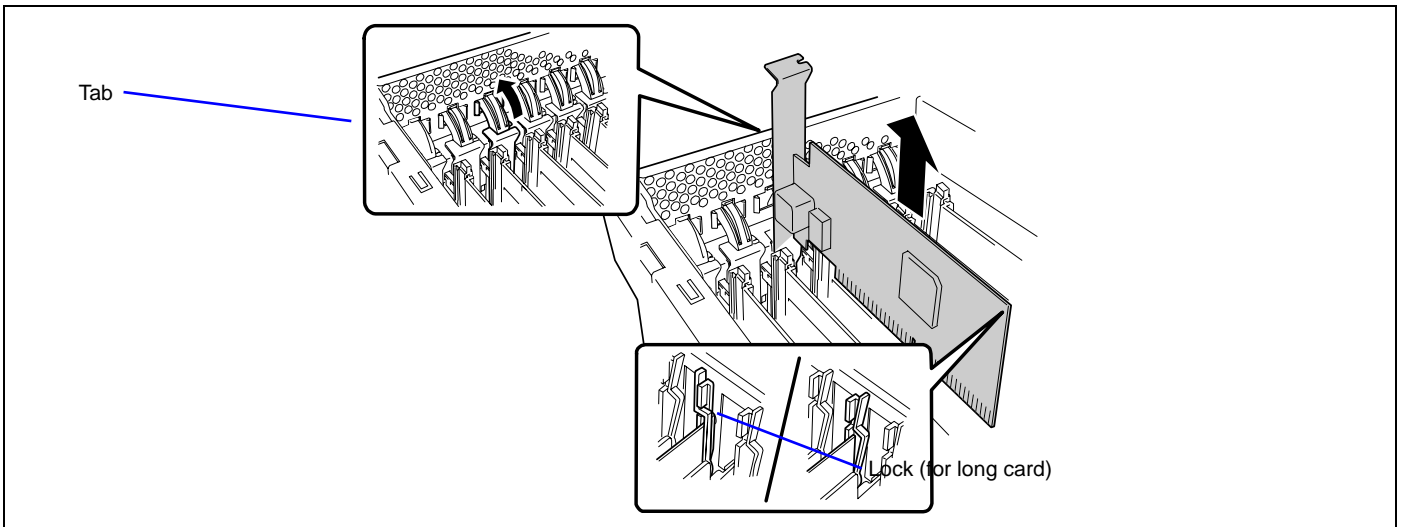
4.   Slowly insert the PCI board into the server.

5. Push the PCI board until the connection part of the board is firmly connected into the slot.

> **IMPORTANT:** If failing to install the PCI board correctly, reinstall it. Be careful not to apply excess force to the PCI board when handling it. Applying excess force may cause damage to the PCI board.

> **NOTES:**
>
> After installed the long board, secure it with the lock on the upper part of the guide rail.
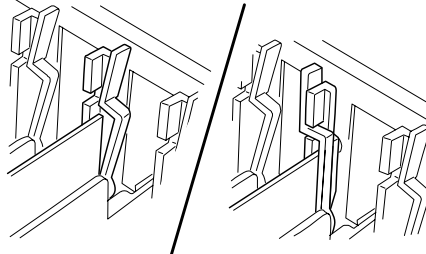
> ■ The insulators are installed between the PCI board slots.
> They are for protecting the PCI board already been installed. Take care not to remove or damage the insulator when installing or removing the PCI board. If the insulator is taken off, reinstall the insulator in place.

6. Connect the cables to the PCI board while firmly holding the PCI board with your hand.

7. Slowly close the tab to secure the PCI board.

8. Press the PCI hot plug switch.
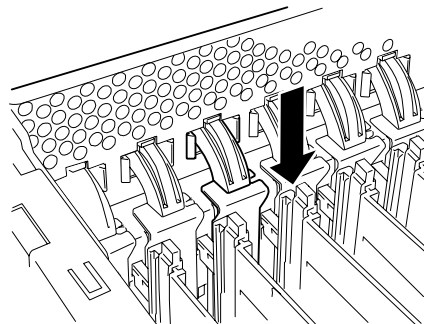
The PCI Slot Power lamp flashes once, and then goes on.

> **NOTES:**
>
> ■ If the server runs on Windows Server 2003, the operating system automatically recognizes the additionally installed PCI board and installs the driver.
>
> ■ If an error occurred in the installed board or slot, the PCI Slot Fault lamp goes on (amber).

9. Reinstall the PCI slot cover and place the server into the rack.

10. Take the following steps to check if the additionally installed PCI board is recognized and operating properly:

(1) Select [Control Panel], [Administrative Tools], [Computer Management], and [Device Manager] in the order to start the Device Manager.

(2) Move the cursor to the added board.
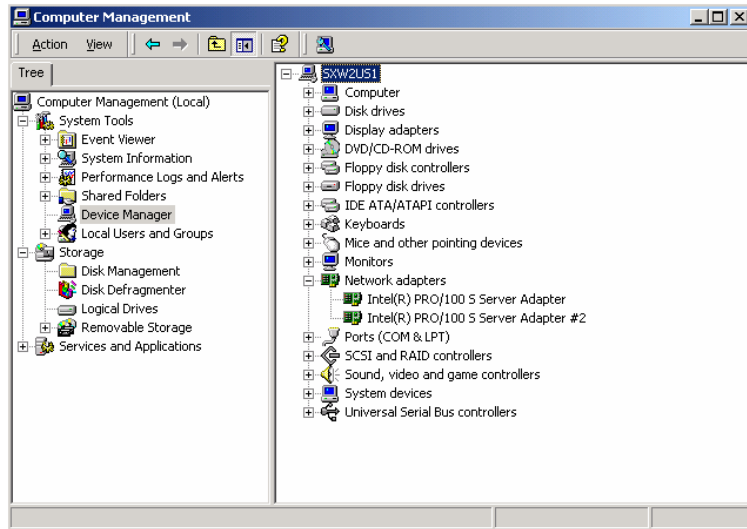
(3) Display the [General] dialog in the property to confirm that the device is normally operated.
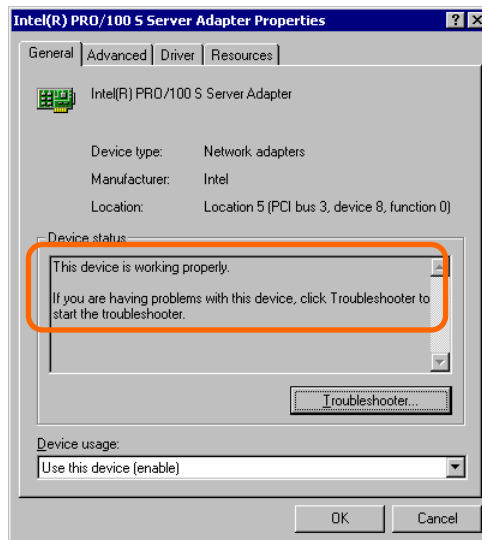
* The message in the "property" depends on the location of the PCI board slot.

■ Notes when removing the PCI slot insulators

Be careful that the insulator does not contact with the capacitor of the PCI-Express slot.
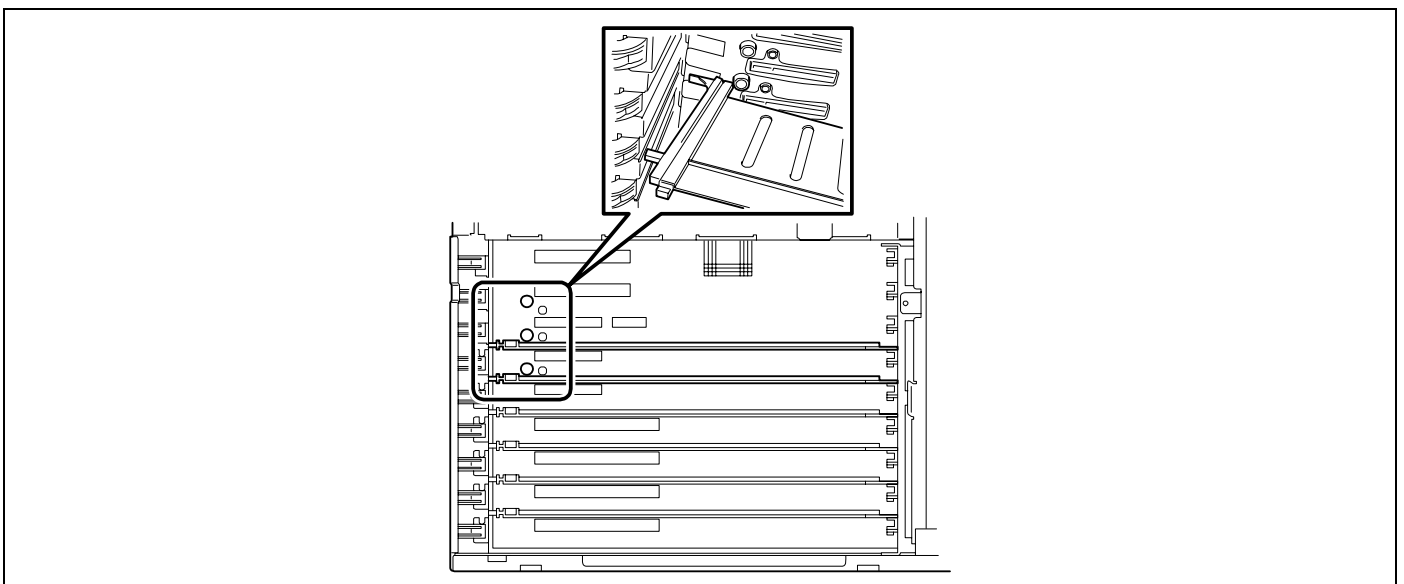
Memory Board

To install or remove the DIMM, remove the memory board first.

One memory board is factory-installed in the server. Up to four memory boards (64 GB max.) can be installed in the server.

The failing DIMM or memory board can be hot-swapped (replacement with power-on state) if the redundant memory boards has been configured. For hot-swap memory board, see "DIMM" described later in this chapter.

Memory board slot #1 (for factory-installed memory board)

Memory board slot #2 (for additional memory board)

Memory board slot #4 (for additional memory board)

Memory board slot #3 (for additional memory board)
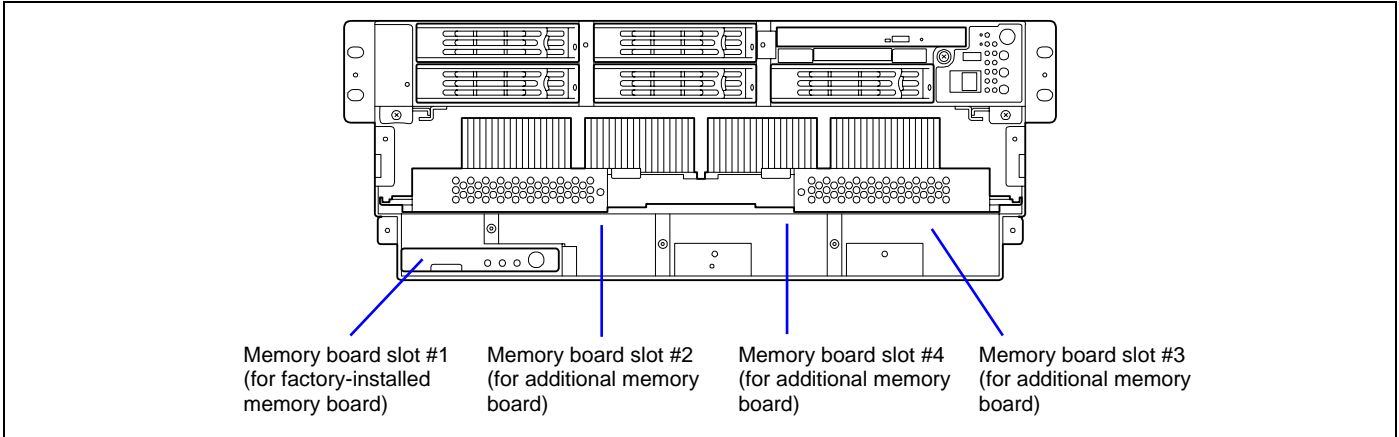
Removal

Remove the memory board as described in the following procedure.

> **IMPORTANT:**
>
> - The memory board is extremely sensitive to static electricity. Make sure to touch the metal frame of the server to discharge static electricity from your body before handling the memory board. Do not touch the memory board terminals or on-board parts by a bare hand or place the memory board directly on the desk. For static notes, see the section "Anti-static Measures" described earlier.
>
> - The memory board becomes very hot while being powered. When removing the board, turn off the power and wait for several minutes before pulling it out.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Unlock the front bezel with the security key, and remove the front bezel.

3. Remove the two screws, and remove the memory slot cover at the front of the server.
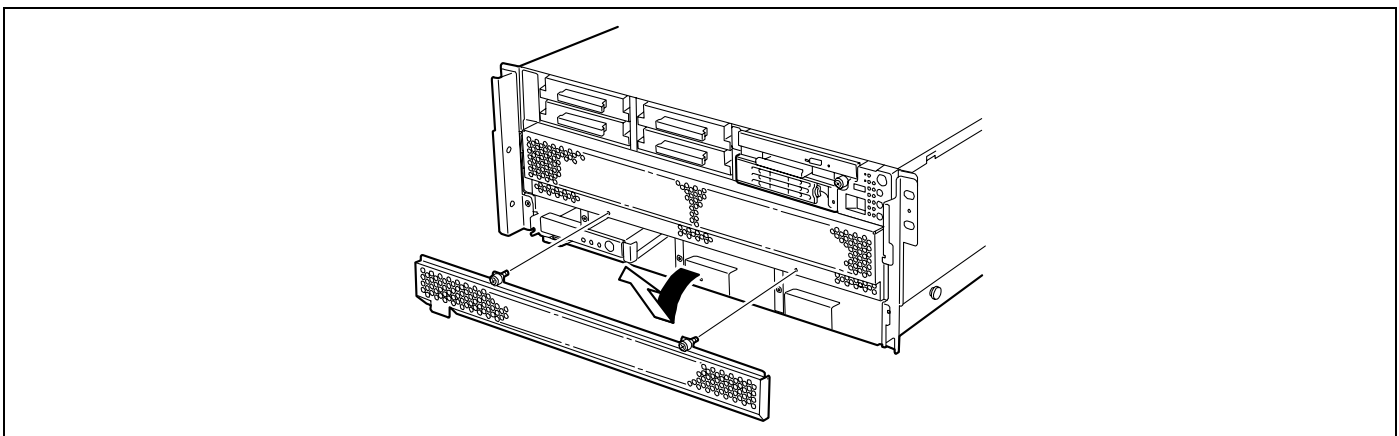
4. Unlock the memory board to open the ejector.

> **IMPORTANT:** The memory board becomes very hot while being powered. When removing the board, turn off the power and wait for several minutes before pulling it out.
>
> Note that the hot-plug memory board is off-powered when it is unlocked (the LED goes off). Wait several minutes in this state.
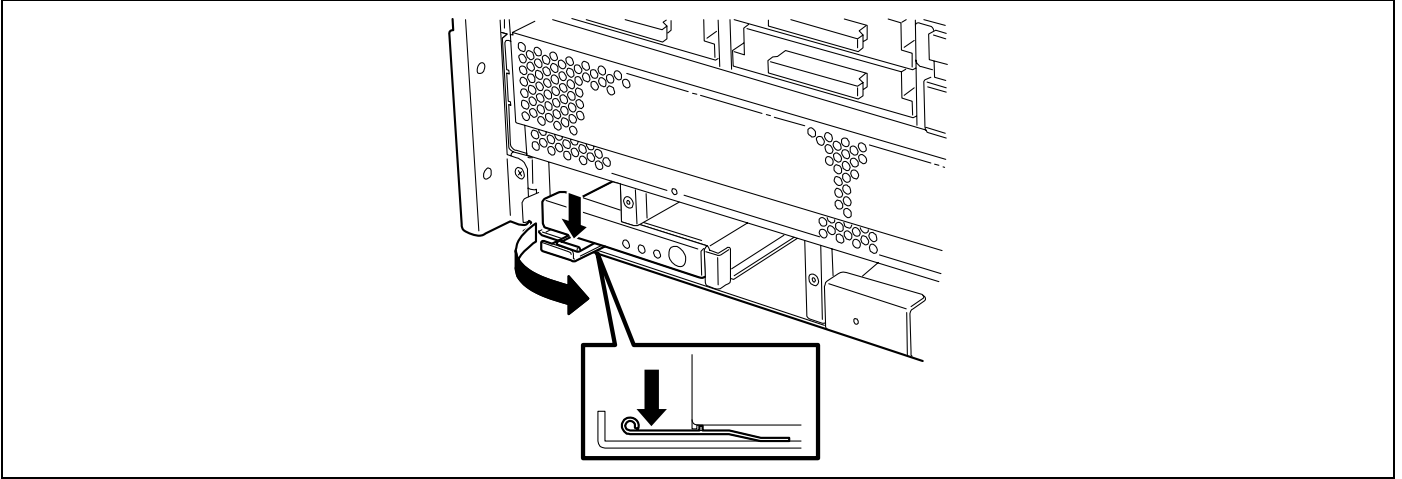
5. Hold the ejector and pull the memory board out from the server.
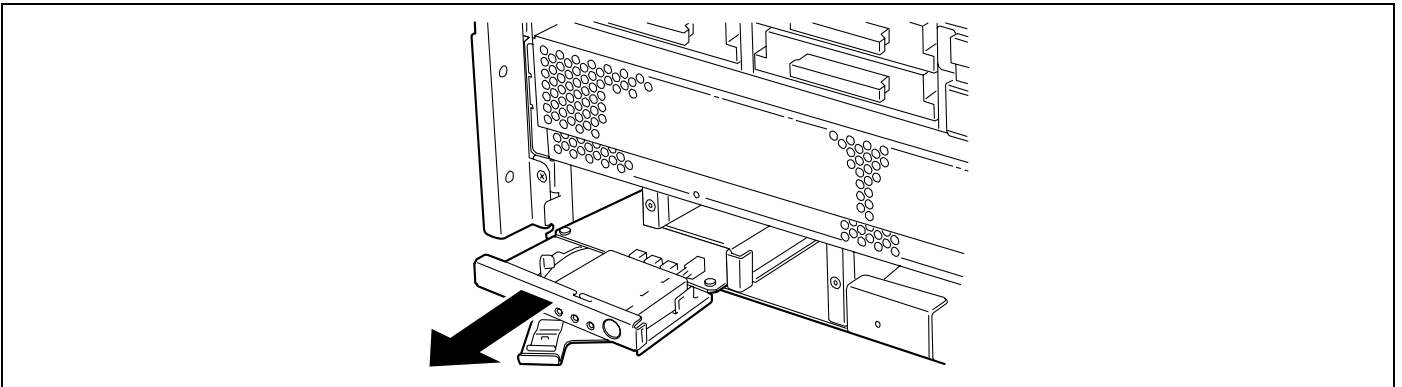
6. Put the memory board on a dry, clean, and static-free place.

Installation

Install the memory board in reverse order of the removal steps.

DIMM

Install the additional DIMM (Dual Inline Memory Module) to the DIMM socket on the memory board in the server.

DIMMs are installed on the sockets in the ascending order of DIMM socket numbers in the unit of two modules.

> **NOTE:** Up to 16 GB of memory (4 GB DIMM × 4) can be installed.
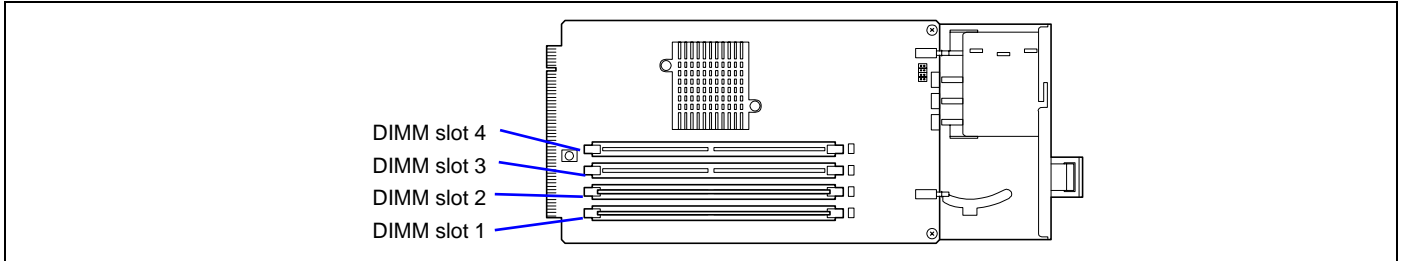
*   DIMM specification is shown on the label attached to the DIMM as follows:

Example: Frequency of 400 MHz, buffered, capacity of 1GB, row
address of 14 bits, column address of 11 bits, and
single rank

2-400 / B / 1024 / R14   C11   S

Single rank
Column address
Row address
Capacity
Buffered / Registered
Frequency

> **IMPORTANT:** The last digit character indicates the symbol representing either of single rank (S) or dual rank (D).
> If DIMMs of single rank and dual rank are installed on the same memory board, be sure to install the DIMM of dual rank in DIMM Group #1 (DIMM slots 1 and 2). Otherwise, the system will fail to start.

Installation

Install a DIMM as described in the following procedure.

IMPORTANT:

- The DIMM is extremely sensitive to static electricity. Make sure to touch the metal frame of the server to discharge static electricity from your body before handling the DIMM. Do not touch the DIMM terminals or on-board parts by a bare hand or place the DIMM directly on the desk. For static notes, see the section "Anti-static Measures" described earlier.

- Make sure to use the DIMM authorized by the manufacturer. Installing a third-party DIMM may cause a failure of the DIMM as well as the server. Repair of the server due to failures or damage resulted from installing such a board will be charged.

- Install two additional DIMMs for each group because the server uses interleaved memory. If DIMMs of different specifications* are installed in a group, the server does not operate normally.

*   DIMM specification is shown on the label attached to the DIMM as follows:

Example: Frequency of 400 MHz, buffered, capacity of 1GB, row
        address of 14 bits, column address of 11 bits, and
        single rank

2-400 / B / 1024 / R14   C11   S

                                │   │   Single rank
                                │   Column address
                          Row address
                      Capacity
   Buffered / Registered
          Frequency

---

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Unlock the front bezel with the security key, and remove the front bezel.

3. Remove the memory slot cover, and remove the memory board on which the DIMMs are to be installed.

NOTE: To additionally install a memory board, remove one screw to remove the blank cover from the additional slot.

IMPORTANT: Keep the removed blank cover for future use.
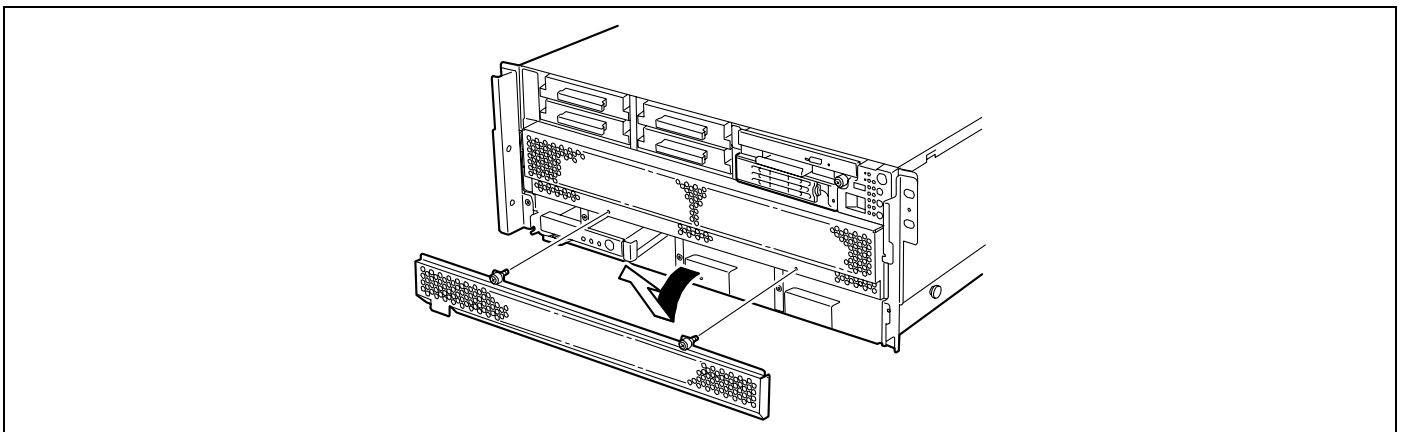
4. Locate the DIMM socket in which you are going to install DIMMs.

5. Fully open the levers at both ends of the socket (1) and remove the socket cover.

> **IMPORTANT:**
> - To avoid damaging the lever, do not apply an excess force to the lever.
> - Keep the removed blank cover for future use.
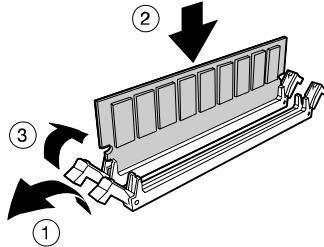
6. Push the DIMM straight into the socket (2).

> **NOTE:** Make sure of the orientation of DIMM. The terminal side of the DIMM has cut-out to prevent incorrect insertion.

The levers automatically close when the DIMM is inserted into the socket (3).

> **IMPORTANT:** Always install the DIMMs in pair. Two DIMMs must be of the same specification. DIMM specification is shown on the label attached to the DIMM as follows:
>
> Example: Frequency of 400 MHz, buffered, capacity of 1GB, row
>   address of 14 bits, column address of 11 bits, and
>   single rank
>
>   2-400 / B / 1024 / R14   C11   S
> | | | | | |
> | | | | | Single rank
> | | | | Column address
> | | | Row address
> | | Capacity
> | Buffered / Registered
>   Frequency

7. Install the memory board back into the chassis slot.

8. Install the memory slot cover and front bezel.

9. Power on the server and verify that POST displays no error messages.

If POST displays an error message, take a note on the message and see the POST error messages listed in Chapter 8.

10. Start the SETUP and select [Advanced] → [Memory Configuration] to verify that the installed DIMM shows the status "Normal". (See Chapter 4 or details.)

11. Select "Yes" for [Reset Configuration Data] on the [Advanced] menu.

This setting is required to change the hardware configuration data. See Chapter 4 for details.

12. If Windows Server 2003 is in use, set the paging file size to the recommended value (total memory size * 1.5) or a greater value. See Chapter 5 for details.

Removal

Remove the DIMM in the following procedure.

> **IMPORTANT:** The DIMM is extremely sensitive to static electricity. Make sure to touch the metal frame of the server to discharge static electricity from your body before handling the DIMM. Do not touch the DIMM terminals or on-board parts by a bare hand or place the DIMM directly on the desk. For static notes, see the section "Anti-static Measures" described earlier.

> **NOTE:** To remove the failed DIMM, check the error message appearing in POST or ESMPRO to identify the DIMM socket (group) in which the failed DIMM is installed.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Unlock the front bezel with the security key, and remove the front bezel.

3. Remove the memory slot cover, and then remove the memory board on which the DIMMs to be removed are installed.

   > **NOTE:** The error lamp corresponding to the failing DIMM goes on.

4. Open the levers at both sides of the socket from which you remove the DIMM. (1).

   The DIMM is unlocked and ready for removal. (2)
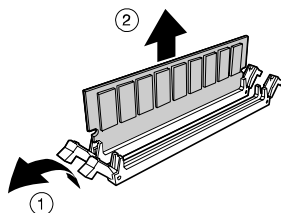
5. Install the memory board.

6. Install the memory slot cover and front bezel.

7. Power on the server and verify that POST displays no error messages.

   If POST displays an error message, take a note on the message and see the POST error messages listed in Chapter 8.

8. Start the SETUP and select [Advanced] → [Memory Configuration] → [Memory Retest] → [Enabled] to clear the error information of the removed DIMM. Then select [Server] → [Clear FRU LED] → [Yes] to turn off the LED indicating DIMM error. (See Chapter 4 for details.)

9. Select "Yes" for [Reset Configuration Data] on the Advanced menu.

   This setting is required to change the hardware configuration data. See Chapter 4 for details.

Memory Mirroring Feature

The memory mirroring feature places a memory board as spare memory in standby state. If the current memory board encounters an uncorrectable error, the memory mirroring feature switches to the standby memory board. When this feature is used, the current memory board and the standby memory board should be combined. Available combinations are:

- Mirroring with memory boards 1 and 2
- Mirroring with a pair of memory boards 1 and 2 and a pair of memory boards 3 and 4

To enable the memory mirroring feature, the combined memory boards must have the DIMM of same capacities.

The table below shows combinations of memory boards installed.

	Memory board 1	Memory board 2	Memory board 3	Memory board 4
A	2 GB (1 GB*2)	2 GB (1 GB*2)	2 GB (1 GB*2)	2 GB (1 GB*2)
B	8 GB (2 GB*4)	8 GB (2 GB*4)	8 GB (2 GB*4)	8 GB (2 GB*4)
C	4 GB (1 GB*4)	4 GB (1GB*4)	–	–
D	16 GB (4 GB*4)	16 GB (4 GB*4)	16 GB (4 GB*4)	16 GB (4 GB*4)

Memory RAID Feature

If one of the four memory boards encounters an uncorrectable error, the memory RAID feature switches to the other memory board to continue operation. To use this feature, four memory boards must be installed. Each memory board must have DIMMs of same capacities.

The table below shows combinations of memory boards installed.

	Memory board 1	Memory board 2	Memory board 3	Memory board 4
A	2 GB (1 GB*2)	2 GB (1 GB*2)	2 GB (1 GB*2)	2 GB (1 GB*2)
B	8 GB (2 GB*4)	8 GB (2 GB*4)	8 GB (2 GB*4)	8 GB (2 GB*4)
C	4 GB (1 GB*4)	4 GB (1 GB*4)	4 GB (1 GB*4)	4 GB (1 GB*4)
D	16 GB (4 GB*4)	16 GB (4 GB*4)	16 GB (4 GB*4)	16 GB (4 GB*4)

Setting BIOS

Start SETUP and select [Advanced] → [Memory Configuration] → [Memory RAS Feature] in order and set as follows:

- To enable the memory mirroring feature: Select [Mirror].

- To enable the memory RAID feature: Select [RAID].

Others

- Memory capacity displayed on the operating system = total capacity of physically installed memory – capacity for standby memory
  Memory mirroring feature: 1/2 of actually installed memory capacity
  Memory RAID feature: 3/4 of actually installed memory capacity

- Enabling the memory mirroring or memory RAID feature does not influence the operations of applications.

- The each feature is automatically disabled when an error message is displayed:

The following indicates that the memory mirroring /memory RAID feature has worked:

a) The Redundancy lamp on the front panel of the server lights green.

b) The failing DIMM group is degraded when the server restarts.

c) If NEC ESMPRO Agent has been installed, the following log is registered as a system log of Event Viewer:

Source name: ESMCommonService

Event ID: 2313

Explanation: Part of the DIMM was isolated due to a memory error.

Memory number: XX

Date/time: XX

d) If report setting is made through NEC ESMPRO Agent, Manager reporting and ALIVE reporting is performed. The report contents are as follows:

Explanation: Part of the DIMM was isolated due to a memory error.

Memory number: XX

Date/time: XX

Memory Hot-Plug Feature 1 (Hot Replace)

In the memory redundant configuration such as memory mirroring and memory RAID configuration, the memory board can be removed while the operating system is running.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Unlock the front bezel with the security key, and remove the front bezel.

3. Remove the two screws and then remove the memory slot cover.
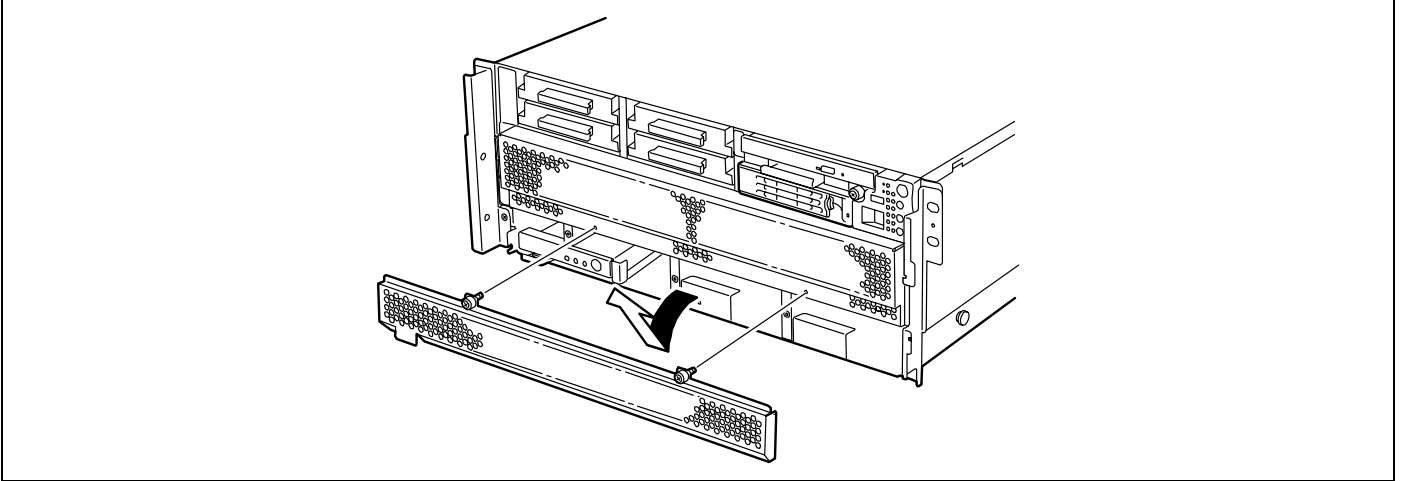
4. Press the Attention switch corresponding to the memory board to be removed.

   The memory board power lamp and the memory board redundancy lamp for that board go off.
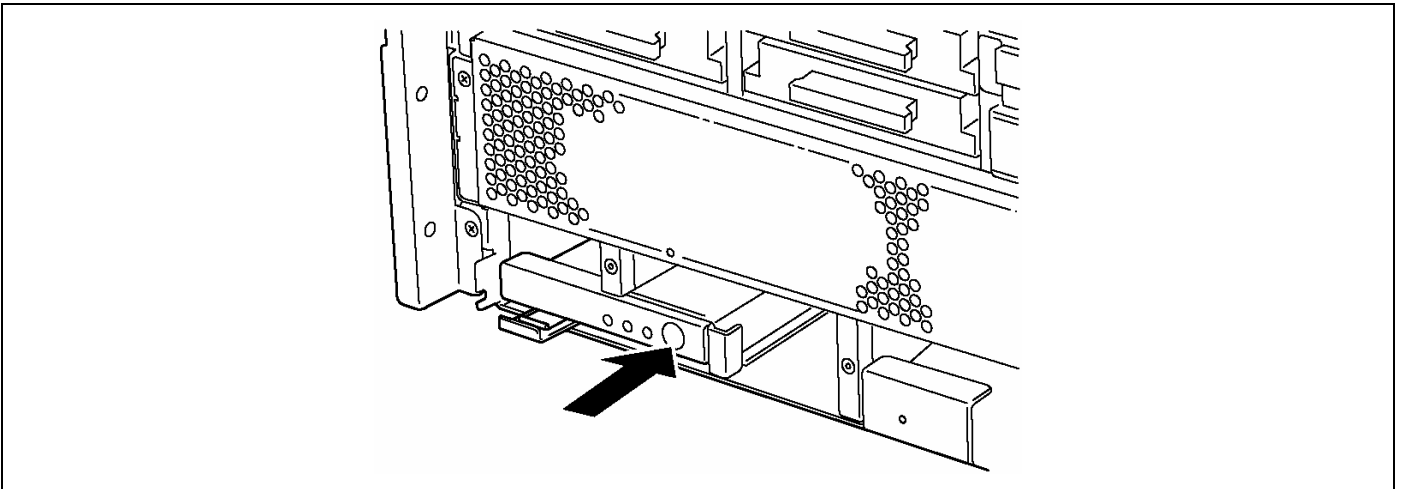
5. Make sure that the memory board power lamp goes off, then remove the memory board.

   IMPORTANT: The memory board becomes very hot while being powered. When removing the board, turn off the power and wait for several minutes before pulling it out.

   Note that the hot-plug memory board is off-powered when it is unlocked (the LED goes off). Wait several minutes in this state.
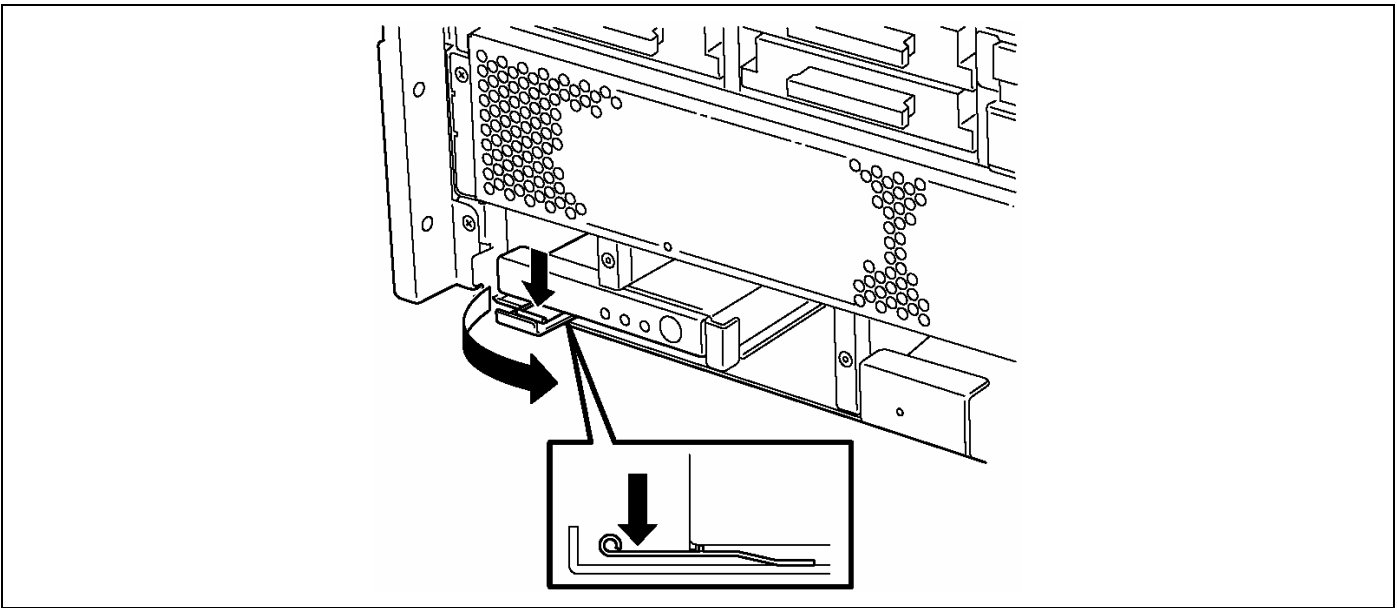
6. Hold the ejector and pull the memory board out from the server.
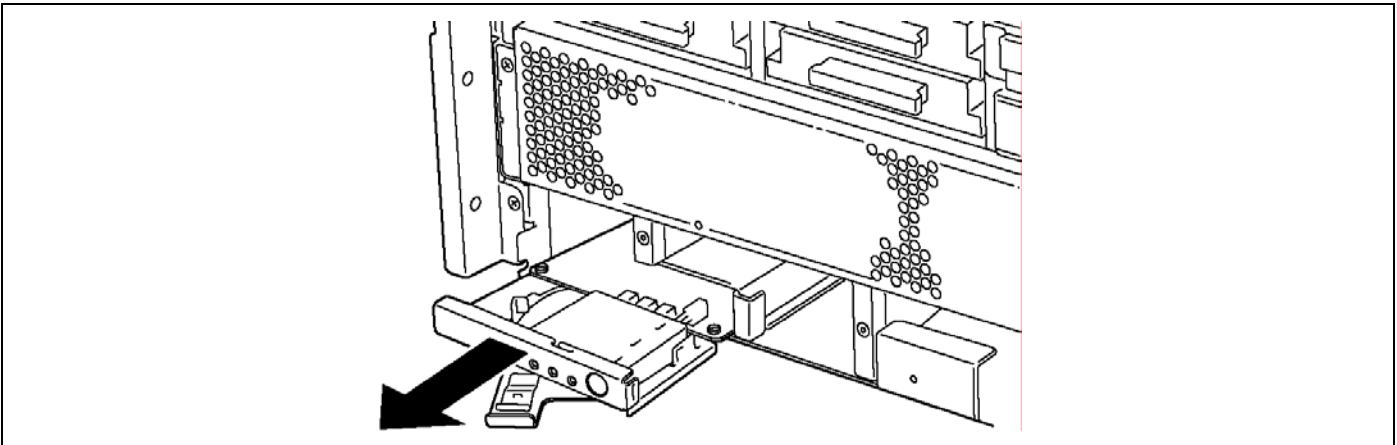
7. To set back the memory boards in redundant configuration, install the memory boards in reverse order of removal procedure. Then, press the Attention switch on the memory board. The memory board Power lamp starts flashing, and after a while, it goes on. The Memory Board Redundancy lamp goes on.
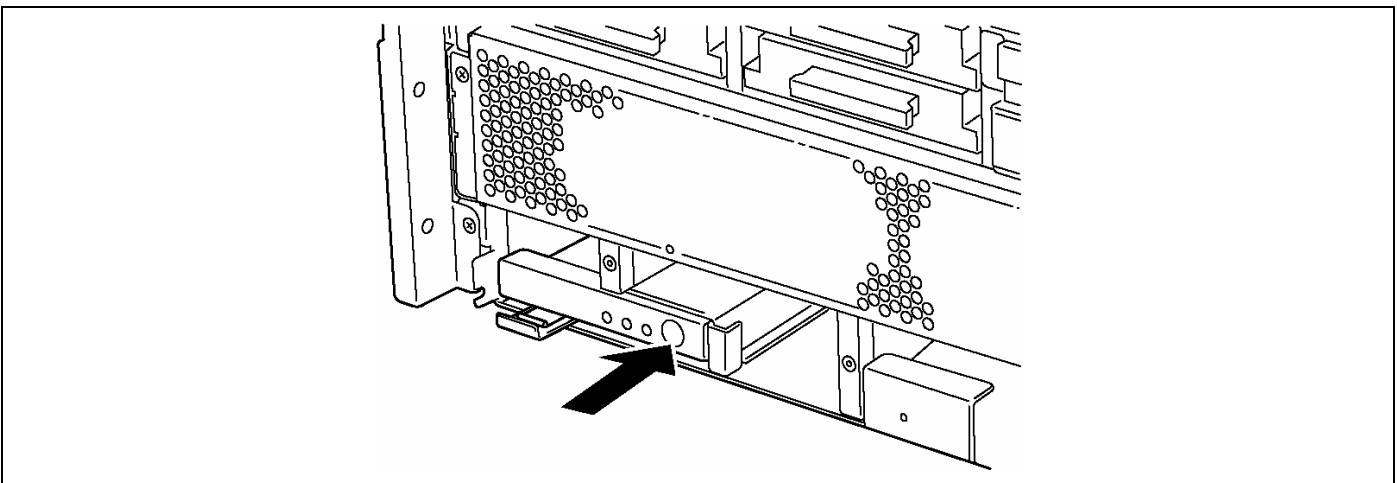
8. Install the memory board in reverse order of the removal steps.

This completes Hot Replace of memory board.

Memory Hot-Plug Feature 2 (Hot Add)

In Windows Server 2003 Enterprise Edition or Windows Server 2003 R2 Enterprise Edition, you can use the Hot-Add memory feature. The Hot Add feature allows you to add a physical memory without shutting down the system.

To use the Hot-Add memory feature, set the BIOS as follows:

Setting BIOS

Start SETUP and select [Advanced] → [Memory Configuration] → [Memory RAS Feature] in order and set as follows:

- To enable the Hot-Add memory feature in normal mode: Select [Normal].

- To enable the Hot-Add memory feature in mirroring mode: Select [Mirror].

> **NOTE:** Before selecting [Mirror], the mirroring configuration must have been set for memory boards 1 and 2. In this case, the memory hot plug is used for memory boards 3 and 4. (Memory boards 3 and 4 must also be in mirroring configuration.)
>
> In addition, be sure to specify [Advanced] → [Memory Configuration] → [Hot-add Memory Support] to "Enabled".

- Hot-Add memory feature in normal mode

  When the operating system starts with memory board 1 (factory-installed), installing memory boards on which DIMMs are installed to memory board slots 2, 3, and 4 can increase the physical memory capacity. See Memory Hot-Plug Feature 1 for memory board installing procedure.

  For example, if you insert a memory board into memory board slot 2 and press the Attention switch of that slot, the memory board Power lamp starts flashing and initialization of memory is started.

  When the memory board Power lamp stops flashing and goes on, the operating system is notified that the memory has been added.

  The notification is processed on the operating system. After a while, you can view the added physical memory in performance monitor of task manager. The memory board can be added to slots 3 and 4 in a similar procedure.

- Hot-Add memory feature in mirroring mode

  Add the memory boards 3 and 4 while the memory boards 1 and 2 are configured to use the mirroring feature. In this case, memory boards 3 and 4 must be configured to use the mirroring feature. See Memory Hot-Plug Feature 1 for memory board installing procedure.

  Only the difference with the normal mode is that the memory board is added to slot 3, and there is not change on system status. Adding a memory board to memory board slot 4 can make the memory mirroring configuration. And it is notified the operating system. After a while, you can view the added physical memory in performance monitor of task manager.

  You can confirm that a half of installed physical memory capacity is added. In memory mirroring configuration, the memory board additionally installed by using the Hot-Add memory feature can be hot-replaceable.

- Indication on NEC ESMPRO Data Viewer after Hot-Add Memory

  If you add a memory board dynamically by using hot-add feature, the added memory size will not be indicated on Data Viewer of NEC ESMPRO Manager unless the system is rebooted.

Processor Board

To install or remove the processor, remove the processor board.

Removal

Remove the processor board as described in the following procedure.

> **IMPORTANT:** The processor board is extremely sensitive to static electricity. Make sure to touch the metal frame of the server to discharge static electricity from your body before handling the processor board. Do not touch the processor board terminals or on-board parts by a bare hand or place the processor board directly on the desk. For static notes, see the section "Anti-static Measures" described earlier.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Unlock the front bezel with the security key, and remove the front bezel.

3. Remove the memory board cover.

4. Remove the two screws and then remove the processor board cover.
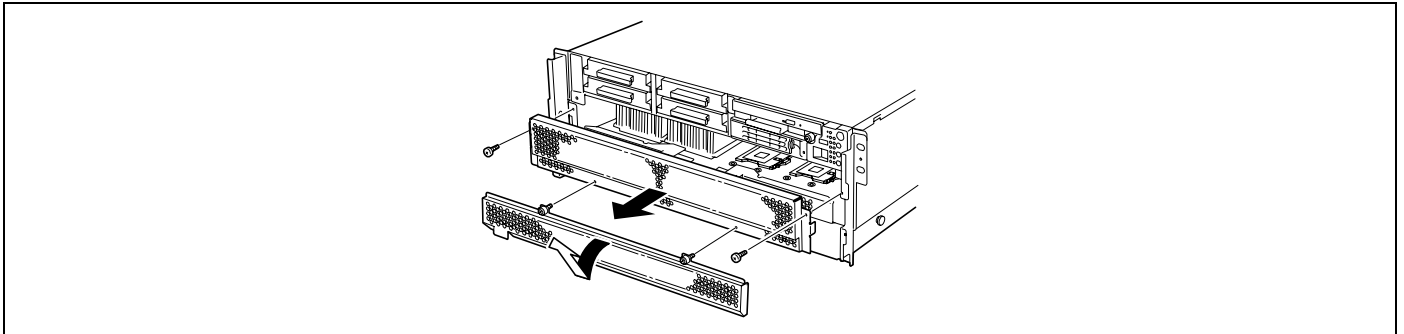
5. Remove the two screws securing the ejector.
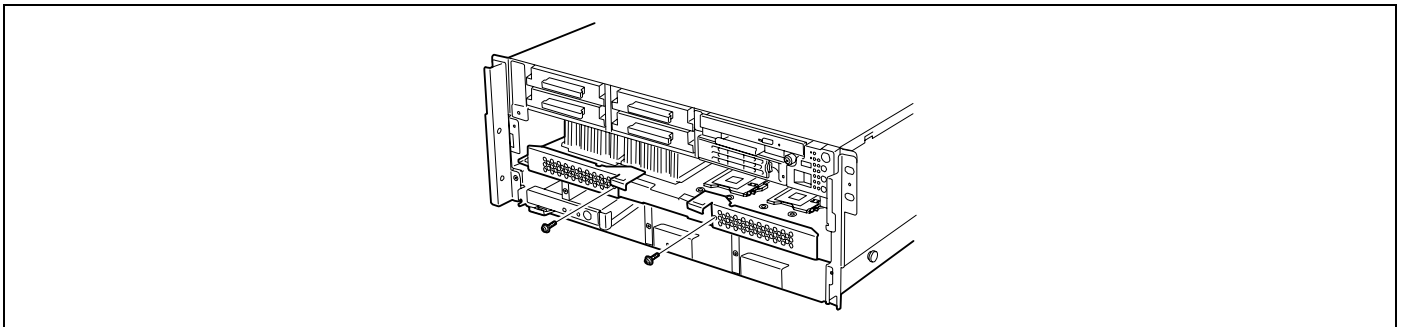
6. Unlock the processor board and open the ejector.
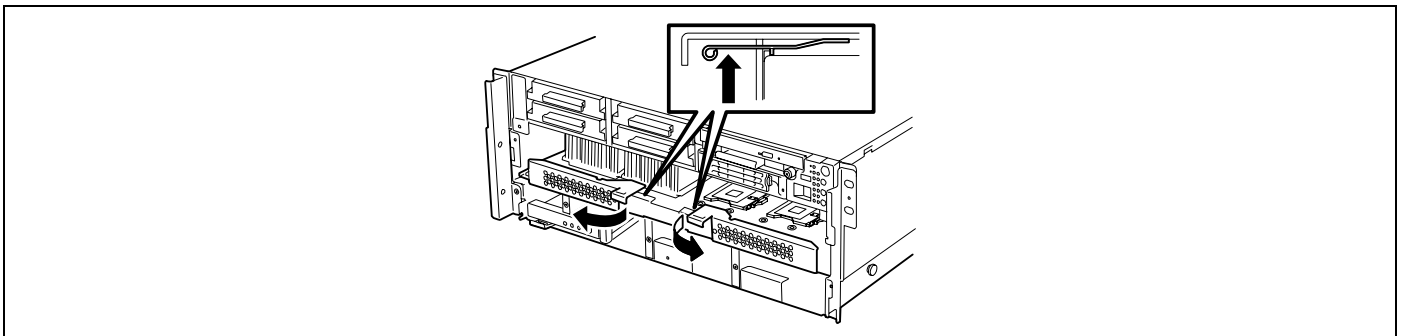
7. Firmly hold the processor board and pull it out from the chassis.
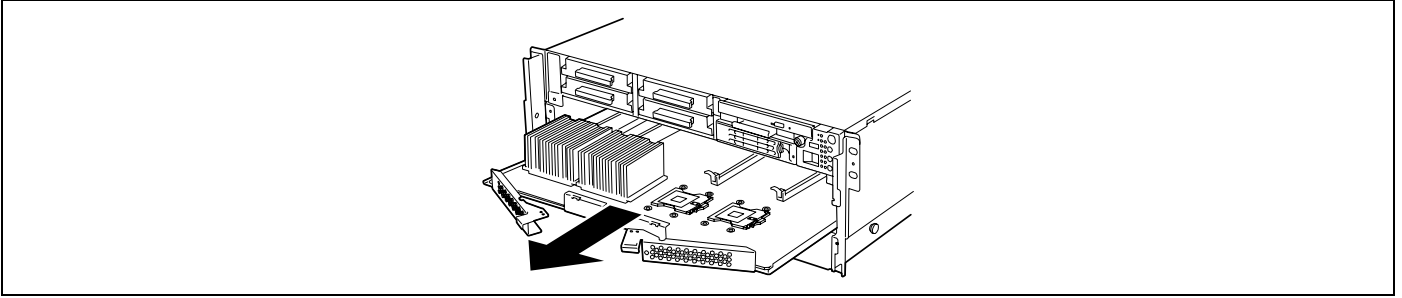
NOTE: Notes when removing the processor board

The processor board is very heavy (max. 7 kg). Pay attention not to drop it.

Also be careful that the connector of the processor board does not hit the chassis. As shown in the figure below, pull the processor board halfway, slightly lift the inner side of the board and then pull out the board.
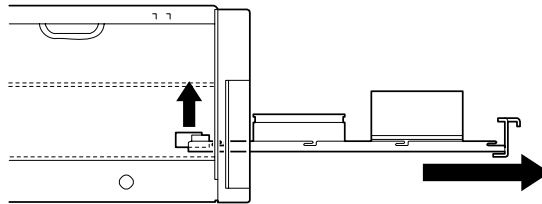
8. Put the processor board on a dry, clean, and static-free place.

Installation

Install the processor board in reverse order of the removal steps.

Processor

The processor board is equipped with sockets to install four 64bit Intel Xeon processor MP and corresponding Voltage Regulation Modules (VRMs). (One processor and one VRM are factory-installed.)
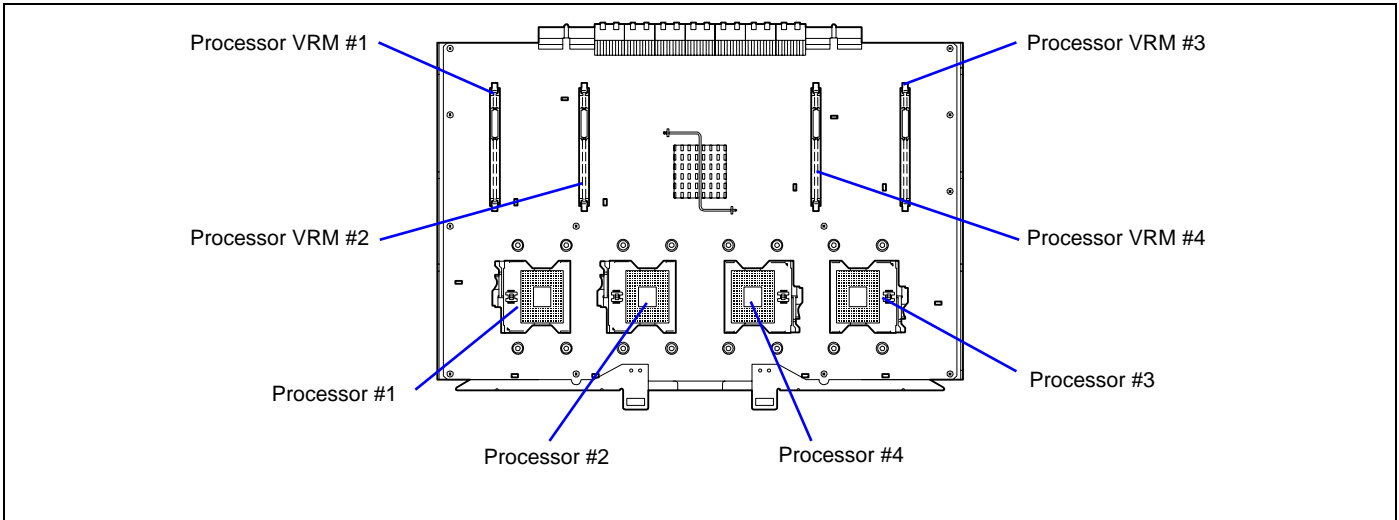
NOTE: If different revisions of processors are installed in a multiprocessor system, Windows logs the following information every start-up. If this message is logged, it is no problem for operation.

Installation

Take the following steps to install the processor.

> **IMPORTANT:**
>
> - The processor is extremely sensitive to static electricity. Make sure to touch the metal frame of the server to discharge static electricity from your body before handling the processor. Do not touch the processor pins by a bare hand or place the processor directly on the desk. For static notes, see the section "Anti-static Measures" described earlier.
>
> - When using the server with the single processor configuration, processor must be installed on the Processor #1.
>
> - Install the processor in the ascending order of the processor number (see figure above).
>
> - To maintain the cooling effect in the server, install the dummy cover to the empty slot.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.

2. Unlock the front bezel with the security key, and remove the front bezel.

3. Remove the memory slot cover.

4. Remove the processor slot cover.

5. Remove the memory board.

6. Locate the processor socket which you are going to install processor, remove two screws, then remove the dummy cover from the socket.
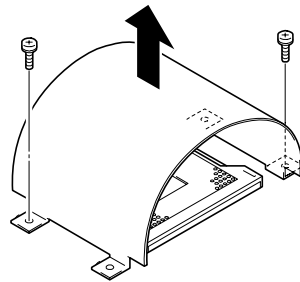
7. Remove the protective cover from the socket surface.

8. Raise the locking lever on the socket.

> **IMPORTANT:** Open the lever until it stops. It can be opened to approx. 120 degrees.
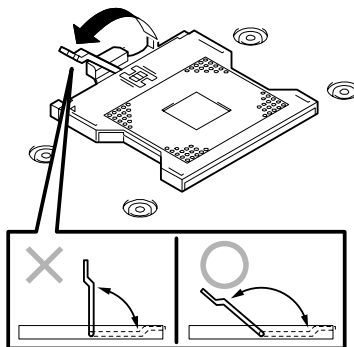
9.   Put the processor on the socket slowly and gently.

> **NOTE:** Be aware of processor direction. Pin layouts on two corners among four differ from others to prevent an incorrect insertion. Confirm the pin mark and pin layout on the socket, and insert the processor correctly.
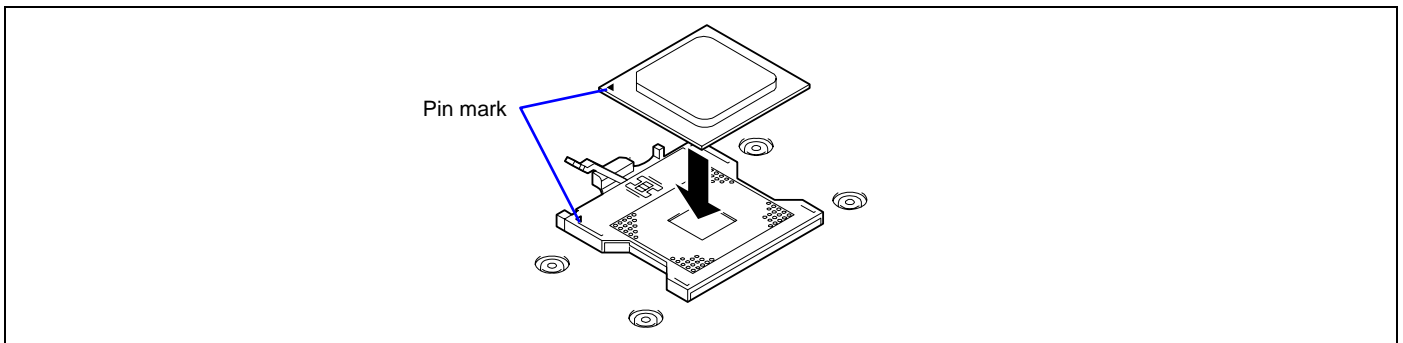
10.   Push the processor lightly to the socket, and push down the lever to secure the processor.
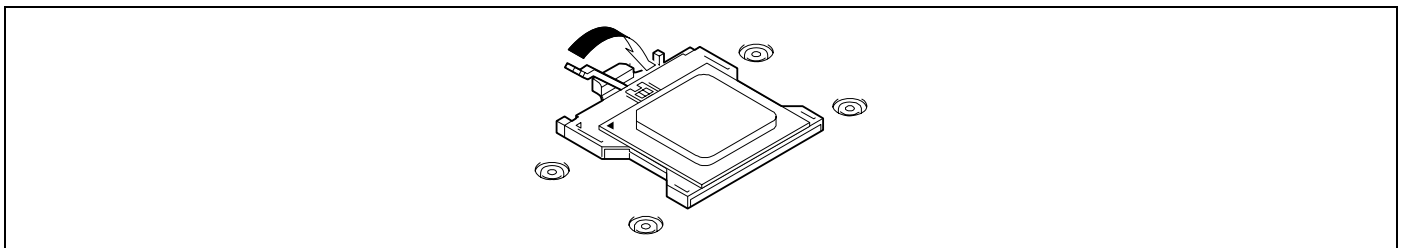
11.   Remove the cooling sheet from the bottom of the heat sink, and put the heat sink on processor.

> **NOTE:** You do not need to care of the direction of the heat sink.
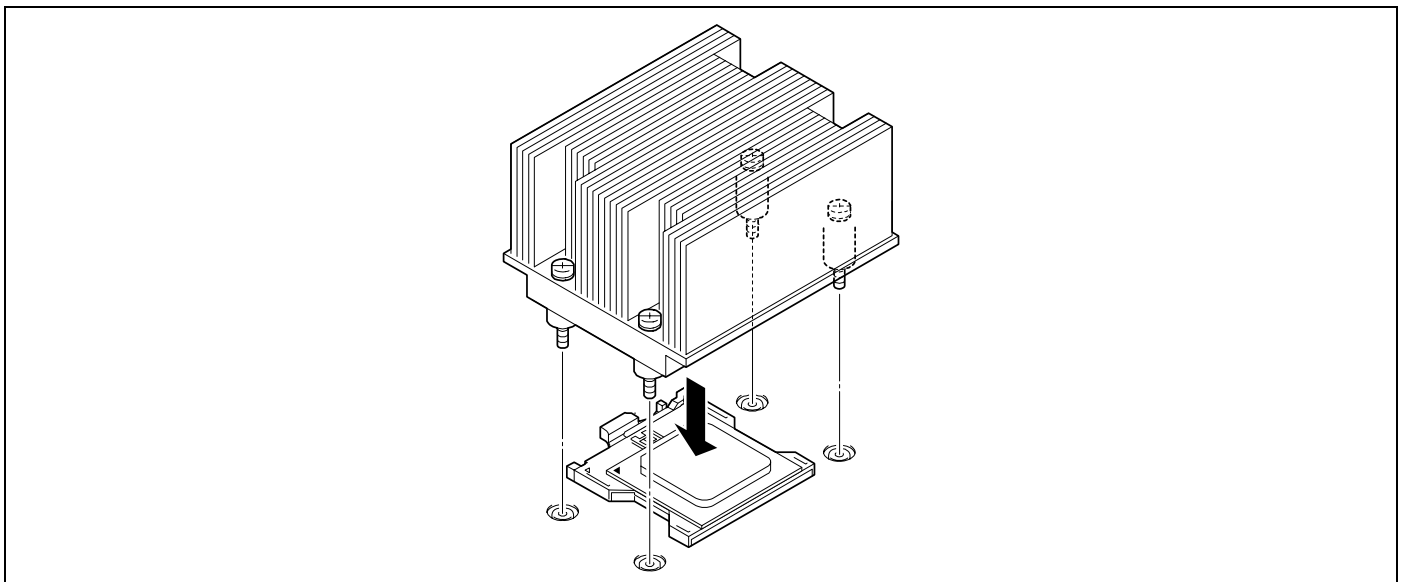
12.   Tighten the four screws to secure the heat sink.
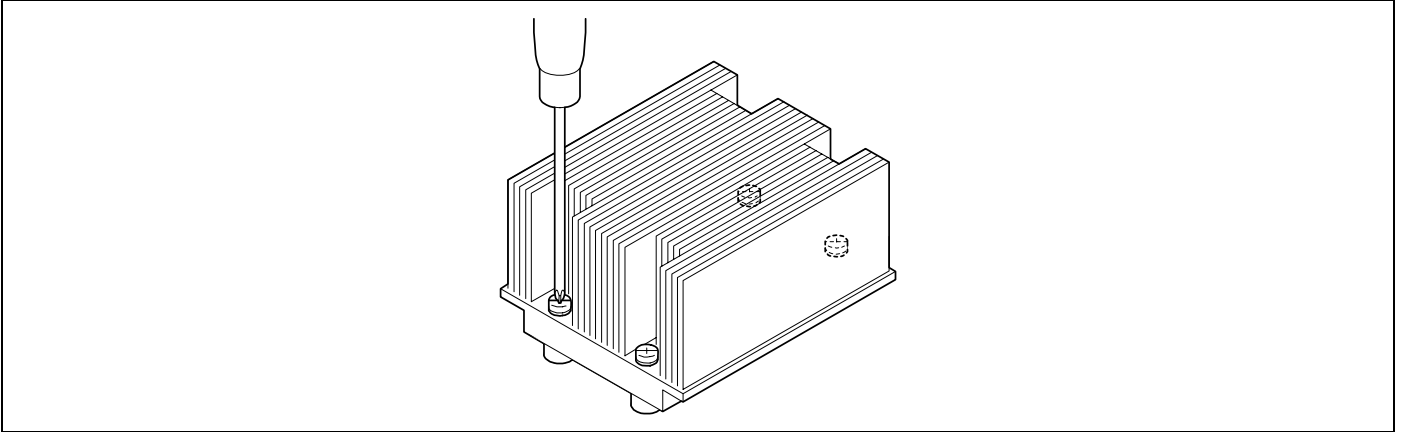
13.   Make sure that the heat sink is level.

> **IMPORTANT:** If the heat sink is not level, remove it, and check if the processor is positioned correctly.

14.   Fully open the levers on both sides of VRM socket.
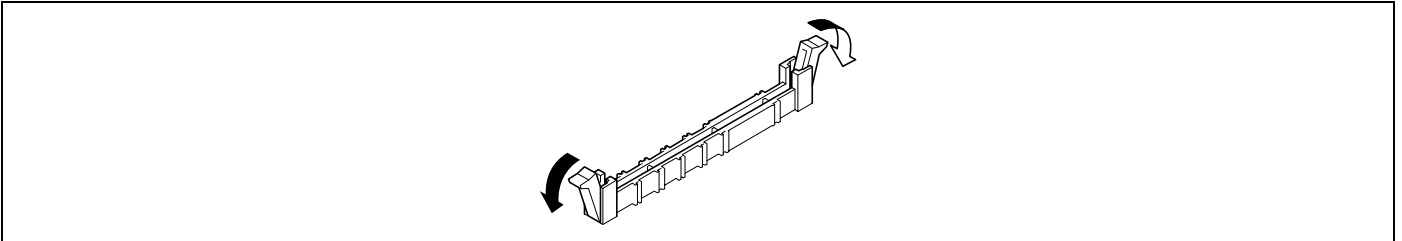
15.   Push the VRM straight into the socket.

When the VRM is inserted into the socket, the lever automatically closes. Push the lever toward inside to securely close the lever.

> **NOTE:** Make sure the orientation of VRM. The terminal side of VRM has a cut-out to prevent the incorrect insertion.
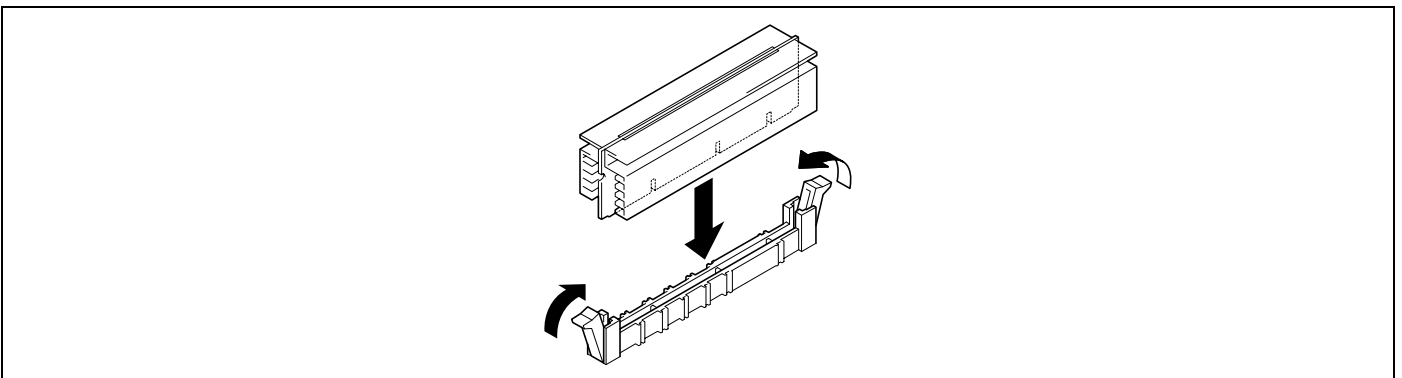
16.   Install the components you removed previously.

17.   Start SETUP and select "Yes" for [Reset Configuration Data] on the Advanced menu.

This setting is required to change the hardware configuration data. See Chapter 4 for details.

18.   To add one or more processors to the server in 1-processor configuration to operate the server with more than one processor, do the procedure below:

For Windows Server 2003, change the driver of [Computer] in the device manager to [ACPI multi-processor PC] and then update the system (see Chapter 5).

Removal

To remove the processor, prepare the removal referring to steps 1 and 5 in the installation procedure and do the reverse procedure of steps 8 to 12.

> **IMPORTANT:**
>
> - Do not remove any processor unless it is failed.
>
> - To maintain the cooling effect in the server, the dummy cover is installed in the empty slot. Be sure to install the dummy cover to the slot where the processor is not installed.
>
> - After the operation, heat may make the cool seat at the bottom of the heat sink adhere to the processor. To remove the heat sink from the processor, first turn the heat sink to the left and right lightly to make sure that the heat sink can be apart from the processor. Removing the heat sink with it adhering to the processor may cause the processor and/or socket to be damaged.

Take the following procedure if a processor is removed (or replaced).

1. Start SETUP to select menus "Main" – "Processor Settings" – "Processor Retest" in the order to clear the error information on the removed processor (see Chapter 4).

When a processor is replaced, select menus "Main" – "Processor Settings" to confirm that the ID and L2 and L3 Cache of the additional processor are defined normally (see Chapter 4).

2. Select "Yes" for [Reset Configuration Data] on the Advanced menu.

This is required to update the hardware configuration information. See Chapter 4 for details.

Appendix A

Specifications

Model type at shipment		Diskless				
Processor	Type	64bit Intel® Xeon™ Processor MP		Dual Core Intel® Xeon® Processor 7000 series		
	Clock	3.16 GHz	3.66 GHz	3 GHz	2.60 GHz	3.40 GHz
	2nd cache	1 MB	1 MB	2 x 2 MB	1 x 2 MB	1 x 2 MB
	3rd cache	None		None	4 MB	16 MB
	Number of processors	1				
	Maximum	4				
Chipset		Intel® TwinCastle (8501) + ICH5 + Brockton + PXH				
Memory	Standard	2 GB (1GB × 2)				
	Maximum	64 GB (The standard DIMM must be replaced.)				
	Expansion unit	2 DIMMs				
	Expansion times	Maximum 8 times (2 times per each memory board)				
	Memory module	DDR2 400 SDRAM DIMM (Registered)				
	Error check	ECC				
	Memory mirroring feature Online sparing memory feature Memory Hot-add/Hot-replace feature Memory RAID feature	Supported				
Graphics (VRAM)		ATI® Radeon® 7000M (VRAM 16MB)				
Auxiliary input device	Floppy disk (standard)	–				
	Hard disk (standard)	–				
	Hard disk (maximum)	732.5 GB (146.5 GB × 5)				
	DVD-ROM (standard)	ATAPI Interface × 1 (Load on tray type, x3-8 speed)				
3.5-inch device bay		1 slot (half height) (when optional HDD cage is installed.)				
3.5-inch disk bay		Up to 5 slots (Hot-swappable) (Normal installation) Up to 3 slots (Hot-swappable) (when optional HDD cage is installed.)				
Additional slot	PCI-X 100MHz (64-bit)	4 slots (Hot-swappable)				
	PCI 33MHz (32-bit)	2 slots				
	PCI EXPRESS(x8)	2 slots (Hot-swappable)				
	PCI EXPRESS(x4)	1 slot				
LAN interface		1000BASE-T/100BASE-TX/10BASE-T (2 ports)				
LAN interface (A-RMC)		100BASE-TX/10BASE-T (1 port, dedicated for server management)				
Keyboard		MINI DIN 6-pin connector (1 port)				
Mouse		MINI DIN 6-pin connector (1 port)				
USB		4-pin (3 ports; front: 1 (USB 1.1), rear: 2 (USB 2.0))				
Serial		D-sub 9-pin (2 ports, rear), RJ-45 (1 port, front (exclusively used with either port on the rear panel))				
Parallel		D-sub 25-pin (1 port)				
Network		RJ-45 (2 ports and 1 management port)				
Display		MINI D-sub 15-pin (1 port)				
SCSI		–				
Cabinet design		19-inch rack mounting type (4U)				
External dimensions		483 (width) × 178 (height) × 738 (depth) mm				
Weight		47 kg (Max.)				
Power supply		100 to 127 Vac ±10%, 200 to 240 Vac ±10%, 50/60 Hz ±1Hz				

Power consumption		1200 VA
Environmental requirements	Temperature	10 to 35°C
	Humidity	20 to 80% RH (no condensation)
Others		NEC EXPRESSBUILDER supported, NEC ESMPRO provided in the standard configuration

Appendix B

Other Precautions

Transfer Rate of the On-board LAN Controller

The LAN controller on the IO board has two ports. Each port supports 10Base-T, 100Base-TX, and 1000Base-T networks and a 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 the "Link Speed & Duplex" value the same as the value specified for HUB.

Server Management Software

The EXPRESSBUILDER CD-ROM that comes with the server contains the NEC ESMPRO utility.

Bull recommends that you should install the NEC ESMPRO for effective use of the reliability enhancement features of the server.

Floppy Disk

Your server is not equipped with floppy disk drive. Use the optional USB floppy disk drive if necessary.

CD/DVD-ROM

Keep the following notes in mind to use the CD/DVD-ROM for the server:

- Press the centre of the storage case to remove the CD/DVD-ROM from the 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 hand.
- 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 with 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 attached on the CD/DVD-ROM, wipe the CD/DVD-ROM from its centre to edge with 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 in use.

Tape Media

The following describes data handling 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 save them into two cartridge tapes to make the primary and secondary tapes.

  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 forth 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 to instruct you 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 angle at which the keyboard is easy to operate.   The adjustment assists in reducing strain on your shoulders, arms, and fingers.
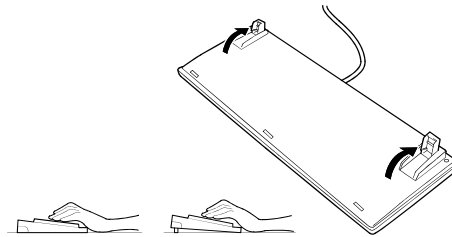
NOTE: The keyboard functions depend on the software.   Refer to the manual that comes with the software for details.

Mouse

Like the keyboard, the mouse is a device to instruct your computer.   Many operating systems and application software require the mouse for operation.

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.)
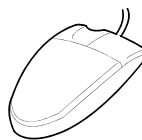
Mouse operation includes "Click," "Double-click," and "Drag."

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.

Click   Double-click   Drag
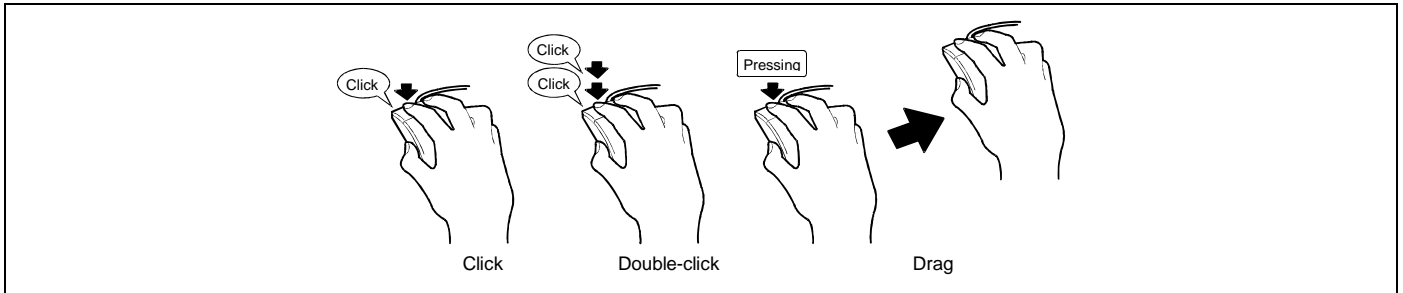
(This page is intentionally left blank.)

Appendix C

IRQ and I/O Port Address

The factory-set interrupt requests and I/O port addresses 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)	IRQ	Peripheral Device (Controller)
0	System timer	8	Real-time clock
1	Keyboard	9	PCI/SCI
2	Cascaded connection	10	PCI
3	COM B serial port (PCI)	11	BMCIRQ/PCI
4	COM A serial port (PCI)	12	Mouse
5	PCI/LPT2 parallel port	13	Numeric processor
6	Floppy disk	14	Primary IDE (DVD-ROM drive)
7	LPT1 parallel port	15	PCI

PIRQ and PCI Device

The factory-set PCI device interrupts are assigned as follows. You can change these interrupts by using the BIOS SETUP, however, use the factory-set interrupts as they are. See Chapter 4 for details.

	PIRQ1	PIRQ2	PIRQ3	PIRQ4	PIRQ5	PIRQ8
USB#1	√					
USB#2				√		
USB20						√
IDE (native mode)			√			
SMBus		√				
VGA					INTA	
RAID			INTA			
LAN			INTA	INTB		
PCISlot#1 (PCI)	INTB		INTA			INTC INTD
PCISlot#2 (PCI)		INTA		INTB		INTC INTD
PCI Slot#3 (PCI-EXPRESS)	INTA	INTB	INTC	INTD		
PCI Slot#4 (PCI-EXPRESS)	INTA	INTB	INTC	INTD		
PCI Slot#5 (PCI-EXPRESS)	INTA	INTB	INTC	INTD		
PCI Slot#6 (PCI-X)	INTB INTD		INTA INTC			
PCI Slot#7 (PCI-X)		INTB INTD		INTA INTC		
PCI Slot#8 (PCI-X)	INTA INTC		INTB INTD			
PCI Slot#9 (PCI-X)		INTA INTC		INTB INTD		

I/O Port Address

The factory-set I/O port addresses for the server are assigned as follows:

Addresses	Description	Chip
00-08h	DMA Control Registers	ICH5
09-0Eh	RESERVED	ICH5
0Fh	DMA Control Register	ICH5
10-18h	DMA Control Register	ICH5
19-1Eh	RESERVED	ICH5
1Fh	DMA Control Register	ICH5
20-21h	Master 8259 Programming Interface	ICH5
24-25h	Master 8259 Programming Interface	ICH5
28-29h	Master 8259 Programming Interface	ICH5
2C-2Dh	Master 8259 Programming Interface	ICH5
2E-2Fh	Configuration Registers	PC87417
30-31h	Master 8259 Programming Interface	ICH5
34-35h	Master 8259 Programming Interface	ICH5
38-39h	Master 8259 Programming Interface	ICH5
3C-3Dh	Master 8259 Programming Interface	ICH5
40-42h	8254 Programming Interface	ICH5
43h	RESERVED	ICH5
4E-4Fh	Configuration Registers	PC87417
50-52h	8254 Programming Interface	ICH5
53h	RESERVED	ICH5
60h	Keyboard/Mouse	PC87417
61h	NMI Status Register	ICH5
62h		PC87417
63h	NMI Status Register	ICH5
64h	Keyboard/Mouse	PC87417
65h	NMI Status Register	ICH5
66h		PC87417
67h	NMI Status Register	ICH5
70h	RESERVED	ICH5
71h	RTC (data)	ICH5
72h	RTC (data)	ICH5
73h	RTC (data)	ICH5
74h	RTC (data)	ICH5
75h	RTC (data)	ICH5
76h	RTC (data)	ICH5
77h	RTC (data)	ICH5
80-91h	16-bit DMA Control Registers	ICH5
92h	Port 92 Register	ICH5
93-9Fh	DMA Control Register	ICH5
A0-A1h	Slave 8259 Programming Interface	ICH5
A4-A5h	Slave 8259 Programming Interface	ICH5
A8-A9h	Slave 8259 Programming Interface	ICH5
AC-ADh	Slave 8259 Programming Interface	ICH5
B0-B1h	Slave 8259 Programming Interface	ICH5
B2-B3h	Power Management	ICH5
B4-B5h	Slave 8259 Programming Interface	ICH5
B8-B9h	Slave 8259 Programming Interface	ICH5
BC-BDh	Slave 8259 Programming Interface	ICH5
C0-D1h	DMA Controller Page Registers	ICH5
C2-DDh	RESERVED	ICH5
DE-DFh	DMA Controller Page Registers	ICH5
F0h	Reset IRQ13	ICH5
102h	VGA	Radeon7000M
170h-177h	Secondary IDE Command Block Registers	ICH5
1F0h-1F7h	Primary IDE Command Block Registers	ICH5
278-27Fh	(Parallel Port 3)	PC87417

Addresses	Description	Chip
2F8-2FFh	Serial port 2	PC87417
376h	Secondary IDE Control Block Registers	ICH5
370-377h	(Floppy disk 2), IDE 2	PC87417
378-37Fh	(Parallel Port 2)	PC87417
3B0-3BBh	VGA	Radeon7000M
3BC-3BEh	Parallel port 1	PC87417
3C0-3CFh	VGA	Radeon7000M
3D4-3D5h	VGA	Radeon7000M
3F6h	Primary IDE Control Block registers	ICH5
3F0-3F7h	Floppy disk 1,IDE 1	PC87417
3F8-3FFh	Serial port 1	PC87417
40Bh	DMA1 Extended Write Mode Register	ICH5
4D0h	Master 8259 ELCR Programming	ICH5
4D1h	Slave 8259 ELCR Programming	ICH5
CF9h	Turbo and Reset Control	TwinCastle

*1   Hexadecimal notation

*2   The I/O port address of a PCI device is set according to its type and number.

Appendix D

Installing Windows Server™ 2003 x64 Editions

This section describes the procedures for installing Windows Server™ 2003 x64 Editions without using Express Setup tool.

BEFORE INSTALLING Windows Server™ 2003 X64 EDITIONS

Please read carefully the following information BEFORE beginning your Windows Server™ 2003 x64 Edition Installation.

Optional Board Supported by EXPRESSBUILDER

EXPRESSBUILDER CD-ROM attached to your system supports the following optional boards:

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

- Supporting installation of operating system in EXPRESSBUILDER
  - LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB (Controller on the I/O board)
  - SecuRAID 321 Disk Array Controller (SCSI 2ch)
- Other optional boards
  - Adaptec 29160LP SCSI Controller

Updating System

If you modified the Windows system, execute "Update the System" in Master Control Menu.

Re-installing to the Hard Disk which has been upgraded to Dynamic Disk

If you want to leave the existing partition when installing the system on the hard disk upgraded to Dynamic Disk, note the following issue:

- Do not select the partition that operating system had been installed as the partition to install the operating system newly.
- Select "Use the current File System" for the format of operating system partition.

MO Device

If you specify the file system as NTFS with MO Device connected during the installation, the file system will not be converted normally. Disconnect MO Device and restart the installation from the beginning.

Media such as DAT

During the operating system installation, do not attach the unnecessary media for operating system installation to the system, such as DAT.

Partition Size

The size for the partition that 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 = 4100 MB
Paging File Size (Recommended)   = Mounted Memory Size $\times$ 1.5
Dump file Size   = Mounted Memory Size + 1 MB
Application Size   = Required Size

> **IMPORTANT:**
>
> - The above-mentioned paging file size is recommended for collecting debug information (memory dump). The paging file with 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 virtual memory shortage when the paging file is insufficient, so set an enough size of the paging file with 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 + 1 MB'.
>
> - If you install any application program or the like, add necessary space to the partition to install these programs.

For example, if the mounted memory size is 512 MB, the partition size will be calculated by the above formula as follows:

4100 MB + (512 MB * 1.5) + (512 MB + 1 MB) + Application Size = 5381 MB + 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 Chapter 5 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 x64 Edition

Preparations for Installation

- EXPRESSBUILDER CD-ROM

- Microsoft® Windows Server™ 2003 Standard x64 Edition (CD-ROM)

- Microsoft® Windows Server™ 2003 Enterprise x64 Edition (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 which you are going to install Windows Server™ 2003 x64 Edition, you do not need to create it again.

You can create Windows Server™ 2003 x64 Edition OEM-DISK for EXPRESSBUILDER with the following two procedures.

- Create from the menu which appears when running the server with EXPRESSBUILDER.

   If you have only your server to create Windows Server™ 2003 x64 Edition OEM-DISK for EXPRESSBUILDER, use this procedure.

   If Windows Server™ 2003 or Windows NT® 4.0 can be operated on your 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 CD-ROM into the 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 CD-ROM and EXPRESSBUILDER starts.

5. Select [Create Support Disk] from [Tools].

6. Select [Windows Server 2003 x64 Edition OEM-DISK for EXPRESSBUILDER] from [Create Support Disk] menu.

7. Insert a floppy disk into the floppy disk drive according to the instruction on the screen.

   Windows Server™ 2003 x64 Edition OEM-DISK for EXPRESSBUILDER will be created.

   Write-protect and attach a label, then keep it safely.

- Create from [Master Control Menu]

   [Master Control Menu] runs on the following operating systems.

   – Windows Server™ 2003 x64 Editions

   – Windows Server™ 2003

   – Windows® XP x64 Edition

   – Windows® XP

   – Windows® 2000

   – Windows® Me/98/95

   – Windows NT® 4.0

   You can create Windows Server™ 2003 x64 Edition OEM-DISK for EXPRESSBUILDER from [Master Control Menu], if you have the computer on which the above operating systems operate.

   Follow the steps below.

1. Prepare one 3.5-inch floppy disk.

2. Run Windows Me/98/95, or Windows 2000, Windows Server 2003, Windows NT 4.0, Windows XP.

3. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive of the server.

   [Master Control Menu] will appear.

4. Click [Setup] with left mouse button and click [Make OEM-DISK] and then [for Windows Server 2003 x64 Edition].

> **NOTE:** You can do the same operation with the menu appeared by the 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. Turn on the system power.

2. Insert the Windows Server™ 2003 x64 Edition CD-ROM into the DVD-ROM drive.

3. Press **Ctrl** + **Alt** + **Delete** to reset the system.

After a bootable operating system has been installed on the hard disk, 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, 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.

Begin after turning on the system power again.

4. Press **F6** in a few seconds when the window is in either 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 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 labelled
              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 Logic MegaRAID SAS RAID Controller Driver (Server 2003 for x64)
  (When LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB is installed.)
– MegaRAID SCSI 320-2 RAID Controller Driver (When add-on board is installed.)

Continue performing tasks according to the subsequent messages that appear.

8. When the following message is shown, press Enter to start "Welcome to Setup".

9. When the installation of Windows Server 2003 x64 Edition has finished, the system reboots automatically.

10. The [Windows Setup] screen will be displayed after logged on to the system.

> **IMPORTANT:**
>
> ■ 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 x64 Edition DISC 2 CD-ROM into the DVD-ROM drive.

Confirm the parameters and click [OK].

12. When the installation has completed, remove Microsoft Windows Server 2003 R2 x64 Edition DISC 2 CD-ROM from the DVD-ROM drive, and restart the system.

After installation is completed, be sure to execute the tasks described in "Driver Installation and Advanced Settings" and "Updating the System" of this manual.

Procedure for License Authentication

Product Key used in the procedure for license authentication should be matched with the COA label in which the product key contained in Windows Server™ 2003 is written.

> **NOTES:**
>
> ■ Execute the activation within 30 days. System may be locked after 30 days is passed.
>
> ■ COA label may be attached to your server.

Updating the System

To ensure normal system operation you should update your system using the following procedures.

1. Logon to the system using the administrator account or other account which is a member of the Administrators group.

2. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

Master Control Menu is automatically appeared on the screen.

3. Click [Setup] with left mouse button and click [Update Bull NovaScale system] section.

4. Continue your work for system update as the following message.

5. Click [OK] to restart the system.

6. Remove the EXPRESSBUILDER CD-ROM from the DVD-ROM drive immediately after clicking [OK]

> **IMPORTANT:** If you change the configuration of the system (by adding or removing hardware or Operating system software components) or repair the system, you must run the system update again.

DRIVER INSTALLATION AND ADVANCED SETTINGS

This section describes on how to install and setup various standard drivers mounted on the device.

For the 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

PROSet is a utility that confirms the function of network contained in network driver.

Utilizing PROSet enables the following items:

- Confirm detailed information of the adapter.

- Diagnose loop back test, packet transmission test and so on.

- Setup of teaming.

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

PROSet is necessary to use these features.

Follow the procedure below to install PROSet:

1. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

2. The [Windows Explorer] dialog starts.

    * Procedure in the case of the standard start menu

        Click Start menu and click [Windows Explorer].

    * Procedure in the case of the classic start menu

        Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].

3. Run "DXSETUP.EXE" in the following directory.

    DVD-ROM DriveLetter:\WINNT\W2K3AMD\NS4\PROSET\WS3XPX64

    The [Intel(R) PROSet - Install Shield Wizard] dialog starts.

4. Click [Next].

5. Choose "I accept the terms in the license agreement" and click [Next].

6. Click [Install].

7. When [Install Shield Wizard Completed] window is displayed, click [Finish].

8. Restart the system.

Network Driver

Specify the details of network driver.

One standard network driver that is mounted will be installed automatically, but the link speed and Duplex mode needs to be specified manually.

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box appears.

   * Procedure in the case of the standard start menu

      1. Click Start menu, Click [Control Panel], Click [Network Connections], and Click [Local Area Connection].

   * Procedure in the case of the classic start menu

      1. Click Start menu, Click [Settings] and Click [Network Connections].

         The [Network Connections] dialog box appears.

      2. Right-click [Local Area Connection] and click [Properties] from pop-up menu.

2. Click [Configure].

   The property dialog box for network adapter appears.

3. Click the [Advanced] and specify the [Link Speed & Duplex] value the same as the value specified for HUB.

4. Click [OK] on the property dialog box for network adapter.

[When PROSet is installed]

1. Open the [Device Manager]

2. Double-click [(Network Adapter Name)] in the list.

3. Click the [Link] and specify the [Link Speed & Duplex Settings] value the same as the value specified for HUB.

4. Click [OK].

Also, add or delete any protocols and services if necessary.

You can operate the process on the property dialog box for local area network which can be appeared from [Network and Dial-up Connection].

> **NOTE:** We recommend you to 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 trouble. For information on how to install the tool, see the "Setting for Solving Problems" described later in this chapter.

Optional Network Board Driver

If you want to use an optional network board (Intel® PRO/1000 PT Dual / Intel® PRO/1000 MT Dual / Intel® PRO 1000 XT Single / Intel® PRO 1000 MF), the network driver will be installed automatically. Therefore, the driver attached to the network board should not be used.

- In case of using (Intel® PRO/1000 PT Dual / Intel® PRO/1000 MT Dual / Intel® PRO 1000 XT Single / Intel® PRO 1000 MF)

  "DVD-ROM Drive Letter:\WINNT\W2K3AMD\NS4\PRO1000\WS3XPX64"

Installation of the Optional Network Board Driver

1. Start Device Manager.

2. Click [Network adapters] and double-click [(Network Adapter Name)].

   [(Network Adapter Name) Properties] appears.

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

3. Click [Driver] tab and click [Update Driver...]. [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.

   Check the [Include this location in the search] check box and specify:

   – [DVD-ROM drive letter:\WINNT\W2K3AMD\NS4\PRO1000\WS3XPX64] when using (Intel® PRO/1000 PT Dual / Intel® PRO/1000 MT Dual / Intel® PRO 1000 XT Single / Intel® PRO 1000 MF)

   Then click [Next].

6. Click [Finish].

Re-install the Network Driver

The network driver will be installed automatically.

Graphics Accelerator Driver

The standard graphics accelerator driver installed by "Update Bull NovaScale system" is automatically installed.

The following is the procedure when it is necessary to install manually.

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

1. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

2. Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].

3. Run "Setup.exe" in the following directory.

   <DVD-ROM Drive Letter>:\WINNT\W2K3AMD\VIDEO\SETUP.EXE

4. Follow the message to continue the installation.

   If the dialog message "Digital Signature could not been found." appears, select [Yes] to continue.

5. Remove the EXPRESSBUILDER CD-ROM from the DVD-ROM drive, follow the on-screen instructions and restart the system.

Installing SCSI Controller Driver

The SCSI controller driver will be installed automatically.

Installing Disk Array Controller Driver SecuRAID 321

To additionally install the SecuRAID 321 disk array controller in a system containing Windows Server™ 2003, connect the controller and take the following steps to install the driver:

1. Start [Device Manager] from [Start] menu → [Control Panel] → [Administrative Tools] → [Computer Management].

2. Double-click [LSI Logic Megaraid SCSI 320-2] which Device Manager lists.

3. Click the [Driver] tab and click [Update Driver...].

4. When the "Update Device Driver Wizard" appears, select "Install from a list or specific location [Advanced]" and click [Next].

5. Select the "Search for the best driver in these locations." and check the "Search removable media [floppy, CD-ROM...]" check box.

6. Insert "Windows Server™ 2003 x64 Edition OEM-DISK for EXPRESSBUILDER" into the floppy disk drive, and click [Next].

7. Copying of the driver is completed, and the [Completing the Hardware Update Wizard] dialog box appears. Click [Finish].

About Windows Activation

Windows Server 2003 x64 Editions must be activated before you can use Windows Server 2003 x64 Editions.

Windows activation process is as follows.

8. Click [Run] on [Start] menu.

   Type as follows in the [Open:] box, and click [OK].

   oobe/msoobe /a
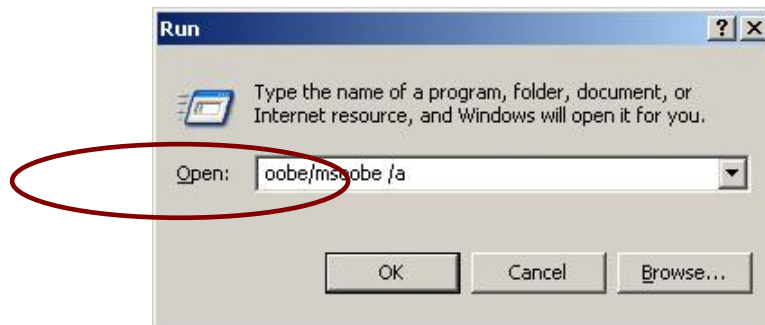
9. When the screen as follows is displayed, click [Next].

The following screen is displayed.

Generating new Installation ID...

10. Process "Windows activation" according to the following message.

SETTING FOR COLLECTING MEMORY DUMP (DEBUG INFORMATION)

Set for collecting memory dump 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

Please read carefully the following information BEFORE beginning your Windows Server™ 2003 Installation.

Optional Board Supported by EXPRESSBUILDER

EXPRESSBUILDER CD-ROM attached to your system supports the following optional boards:

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

- Supporting installation of operating system in EXPRESSBUILDER
  - LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB (Controller on the I/O board)
  - SecuRAID 321 Disk Array Controller (SCSI 2ch)
- Other optional boards
  - Adaptec 29160LP SCSI Controller

Installing Service Pack

You can install the Service Pack on the server. When the Service Pack is not attached to your system, prepare it by yourself.

When using Windows Server 2003 with this equipment, surely apply ServicePack 1.
When installing Windows Server 2003 R2, it is not necessary to apply Service Pack 1.

Updating System

If you modified the Windows system, execute "Update the System" in Master Control Menu.

Re-installing to the Hard Disk which has been upgraded to Dynamic Disk

If you want to leave the existing partition when installing the system on the hard disk upgraded to Dynamic Disk, note the following issue:

- Do not select the partition that operating system had been installed as the partition to install the operating system newly.
- Select "Use the current File System" for the format of operating system partition.

MO Device

If you specify the file system as NTFS with MO Device connected during the installation, the file system will not be converted normally. Disconnect MO Device and restart the installation from the beginning.

Media such as DAT

During the operating system installation, do not connect media not necessary for operating system installation such as DAT.

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 any files or registries, and cause unexpected impact to the system or the applications.

If you install Windows Server 2003 R2, backup user data referring "Windows Server 2003 Clean Installation", and reinstall Windows Server 2003 R2.

> **NOTE:** "in-place upgrade" is to perform overwrite upgrade from Windows Server 2003 which is already installed to Windows Server 2003 R2.

Partition Size

The size for the partition that 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 = 3500 MB (Windows Server 2003 R2)
$\qquad$ = 3500 MB (Windows Server 2003 with Service Pack1)
$\qquad$ = 4400 MB (Windows Server 2003 + Service Pack1 CD-ROM)
Paging File Size (Recommended)   = Mounted Memory Size * 1.5
Dump File Size   = Mounted Memory Size + 12 MB
Application Size   = Required Size

> **IMPORTANT:**
> - The above-mentioned paging file size is recommended for collecting debug information (memory dump). The paging file with 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 virtual memory shortage when the paging file is insufficient, so set an enough size of the paging file with the entire system.
> - The maximum paging file size which can be set on one partition is 4095 MB. If the above paging file size exceeds 4095 MB, specify 4095 MB for the paging file size.
> - The maximum dump file size for the system with more than 2 GB memory mounted is '2048 MB + 12 MB'.
> - If you install any application program or the like, add necessary space to the partition to install these programs.

For example, if the mounted memory size is 512 MB, the partition size will be calculated by the above formula as follows:

3500 MB + (512 MB * 1.5) + (512 MB + 12 MB) + Application Size = 4792 MB + 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 Chapter 5 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 CD-ROM

- Microsoft® Windows Server™ 2003 Standard Edition (CD-ROM) / Microsoft® Windows Server™ 2003 Enterprise Edition (CD-ROM), Microsoft® Windows Server™ 2003 R2 Standard Edition (CD-ROM) / Microsoft® Windows Server™ 2003 R2 Enterprise Edition (CD-ROM)

- User's Guide

- Getting Started

- Windows Server™ 2003 OEM-DISK for EXPRESSBUILDER

- Windows Server 2003 Service Pack (CD-ROM)

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 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 with the following two procedures.

- Create from the menu which appears when running your server with EXPRESSBUILDER.

   If you have only your server to create Windows Server™2003 OEM-DISK for EXPRESSBUILDER, use this procedure.

   If Windows Server™2003 or Windows NT®4.0 can be operated on tour s 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 CD-ROM into the 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 CD-ROM and EXPRESSBUILDER starts.

5. Select [Create Support Disk] from [Tools].

6. Select [Windows Server 2003 OEM-DISK for EXPRESSBUILDER] from [Create Support Disk] menu.

7. Insert a floppy disk into the floppy disk drive according to the instruction on the screen.

   Windows Server 2003 OEM-DISK for EXPRESSBUILDER will be created.

   Write-protect and attach a label, then keep it safely.

- Create from [Master Control Menu]

   [Master Control Menu] runs on the following operating systems.

   – Windows Server™ 2003 x64 Editions

   – Windows Server™ 2003

   – Windows® XP x64 Edition

   – Windows® XP

   – Windows® 2000

   – Windows® Me/98/95

– Windows NT® 4.0

You can create Windows Server™ 2003 OEM-DISK for EXPRESSBUILDER from [Master Control Menu], if you have a computer on which the above operating systems operate.

Follow the steps below.

1. Prepare one 3.5-inch floppy disk.

2. Run Windows Me/98/95, or Windows 2000, Windows Server 2003, Windows NT 4.0, Windows XP.

3. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive of the server.

    [Master Control Menu] will appear.

4. Click [Setup] with left mouse button and click [Make OEM-DISK] and then [for Windows Server 2003].

    > **NOTE:** You can do the same operation with the menu appeared by the right-click.

5. 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 DVD-ROM drive.

3. Press **Ctrl** + **Alt** + **Delete** to reset the system.

    After a bootable operating system has been installed on the hard disk, 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, this step is unnecessary.

    The Windows Server™ 2003 setup screen will appear.

    If the screen is not displayed, **Enter** was not pressed properly.

    Begin after turning on the system power again.

4. Press **F6** in a few seconds when the window is in either 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 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 labelled
                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 SAS Adapter and press **Enter**.

  – LSI Logic MegaRAID SAS RAID Controller Driver (Server 2003 32-bit)
    (When LSI Logic MegaRAID™ SAS PCI EXPRESS™ ROMB is installed.)

  – LSI MEGARAID Products for Windows 2003 (x86)
    (When SecuRAID 321 board is installed.)

Continue performing tasks according to the subsequent messages that appear.

8. When the following message is shown, press Enter to start "Welcome to Setup".

9. When the installation of Windows Server 2003 has finished, the system reboots automatically.

  – Windows Server 2003 has installed: Go on the step 13.

  – Windows Server 2003 R2 has installed: Go on the step 10.

10. When Windows Server 2003 R2 has been installed, the [Windows Setup] screen will be displayed after logged 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 DISC 2 according to the following procedures.

  ■ You can install Microsoft Windows Server 2003 R2 DISC 2 after the application of "System update".
    Be sure to install Microsoft Windows Server 2003 R2 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 DVD-ROM drive.

Confirm the parameters and click [OK].

12. When the installation has completed, remove Microsoft Windows Server 2003 R2 DISC 2 CD-ROM from the DVD-ROM drive, and restart the system.

When the installation has completed, be sure to execute the tasks described in "Driver Installation and Advanced Settings" and "Updating the System" of this manual.

Procedure for License Authentication

Product Key used in the procedure for license authentication should be matched with the COA label in which the product key contained in Windows Server 2003 is written.

> **NOTES:**
>
> - Execute the activation within 30 days. System may be locked after 30 days is passed.
>
> - COA label may be attached to your server.

Updating the System

To ensure normal system operation you should update your system using the following procedures.

1. Logon to the system using the administrator account or other account which is a member of the Administrators group.

2. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

    Master Control Menu is automatically appeared on the screen.

3. Click [Setup] with left mouse button and click [Update Bull NovaScale system] section.

4. Continue your work for system update as the following message.

5. Click [OK] to restart the system.

6. Remove the EXPRESSBUILDER CD-ROM from the DVD-ROM drive immediately after clicking [OK]

    > **IMPORTANT:** If you change the configuration of the system (by adding or removing hardware or Operating system software components) or repair the system, you must run the system update again.

DRIVER INSTALLATION AND ADVANCED SETTINGS

This section describes how to install and setup various standard drivers mounted on the device.

For the 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

PROSet is a utility that confirms the function of network contained in network driver.

Utilizing PROSet enables the following items:

- Confirm detailed information of the adapter.
- Diagnose loop back test, packet transmission test and so on.
- Setup of teaming.

Configuring several network adapters as one team provides the server a tolerant environment on any trouble and enhance throughput between the switches.

PROSet is necessary to utilize these features.

Follow the procedure below to install PROSet.

1. Insert the EXPRESSBUILDER CD-ROM into the DVD-ROM drive.

2. The [Windows Explorer] dialog starts.

   * Procedure in the case of the standard start menu

        Click Start menu and click [Windows Explorer].

   * Procedure in the case of the classic start menu

        Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].

3. Run "PROSET.EXE" in the following directory.

   <DVD-ROM Drive Letter>:\WINNT\DOTNET\NS4\PROSET\2KXPWS03

   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. Choose "Typical" and click [Next].

7. Click [Install].

8. When [InstallShield Wizard Completed] window is displayed, click [Finish].

9. Restart the system.

Network Driver

Specify the details of network driver.

Two standard network drivers that are mounted will be installed automatically, but the link speed and Duplex mode need to be specified manually.

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box appears.

   * Procedure in the case of the standard start menu

        1. Click Start menu, Click [Control Panel], Click [Network Connections], and Click [Local Area Connection].

   * Procedure in the case of the classic start menu

1. Click Start menu, Click [Settings] and Click [Network Connections].

   The [Network Connections] dialog box appears.

2. Right-click [Local Area Connection] and click [Properties] from pop-up menu.

2. Click [Configure].

The property dialog box for network adapter appears.

3. Click the [Advanced] and specify the [Link Speed & Duplex] value the same as the value specified for HUB.

4. Click [OK] on the property dialog box for network adapter.

[When PROSet is installed]

1. The [Intel PROSet] dialog box appears.

   * Procedure in the case of the standard start menu

   Click Start menu, point to [Control Panel] and click [Intel PROSet].

   * Procedure in the case of the classic start menu

   1. Click Start menu, point to [Settings] and click [Control Panel].

   2. Double-click [Intel(R) PROSet] on the [Control Panel] window.

2. Click [(Network Adapter Name)] in the list.

3. Click the [Speed] and specify the [Link Speed & Duplex Settings] value the same as the value specified for HUB.

4. Click [Apply] and click [OK].

Specify the other network drivers with the same process as above.

Also, add or delete any protocols and services if necessary.

You can operate the process on the property dialog box for local area network which can be appeared from [Network and Dial-up Connection].

> **NOTE:** We recommend you to add "Network Monitor" at "Adding Services".
>
> "Network Monitor" can monitor frames (or packets) sent or received by a computer on which "Network Monitor" is installed.   This is an effective tool for analyzing network faults.
>
> For information about the installation procedure, see Chapter 6.

Re-install the Network Driver

The network driver will be installed automatically.

Installing SCSI Controller Driver (Adaptec 29160LP)

If you use SCSI controller driver (Adaptec 29160LP), update your system with EXPRESSBUILDER CD-ROM attached to your system.

The SCSI controller driver will be installed automatically.

Installing Disk Array Controller Driver (SecuRAID 321)

To additionally install the SecuRAID 321 in a system containing Windows Server™ 2003, connect the controller and take the following steps to install the driver:

1. Start [Device Manager] from [Start] menu → [Control Panel] → [Administrative Tools] → [Computer Management].

2. Double-click [LSI Logic Megaraid SCSI 320-2] which Device Manager lists

3. Click the [Driver] tab and click [Update Driver...].

4. When the "Update Device Driver Wizard" appears, select "Install from a list or specific location [Advanced]" and click [Next].

5. Select the "Search for the best driver in these locations." and check the "Search removable media [floppy, CD-ROM...]" check box.

6. Insert "Windows Server 2003 OEM-DISK for EXPRESSBUILDER" into the floppy disk drive, and click [Next].

7. Copying of the driver is completed, and the [Completing the Hardware Update Wizard] dialog box below appears. Click [Finish].

About Windows Activation

Windows Server 2003 must be activated before you can use Windows Server 2003.

Windows activation process is as follows.

1. Click [Run] on [Start] menu.

   Type as follows in the [Open:] box, and click [OK].

   oobe/msoobe /a
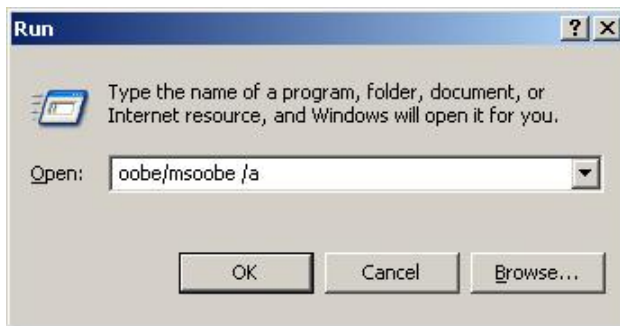
2. When the following screen is displayed, click [Next]

   The following screen is displayed.

3. Process "Windows activation" according to the following message.

SETTING FOR COLLECTING MEMORY DUMP (DEBUG INFORMATION)

Set for collecting memory dump using the procedure described in Chapter 5.

Appendix F

Product Configuration Record Table

Use this table for information about setup and system environment change.

Hardware

Main Unit						
	Model name		Serial No.		Date Installed	
Processor						
#1	Clock		Serial No.		Date Installed	
#2	Clock		Serial No.		Date Installed	
#3	Clock		Serial No.		Date Installed	
#4	Clock		Serial No.		Date Installed	
Memory						
Group #1	Size		Serial No.		Date Installed	
Group #2	Size		Serial No.		Date Installed	
Group #3	Size		Serial No.		Date Installed	
Group #4	Size		Serial No.		Date Installed	
Group #5	Size		Serial No.		Date Installed	
Group #6	Size		Serial No.		Date Installed	
Group #7	Size		Serial No.		Date Installed	
Group #8	Size		Serial No.		Date Installed	
Monitor						
	Type		Model name		Serial No.	
					Date Installed	
Hard Disk Drive						
Slot 0	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Slot 1	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Slot 2	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Slot 3	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Slot 4	Type			Serial No.		
	Capacity			Date Installed		
	Type number					

Backup Device						
Slot 1	Size		Capacity		Serial No.	
(Optional)	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	
PCI Slot #6						
	Model name				Serial No.	
					Date Installed	
PCI Slot #7						
	Model name				Serial No.	
					Date Installed	
PCI Slot #8						
	Model name				Serial No.	
					Date Installed	
PCI Slot #9						
	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	
Display						
	Model name				Serial No.	
	Manufacturer				Date Installed	
Keyboard						
	Model name				Serial No.	
	Manufacturer				Date Installed	
Mouse						
	Model name				Serial No.	
	Manufacturer				Date Installed	

Software

Firmware version	
Operating system Application of RUR media	Name: Version: ☐ Apply Name: Version:
File system	☐ FAT ☐ HPFS ☐ NTFS ☐ Others ( )
Bundled software installed	
Licensed software installed	
Application running when a failure occurred	

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