NovaScale R460 E1

User's Guide

NOVASCALE

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User's Guide

Hardware

January 2008

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REFERENCE
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Proprietary Notice and Liability Disclaimer

Trademarks

Suggestions and criticisms concerning the form, content, and presentation of this manual are invited. A form is provided at the end of this manual for this purpose.

Table of Contents

Text Conventions

This guide uses the following text conventions.

Warnings, cautions, and notes have the following meanings:

⚠ Warning

Warnings alert you to situations that could result in serious personal injury or loss of life.

⚠ Caution

Cautions indicate situations that can damage the system hardware or software.

Notes: *give important information about the material being described.*

■ Names of keyboard keys are printed as they appear on the keyboard. For example, **Ctrl**, **Alt**, or **Enter**.

■ Text or keystrokes that you enter appear as boldface type. For example, type **abc123** and press **ENTER**.

■ File names are printed in upper case letters. For example, AUTOEXEC.BAT.

Safety Notices

⚠ Caution

To reduce the risk of electric shock which could cause personal injury, follow all the safety notices.

Symbols are shown in your documentation and on your equipment to indicate safety hazards.

Regulatory Information

European Notice

Products with the CE marking comply with both the Electromagnetic Compatibility Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) - modified by the Directive 93/68/EEC - issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Standards:

■ EN55022: Radio Frequency Interference

■ EN55024 (1998+A1:2001): Immunity characteristics

■ EN6100-3-2: Limits for harmonic current emissions

■ EN6100-3-3: Limitation of voltage fluctuation and flicker in low-voltage supply system

■ EN60950-1 (2001): Product Safety

⚠ 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).

If your system includes a telecommunication network board, the input/output socket is classified as Telecommunication Network Voltage (TNV-3).

USA and Canada Notice

Products with UL marking comply with the following UL standards:

■ UL 1950 (3rd edition 1998)

Products with FCC marking comply with the following FCC standards

■ FCC part 15

The model type/ref. used for UL and FCC certification can be found on the regulatory labels stuck on your system.

The equipment has been tested and found to comply with the limits for a Class A or B 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.

Modifications to the Product

CE and FCC Marking

We cannot be held responsible for modifications made by the User and the consequences thereof, which may alter the conformity of the product with the CE or FCC Marking.

Connections and Remote Earths

PELV (Protected Extra Low Voltage)

To ensure the extra-low voltage integrity of the equipment, only connect equipment with mains-protected electrically-compatible circuits to the external ports.

SELV (Safety Extra Low Voltage)

Every input and output of this product is classified as Safety Extra Low Voltage.

Remote Earths

To prevent electrical shock, connect all local (individual office) systems and system support equipment to the same electrical circuit of the building wiring. If you are unsure, check the building wiring to avoid remote earth conditions.

Building Supply

Only connect the equipment to a building supply that is in accordance with current wiring regulations in your country. In the U.K., those are the IEE regulations.

Power Supply and Cables

Power Supply

■ The DC push-button on/off switch on the front panel does not turn off the system AC power. +5vdc is present on the system board whenever the AC power cords are connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

■ Under no circumstances should the user attempt to disassemble the power supply. The power supply has no user-replaceable parts. Inside the power supply are hazardous voltages that can cause serious personal injury. A defective power supply must be returned to your dealer.

Cables

■ In the U.S.A. and Canada, the power cord must be a UL-listed detachable power cord (in Canada, CSA-certified), type ST or SJT, 16 AWG, 3-conductor, provided with a moulded-on NEMA type 5-15 P plug cap at one end and a moulded-on cord connector body at the other end. The cord length must not exceed 9 feet (2.7 meters).

■ Outside the U.S.A. and Canada, the plug must be rated for 250 VAC, 10 amp minimum, and must display an international agency approval marking. The cord must be suitable for use in the end-user country. Consult your dealer or the local electrical authorities if you are unsure of the type of power cord to use in your country. The voltage change occurs via a switch in the power supply.

■ The detachable power supply cords are intended to serve as the disconnect devices.

■ For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.

■ This equipment has a 3-wire, grounded power cords. To prevent electrical hazards, do not remove or defeat the ground prong on the power cords. Replace a power cord if it gets damaged. Contact your dealer for an exact replacement.

Batteries

Lithium batteries can be dangerous. Improper handling of lithium batteries may result in an explosion. Dispose of lithium batteries as required by local ordinance. Also *see "Product Disposal" on page 14*

Chassis Cover Removal and Replacement

When servicing your system, make sure to replace the chassis cover and secure it with the screws before plugging in the power cable and turning it on. The chassis cover ensures proper airflow and cooling.

Laser Compliance Statement

The optical devices are tested and certified to be compliant with International Electro-technical Commission IEC60825-1 and European EN60825-1 standards for Class 1 laser products.

Class 1 laser products are not considered hazardous. The optical devices are designed such that there is never human access to laser radiation above a Class 1 level during normal operation or prescribed maintenance conditions.

The optical devices installed in your system is designed for use solely as a component of such electronic product and therefore does not comply with the appropriate requirements of Code of Federal Regulation Sec. 1040.10 and Sec. 1040.11 for **COMPLETE** laser products

Warning - Hazardous Voltage!

Hazardous voltage is present inside your system when it is connected to an AC supply even when the system's power switch is off. Exposure to Hazardous Voltage could cause personal injury. To reduce the risk of electric shock which could cause personal injury, follow all safety notices. The symbols shown are used in your documentation and on your equipment to indicate safety hazards.

Warning -Avoid Electrostatic Discharge!

Circuit cards and integrated circuits can be easily damaged by static electricity. To reduce risk of damage, store them in protective packaging whenever they are not installed in your system.

Before you install or remove memory modules, video memory, disk drives, circuit cards or other devices, protect them from static electricity. To do so, make sure your system's power switch is **OFF**. Then, unplug the system's AC power cord(s). Wear an anti-static wrist strap (available at electronic supplies stores) to handle the device you want to install. Be sure to connect the wrist strap to an unpainted metal portion of the system chassis.

As an alternative, you can dissipate electrostatic buildup by touching an unpainted metal portion of the system chassis with one hand. Handle the device you are installing with the other hand, and maintain continuous contact with the unpainted portion of the chassis until it is installed in the system.

Product Disposal

The Waste Electrical and Electronic Equipment (WEEE) Directive requires that used electrical and electronic products must be disposed of separately from normal household waste in order to promote reuse, recycling and other forms of recovery and to reduce the quantity of waste to be eliminated with a view to reduce landfill. WEEE includes accessories such as keyboard, mouse, remote control, speakers, etc. When you dispose of such products, please follow the agreement made between you and us and/or your distributor.

Using This Guide

This user's guide provides a quick reference to information about your server system. Its goal is to familiarise you with your system and the tasks necessary for system configuring and upgrading.

This guide contains the following information:

■ Chapter 1 contains information about the front, back and internal features of your system and about the motherboard. It lists the standard and optional features of your system and provides details about the ExpressBuilder DVD-ROM. It also provides rack version of your system specific information.

■ Chapter 2 helps you installing the server in an appropriate place, make connections and start using your system.

■ Chapter 3 shows you how to configure your system and helps you set up the various options.

■ Chapter 4 provides all the information you need to remove components from your system and install new ones. You will find in this chapter how to install hard disk drives, upgrade memory, install optical devices... etc.

■ Chapter 5 gives you information about how to solve the various issues you may encounter with your system.

Related Documents

In addition to this User Guide, several other documents are included with your system either as electronic files (on the ExpressBuilder DVD-ROM) or as paper copy shipped with your server.

We recommend you read these additional documents as it becomes necessary when setting up, using or upgrading your server system.

Care and Handling

Use the following guidelines to properly handle and care for your system.
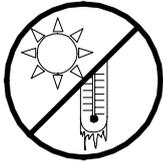
Protect the system from extremely low or high temperatures. Let the system warm (or cool) to room temperature before using it.

Keep the system away from magnetic forces.

Keep the system dry. Do not wash the system with a wet cloth or pour fluid into it.
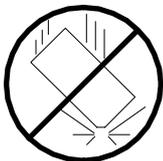
Protect the system from being bumped or dropped.

Check the system for condensation. If condensation exists, allow it to evaporate before powering on the system.

Keep the system away from dust, sand, and dirt.

Care and Handling

System Overview

Your Bull NovaScale R460 E1 server is a modular, multiprocessing server based on the Intel® Xeon™ microprocessor. It is a solid performer and offers the latest technology. The combination of computing performance, memory capacity, and integrated I/O provides a high performance environment for many server market applications. These range from large corporations supporting remote offices to small companies looking to obtain basic connectivity capability such as file and print services, e-mail, web access, web site server, etc.

Your server is housed and available as a rack-mount system. Your server conveniently installs into a standard EIA 19-inch rack assembly.
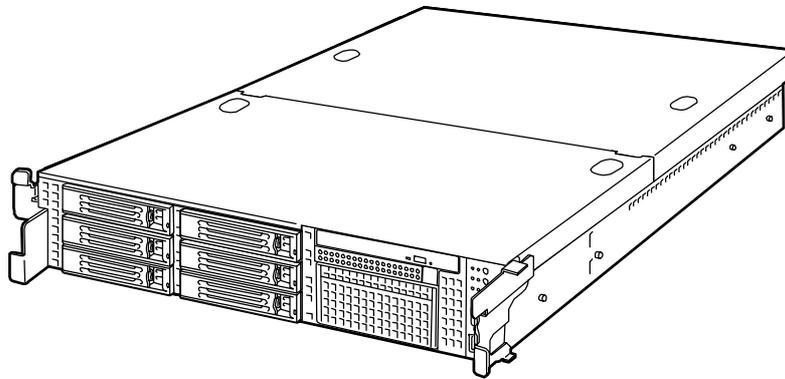
Figure 1: Bull NovaScale R460 E1 Server

System Chassis Features

External View
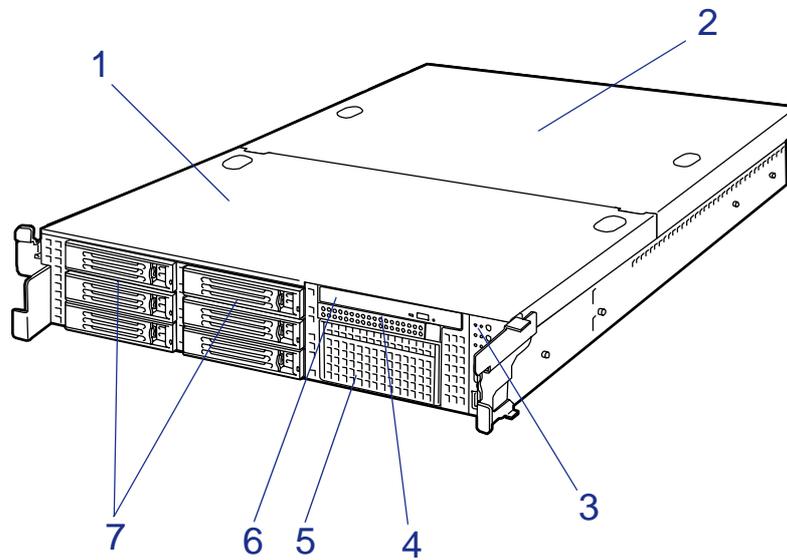
Figure 2: External View

1	**Drive cover**
2	**Logic cover**
3	**Switches, indicators, and front I/Os**
4	**Backup file device bay**
5	**Floppy disk drive bay**
6	**Optical disc drive**
7	**SAS hot-plug hard disk drive bay**

Front View with Front Bezel Closed

The following figure shows the location of the front system features.
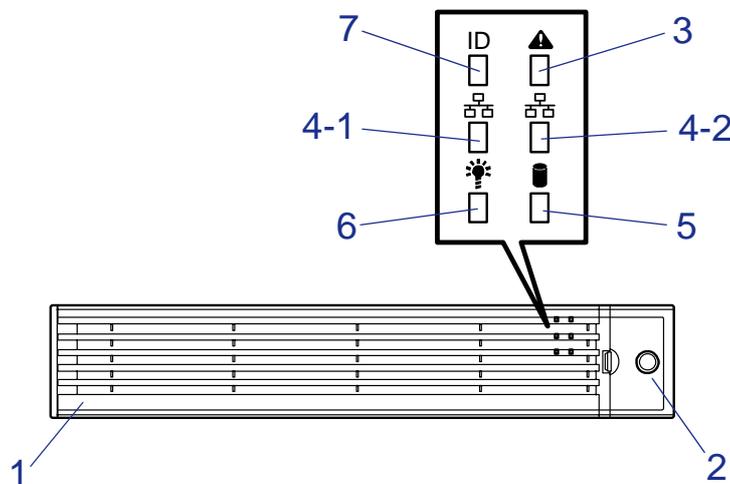
Figure 3: Front View with Front Bezel Closed

1   **Front bezel**

The front bezel is a cover protecting the front devices during daily operation. A security key is provided to lock the cover.

2   **Key slot**

Insert the security key into this slot when unlocking the front bezel.

3   **Status lamp (green/amber) (on the front panel)**

This lamp indicates the server status. The lamp is green during normal operation. The lamp turns amber or flashes when the server enters the abnormal state.

4   **ACT lamp (green)**

This lamp is on while the system is connected to the network. The number "1" on the icon indicates LAN port 1, and the number "2" indicates LAN port 2.

5   **Disk Access lamp (green/amber)**

This lamp is green during access to the internal hard disks. The lamp turns amber when even one of the internal hard disks fails.

6   **Power lamp (green)**

This lamp turns green when the power is turned on. (The lamp also goes on or flashes when software issues a command.)

7   **UID lamp (blue)**

This lamp goes on when the UID switch is pressed. (The lamp also goes on or flashes when software issues a command.)

Front View with Front Bezel Removed
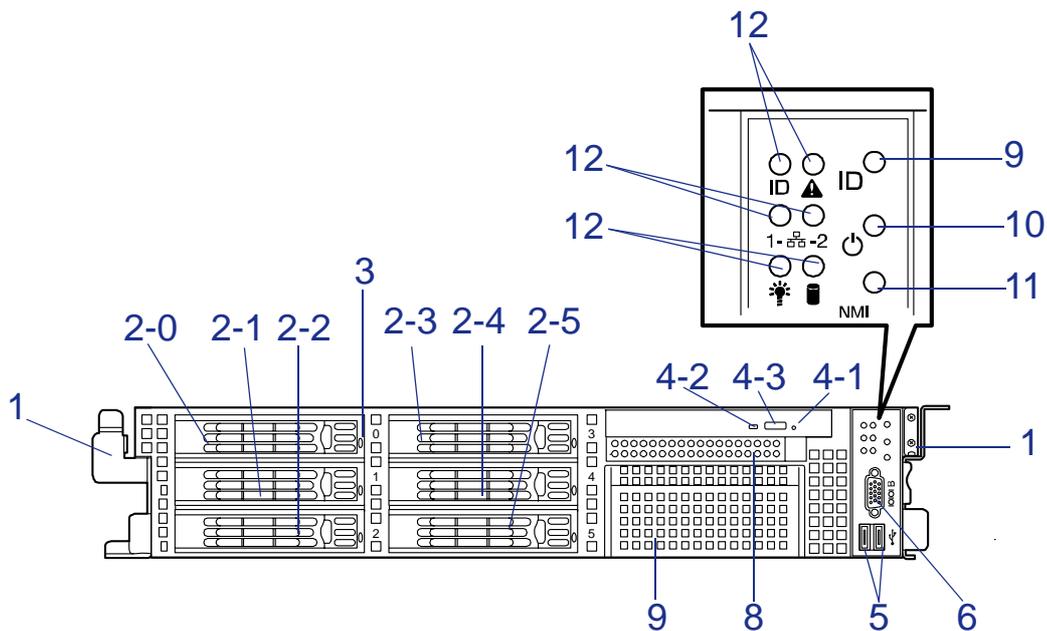
Figure 4: Front View with Front Bezel Remved

1   **Handles (1 at the right and left each)**

Hold the handles when dismounting/mounting the server from/in the rack.

2   **Hard disk bays**

Mount hard disks in the bays. Each number following the bold-faced number indicates the SCSI ID or SAS port number. In the standard configuration, hard disk drive trays are mounted in all the bays.

3   **Disk lamp (green/amber)**

Lights green when the hard disk is being accessed.

Lights amber when the hard disk fails.

Flashes alternatively green and amber during the build process (only in RAID system).

4   **Optical disc drive**

This drive reads/writes data from the optical disc drive.
4-1 Emergency hole
4-2 Disk access lamp
4-3 CD tray eject button

5   **USB connectors (2 ports)**

Connect USB devices via these connectors.

6   **Serial port B (COM B) connector**

Used to communicate with the remote console via direct connection.

7   **Backup device bay**

Mount an optional DAT or AIT drive in this bay.

8   **Floppy disk drive bay**

Mount an optional floppy disk drive in this bay.

9   **UID (Unit ID) switch**

Press this switch to turn on/off the UID lamps on the front and rear panels of the server. Pressing the switch once turns on the lamps. Pressing it again turns them off. (The LED also goes on or flashes when the software issues a command.)

10   **Power switch**

Press this switch to turn on/off the power.

While the system is off, press the switch once to turn on the power, and the POWER lamp goes on.

While the system is on, press the switch once to turn off the power.

If required, press the switch for 4 seconds or more to forcibly turn off the power.

11 **DUMP switch (NMI switch)**

Press this switch to dump memory.

12 **Lamps** (See the previous page for the six lamps.)

Rear View
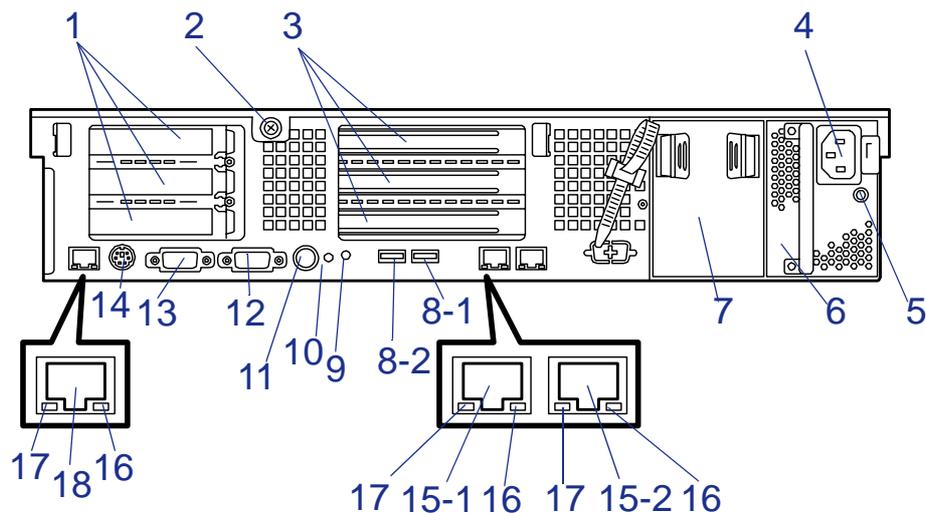
Figure 5: Rear View

1   **Low-profile PCI board extension slots**

Mount PCI boards of the low-profile type into the slots. The slots are called 3C, 2C, and 1C from top.
The RAID controller is factory-installed in slot 3C.

2   **Captive thumbscrew**

Secures the logic cover.

3   **Full-height PCI board extension slots**

Mount PCI boards of the full-height type in the slots. The slots are called 3B, 2B, and 1B from top.

4   **AC inlet**

Connect the provided power cord to this socket.

5   **AC power lamp**

This LED turns green and flashes when the power supply receives the AC power from the power cord.
The LED grows steadily after supplying the DC power to the system (power-on).
Turns amber when a power failure occurs.
Flashing in amber indicates no AC power is received in the redundant configuration.

6   **Power supply unit (power supply slot 1)**

This unit supplies power to the server.

7   **Power supply unit extension slot (power supply slot 2)**

Mount an optional power supply unit in this slot. The slot is protected with the blank cover in the
standard status.

8   **USB connectors**

Connect device compliant with the USB interface to this connector.

9   **UID lamp (blue)**

This lamp goes on when the UID switch is pressed. (The lamp also goes on when software issues a
command.)

10   **DUMP switch**

Press this switch to dump memory.

11   **UID (Unit ID) switch**

Press this switch to turn on/off the UID lamps on the front and rear panels of the server. Pressing the
switch once turns on the lamps. Pressing it again turns them off.

12   **VGA connector**

Connect the display unit to this connector.

13   **Serial port A (COM A) connector**

Connect device having a serial interface to this connector. Use COM B connector to communicate with the remote console. A leased line cannot be connected directly to this connector.

14 **Mouse/keyboard connectors**

Connect the mouse and keyboard to the connectors through the provided relay cables.

15 **LAN connectors**

Connect network systems on the LAN to the connectors.
The number "1" following the bold-faced number indicates LAN port 1, and the number "2" indicates LAN port 2.

16 **Speed lamp (amber)**

This lamp indicates the transmission speed of the LAN.

17 **LINK/ACT lamp (green)**

This lamp indicates the access status of the LAN.

18 **Management LAN Port**

100BASE-TX/10BASE-T interface port used to manage the server via the LAN.

Internal View
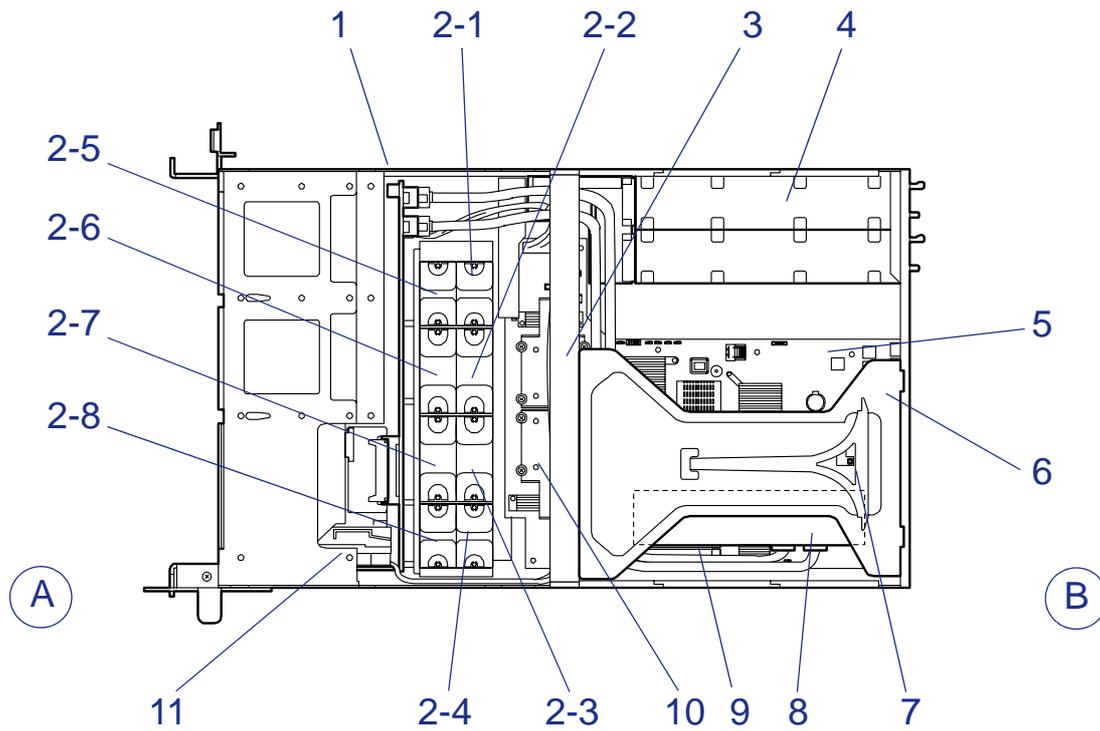
Figure 6: Internal View

A   **Front side**

B   **Rear side**

1   **Backplane**

2   **Cooling fans**

  2-1: FAN1
  2-2: FAN2
  2-3: FAN3
  2-4: FAN4
  2-5: FAN5 (optional redundant fan)
  2-6: FAN6 (optional redundant fan)
  2-7: FAN7 (optional redundant fan)
  2-8: FAN8 (optional redundant fan)

3   **Support arm**

4   **Power supply unit**

5   **Motherboard**

6   **Riser card**

7   **Cover open sensor**

8   **RAID Board**

  The RAID controller is factory-installed in slot 3C.

9   **DIMM (Two DIMMs are mounted as standard in slots #11 and #21)**

10   **Processor (mounted under the heat sink)**

11   **Front panel board**

System board Features

Motherboard
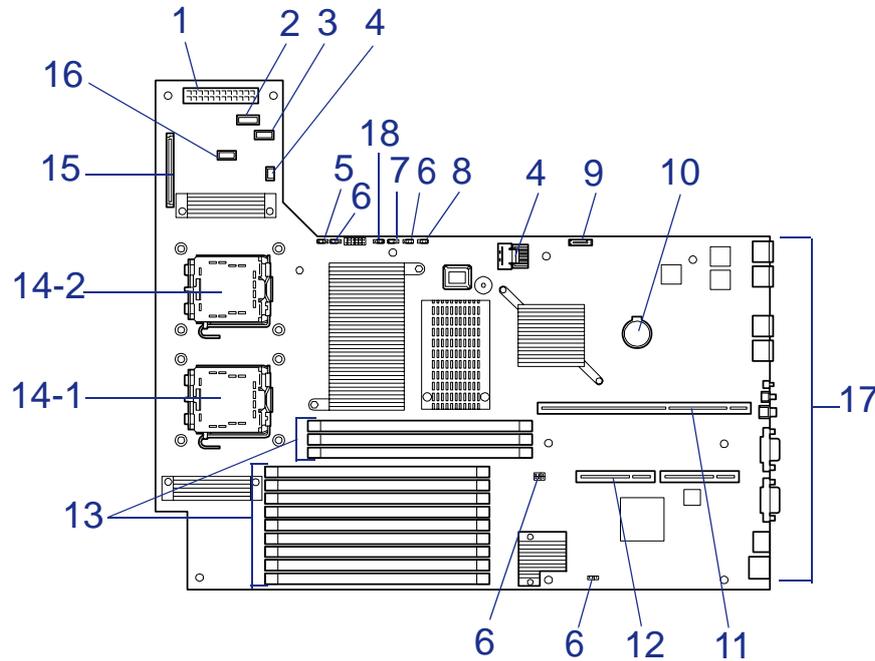
Figure 7: Motherboard

1   **Power connector**

2   **Power signal connector**

3   **USB connector**

4   **Unused connector**

5   **Jumper switch for redundant fan**

6   **Unused jumper switch**

7   **Password Clear jumper switch**

8   **CMOS Clear jumper switch**

9   **SATA2 Backup device connector**

10   **Lithium battery**

11   **Connector for PCI Riser Card (for full-height board)**

12   **Connector for PCI Riser Card (for low-height board)**

13   **DIMM sockets (for the interleave type)**

The sockets are called #41, #42, #43; #11, #12, #13, #21, #22, #23, #31, #32, #33 sequentially from top.

14   **Processor sockets**

#14-1: Processor 1

#14-2: Processor 2

15   **Backplane connector**

16   **Connector for USB backup device**

17   **External connectors**

18   **RAID Configuration jumper switch**

ACPI

The motherboard supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 2.0 specifications. An ACPI aware operating system can put the system into a state where the hard drives spin down, the system fans stop, and all processing is halted. However, the power supply will still be on and the processors will still be dissipating some power, so the power supply fans will still run.

The system board supports sleep states s0, s1, s4, and s5:

- ■ s0: Normal running state.

- ■ s1: Processor sleep state. No context will be lost in this state and the processor caches will maintain coherency.

- ■ s4: Hibernate or Save to Disk: The memory and machine state are saved to disk. Pressing the power button or other wakeup event will restore the system state from the disk and resume normal operation. This assumes that no hardware changes have been made to the system while it was off.

- ■ s5: Soft off: Only the RTC section of the CSB and the BMC are running in this state. No context is saved by the OS or hardware.

⚠ Caution

The system is off only when the AC power cord is disconnected.

Remote Management Feature

Server management is concentrated in the ExpressScope. The ExpressScope and associated circuitry are powered from a 5V DC standby voltage, which remains active when system power is switched off, but the ac power source is still on and connected.

The ExpressScope supports Dianascope, which allows remote server management through the network. Events monitored by the manager system include over-temperature and over-voltage conditions, fan failure, or chassis intrusion.

Information on Dianascope may be found in the ExpressBuilder DVD-ROM.

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

The ExpressScope performs the following:

- ■ Monitors server board temperature and voltage*

- ■ Monitors processor presence and controls Fault Resilient Boot (FRB)

- ■ Detects and indicates baseboard 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.

- ■ Monitors the hard disk drives.

* NEC ESMPRO also supports these features.

> 📰 **Note:** *To use the Remote Management Extended License, contact your sales representative to see the latest information about remote console/remote media feature.*

Degradation Feature

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

> 📰 *Note:* The degradation feature is only available when at least two DIMMs or processors are installed.

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

Memory RAS Features

Your server board has memory mirroring and online spare memory features. For more information see *"Using the Memory RAS Features" on page 161*.

Remote Power-On Feature (Wake On LAN)

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

To enable this feature, use the BIOS setup utility, "SETUP." (See *"BIOS Setup Utility" on page 64*.)

The remote power-on feature is not available in the following cases. Press the POWER switch once to start the OS, 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.)

AC-Link Feature

When the power cord of the server is connected to an uninterruptible power supply (UPS) unit, the server supports the power linkage feature that enables control over the power supply from the UPS to the server. The AC-Link feature can be enabled or disabled with the Server menu of the BIOS setup utility, "SETUP." (See *"BIOS Setup Utility" on page 64*.)

Standard Features

High performance

- Quad-core Intel® Xeon® Processor
- High-speed memory access (DDR2-667)
- High-speed network interface (1000 Mbps/100 Mbps/10 Mbps supported)
- High-speed disk access: SATAII 300 or Serial Attached SCSI (SAS).

Expandability

- PCI Express (x8): 1 slot (low profile) PCI Express (x4): 2 slots (low profile, connector x8) (the factory-installed RAID controller occupies the slot.) PCI Express (x8): 1 slot (full height)
- Large memory up to 48GB.
- Up to two multi-processors are available for upgrade.
- Three network ports (one for management LAN)
- USB2.0 interface

Management utilities

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

Maintenance Features

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

High reliability

- Memory monitoring feature (error correction/error detection)
- CPU/memory degradation feature (logical isolation of a failed device)
- Memory x4/x8 SDDC feature

- Memory mirroring/online spare memory feature
- Bus parity error detection
- Temperature detection
- Error notification
- Internal fan monitoring feature
- Internal voltage monitoring feature
- Redundant power supply (hot-swap)
- Internal RAID Controller
- Auto-rebuild feature (hot-swappable)
- BIOS password feature
- Mechanical security lock
- Redundant fans

Many available features

- Redundant power supply (with optional power supply unit installed)
- El Torito Bootable CD-ROM (no emulation mode) format support
- POWER switch mask
- Software power-off
- Remote power-on feature
- AC-Link feature
- Remote Console feature

Self-diagnosis

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

Setup

- ExpressBuilder (system setup utility)
- Parameter File Creator
- SETUP (BIOS setup utility)

System Security

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

Security with Mechanical Locks and Monitoring

To unlock the bezel, insert the key in the lock and turn the lock counterclockwise until it stops (about a quarter turn). The bezel is now unlocked and can be opened again.

To lock the bezel, insert the key in the lock. Turn the lock clockwise until it stops (about a quarter turn). The bezel is now locked and cannot be opened.

Software Locks via the BIOS 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, you can access the system only after you enter the correct password(s). For example:

- ■ Mask the power switch function after the power-on.

- ■ Set and enable a supervisor password.

- ■ Set and enable a user password.

- ■ Disable access to the boot sector of the operating system hard disk drive.

ExpressBuilder DVD

Please setup the server using the ExpressBuilder DVD both when setting it up for the first time, and when you make changes to its configuration.

With the ExpressBuilder DVD you can:

■ Install the Operating System, using the Express Setup.

■ Diagnose the system, using the System Diagnostics tool.

■ Create a support disk; this disk will be used to manually install a Microsoft operating system.

■ Update the BIOS or the server firmware.

■ Update a Microsoft operating system, using the "Update System" feature of the Windows Autorun menu (available from the windows-based ExpressBuilder).

■ Install utilities, such as management software for Windows (NEC ESMPRO, Dianascope, etc.). Windows-based applications are installed via the Windows Autorun menu.

■ Read the on-line documentation (Windows systems only).

> 📄 *Note: Some of the above features can be performed remotely using a cross cable (COM) or LAN.*

Software End-User License Agreement

Carefully read the terms and conditions of the Software End User License Agreement printed on the ExpressBuilder DVD-ROM sleeve.

Using a Client Computer equipped with a CD Drive

The ExpressBuilder disk is a DVD, which means that the client computer you want to use to manage the server needs a DVD drive.

If you want to install the ExpressBuilder management software to the client without a DVD drive, make a CD-R from the ExpressBuilder DVD according to the procedure below.

> 📄 *Note:The sole purpose of this procedure is the creation of CD to install the management software to the client.*

1. Insert the ExpressBuilder DVD in a computer equipped with a DVD drive.

2. Close the Autorun menu if it is displayed.

3. Copy the below files of ExpressBuilder to a hard disk using the Explorer.

```
\(root folder)
      │
   \002 : copy version.xml

          ├──── \ar_menu : copy this sub-folder

          ├──── \doc : copy this sub-folder

          └──── \win : copy this sub-folder
```
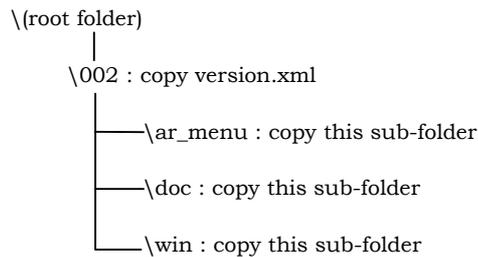
4. Delete the **ar_menu\autorun_menu.xml** on the hard disk, and rename the **ar_menu\autorun_en.xml** on the hard disk to **autorun_menu.xml**.

5. Copy the above files/folders to a CD-R.

Match the root folder when you burn a CD-R.

6. Delete the files/folders that you copied during step 3.

7. Insert the CD-R in the client computer on which you want to install the management software.

8. Kick the below file of the CD-R by using Explorer.

\002\ar_menu\autorun_menu.exe   (for Windows 32 bit edition)

autorun_menu_x64.exe   (for Windows 64 bit edition)

Setting Up the System

Overview

This chapter describes how to select a site, unpack the system, make cable connections, and power on the system units. Information on front and rear panel features, switches and LEDs are also included in this chapter.

Setup Flow

Follow the flowchart below to set up the server.

Select a suitable site for the server. Assemble the 19-inch rack assembly.

Unpack the server and accessories from the chipping carton box.

Install the server into the rack assembly.

Connect peripheral devices to the server.

Connect the power cord to the server.

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

Install an operating system to the server. .

Install the utilities in the provided ExpressBuilder DVD-ROM..

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 Server Site

To use the server, install it on a standard EIA 19-inch rack assembly.

Refer to the documentation attached to the rack or contact your sales agent for the installation of the server on 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 "General Safety Information" on page 135 for details.

■ Do not use the server in any unapproved place.

■ Do not connect the ground line to a gas pipe.

⚠ 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 "General Safety Information" on page 135 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 leave more than one device being pulled out from the rack.

■ Do not provide the wiring exceeding the rating power.

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.

■ Narrow space from which devices cannot be pulled out from the rack completely

■ Place that cannot bear the total weights of the rack and devices mounted on the rack

■ Place where stabilizers cannot be installed or where the rack can be installed only after the practice of proper earthquake-resistant construction

■ Place of uneven or slanting floor

■ Place of drastic temperature change (near a heater, air conditioner, or refrigerator)

■ Place where intense vibration may be generated

■ Place where corrosive gas is generated, chemicals are nearby, or chemicals may be accidentally sprayed over

■ Place where a carpet not subject to anti-static process is laid.

■ Place where some objects may be fallen on the rack

■ Place near a device generating intense magnetic field (such as a TV, radio, broadcast/communication antenna, power transmission wire, and electromagnetic crane) is placed (If unavoidable, contact your sales agent to request proper shield construction.)

■ Place where the power cord of the server must be connected to an AC outlet that shares the outlet of another device with large power consumption.

■ Place near 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 sales agent for separate power cabling or noise filter installation.

Unpacking the System

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

Installing the Server into a Rack

This section provides the instructions to install the server into a standard EIA 19-inch rack cabinet.

Before Installation

⚠ Warning

■ Do not use any rack which does not conform to the relevant standard.

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

■ Do not install the server on the rack leaving the cover removed.

■ Do not pinch your finger with mechanical components.

Restricted Access Location

The server is intended for installation in a Restricted Access Location, mounted above a non-combustible material.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling server components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your server.

Checking Components

Check that you have the components to install the server on the rack (screws, core nuts, sliding rails).

Required Tools

Phillips screwdriver.

Installing the Server

This server can be installed in either an NEC rack or a third vendor's rack. Take the following steps to install the server in the rack.

Preparing before Installation

The left and right slide rails are fixed with tapes at the front and side faces to prevent from falling off during transportation. Peel off the tape before you install the server in the rack.
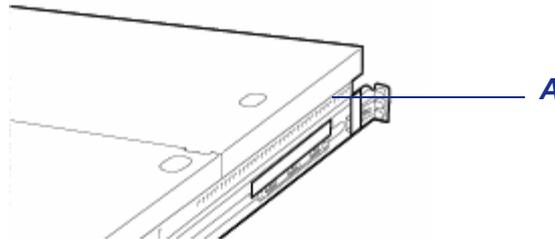
Figure 8: Peeling off the Tape

A: Tape

Removing the Rail Assemblies

1. Remove the sliding rails from the server.
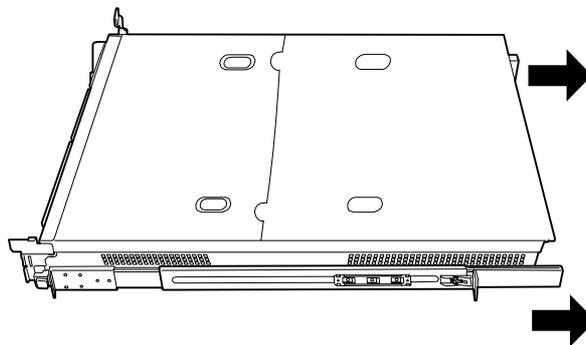
Figure 9: Removing the Sliding Rails

2. Push the unlock button on the front of the server, hold the rails and slowly move them toward the rear of the server.
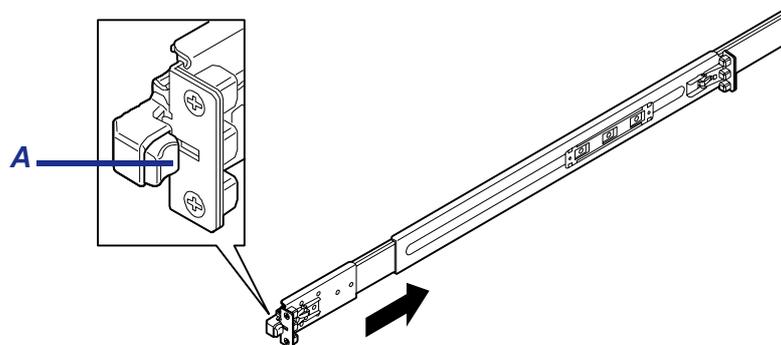
Figure 10: Sliding the Rails to the rear of the Server

A: Unlock button

3. The rails lock with a clicking sound. Pull the release levers on the left and right sides of the server toward direction indicated by an arrow (white) in the figure, and remove them from the server while unlocking it.
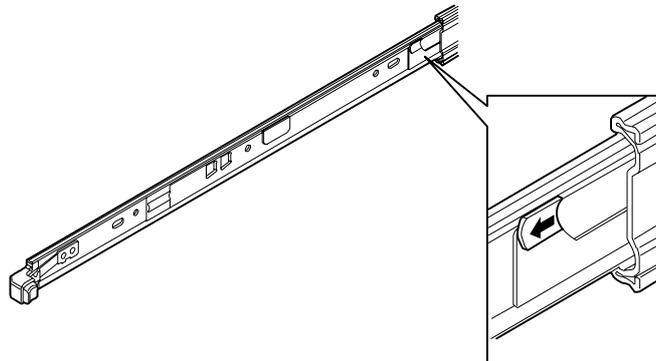
Figure 11: Removing the Rails

Pull the release lever toward the direction shown
by the arrow (white) to remove the rail.

4. Only the inner rails remain screwed to the server when the rail assemblies have been removed.

A
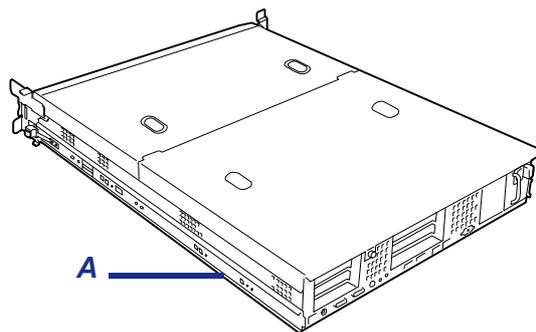
Figure 12: Inner Rails on the Server

A: Inner rails

5. Push the levers, and move the removed rail assemblies toward the direction indicated by an arrow in the figure, to restore the original position.
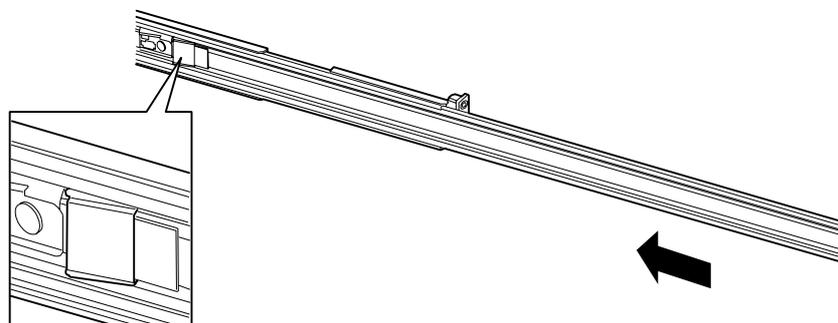
Figure 13: Folding the Rail Assemblies

⚠ **Caution**

■ The removed rail assemblies are to be installed on the inner rails later.

■ Do not catch your fingers in the levers or rails.

Installing the rail assemblies

1. Insert the square projection of the rail assembly into the angle hole on the 19-inch rack until it is locks into place.

   The figure below shows the right side (front) of the rack. Install the rail assemblies to the right side (rear), and left side (front and rear) of the rack in the same procedure.
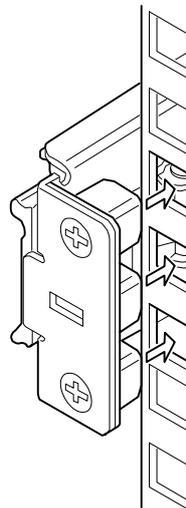
Figure 14: Installing the Rail Assembly (Right Side Shown)

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

📑 *Note: There may be some backlashes in the front and rear, however, it is not a deficiency.*

2. Make sure that the rail assembly is surely locked to the rack.

Installing the Server

1. Pull out the sliding rails of the right and left rail assemblies until they lock.
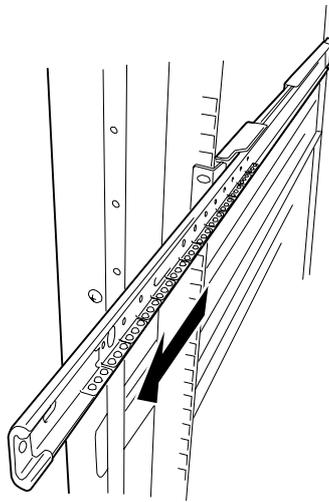
Figure 15: Pulling Out the Sliding Rail

📝 **Note**: *Make sure that the sliding rails are surely locked by the stopper.*
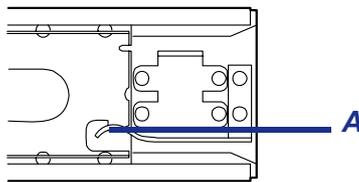
A: Stopper

2. At least two persons are required to install the server. Securely hold the server and install it in the rack.

3. Firmly fit the inner rails (on the sides of the server) into the rail assemblies that are installed on the rack, and then slowly push the server into the rack.
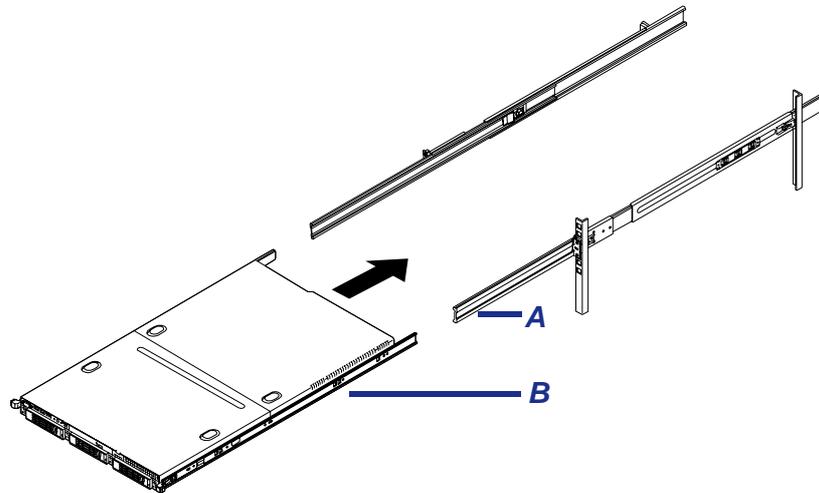
Figure 16: Pushing the Server into the Rack

A: Rail assembly
B: Inner rail at server side

4. When the server is locked on its way into the rack, press the release levers (blue) on the right and left sides of the server and slowly push it in.

5. The server locks again when the server is completely pushed into the rack.
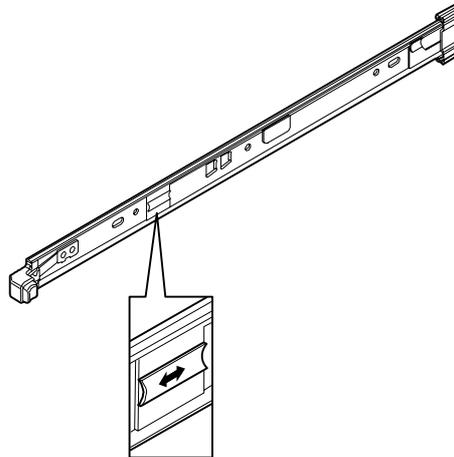
Figure 17: Pressing the Release Levers

⚠ **Caution**

■ Do not catch your fingers in the levers or rails.

■ Insert both inner rails straight into the rack.

■ Hold the thumbscrews on both sides of the server, and install the server carefully while making sure of the installation position.

📝 **Note***: During the first installation, you may feel strong friction when pushing because the mechanical components cannot completely engage with each other. Push the server firmly.*

6. Make sure that the sliding rails move smoothly by pulling the server out of the rack and pushing it in several times.

📝 **Notes***:*

■ *To install the server in the location adjacent to the other device, pay attention to interference. If the installing server disturbs the other devices already been installed, adjust the position, and install the rail assembly again.*

■ *Make sure that the sliding rails move smoothly. If the sliding rails are stuck to the rack frame and do not come out, reinstall them.*

Installing the front bezel

1. Install the front bezel so that the left tab on the front bezel engages with the chassis frame.
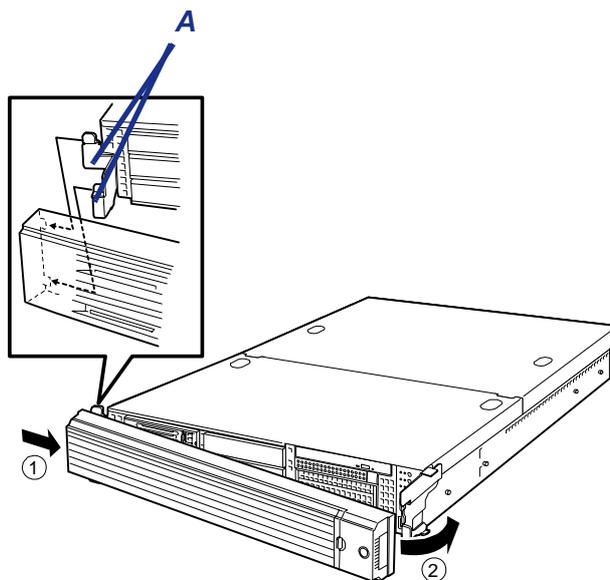
Figure 18: Installing the Front Bezel

A: Tabs

Removal

Remove the server from the rack as described in the following procedure.

1. Make sure that the server is powered off, and disconnect the power cords and all the interface cables from the server.

2. Unlock the front bezel with the security key.
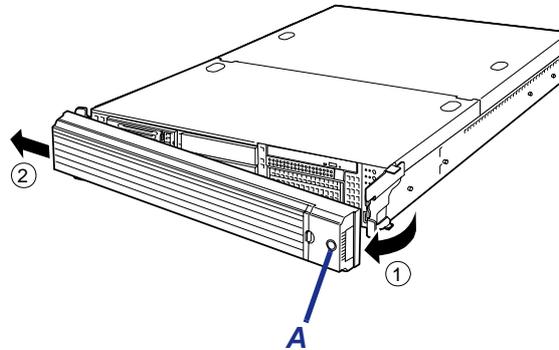
Figure 19: Unlocking the Front Bezel

A: Security Key Hole

3. <This step is required only when the optional cable arm is mounted.>

    Remove the cable arm from the server.

4. Push the left and the right unlock buttons on the front of the server, and pull out the server from the rack slowly and carefully. The server clicks to unlatch.
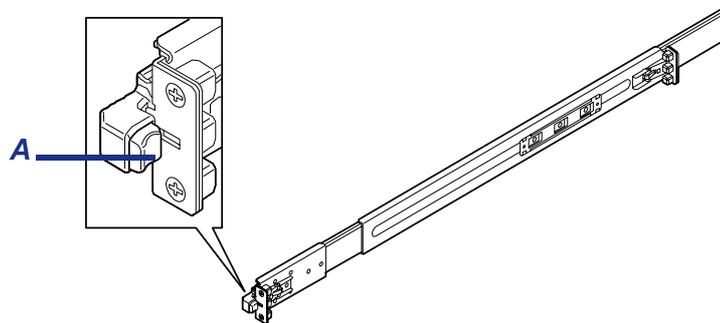
Figure 20: Pushing the Unlock Button

A: Unlock button

5. Push the right and left release levers (blue) forward or rearward to unlock, and slowly pull out the server from the rack.
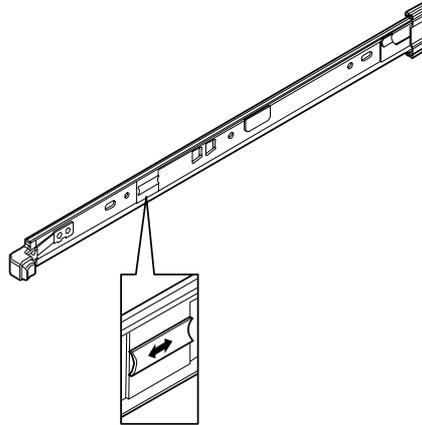
Figure 21: Pushing the Release Levers

⚠ **Caution**

Do not apply any load on the server when it is pulled out from the rack. Personal injuries may occur if the server falls.

6. Firmly hold the server, and take it out from the rack.

⚠ **Caution**

■ Pull out the server slowly holding the bottom of the server by at least two persons.

■ Do not catch your fingers in the levers or rails.

7. To remove the rail assembly, pull out the rail toward you while pressing on the lever.
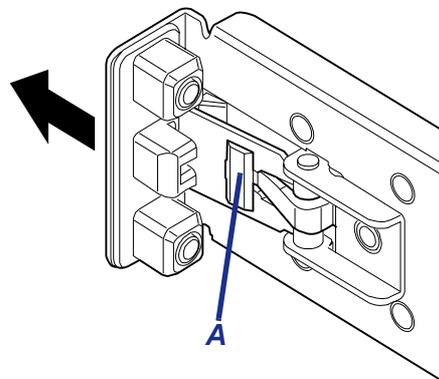
Figure 22: Pressing the Lever

A: Release lever

Making Connections

Connecting Peripheral Devices

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 "General Safety Information" on page 135.

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

■ Do not use any unauthorized interface cable.

⚠ **Caution**

■ Power off the server and a peripheral device before connection. Connecting a powered peripheral device to the powered server will cause malfunctions and failures.

■ To connect a third-party peripheral device or interface cable to the server, consult with your sales agent 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 tie wrap.

■ 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.

■ Form the power cord with a slight slack at the AC inlet of the server. This is to prevent the power cord from coming off when the server is pulled out from the rack.

■ Do not apply any pressure to the plug of the power cord.
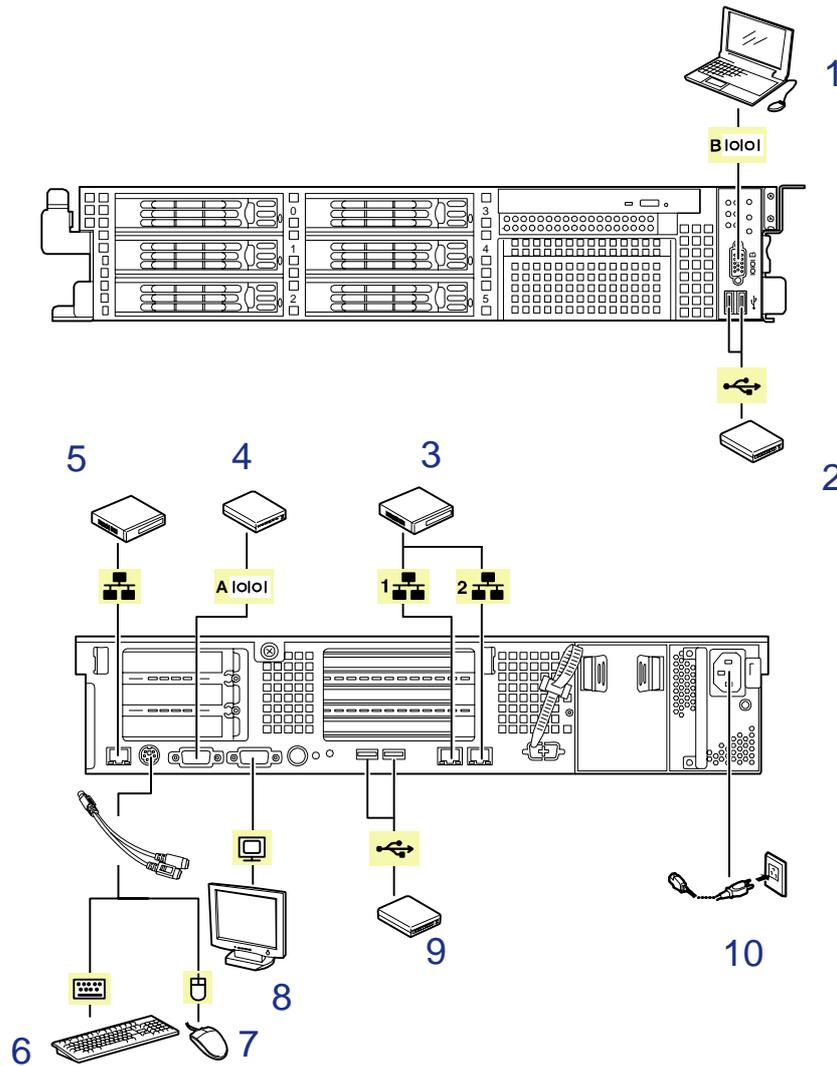
Figure 23: System Connections

1	**Serial Port 2**	Connect a device with a serial interface (e.g. Management PC) Note: A leased line cannot be connected directly to this connector.
2	**Front USB Ports (x2)**	Connect any USB device. USB keyboard and mouse are not supported
3	**LAN Connectors 1 &2**	
4	**Serial Port 1**	Connect a device with a serial interface Note: a Management PC cannot be connected on this port, but only to serial port B (BIOS Setup changes are required). A leased line cannot be connected directly to this connector.
5	**Management port**	Connect your network or hub.
6	**PS/2 Keyboard Port**	Connect a PS/2 keyboard, using the provided "Y" cable.
7	**PS/2 Mouse Port**	Connect a PS/2 mouse, using the provided "Y" cable.
8	**VGA Port**	Connect the monitor.
9	**Rear USB Ports (x2)**	Connect any USB device. Note: USB keyboard and mouse are not supported
10	**Power Inlet**	When all peripherals are connected, finally connect the provided power cable to a 15 A rated wall outlet or to a BackUPS

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 "General Safety Information" on page 135.

■ Do not hold the power plug with a wet hand.

■ Do not connect the ground wire to a gas pipe.

⚠ 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 "General Safety Information" on page 135.

■ 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 power receptacle on the rear of the server.

2. Plug the other end of the power cord into the wall outlet. The AC power LED on the power supply turns green and flashes.
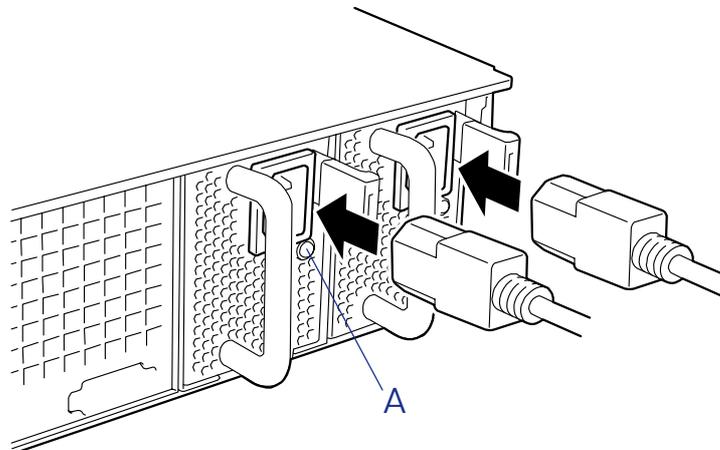
Figure 24: Plugging the power cord

A: AC Power LED

📝 **Note**: *Secure the power cord with an AC cord holder that comes with your server.*

To connect the power cord from the server to an uninterruptible power supply (UPS), use service outlets on the rear of the UPS. Refer to the manual that comes with the UPS.

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

Change a parameter for "AC-LINK" under the Server menu of the BIOS SETUP utility. See *"BIOS Setup Utility" on page 64* for details.

Turning On the Server

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

⚠ Caution

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 all external devices, such as a video display, keyboard, and mouse (optional) have been connected, and the power cords are connected.
2. Power on the video display and any other external devices.

📄 **Note**: *If the server power cord(s) is connected to a power control unit such as an UPS (Uninterruptible Power Supply), make sure that the power control unit is powered on.*

---

3. Make sure that any connected USB floppy disk drive contains no floppy disk and the optical drive contains no bootable CD-ROM or DVD-ROM.
4. Open the front bezel.
5. Press the POWER switch *(A in figure below)*.

📄 **Notes:**

■ *If the power cord is connected to the power control unit such as the UPS, turn on the power control unit.*

■ *If a remote management card (RMC) is installed in your server, 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 RMC firmware start-up.*

A	Power switch
B	Power lamp
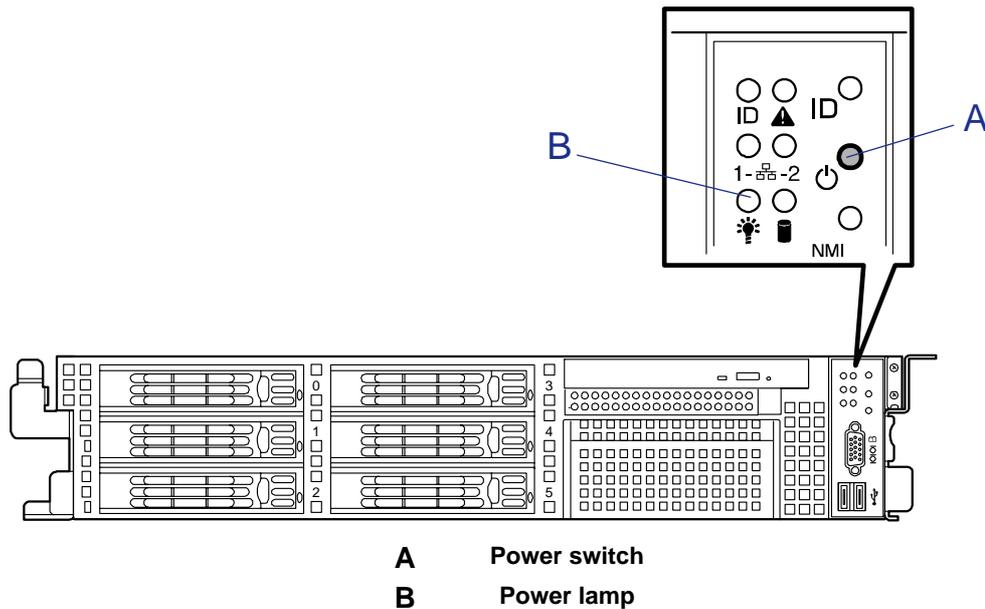
Figure 25: Power Switch & Power Lamp

The POWER lamp on the front of the server lights on.

In a few seconds, a full-screen Bull 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).

If the server halts before completing the POST, the POST emits a beep code indicating a fatal system error requiring immediate attention. (See *"Troubleshooting Guide" on page 214* 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 Bull logo screen. You can always change the Bull logo screen to the POST screen by pressing Esc. To change the start-up screen, use the BIOS setup utility, "SETUP." (See* "BIOS Setup Utility" on page 64 *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 *"BIOS Setup Utility" on page 64*. For the BIOS SETUP for the option board, refer to the manual that comes with the option board.

Installing Operating System

See *"Installing Microsoft Windows Server 2003" on page 324* for more information on installing a Microsoft operating system.

To install other operating systems, contact your sales agent.

📑 *Notes*:

- ■ *Use ExpressBuilder for initial setup of your server. The ExpressBuilder is a support software for the BULL NovaScale server. It simplifies the process of installing and configuring your server.*

- ■ *Before installing the operating system, adjust the system date and time by using the BIOS setup utility "SETUP." See "BIOS Setup Utility" on page 64*

Installing Utilities

Install the utilities that come with the server. See *"Appendix 4: Installing and Using Utilities" on page 267* for more information.

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.

📑 *Note: An optional USB floppy disk drive is required.*

You can save the information by the following process.

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

Powering On Your System

⚠ **Caution**

■ If the power cord is connected to a power control device such as a UPS (Uninterruptive Power Supply), make sure that the power control device is powered.

■ Do not turn off the server until characters following the Boot-BIOS logo appears on the screen.

Power on your system as follows.

1. Make sure all external devices, such as a video display, keyboard, and mouse (optional) have been connected, and the power cords are connected.

2. Power on the video display and any other external devices.

📝**Note**: *If the server power cord(s) is connected to a power control unit such as an UPS (Uninterruptible Power Supply) make sure that the power control unit is powered on.*

---

3. Make sure no bootable media in inserted into the optical drive.

4. Press the POWER switch (A) on the front of the computer chassis to power on the system. The POWER lamp (B) lights green. If it is not lit, ensure the ac power cord is connected to a functional ac power source.
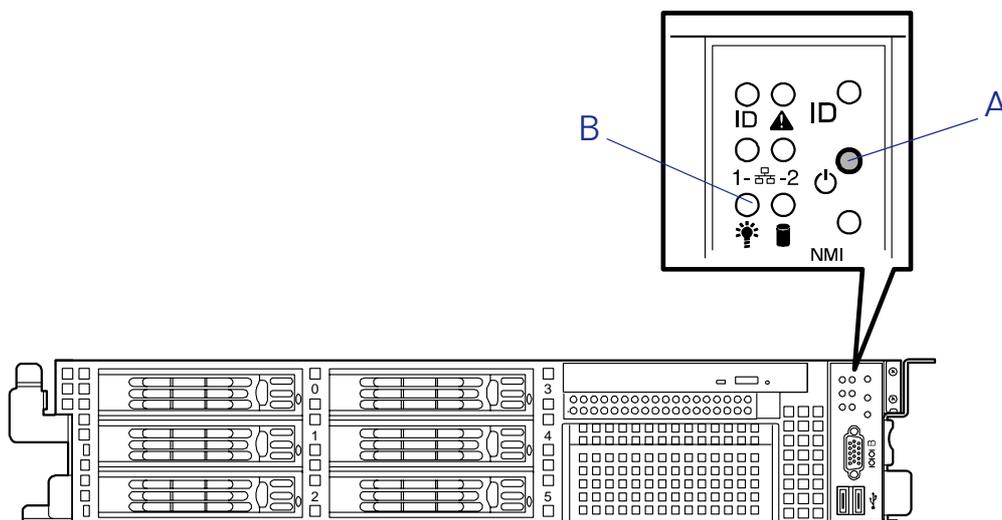
After a few seconds your system begins the internal Power-On Self Tests (POST). POST automatically checks the system board, CPU(s), memory, keyboard, mouse, and most installed peripheral devices. POST also displays the start messages of the BIOS setup utility during execution.

The POST check results should be checked in the following cases:

■   When the server is being used for the first time.

■   When the server appears to fail.

■   When the server beeps many times between power-on and OS start-up.

■   When an error message appears on the screen.

> 📑 *Note: For error messages that appear on the display unit, refer to subsection **"Error Messages" on page 200** in this Guide.*

⚠ Caution

Always allow POST to complete before powering down your system.

If you have problems powering on your system, refer to *"Problem Solving" on page 212*.

After you have successfully powered on your system, insert the ExpressBuilder DVD-ROM into the optical disc drive, reboot the system and follow the screen prompts to run ExpressBuilder.

POST Execution Flow

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

⚠ Caution

■   Do not make key entries or perform mouse operations while POST is in progress.

■   Some system configurations may display the message "Press Any Key" to prompt a key entry. This message is driven by BIOS of an installed optional board. Make sure to read the manual that comes with the optional board before any key entry.

■   Powering on the server, after you installed or removed an optional PCI board or moved it to another slot, may display the message that indicates incorrect board configuration and suspend POST.
In such a case, press **F1** to continue POST. Board configuration can be made using the utility described later.

1. After a few seconds from power-on, POST starts checking the memory. The count message of the basic and expansion memory appears at top left on the display unit screen. The memory check may takes a few minutes to complete depending on the memory size of the server. Also, it may take approximately one minute for the screen display to appear after rebooting the server.

2. Some messages appear upon completion of the memory check. These messages appear to indicate that the system has detected the CPU, baseboard management controller, keyboard, and mouse.

3. After a few seconds, POST displays the following message prompting you to launch the BIOS SETUP utility stored in the system memory of the server. Launch the BIOS setup utility when you need to change the settings to meet the requirements for the server. As long as the above message is not displayed with an error message, you don't have to launch the utility. (Ignore the message. POST will automatically proceed.)

    To launch the SETUP utility, press **F2** while the above message is displayed.

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

    The message "<F12> to Network" prompts you network booting (PXE boot). If you press **F12**, the POST searches for boot device on network.

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

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

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

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

⚠ Caution

Do not set a password before installing an OS.

6. The OS starts when POST completes.

Identification of Servers (UID Switch)

An "UID (Unit ID) LED" is provided on the front panel and rear panel. If more than one server is mounted in a single rack, the LED identifies the server you are going to maintain.

The UID LED goes on when the UID (Unit ID) switch on the front panel is pressed. It goes off when the switch is pressed again.

Maintenance from the rear of the rack might be carried out in a dark, narrow space. The interface cable of a server or power supply unit in normal state may be disconnected by accident in this situation. To prevent this problem, you should start maintenance after confirming the target server by using the UID switch.
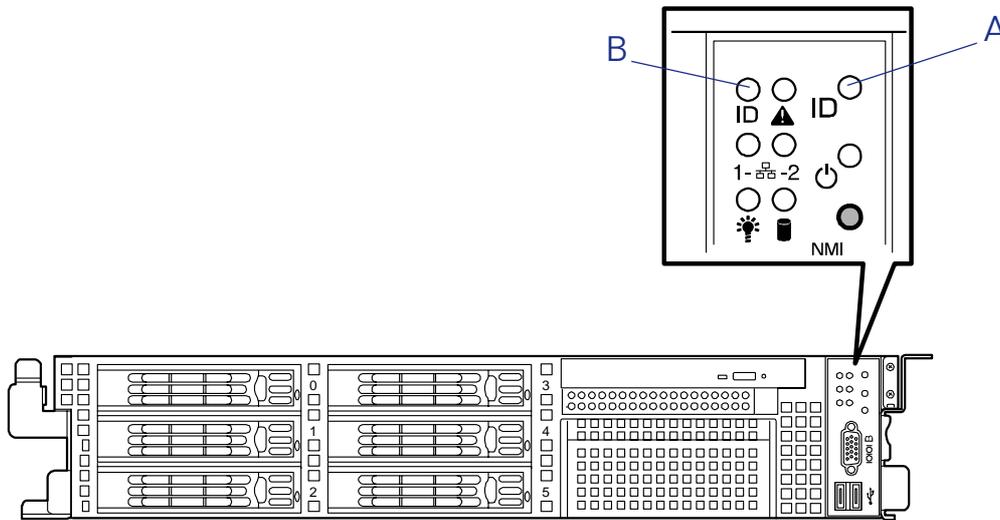
Figure 26: Front of the server

A: UID switch
B: UID LED
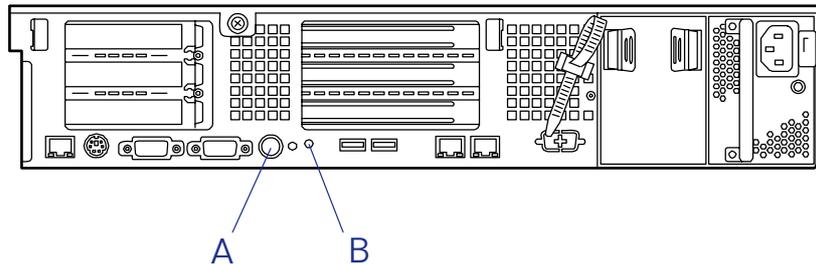
Figure 27: Rear of the server

A: UID switch
B: UID LED

Powering Off the Server System

When server system power is on, pressing the power on/off switch on the front panel of the server turns the power off.

To turn the server system power off:

1. Shutdown the operating system (OS).
2. If necessary, press the POWER switch on the front of the computer chassis again to power off the system. The POWER lamp lights off.

3. Power off the peripheral devices.

⧮ *Notes*:

■ *If the server power cord is connected to a power control unit such as an UPS (Uninterruptible Power Supply), refer to the UPS user's guide for proper power-off procedures.*

■ *The standby feature of Windows Server is not available. Do not select "Standby" in Windows shutdown menu.*

Forcing a Power Shutdown

A forced power shutdown can be used when the power on/off switch does not power off the server or the reset functions do not work.

To perform a forced power shutdown:

■ Press in on the power on/off switch located on the front panel of the server for at least 4 seconds to force the server power off.

To power on after a forced shutdown, wait 10 seconds and then power on again.

Configuring Your Server

Overview

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

A RAID Setup Utility configures the RAID system and the logical drives connected to the onboard RAID controller.

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

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

Configuring Motherboard 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.

If you forget the passwords, however, your only option is to 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.

⚠ Caution

■ Clearing the CMOS data resumes the factory-set configuration data.

■ After clearing CMOS, you must run the BIOS SETUP utility and execute the following menus to reconfigure your motherboard.
  – Load Setup Defaults in the Exit menu
  – Memory Retest of Memory Configuration in the Advanced menu
  – Processor Retest of Processor Settings in the Main menu

■ Refer to <u>"RAID Configuration" on page 83</u> for RAID configuration jumper setting.

■ Do not change any other switch settings. Any change may cause the server to fail or malfunction.

⚠ Warning

Do not change any other switch settings. Any change may cause the server to fail or malfunction.
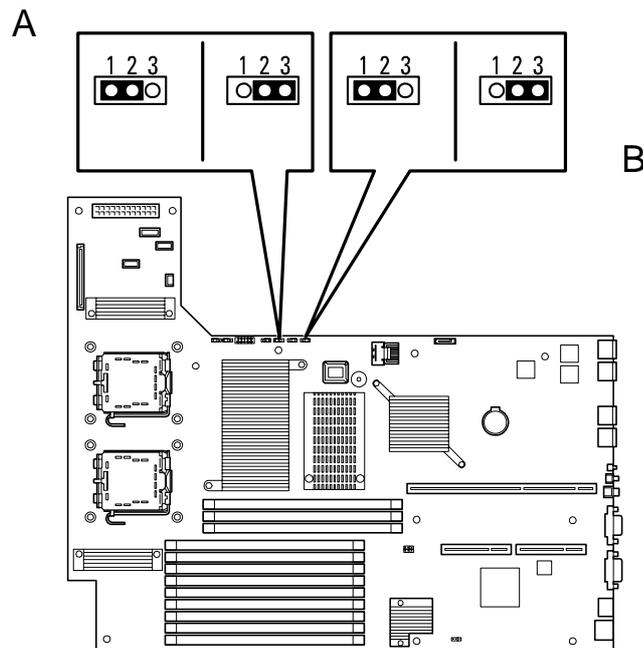
Figure 28: Clear CMOS & Clear Password Jumpers

A	**Clear password jumper**	**B**	**Clear CMOS jumper**
	(1) Normal		**1-2 = Normal**
	(2) Clear password		**2-3 = Clear CMOS**

The following describes the clearing procedure.

⚠ **Warning**

Observe the following instructions to use the server safely. Failure to follow these instructions may result in death or serious personal injury. See "General Safety Information" on page 135 for details.

■ Do not disassemble, repair, or alter the server.

■ Do not remove the lithium battery.

■ Do not connect the ground line to a gas pipe.

⚠ **Caution**

Observe the following instructions to use the server safely. Failure to follow these instructions may result in death or serious personal injury. See "General Safety Information" on page 135 for details.

■ Never attempt to lift the server only by yourself.

■ Make sure to complete board installation.

■ 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.

Clearing CMOS or Password

To clear the CMOS or the password, do as follows:

1. Power off the server and disconnect the power cord and all the cables connected on the rear of the server.

2. Remove the logic cover.

3. Locate the position of the jumpers on the motherboard (see *Figure 28 on page 61*).

4. For clearing the BIOS password, remove the jumper strap on the BIOS password clear jumper. For Clearing the CMOS, move the jumper strap to the CMOS clear position (2-3).

5. Connect the power cord and power on the server.

6. Wait until the "Password cleared" or "CMOS cleared" message is displayed (about 5 seconds).

7. Power off the server and disconnect the power cord.

8.   Re-install the jumper block to the default position.

9. Reinstall the cover removed in Step 2.

10. Plug the power cord and all the cables to the server and turn on the server.

11. Press **F2** when prompted to run the BIOS Setup utility, and select "Load Setup Defaults" at the Exit menu.

⚠ Caution

■ Clearing the CMOS data resumes the factory-set configuration data.

■ After clearing CMOS, you must run the BIOS SETUP utility and execute the following menus to reconfigure your motherboard.
– Load Setup Defaults in the Exit menu
– Memory Retest of Memory Configuration in the Advanced menu
– Processor Retest of Processor Settings in the Main menu

BIOS Setup Utility

The BIOS Setup Utility is used to change system configuration parameters. The utility is resident in the system FLASH memory and does not require a diskette or an operating system present to run.

Using the BIOS Setup Utility

You can access the BIOS Setup utility when you turn on or reboot your system.

📄**Note**: *The server is factory-configured with the best parameters. Run the Setup utility only when it is required.*

To run the BIOS Setup Utility, perform the following procedure:

1. Power-on or reboot the system. "Press <F2> to enter SETUP" displays.
2. Press **F2**. The BIOS Setup Utility starts and the Main Menu is displayed. The menu bar at the top of the Main Menu lists the following selections:

Table 1: BIOS Setup Menus

Menu	Use
Main Menu	Use this menu for basic system configuration.
Advanced Menu	Use this menu for setting the Advanced Features available on your system.
Security Menu	Use this menu for setting passwords.
Server Menu	Use this menu to configure server specific options, the redirection console and to display server information.
Boot Menu	Use this menu to configure Boot Device priority.
Exit Menu	Exits the current menu.

Use the arrow keys to select a menu or an item on a displayed menu. Press the value keys (listed in the table below) to cycle through the allowable values for the selected field. Use the Exit menu's "Save Values" selection to save the current values on all the menus.

To display a submenu, position the cursor on a selection that has a submenu and press **ENTER**. An arrow precedes selections with submenus.

Refer to the following table for information on the keys that you use with BIOS Setup. These keys are also listed at the bottom of the Setup menu.

Table 2: BIOS Setup Keys

Key	Function in Setup Menu
F1 or Alt-H	Get Help about an item.
ESC	Exit the current menu and return to the previous menu.
Left or right arrow keys	Move between menus.
Up or down arrow keys	Move cursor up and down. The cursor moves only to the settings that you can change.

Table 2: BIOS Setup Keys (Continued)

Key	Function in Setup Menu
F9	Load default configuration values for this menu.
F10	Save configuration values and exit.
ENTER	Execute command or Select ⇑ submenu.

BIOS Setup Configuration Settings

The BIOS Setup Configuration tables show the default settings for the BIOS Setup Utility and provide a place for you to record any changes you make to these settings. Recommended values are bold in the following tables.

Main Menu

Table 3: Main Menu

Feature	Choices or Display Only	Description	Your Setting
System Time	HH:MM:SS	Set the System Time.	
System Date	MM/DD/YYYY	Set the System Date.	
Hard Disk Pre-Delay	**Disabled** 3, 6, 9, 12, 15, 21, 30 Seconds	Allows to add a delay before the first access of a hard disk drive by the BIOS.	
Primary IDE Master	Selects sub-menu		
Primary IDE Slave	Selects sub-menu		
Secondary IDE Master	Selects sub-menu		
Secondary IDE Slave	Selects sub-menu		
Processor Settings	Selects sub-menu		
Language	**English (US)** Français Deutsch Español Italiano	Select the display language for the BIOS.	

Primary and Secondary Master & Slave IDE submenus

Table 4: Primary And Secondary Master And Slave IDE Submenus

Feature	Choices or Display Only	Description	Your Setting
Type	**Auto** None User CD-ROM	Select Auto if a device is attached to the IDE or serial ATA channel. It is strongly recommended to keep the factory setting **Auto**	
Multi-Sector Transfer	Disabled 2 Sectors 4 Sectors 8 Sectors 16 Sectors	Enables or disables multiple sector transfers support. This field is informational only, for Type Auto.	
LBA Mode Control	Enabled Disabled	LBA stands for "logical block addressing". Instead of referring to locations by passing to the disk a cylinder, head and sector number (CHS addressing), the sectors are serialized so that each just has an integer number; 0, 1, 2, etc. up to the total number of sectors on the disk. Disabled will disable the LBA mode, Auto will enable it if the IDE device supports it. This field is informational only, for Type Auto.	
32-Bit I/O	**Disabled** Enabled	Enables/disables the 32-Bit IDE data transfer mode.	

Table 4: Primary And Secondary Master And Slave IDE Submenus (Continued)

Feature	Choices or Display Only	Description	Your Setting
Transfer Mode	**Standard** Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO **4** FPIO 3/DMA1 FPIO 4/DMA2	Select the method for moving data to/from the drive. This field is informational only, for Type Auto. This field is updated to display only the modes supported by the attached device.	
Ultra DMA	Disabled Mode 0 Mode 1 Mode 2 Mode 3 Mode 4 Mode 5	Selects the DMA mode used for moving data to/from the drive. This field is informative only for Type Auto.	

Processor Settings Submenu

Table 5: Processor Settings Submenu

Feature	Choices or Display Only	Description	Your Setting
Processor Retest	Yes **No**	If Yes is selected, the BIOS will clear historical processor status and retest the processor on next boot.	
Processor Speed	Display only	Displays the processor speed detected by the BIOS	
Processor 1 CPUID	Display only	Displays the processor CPU ID detected by the BIOS, if present Disabled indicates that the CPU is defective.	
Processor 1 L2 Cache	Display only	Displays the processor level 2 cache detected by the BIOS	
Processor 2 CPUID	Display only	Displays the processor CPU ID detected by the BIOS, if present Disabled indicates that the CPU is defective.	
Processor 2 L2 Cache	Display only	Displays the processor level 2 cache detected by the BIOS	
Execute Disabled Bit	**Disabled** Enabled	Displays the CPU which supports Execute Disabled Bit	
Virtualization Technology	Enabled **Disabled**	Enables or disables the Intel(R) Virtualization Technology.	
C1 Enhanced Mode	**Enabled** Disabled	Enables or disables the C1 Enhanced Mode	
Intel(R) Speedstep(R) technology	**Enabled** Disabled	Enables or disables the Intel(R) SpeedStep Technology.	

Note: The BIOS may display more options that presented here.

Advanced Menu

Table 6: Advanced Menu

Feature	Choices or Display Only	Description	Your Setting
Memory Configuration	Select submenu		
PCI Configuration	Select submenu		
Peripheral Configuration	Select submenu		
Advanced Chipset Control	Select submenu		
Boot-time Diagnostic Screen	**Disabled** Enabled	Enables or disables the display of the diagnostic screen during boot. If disabled, the Bull logo is displayed.	
Reset Configuration Data	**No** Yes	Select *Yes* if you want to clear the Extended System Configuration Data (ESCD) area.	
NumLock	On **Off**	Selects power on state for NumLock.	
Memory/Processor Error	**Boot** Halt	If *Boot* is selected, the system will attempt to boot after a memory or processor error.	

Memory Configuration Submenu

Table 7: Memory Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
System Memory	Display only	e.g. 640 KB	
Extended Memory	Display only	e.g. 784896 KB	
DIMM Group #1 Status	Display only	Indicates the current memory status. "Normal" indicates the normal status, "Disabled" indicates a memory error, and "Not installed" indicates no DIMM installed (display only).	
DIMM Group #2 Status	Display only		
DIMM Group #3 Status	Display only		
DIMM Group #4 Status	Display only	Group #1 indicates DIMMs in DIMM sockets #11 and #21.	
DIMM Group #5 Status	Display only	Group #2 indicates DIMMs in DIMM sockets #31 and #41.	
DIMM Group #6 Status	Display only	Group #3 indicates DIMMs in DIMM sockets #12 and #22. Group #4 indicates DIMMs in DIMM sockets #32 and #42. Group #5 indicates DIMMs in DIMM sockets #13 and #23. Group #6 indicates DIMMs in DIMM sockets #33 and #43. (Memory is interleaved and DIMMs are used per pair.)	

Table 7: Memory Configuration Submenu (Continued)

Feature	Choices or Display Only	Description	Your Setting
Memory Retest	**No** Yes	Clears the memory error status	
Extended RAM Step	1MB 1KB Every location **Disabled**	Test the extended memory once per MB, per KB, every memory location or no test.	
Memory RAS Feature	**Interleave** Mirror	Disables or enables the memory mirroring feature.	
Sparing	**Disabled** Enabled	Disables or enables the online spare memory feature.	

PCI Configuration Submenu

Table 8: PCI Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Onboard Video Controller	Select submenu		
Onboard LAN	Select submenu		
PCI Slot 1B Option ROM	Disabled **Enabled**	Used to enable or disable an option ROM on a PCI board connected to the full-height riser card.	
PCI Slot 1C Option ROM	Disabled **Enabled**	Used to enable or disable an option ROM on a PCI board connected to the low-profile riser card.	

PCI Device, Onboard Video Controller Submenu

Table 9: PCI Device, Onboard Video Controller Submenu

Feature	Choices or Display Only	Description	Your Setting
VGA Controller	Disabled **Enabled**	Enables or disables the onboard VGA controller.	
Onboard VGA Option ROM Scan	**Auto** Force	Allows selecting the onboard VGA controller or optional PCI VGA controller as the display device that will be active when the system boots. The "Force" option is selected to use the onboard VGA controller if the optional PCI VGA controller is installed in the system.	

PCI Device, Onboard LAN Submenu

Table 10: PCI Device, Onboard LAN Submenu

Feature	Choices or Display Only	Description	Your Setting
LAN Controller	Disabled **Enabled**	This option allows you to enable or disable the onboard LAN controller	
LAN1 Option ROM Scan	Disabled **Enabled**	Initializes device expansion ROM. Only if Onboard LAN Controller is enabled.	
LAN2 Option ROM Scan	Disabled **Enabled**	Initializes device expansion ROM. Only if Onboard LAN Controller is enabled.	

Peripheral Configuration Submenu

Table 11: Peripheral Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Serial Port A	Disabled **Enabled** Auto	Enables or disables the serial port A	
Base I/O address	**3F8** 2F8 3E8 2E8	Set the base I/O address for serial port A	
Interrupt	IRQ3 **IRQ4**	Set the interrupt for serial port A	
Serial port B	Disabled **Enabled** Auto	Enables or disables the serial port B	
Base I/O address	**3F8** 2F8 3E8 2E8	Set the base I/O address for serial port B	
Interrupt	IRQ3 **IRQ4**	Set the interrupt for serial port B	
USB Controller	Disabled **Enabled**	Enables or disables the USB controller.	
USB 2.0 Controller	Disabled **Enabled**	Enables or disables the USB 2.0 controller.	
Parallel ATA	Disabled **Enabled**	Enables or disables the Parallel ATA.	
Serial ATA	Disabled **Enabled**	Not supported in this system. Leave the factory setting as is.	
SATA Controller Mode Option	Compatible **Enhanced**		
SATA AHCI	Disabled **Enabled**		

Advanced Chipset Control Submenu

Table 12: Advanced Chipset Control Submenu

Multimedia Timer	**Disabled**	Enables or disables the multimedia timer feature.	
	Enabled		
Intel(R) I/O AT	Disabled	Enables or disables the Intel(R) Acceleration technology.	
	Enabled		
Wake on Ring	**Disabled**	Enables or disables the remote power-on funtion through a serial port.	
	Enabled		
Wake on RTC Alarm	**Disabled**	Enables or disables the remote power-on funtion through the RTC Alarm.	
	Enabled		

⚠ **Caution**

If the AC power is turned off while the Wake On Ring feature is enabled, this feature is disabled at the next system boot after AC power-on. You need to press the Power switch to boot the system. If the AC power is turned off, Wake On Ring feature on power management chip is disabled until the next DC power-on.

Security Menu

> 📰 **Note***: Enabling the Supervisor Password field requires a password for entering Setup. The passwords are not case sensitive.*

Table 13: Security Menu

Feature	Choices or Display Only	Description	Your Setting
Security Chip Configuration		Displays the Security Chip Configuration Submenu.	
Supervisor Password is	Set Clear	Indicates whether the supervisor password is set (display only).	
User Password is	Set Clear	Indicates whether the user password is set (display only).	
Set Supervisor Password	Up to 8 alphanumeric characters	Press **Enter** to display the supervisor password entry screen. With the supervisor password, all SETUP menus are available for access. This option is available only when you log into the SETUP utility with the supervisor password.	
Set User Password	Up to 8 alphanumeric characters	Press **Enter** to display the user password entry screen. With a user password, only certain menus are accessible. This option is available only if the Supervisor Password is set.	
Password On Boot	**Disabled** Enabled	Specify whether to request a password entry at boot-up. Administrator password setup is required. Only available if supervisor password is set.	
Fixed Disk Boot Sector	**Normal** Write Protect	Allows to write protect hard disk boot sector to protect against viruses.	
Power Switch Inhibit	**Disabled** Enabled	Enables or disables the power switch. When set to Enabled, once the operating system has started, you cannot turn off the system using the power switch. Forced shutdown is also unavailable. (See "Forcing a Power Shutdown" on page 58.)	

Security Chip Configuration Submenu

Table 14: Security Chip Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
TPM Support	**Disabled** Enabled	Enables or disables the TPM feature.	
Current TPM State		Displays the current TPM state.	
Change TPM State	**No Change** Enabled and Activated Disabled and disactivated Clear	Changes the TPM state.	

Server Menu

Table 15: Server Menu

Feature	Choices or Display Only	Description	Your Setting
System Management	Select Submenu		
Console Redirection	Select Submenu		
BMC LAN Configuration	Select Submenu		
Event Log Configuration	Select Submenu		
Assert NMI on PERR	Disabled **Enabled**	Sets support of PCI bus parity error (PERR).	
Assert NMI on SERR	Disabled **Enabled**	Sets support of PCI bus system error (SERR).	
FRB-2 Policy	Disable FRB-2 Timer Disable BSP Do not Disable BSP **Retry 3 Times**	Sets the FRB level 2 timer.	
Boot Monitoring	**Disabled** 5 Minutes 10 Minutes 15 Minutes 20 Minutes 25 Minutes 30 Minutes 35 Minutes 40 Minutes 45 Minutes 45 Minutes 50 Minutes 55 Minutes 60 Minutes	Sets whether the boot monitoring function is disabled, or, if it is enabled, sets the time limit for time out. It is mandatory to install the NEC ESMPRO Agent in order to use this function.	
Boot Monitoring Policy	**Retry 3 Times** Always Reset	Specifies what happens when a time out is detected during boot monitoring. When **Retry 3 Times** is selected, the system is reset after a time out occurence, and tries 3 times to boot the OS. When **Always Reset** is selected, the system is reset after the time out occurence, and tries repeatedly to boot the OS.	

Table 15: Server Menu (Continued)

Feature	Choices or Display Only	Description	Your Setting
Thermal Sensor	Disabled **Enabled**	Specifies whether the thermal sensor monitoring function is enabled or not. If a thermal error is detected while this parameter is enabled, the system stops at the end of the POST.	
BMC IRQ	Disabled **IRQ 11**	Determines the routing of the BMC Interrupt.	
POST Error Pause	Disabled **Enabled**	Specifies whether the system waits for user intervention on critical POST errors. If no keyboard is connected to the system, this option is ignored and the system always continues to bootup.	
AC-LINK	Stays Off **Last State** Power On	Sets the AC-LINK feature. Determines the mode of operation if a power loss occurs.	
Power On Delay Time (Sec)	20 - 255	Sets the power-on delay time whithin a 0 to 255 seconds range. This parameter is valid when "Power On " or "Last State" is specified for AC Link.	
Platform Event Filtering	Disabled **Enabled**	This item is meaningless when the notification feature of the Remote Management Card is enabled.	

⚠ **Caution**

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

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

System Management Submenu

Table 16: System Management Submenu

Feature	Choices or Display Only	Description	Your Setting
BIOS Version	e.g. 4N34	Displays the current BIOS version number.	
Board Part Number		Displays the motherboard part number.	
Board Serial Number		Displays the motherboard serial number.	
System Part Number		Displays the system part number.	
System Serial Number		Displays the system serial number.	
Chassis Part Number		Displays the chassis part number.	
Chassis Serial Number		Displays the chassis serial number.	
Onboard LAN1 MAC Address		Displays the Onboard LAN1 port MAC adress.	
Onboard LAN2 MAC Address		Displays the Onboard LAN2 port MAC adress.	
Management LAN MAC Address		Displays the Management LAN port MAC adress.	
BMC Device ID		Displays the BMC device ID.	
BMC Device Revision		Displays the BMC device revision.	
BMC Firmware Revision		Displays the BMC firmware revision.	
SDR Revision		Displays the sensor data record revision.	
PIA Revision		Displays the platform information area revision.	

Console Redirection Submenu

Table 17: Console Redirection Submenu

Feature	Choices or Display Only	Description	Your Setting
BIOS Redirection Port	**Disabled** Serial Port A Serial Port B	Specify the serial port to which a hardware console is connected.	
ACPI Redirection Port	**Disabled** Serial Port A Serial Port B	Specify the serial port to which an ACPI console is connected.	
Baud Rate	9600 **19.2K** 38.4K 57.6K 115.2K	Selects a baud rate for communications with the connected HW console.	
Flow Control	None XON/XOFF **CTS/RTS** CTS/RTS + CD	Select a flow control method.	

Table 17: Console Redirection Submenu (Continued)

Feature	Choices or Display Only	Description	Your Setting
Console Type	**PC ANSI** VT100+ VT-UTF8	Specify the type of remote console.	
Remote Console Reset	**Disabled** Enabled	Enables or disables the reset function when an Escape command is sent from the remote console.	

BMC LAN Configuration Submenu

Table 18: BMC LAN Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
IP Address	192.168.001.001	Specifies an IP address for the management LAN.	
Subnet Mask	255.255.255.000	Specifies a subnet mask for management LAN.	
Default Gateway	000.000.000.000	Specifies a default gateway for the mangement LAN.	
DHCP	**Disabled** Enabled	Set it to **Enabled** to obtain an IP address from the DHCP server automatically. To specify an IP address manually, set it to **Disabled**.	
Web interface	-	-	
HTTP	**Disabled** Enabled	Set it to Enabled to use HTTP communication for the Web interface.	
HTTP Port Number	80	Specifies the TCP port number which the management LAN uses for HTTP communication.	
HTTPS	**Disabled** Enabled	Set to [Enabled] to use HTTPS communication for Web interface.	
HTTPS Port Number	443	Specifies the TCP port number which the management LAN uses for HTTPS communication.	
Command Line Interface	-	-	
Telnet	**Disabled** Enabled	Set to [Enabled] to use Telnet communication as a command line interface.	
Telnet Port Number	23	Specifies the TCP port number to be used for Telnet communication.	
SSH	**Disabled** Enabled	Set to [Enabled] to use SSH communication as a command line interface.	
SSH Port Number	22	Specifies the TCP port number to be used for SSH communication.	
Clear BMC Configuration		Press Enter and select "Yes" to initialize the BMC configuration.	

⚠ **Caution**

Notes on performing Clear BMC Configuration

■ Executing "Load Setup Defaults" in BIOS SETUP utility does not restore the default value for settings related to management LAN of BMC. To restore the default value, you need to execute Clear BMC Configuration.

■ It takes about several tens seconds until initialization completes after execution of Clear BMC Configuration.

■ Executing Clear BMC Configuration also clears settings made in NEC DianaScope. Before execution, be sure make backup copy of setting information of NEC DianaScope.

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

Event Log Configuration Submenu

Table 19: Event Log Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
System Event Log	Select submenu		
Clear All Event Logs		Press **Enter** and select *Yes* to clear the event log.	

Boot Menu

Table 20: Boot Menu

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

1. When the BIOS detects a bootable device, it displays the information on the device in the relevant description.

    To boot the server from a desired device, the device must be registered as a boot device. (Up to eight boot devices can be registered.)

2. Pressing **X** after selecting a device allows the selected device to be registered as a boot device or deleted from the registration.

    When eight boot devices are registered, no other device can be registered as a boot device, even if you press **X**. To register another device as aboot device, you first need to delete the reigstration from a device which is not anymore used to boot.

    Pressing **Shift + 1** after selecting a device enables/disables the selected device.

3. You can change the boot priority (first to eighth) of each device by using the up and down arrow keys, and + and/or –.

    To change the priority of a device, move the cursor to the device by using the up and down arrow keys, and press + or –.

Exit Menu

> ⚠ **Caution**
>
> For the 3.5-inch disk model, record the current SATA controller
> options in the Peripheral Configuration page of the Advanced
> menu before reloading the Setup or custom defaults. The SATA
> controller options affect the RAID System configuration.

You can make the following selections on the Exit Menu. Select an option using the up
or down arrow keys, then press <Enter> to execute the option. Pressing <Esc> does
not exit this menu. You must select one of the items from the menu or menu bar to exit.

Table 21: Exit Menu

Choices	Description
Exit Saving Changes	Exits after writing all modified Setup item values to NVRAM. F10 key can be used for this operation.
Exit Discarding Changes	Exits leaving NVRAM unmodified. User is prompted if any of the setup fields were modified. Esc key can be used for this operation.
Load Setup Defaults	Loads default values for all SETUP items. F9 key can be used for this operation.
Load Custom Defaults	Loads the custom defaults for the BIOS Setup options.
Save Custom Defaults	Saves the current values as custom defaults. This menu is only available once the Load Custom Defaults option has been used.
Discard Changes	Read previous values of all Setup items from NVRAM.
Save Changes	Save changes to NVRAM without exiting the Setup.

RAID Configuration

This section describes how to use the internal hard disk drives as a RAID System managed by the Onboard RAID Controller (LSI embedded MegaRAID) installed in the 3.5-inch disk model or the Internal RAID Controller installed in the 2.5-inch disk model.

For information about the optional RAID Controller for the 3.5-inch disk model, refer to the documents provided with optional RAID Controller.

RAID

Overview of RAID System

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 actual, 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 Onboard RAID Controller (LSI Embedded MegaRAID) or Internal RAID Controller has a feature to divide a single disk group into several virtual drives (virtual disks). The RAID controller recognizes these virtual disks as if it were a single hard disk drive. The RAID Controller accesses to more than one hard disk drive configuring a disk group in parallel.

Some RAID levels can recover data from remaining data and parity by using the 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 Onboard RAID Controller (LSI Embedded MegaRAID) supports RAID levels 0 and 1. The Internal RAID Controller supports RAID levels 0, 1, 5, and 6. The number of hard disk drives required to create a disk group varies depending on the RAID level as shown in the table below.

Table 22: RAID levels

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

⚠ **Caution**

To use RAID 5 or RAID 6 with the Internal RAID Controller, you need to install the optional RAID Upgrade Kit.

📄 **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.
The allowable number of disk groups is equal to the number of HDDs.

The figure below shows a sample Configuration. The three HDDs are connected to the Onboard RAID Controller (LSI Embedded MegaRAID) or Internal RAID Controller, creating one disk group (DG).
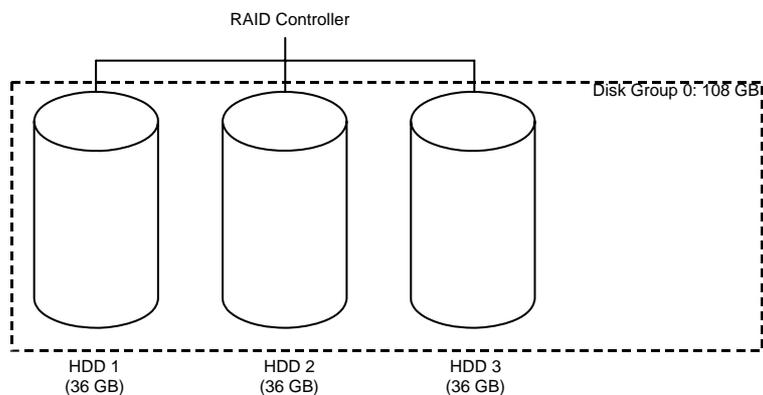
Figure 29: Sample RAID Configuration

Virtual Disk

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

The figure below shows a sample Configuration in which the Onboard RAID Controller (LSI Embedded MegaRAID) or Internal RAID Controller is connected with three HDDs, creating one Disk Group. Two RAID5 virtual disks (VD) are defined in the Disk Group.
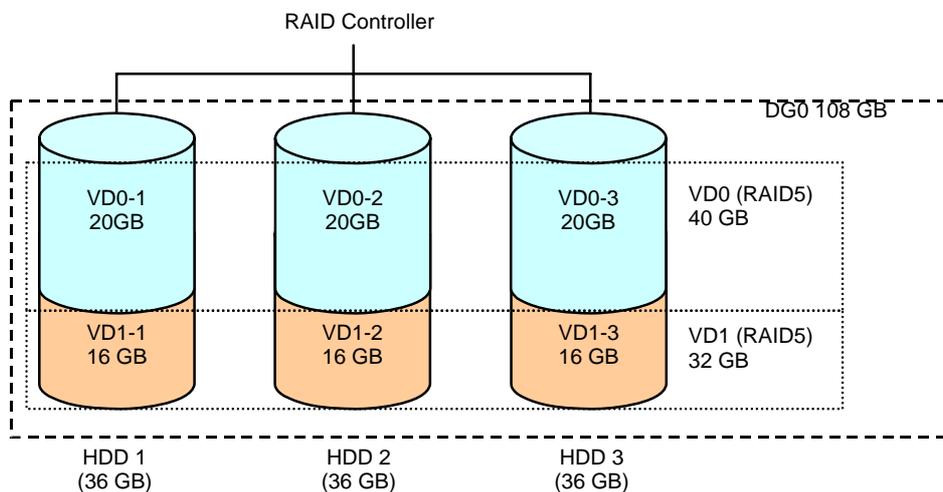
Figure 30: Sample Virtual Disk Configuration

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 defective.

Hot-Swap

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

Hot-Spare

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

RAID Levels

The table below lists the characteristics of the RAID levels.

Figure 31: RAID Levels Characteristics

Level	Function	Redundancy	Characteristics
RAID 0	Striping	No	Data read/write at the highest rate Largest capacity Capacity: (capacity of single HDD) × (number of HDDs)
RAID 1	Mirroring	Yes	Two HDDs required Capacity: capacity of single HDD
RAID 5	Striping of both data and redundant data	Yes	Three or more HDDs required Capacity: (capacity of single HDD) × ((number of HDDs) - 1)
RAID 6	Striping of both data and redundant data	Yes	Three or more HDDs required Capacity: (capacity of single HDD) × ((number of HDDs) - 2)

⚠ Caution

To use RAID 5 or RAID 6 with Internal RAID Controller, you need to install the optional RAID Upgrade Kit.

RAID0

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

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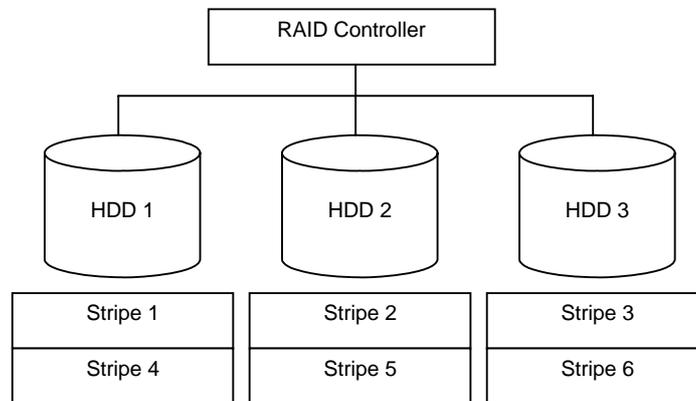

Figure 32: RAID0 Configuration

> 📄 **Note***: RAID0 cannot have data redundancy. If a HDD is defective, 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 defective, the other HDD containing the same data can substitute for the defective HDD. Thus the system can continue to operate without interruption.
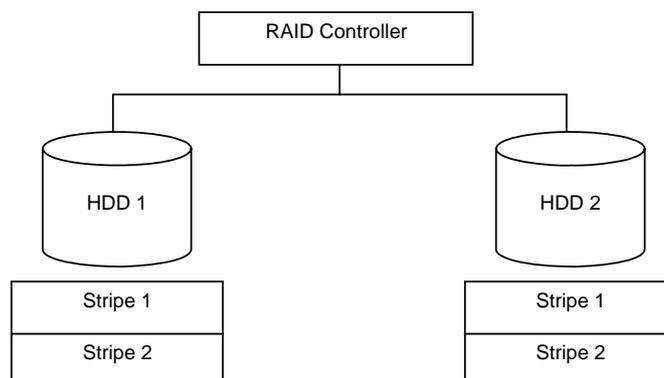
Figure 33: RAID1 Configuration

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 virtual drive is defective, data is still available with no problems.
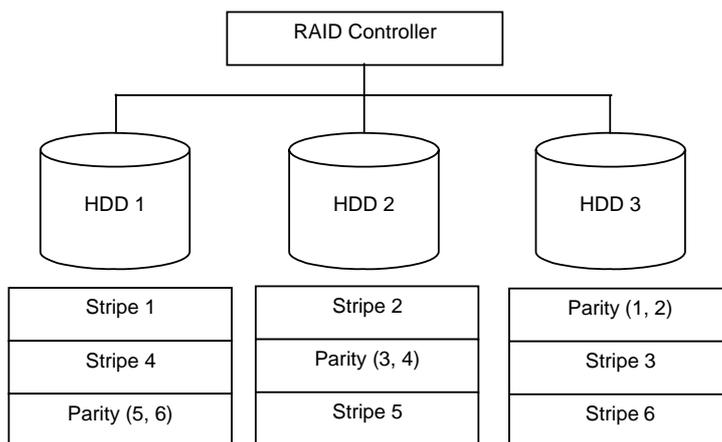
Figure 34: RAID5 Configuration

RAID6

A RAID 6 extends RAID 5 by adding an additional parity block (Q) created by different calculation method such as weighting by some factor, thus it uses block-level striping with two parity blocks distributed across all member disks. This mode is called "striping with duplex and distributed parity". Accordingly, the total capacity assigned to the parity is just the same as the capacity of two HDDs. If any two of the HDDs configuring a virtual drive are defective, data is still available with no problems.
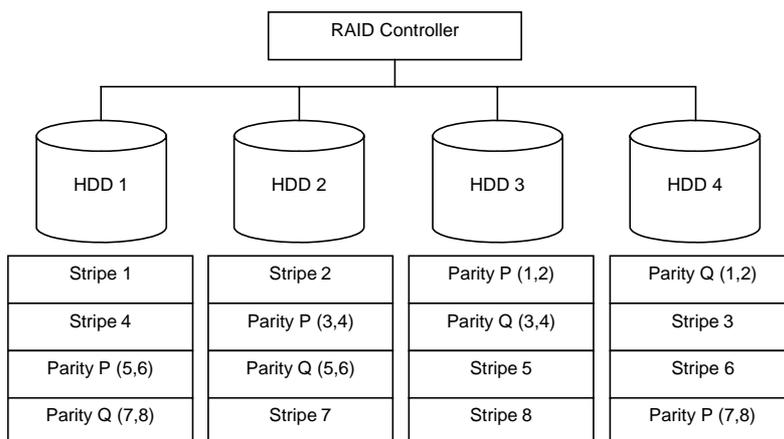

Figure 35: RAID6 Configuration

Configuration by Internal RAID Controller

This section describes how to set the internal hard disk drives as a RAID System using the Internal RAID Controller of the 2.5-inch disk model.

Rebuild

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

Manual Rebuild

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

Refer to the "Universal RAID Utility User's Guide" in ExpressBuilder DVD that comes with the server.

Auto Rebuild

The Internal RAID Controller can automatically start the Rebuild.

The Auto Rebuild can be of two types, as follows:

Standby Rebuild

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

Hot-swap Rebuild

Automatic Rebuild by hot-swapping a defective HDD.

📋 ***Note*** *the following for the Rebuild:*

■ *The HDD used for the Rebuild should have the same capacity, rotation speed, and standard as the defective HDD.*

■ *During a Rebuild, the processing rate is decreased becaus of the high load.*

■ *During a Rebuild, do not shutdown or reboot the server. If the server is shutdown by an unforeseen accident such as power interruption, turn on the power again as soon as possible. The Rebuild restarts automatically.*

■ *The interval between the removal of the defective HDD and the installation of a substitute HDD should be at least 60 sec.*

■ *If the hot-swap Rebuild does not operate, perform a Manual Rebuild.*

Patrol Read

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

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

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

> 📰 **Note** *the following for the Patrol Read:*
>
> ■ *For the Internal RAID Controller, the Patrol Read feature is factory-set to "Enabled". For the external SAS RAID controller, the Patrol Read feature is either enabled or disabled depending on firmware.*
>
> ■ *To change the Patrol Read settings, use the Universal RAID Utility.*
>
> ■ *If the system is restarted while running Patrol Read, Patrol Read resumes from the point where it was stopped.*

Consistency Check

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

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

The Consistency Check performs not only a Consistency Check but also repairs the error sectors. It can also be used as a preventive maintenance.

> 📰 **Note** *the following for the Consistency Check:*
>
> ■ *During Consistency Check, the processing rate is decreased due to the high load.*
>
> ■ *If the system is restarted, the Consistency Check is aborted, but resumes afterwards.*
>
> ■ *To schedule the execution of the Consistency Check, use WebBIOS, not the Universal RAID Utility*

Background Initialize

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

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

The Background Initialize is not performed in the following cases.

■ A Full Initialize has already been executed and completed normally before executing a Background Initialize.

(*) Full Initialize clears the entire area of a virtual disk with "0".

■ A Consistency Check has already been executed and completed normally before executing a Background Initialize.

■ A Rebuild has already been executed and completed normally before executing a Background Initialize (for RAID5 only).

"Yes" is specified for "Disable BGI" in VD Definition.

■ The Virtual disk is in degraded or offline state.
A Background Initialize is performed if the virtual disk of RAID6 is partially degraded.

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

■ When the virtual disk is degraded or offline, the offline HDD is put Online, and the virtual disk state becomes Optimal.

■ When you replace the RAID Controller.

■ When you execute a Reconstruction to an existing virtual disk to make a RAID5 VD with five or more HDDs.

📑 *Note the following for Background Initialize:*

■ *During Background Initialize, the processing rate is decreased due to the high load.*

■ *Background Initialize will resume a few minutes later if it is interrupted.*

Reconstruction

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

⚠ **Caution**

You can use WebBIOS for the Reconstruction whereas the Universal RAID Utility does not support the Reconstruction feature.

Removed physical drive

Unsupported.

Migration only

Unsupported.

Migration with addition

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

Table 23: Migration with addition

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

📰 *Note the following for the Reconstruction:*

■ *Be sure to make a backup copy of the data and to perform a Consistency Check before starting the Reconstruction.*

■ *The Reconstruction is disabled in a configuration where several virtual disks are defined in one disk group*

■ *During the Reconstruction, the processing rate is decreased due to the high load.*

■ *The Reconstruction can be performed for the degraded or partially degraded virtual disk. However, we recommend you first execute a Rebuild to recover the virtual disk, then execute Reconstruction.*

■ *During the Reconstruction, do not shutdown or reboot the server. If the server is shutdown by an unforeseen accident such as power interruption, power on again as soon as possible. The Reconstruction restarts automatically.*

■ *In some configurationa, the Background Initialize may start automatically once the Reconstruction is completed.*

Ex: Migration with addition for a RAID5 virtual disk

The figure below shows the addition of a single 36GB HDD to a RAID5 virtual disk configured with three 36GB HDDs.
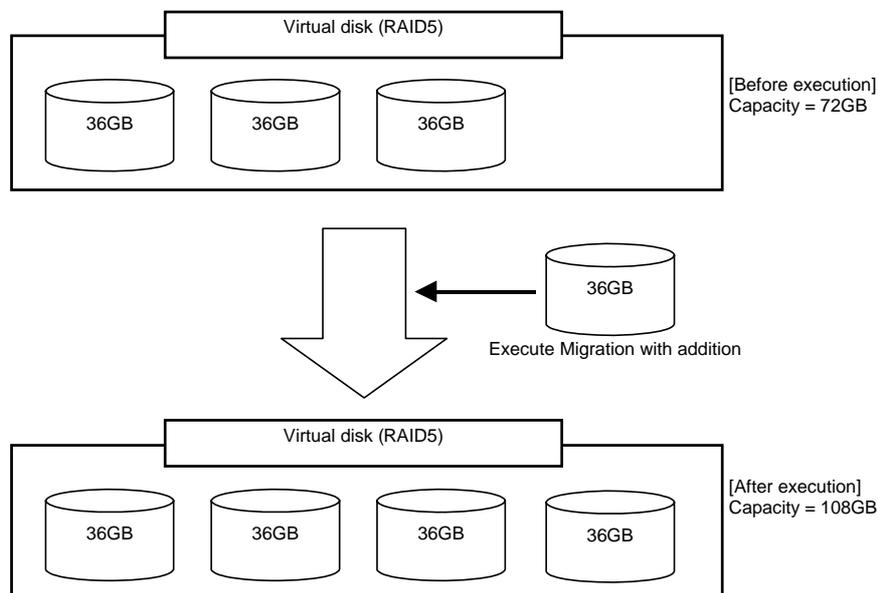
Before Using WebBIOS

Supported Functions

■ Indication of model name and capacity of a hard disk drive (called HDD hereafter)

■ Indication of the HDD allocation status

■ Creation of virtual disks

- RAID level Settings

- Stripe Block size Settings

- Read Policy/Write Policy/IO Policy Settings

■ Indication of the configuration information and status of the virtual disk

■ Virtual Disk removal

■ Configuration clearing

■ Initialization

■ Consistency Check

■ Manual Rebuild

■ Reconstruction

Notes on when creating a Virtual Disk

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

■ Be sure to execute a Consistency Check after the VD creation.

■ When installing an OS in VD under the Internal RAID Controller, create a VD dedicated to the OS installation.

■ WebBIOS cannot be handled via the remote console functions of NEC DianaScope.

■ The physical drive numbers shown in WebBIOS and those shown in the Universal RAID Utility are identified as follows.

- WebBIOS

Enclosure number and Slot number shown in the Physical Drives box*

*"X:X:X" shown in the Physical Drives box represents the Connector number:Enclosure number:Slot number.

- The Connector number is not supported on this server, thus, it is always indicated as "()".
- The Enclosure Number is always "1".
- The Slot number represents a slot number of disk bay.

- Universal RAID Utility

The Enclosure number and Slot number are shown in the Physical Device Properties

Note that the slot numbers shown in Physical Drives box of WebBIOS start from 0, whereas those in the Universal RAID Utility start from 1.
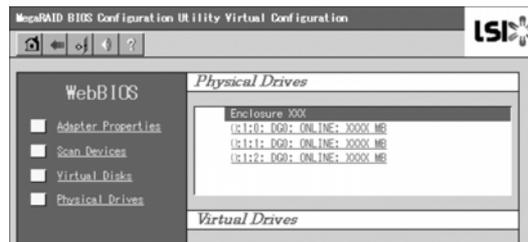
Figure 36: Physical Drives View of WebBIOS
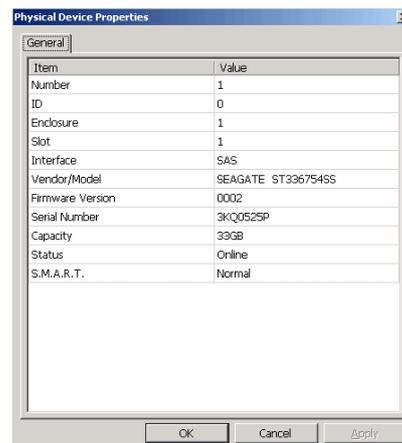
Figure 37: Physical Device Properties in the Universal RAID Utility

Using WebBIOS

Starting WebBIOS

1. Power on the server and press **Esc** when a full-screen logo is displayed.
2. Press **Ctrl** + **H** on the POST screen to start WebBIOS.

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

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

⚠ **Caution**

■ Do not press unnecessary keys, such as **Pause** during POST.

■ If you fail to press **Ctrl + H** and the system proceeds without displaying the WebBIOS main menu (shown on the next page), reboot the system, and press **Ctrl + H** on the POST screen.

Main Menu

The screen shown below is the [Adapter Selection] screen that appears first on WebBIOS. Select a controller to operate WebBIOS, and click [Start].
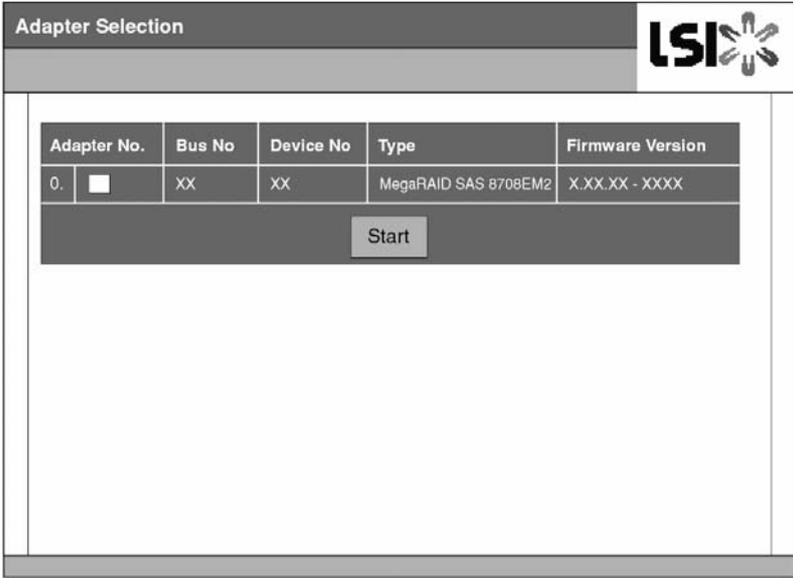
Figure 38: Adapter Selection Screen

The WebBIOS Top Menu appears.

Figure 39: WebBIOS Top Menu Screen

⚠ **Caution**

"X:X:X" shown in Physical Drives box represents Connector number:Enclosure number:Slot number. With this server, the Connector number is not supported, thus, it is always indicated as "()". The Enclosure number is always "1". The Slot number represents a slot number of disk bay.

Adapter Properties

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

Figure 40: Configuration Information Screen

Click [Next] to see the detailed settings of this controller.
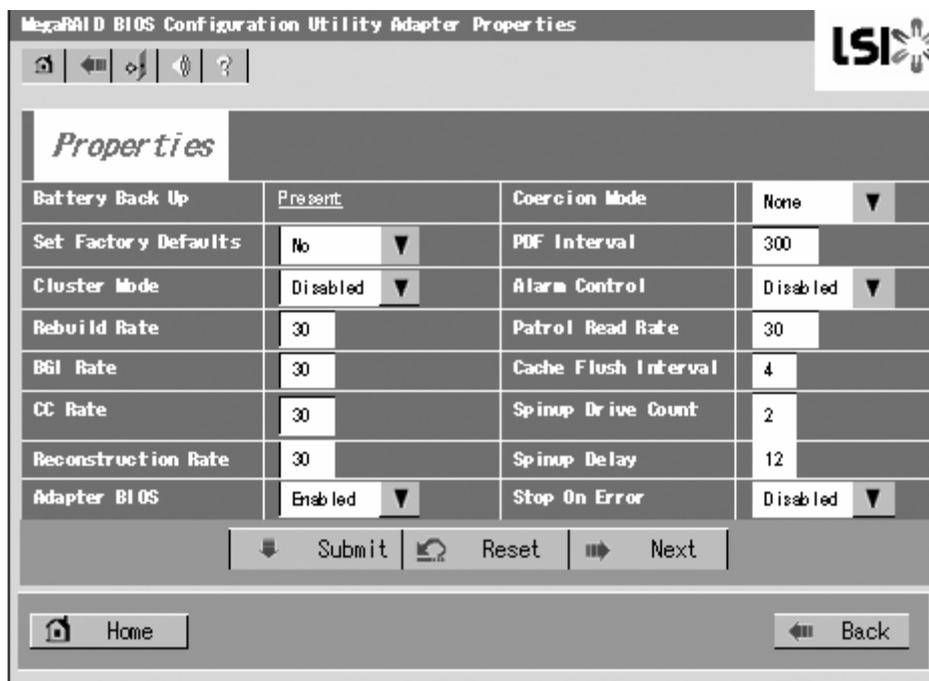
Figure 41: Detailed Controller Settings Screen (1)

The detailed settings continues on the next page. Click [Next] to view more information.
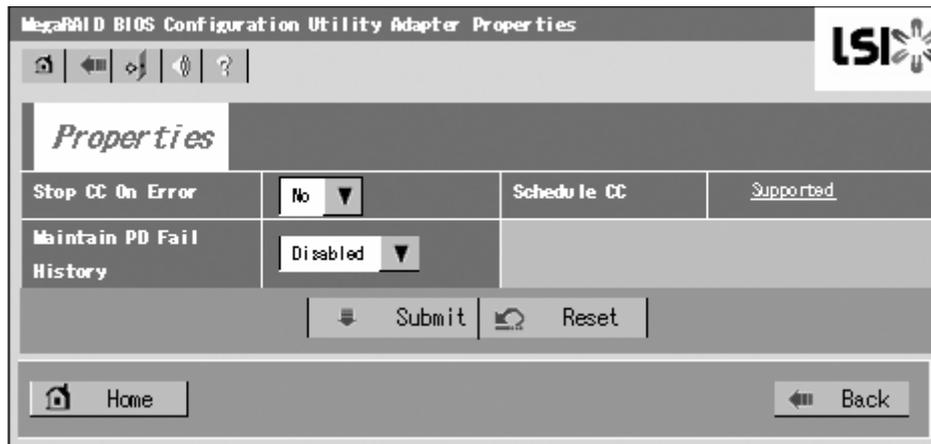
Figure 42: Detailed Controller Settings Screen (2)

Table 24: 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 vendor's factory defaults.	Prohibited *1
Cluster Mode	Disabled	–	Prohibited
Rebuild Rate	30	Recommended value: 30	Permitted
Patrol Read Rate	30	Recommended value: 30	Permitted
BGI Rate	30	Recommended value: 30	Permitted
CC Rate	30	Recommended value: 30	Permitted
Reconstruction Rate	30	Recommended value: 30	Permitted
Adapter BIOS	**Enabled** Disabled	–	Prohibited
Coercion Mode	**None** 128MB-way 1GB-way	–	Prohibited
PDF Interval	300	–	Prohibited
Alarm Control	**Disabled** Enabled Silence	Disabled:Does not issue an alarm.	Prohibited *2
Cache Flush Interval	4	–	Prohibited
Spinup Drive Count	2	–	Prohibited
Spinup Delay	12	–	Prohibited
StopOnError	**Disabled** Enabled	–	Prohibited
Stop CC On Error	**No** Yes	Specify the operation at error detection in Consistency Check. No: Recover and resume. Yes: Abort	Permitted
Maintain PD Fail History	**Disabled** Enabled	–	Prohibited
Schdule CC	Supported	Set the scheduled Consistency Check.	Permitted

*1Do not perform "Set Factory Defaults". If performed, the factory-set values can no longer be restored.

Changing the Settings

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

The "Battery Backup" status is "Present". Clicking [Present] opens the Battery Status screen as shown below.
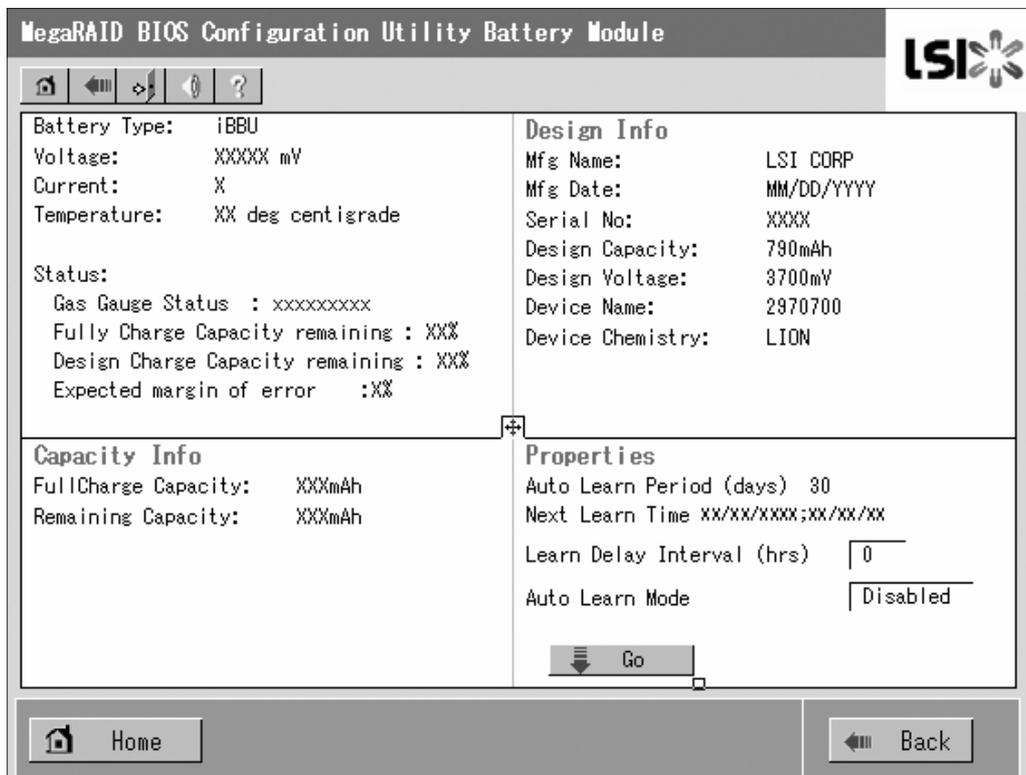
Figure 43: Battery Status Screen

⚠ **Warning**

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

📄 ***Notes****:*

■ *The Status field shows "Charging" when the battery is being charged. It shows "Discharging" when the battery is being discharged.*

■ *When powering on the server after the battery replacement, the Status may not immediately change to "Charging". In that case, power on the server for several hours, and check the "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 while WebBIOS is running.

⚠ **Caution**

■ If the newly connected HDD contains another configuration information, the [Foreign Configuration] screen shown below appears. To use the HDD as new one, click [Clear] to clear the configuration information in HDD.
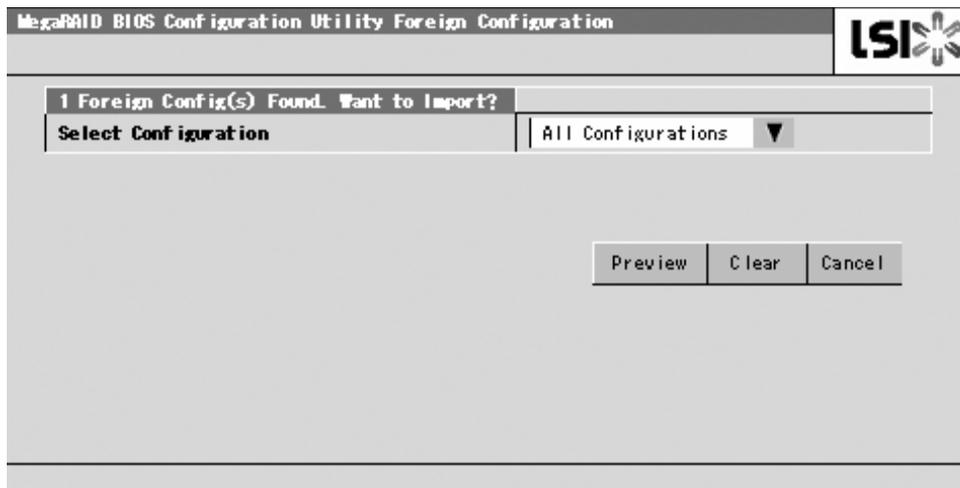
Figure 44: Foreign Configuration Screen

■ If you use the Universal RAID Utility to configure a RAID system using the newly connected HDD containing another configuration information, first clear any other configuration information using this Scan Devices feature.

Virtual Disks

When you click [Virtual Disks] on the WebBIOS Top Menu, the screen for operating the VD that has already been configured is displayed.
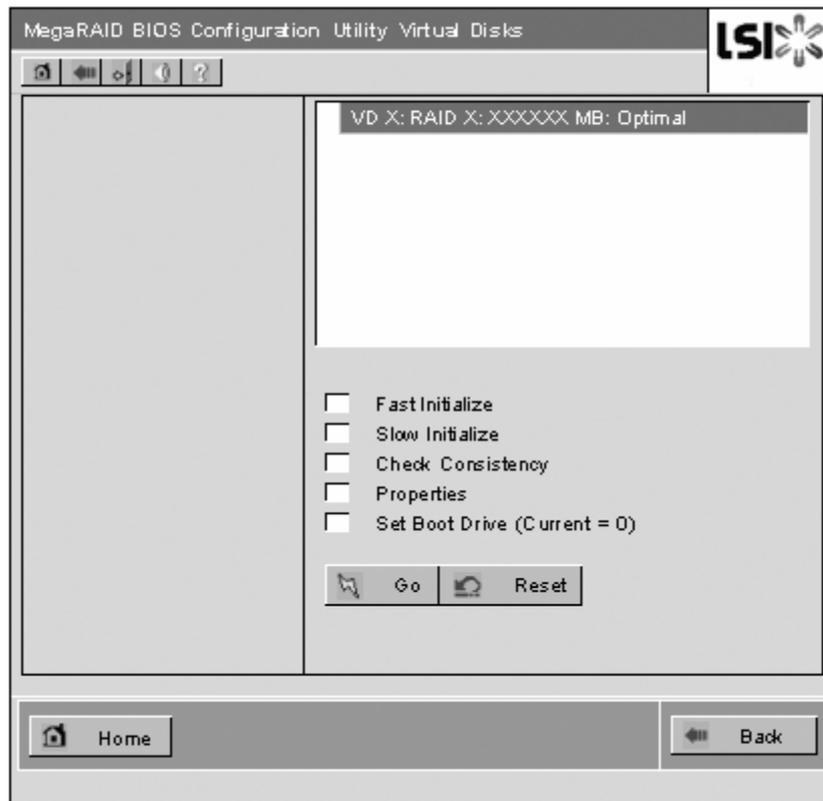
Figure 45: Virtual Disks Operation Screen

⚠ **Caution**

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 the WebBIOS Top Menu, the screen for operating the physical drive (HDD) appears.
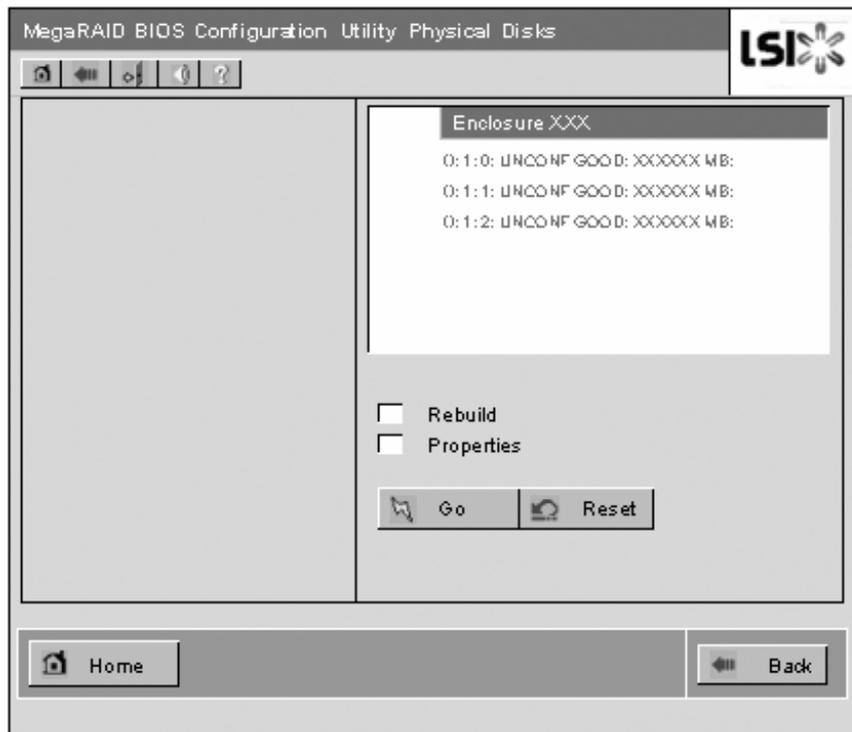
Figure 46: Physical Drive Operation Screen

⚠ **Caution**

If no hard disk drive exists, the upper right column of the screen will be blank. Use this menu only when a hard disk drive exists.

Physical Drives Properties

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

   1. Click on the Physical Drive you want to check.
   2. Click the checkbox for [Properties].
   3. Click [Go].
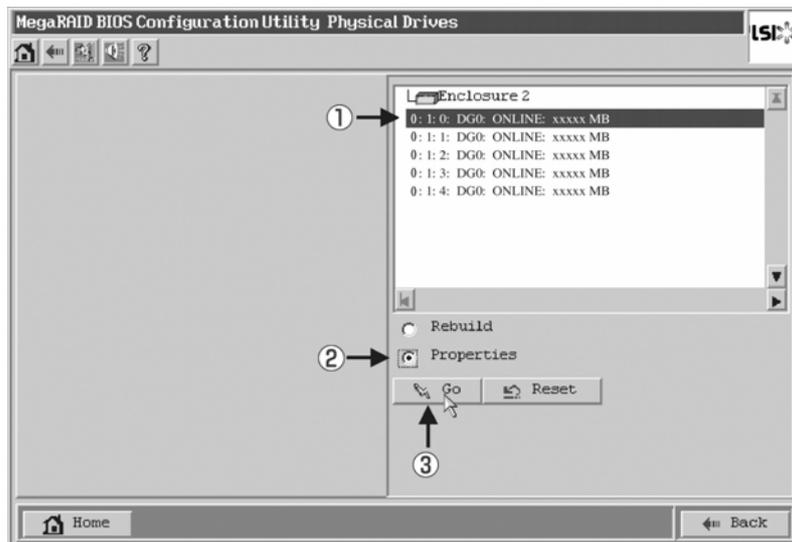
Figure 47: Physical Drives Properties Screen (1)

The Properties screen shown below appears.
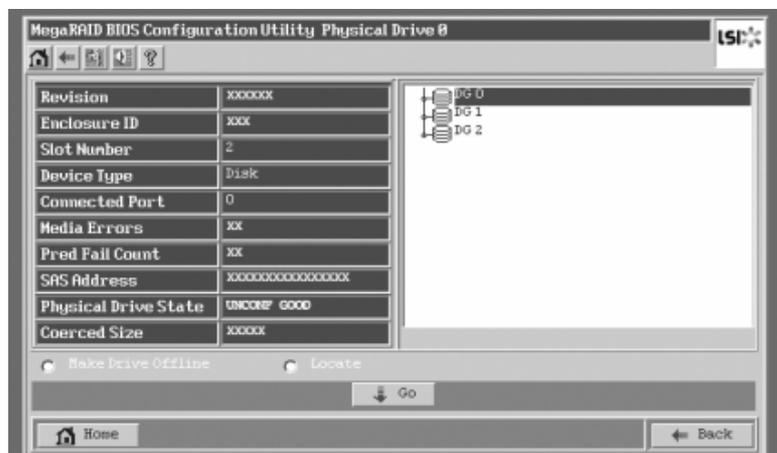
Figure 48: Physical Drives Properties Screen (2)

Configuration Wizard

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

Adapter Selection

Click [Adapter Selection] on the WebBIOS top menu to open the [Adapter Selection] screen.

Physical View / Logical View

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

Events

The Events screen is used to confirm the system events.

⚠ **Caution**

The Internal RAID Controller does not support the Events feature.

Exit

When you click [Exit] on the WebBIOS Top Menu, a confirmation screen to exit from WebBIOS is displayed. Click [Yes] to exit from WebBIOS.
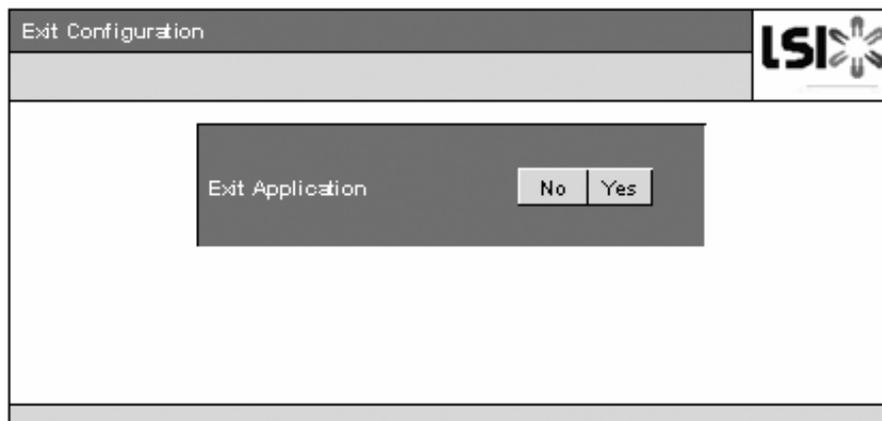
Figure 49: WebBIOS Exit Screen (1)

the screen shown below is displayed when WebBIOS is terminated. Restart the server.
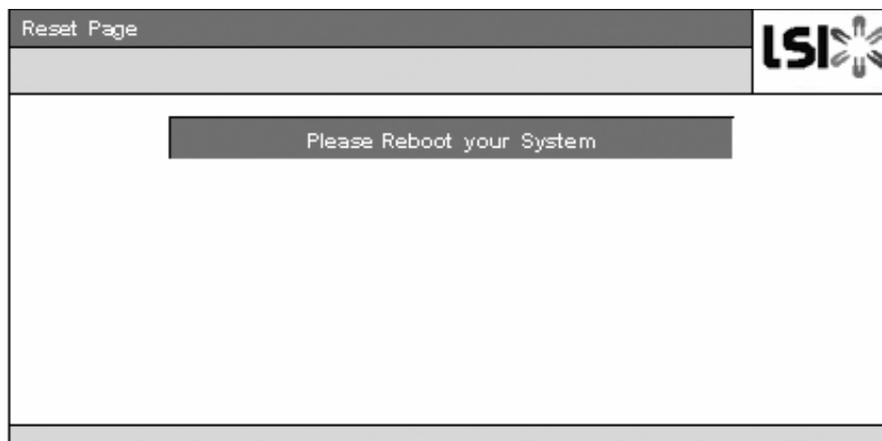
Figure 50: WebBIOS Exit Screen (2)

Configuring a Virtual Disk

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

Configuration Wizard

When you click [Configuration Wizard] on the WebBIOS Top Menu, the screen shown below is displayed. Select the relevant operation, and click [Next] at lower right of the screen.
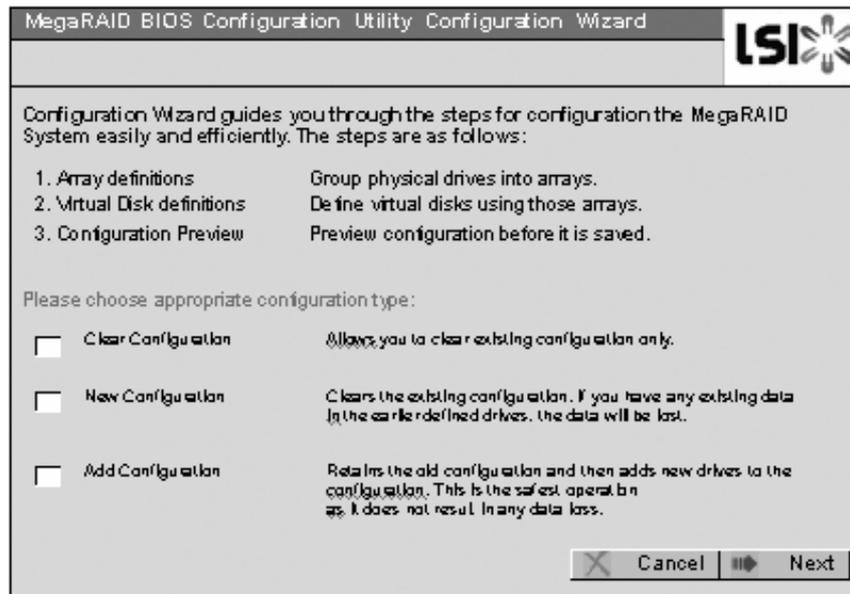
Figure 51: Configuration Wizard Screen (1)

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 virtual disk defined earlier, the data will be lost.
Add Configuration	Retains the old configuration and then adds a new virtual disk.

When you select [New Configuration] or [Add Configuration], the screen shown below is displayed.
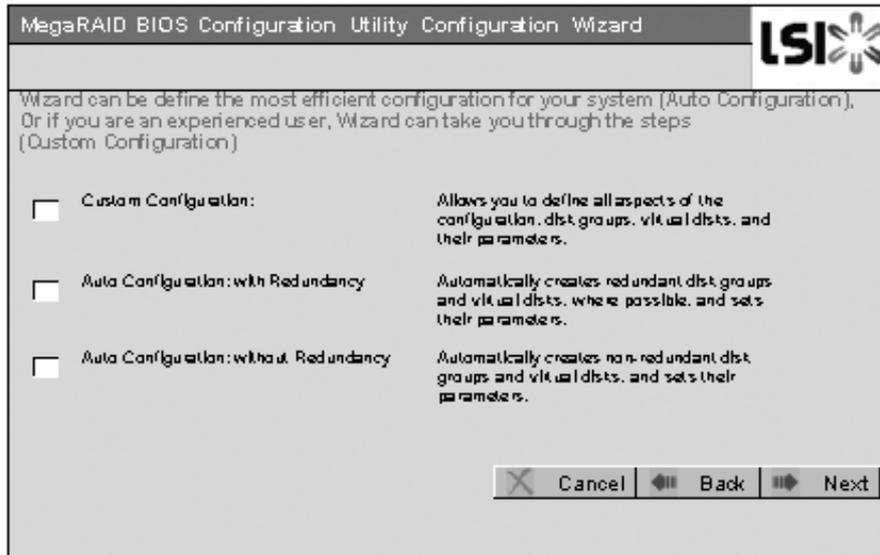
Figure 52: Configuration Wizard Screen (2)

Custom Configuration:	Allows you to define all aspects of the configuration, RAID level, size, and others.
Auto Configuration with Redundancy:	Automatically creates a redundant virtual disk.
Auto Configuration without Redundancy:	Automatically creates a non-redundant virtual disk.

⚠ Caution

The Internal RAID Controller only supports "Custom Configuration".

Use this menu to define several physical drives (PD) as a disk group (DG).
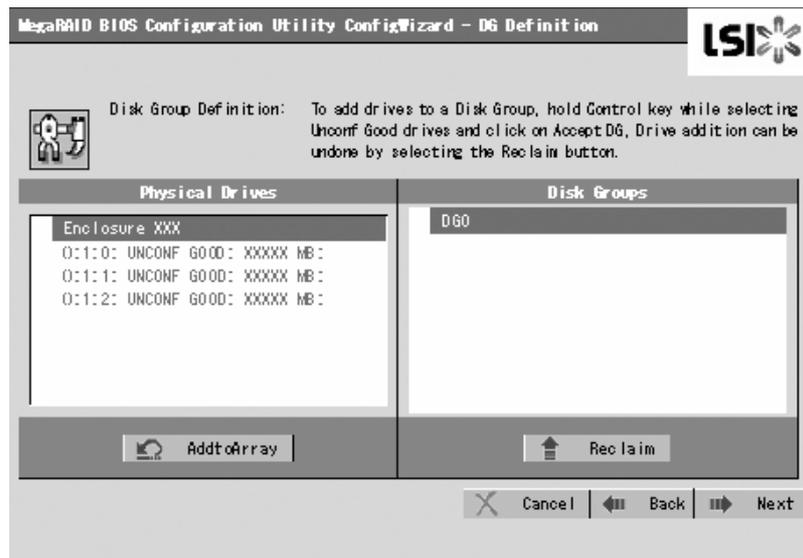
Figure 53: Configuration Wizard Screen (3)

1. To add physical drives (HDD) to a Disk Group, hold **Ctrl** while selecting physical drives (HDDs) in DG.
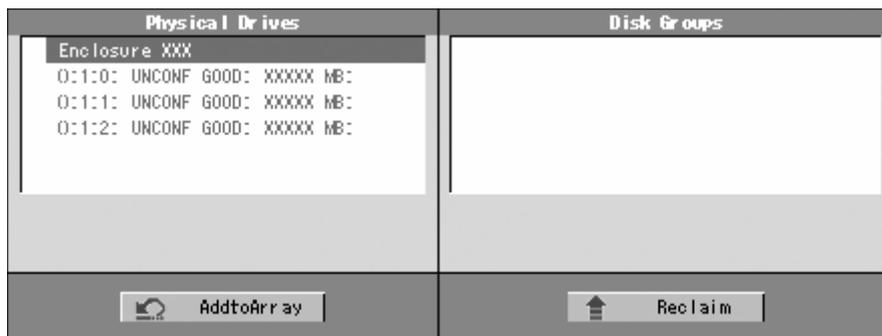
Figure 54: Configuration Wizard Screen (4)

2. Once the selection is completed, click [Add to Array].
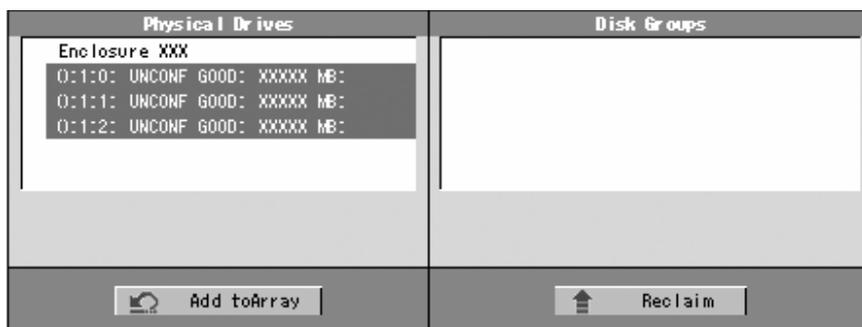
Figure 55: Configuration Wizard Screen (5)

3. A new DG is defined in the Disk Groups frame.

To define the new DG, click [Accept DG].
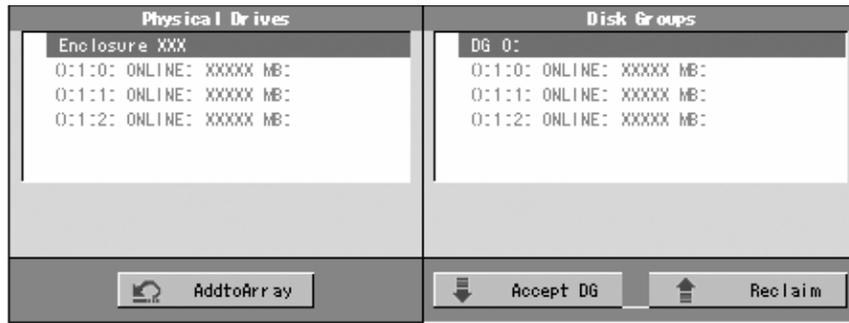
Figure 56: Configuration Wizard Screen (6)

4. Once the DG has been defined, click [Next].
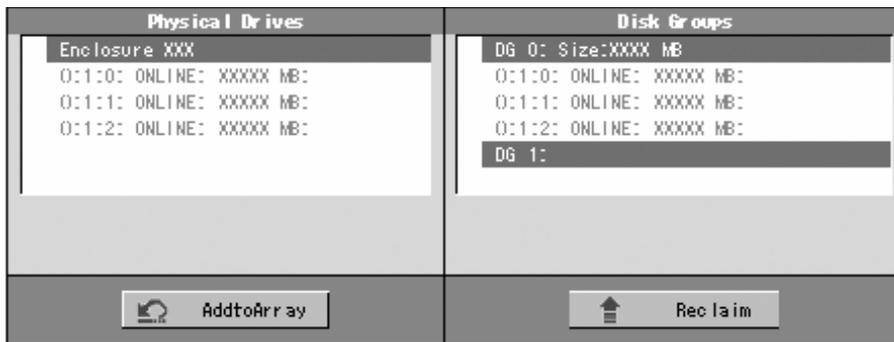
Figure 57: Configuration Wizard Screen (7)

5. Then, the Span Definition screen appears.
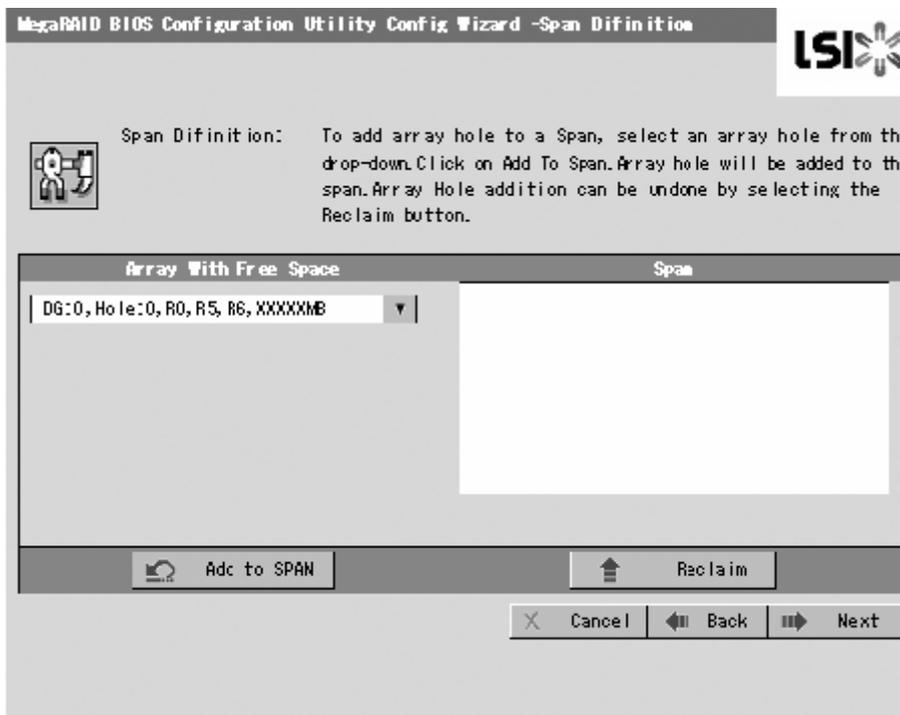
Figure 58: Configuration Wizard Screen (8)

6. Select a DG to define a VD from "Array With Free Space" frame, then click [Add to SPAN]. The DG is defined in the "Span" field to the right.
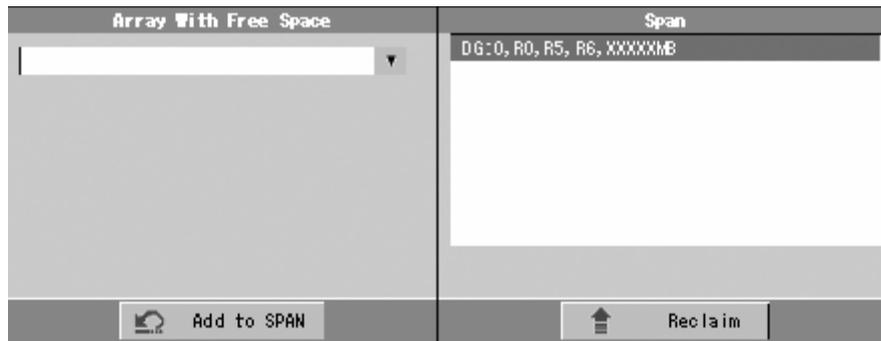
Figure 59: Configuration Wizard Screen (9)

7. Once the Span has been defined, click [Next].

⚠ Caution

■ To configure RAID0, 1, 5, or 6, perform Span Definition to a single DG only. If you need to perform Span Definition to several DGs, define VD for the first DG, then select the next DG to define VD.

■ Span Definition cannot be performed to DGs containing the different number of HDDs.

Define the virtual disk (VD) in DG that has been created in the previous step. When DG was defined, the [VD Definition] screen is displayed. In the "Next

LD, Possible RAID Levels" column, the available RAID levels and maximum size for the VD are displayed.
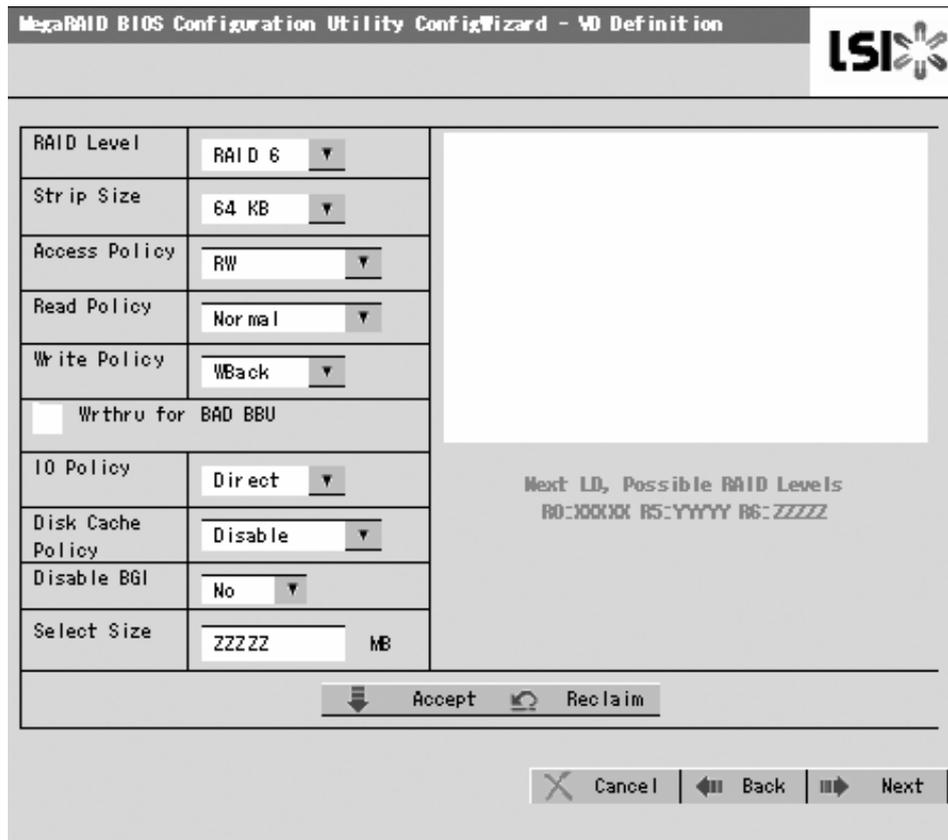
Figure 60: Configuration Wizard Screen (10)

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

1. Specify the necessary parameters in left columns.

2. Enter "yyyyy" in "Select Size" field.

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

4. If you want to define another VD, click [Back] and repeat the steps starting from the Span Definition screen.

5. When the VD is defined, click [Next].

⚠ **Caution**

■ The value shown in "Select Size" indicates the maximum size allowed for RAID1 or RAID6. You need to specify the maximum size for RAID0 or RAID5 according to "Next LD, Possible RAID Levels".

■ To use RAID 5 or RAID 6 with Internal RAID Controller, you need to install the optional RAID Upgrade Kit.

■ If the RAID Upgrade Kit is not installed, do not select "RAID5" that may appear in [RAID Level] box. If selected, you will fail to save the configuration information. In such a case, you need to define a VD again from the beginning.

---

6. The VD 0 is created in the DG 0 as shown in the screen below.
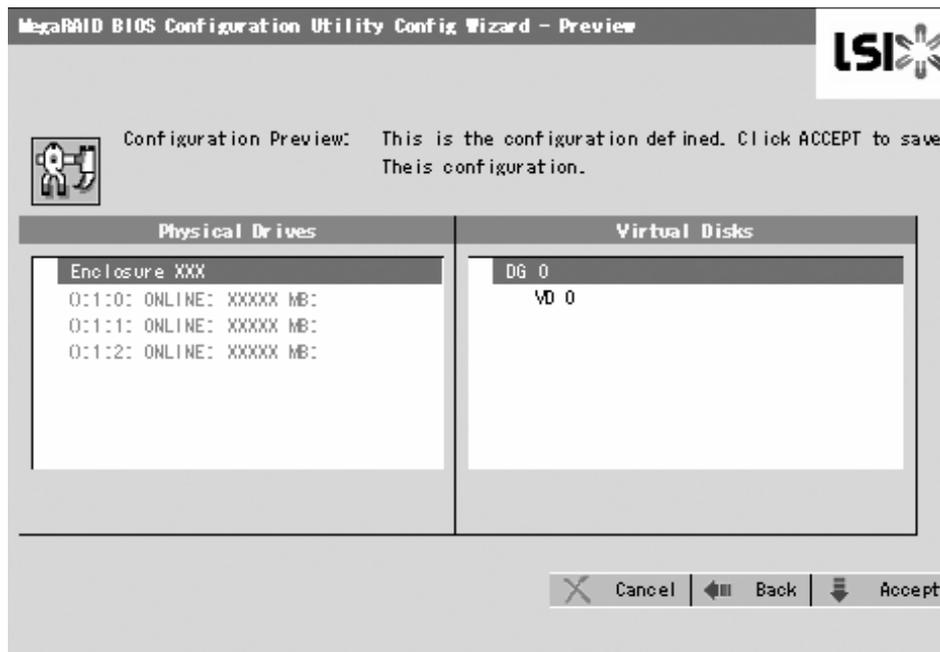
Figure 61: Virtual Disk Creation

7. Make sure that the VD is created correctly, and click [Accept] at the lower right of the screen.

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

9. The confirmation message "All data on the new Virtual Disks will be lost. Want to Initialize?" appears. Select "Yes".

10. The "Virtual Disks" operation screen is displayed. If no other operation is required, click [Home].

11. The WebBIOS Top Menu is displayed. The Virtual Disk you have created is displayed in the lower right frame of the screen.
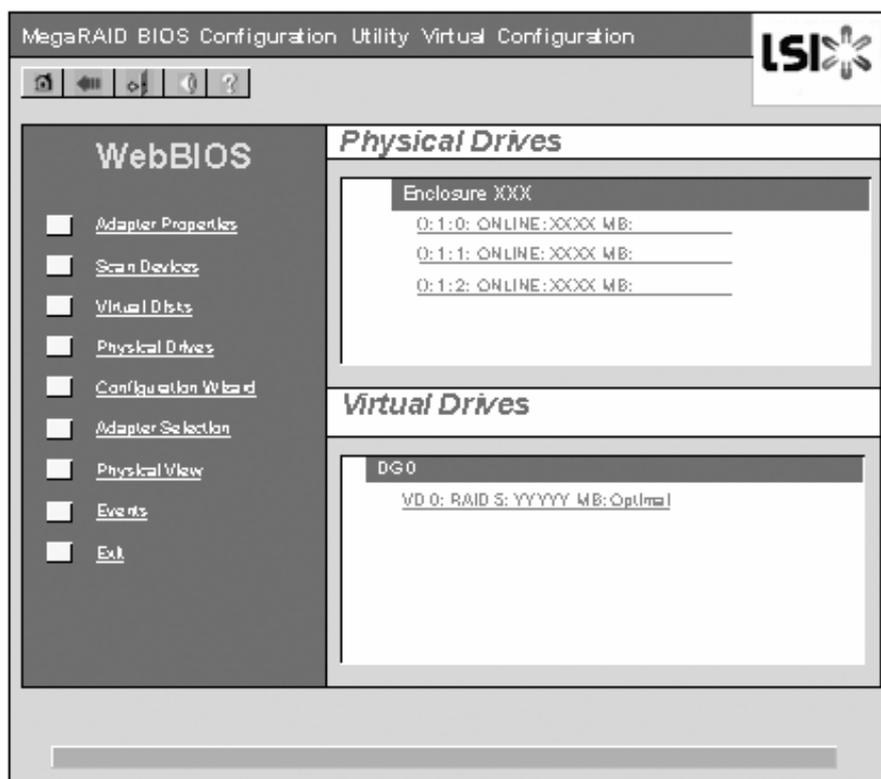
Figure 62: WebBIOS Top menu

Configuring a SPAN

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

⚠ **Caution**

Do not attempt to configure RAID00 or RAID60. They are not supported.

---

1.   Click the [Configuration Wizard] on the WebBIOS Top Menu.
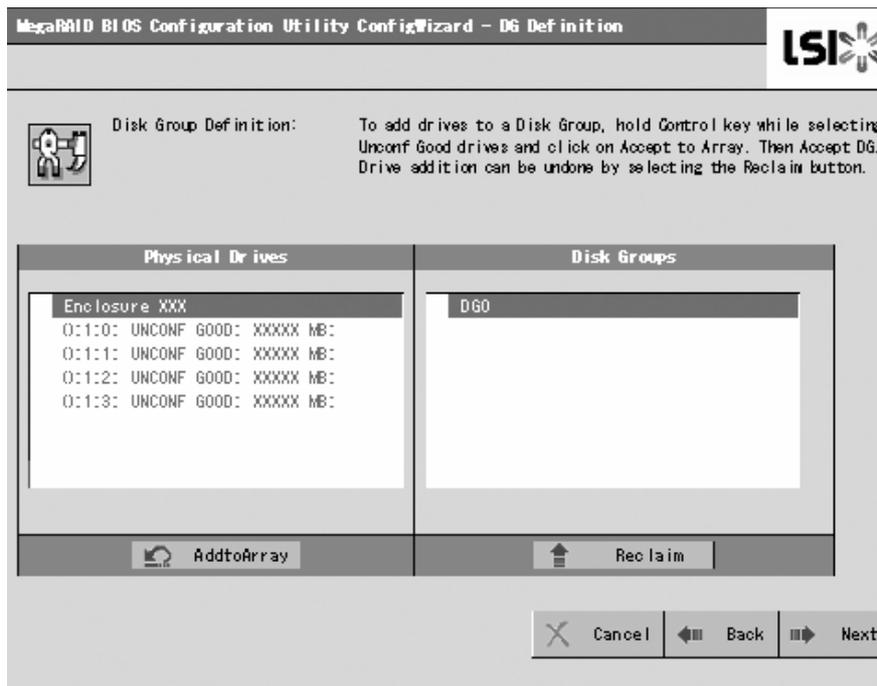
Figure 63: Span Configuration Wizard (1)

2.   To add physical drives (HDD) to a Disk Group, hold **Ctrl** while selecting the HDDs in the DG. (In the example, two DGs will be configured and spanned.)
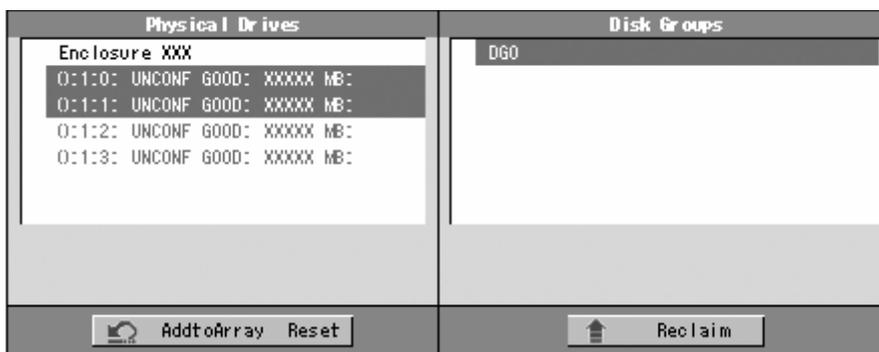
Figure 64: Span Configuration Wizard (2)

3.   Upon completion of selection, click [Add to Array] at the lower right of the screen. Make sure that the new DG is defined in the Disk Groups frame to the right, click [Accept DG].
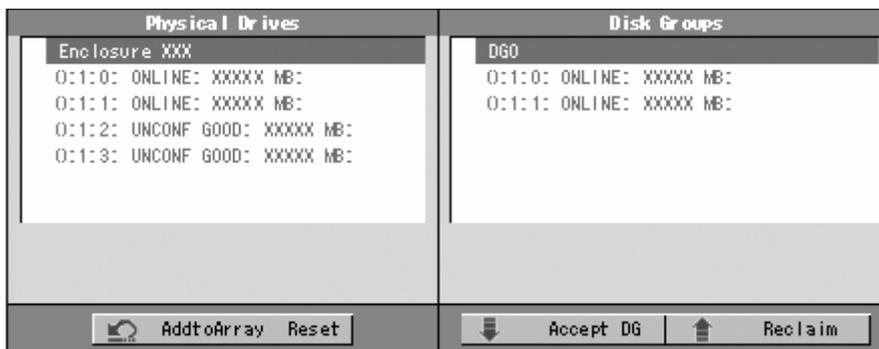
Figure 65: Span Configuration Wizard (3)

4. A new DG is defined in the Disk Groups frame. Define another DG in the similar procedures. Once the DGs have been defined, click [Next] at the lower right of the screen.
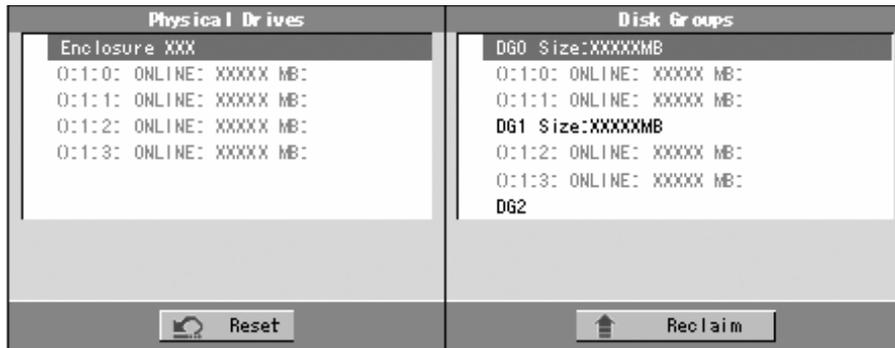
Figure 66: Span Configuration Wizard (4)

5. Configure a RAID10 (spanning of RAID1) using the two DGs that have been created in the previous step. When DGs are defined, the [VD Definition] screen is displayed.
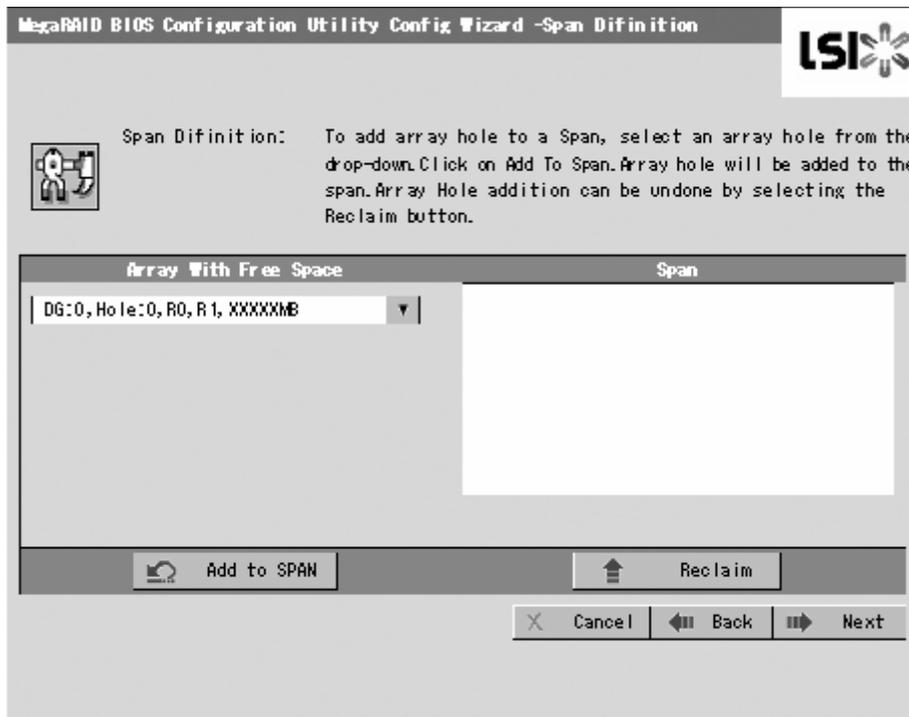
Figure 67: Span Configuration Wizard (5)

6. Select DG0 from the "Array With Free Space" frame, then click [Add to SPAN]. The DG is defined in the "Span" field to the right.
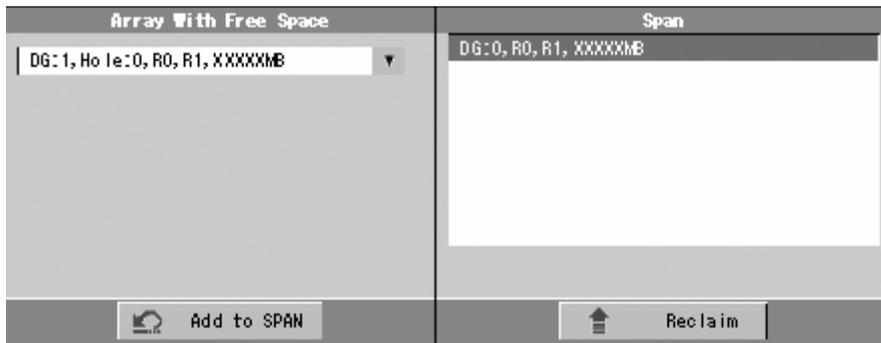
Figure 68: Span Configuration Wizard (6)

7. Select DG1 and click [Add to SPAN]. When the two DGs are defined in the "Span" field to the right, click [Next].
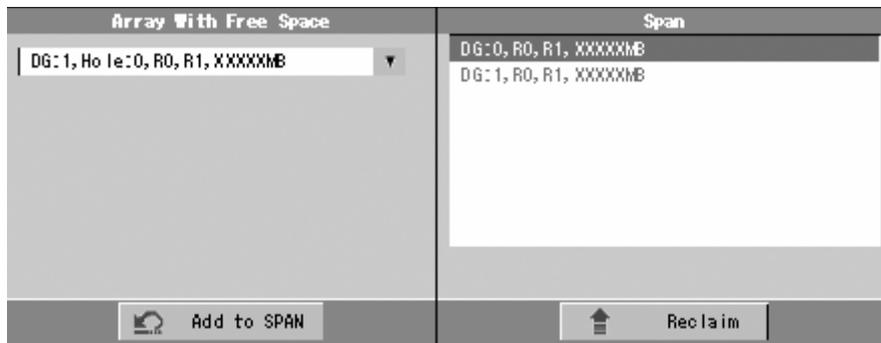
Figure 69: Span Configuration Wizard (7)

8. The VD Definition screen is displayed. Enter the necessary parameters, and click [Accept].
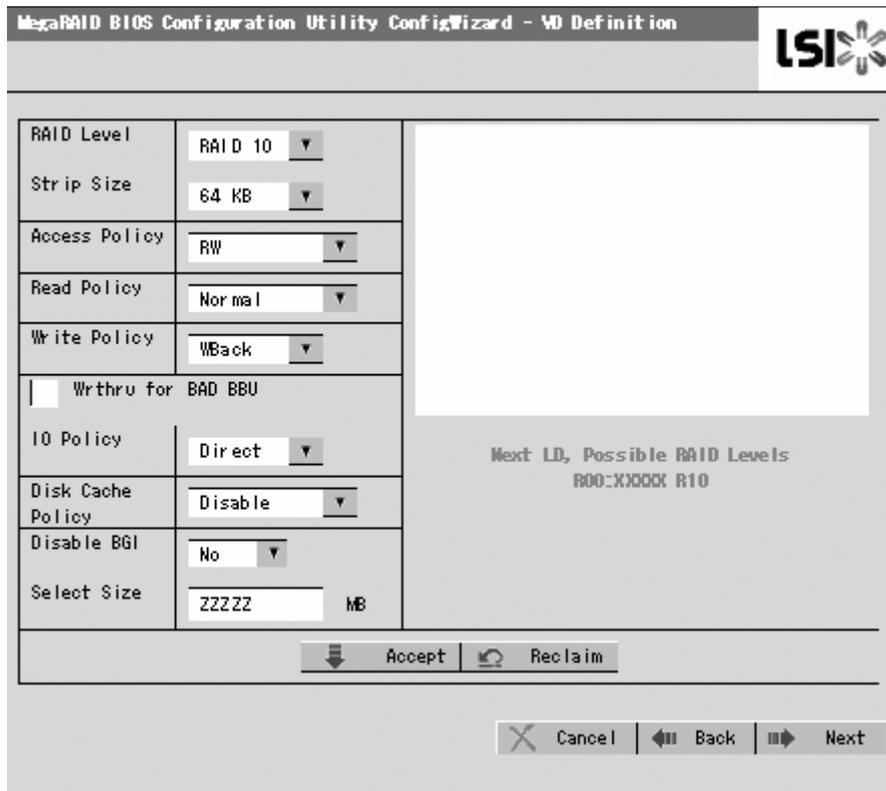
Figure 70: Span Configuration Wizard (8)

9. Make sure that both the DG0 and DG1 are defined as VD 0, then click [Next].
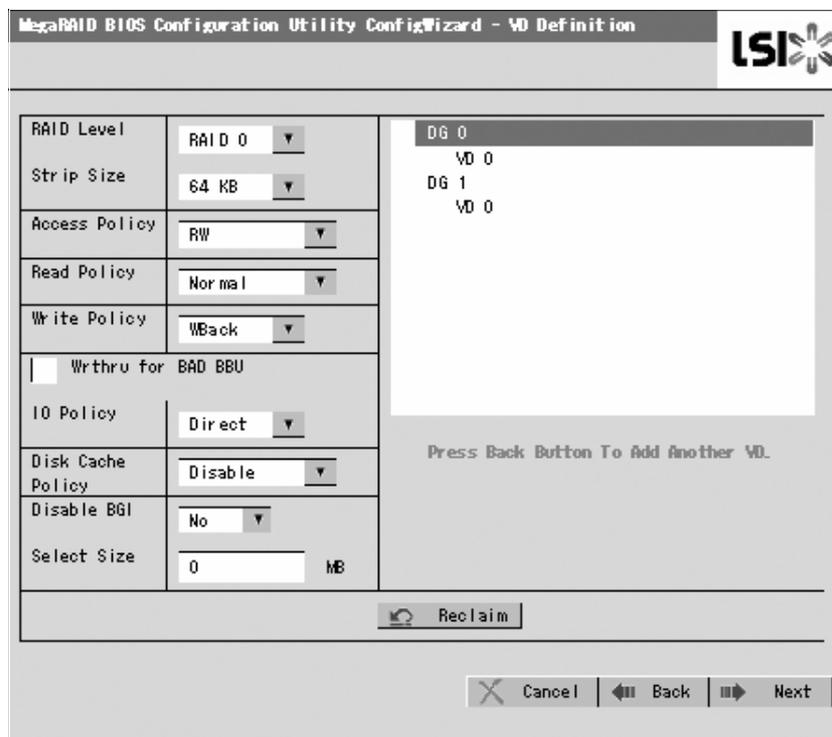
Figure 71: Span Configuration Wizard (9)

10. On the "Preview" screen, make sure that the VD is defined correctly, then click [Accept].
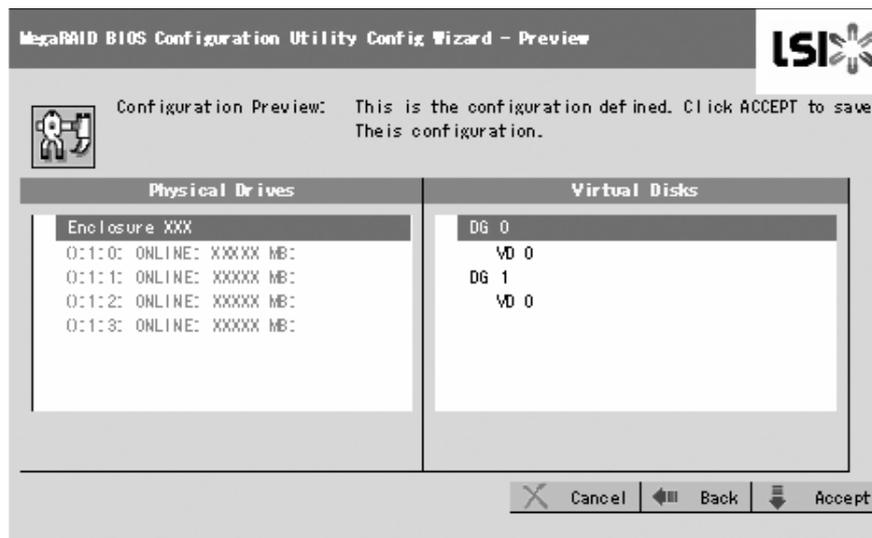
Figure 72: Span Configuration Wizard (10)

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

12. The confirmation message "All data on the new Virtual Disks will be lost. Want to Initialize?" appears. Normally, select "Yes".

13. The "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. The Virtual Disk you have created is displayed in the lower right frame of the screen.

Parameters for VD Definition

Table 25: Configuration Wizard Parameters

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

⚠ **Caution**

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

■ To use RAID 5 or RAID 6, with an Internal RAID Controller, you need to install the optional RAID Upgrade Kit.

■ If the RAID Upgrade Kit is not installed, do not select "RAID5" that may appear in [RAID Level] box. If selected, you will fail to save the configuration information. In such a case, you need to define a VD again from the beginning.

The Write Policy features the following modes to be used in combination with the WrtThru for BAD BBU. Select a mode suitable for your environment.

Table 26: Write Policy Modes

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

You can change the parameters for the VD definition except for the RAID level and Stripe Size. On the WebBIOS Top Menu, click [Virtual Disks], specify the parameters in the "Policies" frame, and click [Change].
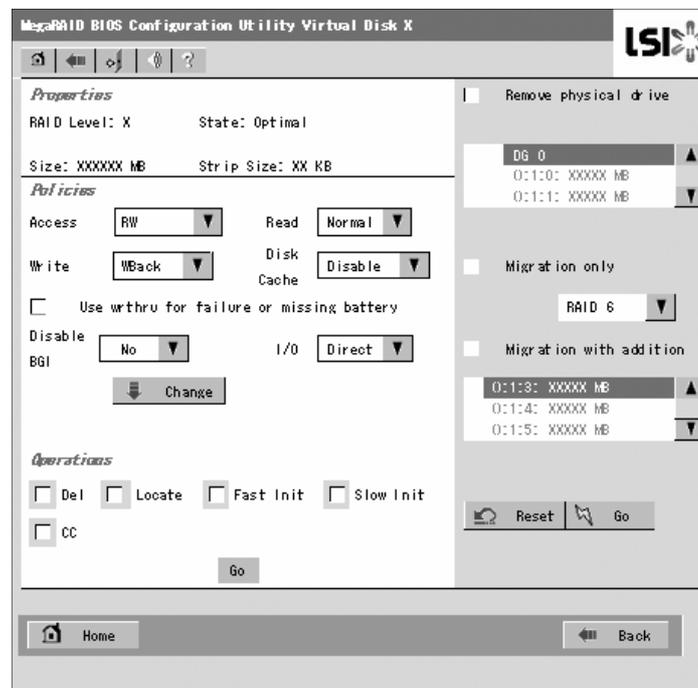
Figure 73: Virtual Disk Definition Screen

Operation of Various Features

Check Consistency

   1. Start WebBIOS.
   2. Click [Virtual Disks] on the WebBIOS Top Menu.
   3. Select a VD to perform the Check Consistency from the upper right frame of the Virtual Disks screen.
   4. Click the checkmark column for the Check Consistency from the lower right frame of the Virtual Disks screen.
   5. Make sure that Check Consistency is checked, and click [Go].
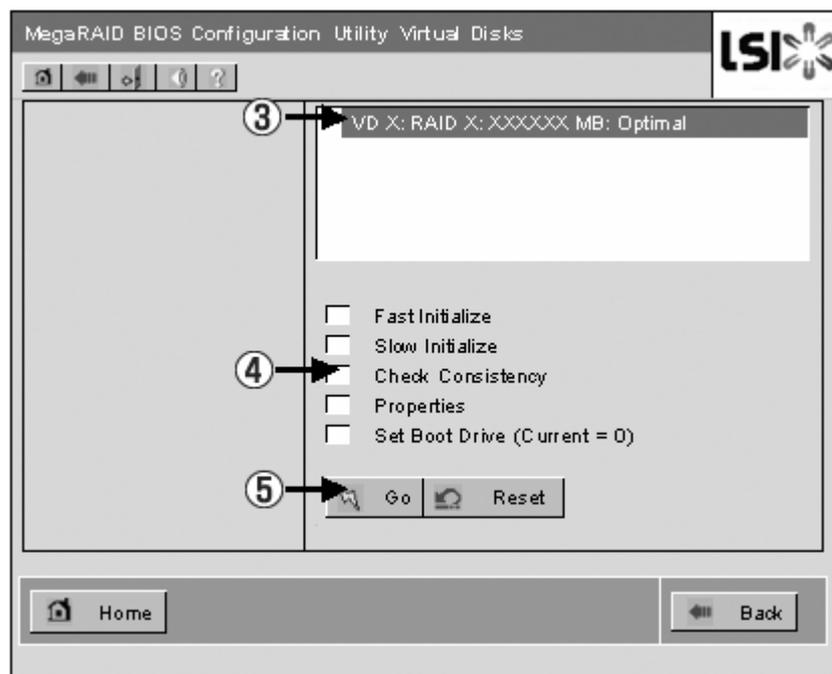
Figure 74: Check Consistency Screen

The Check Consistency progress is displayed on the left frame of Virtual Disks screen.

6. Click [Home] at the lower left of the Virtual Disks screen to return to the Top Menu.
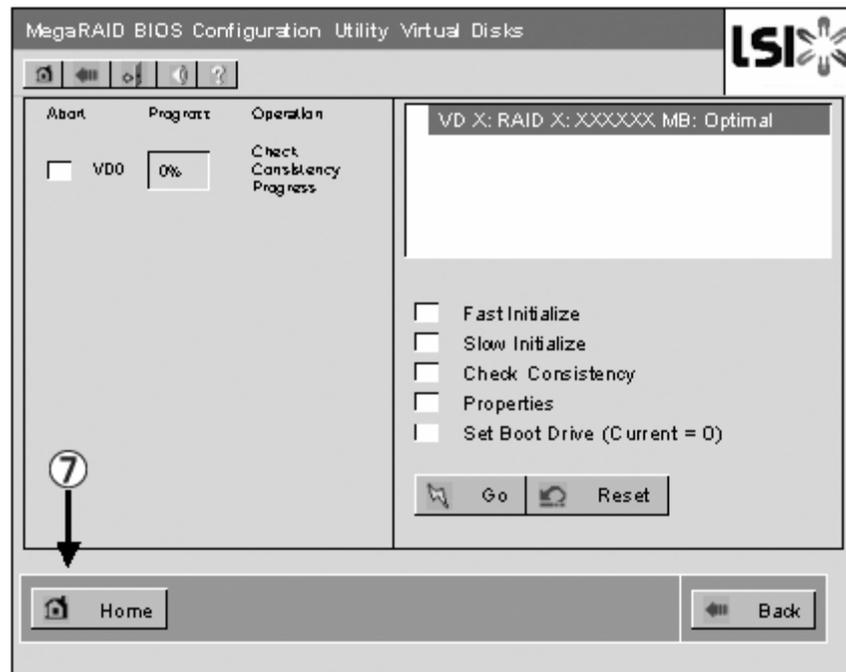
Figure 75: Virtual Disks Screen

⚠ **Caution**

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

Manual Rebuild

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

Replace the failed HDD with a new one after turning off the power of the server. The Auto Rebuild feature is disabled for non-hot-swap replacement. Use the Manual Rebuild feature to recover the virtual disk as described below.

1. Start WebBIOS.

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

In the example below, the hard disk drive in slot number 2 has been replaced. The indication "PD Missing from DGx: Slot 2: xxxxx MB" indicates that the PD (physical drive) installed in slot number 2 was removed.
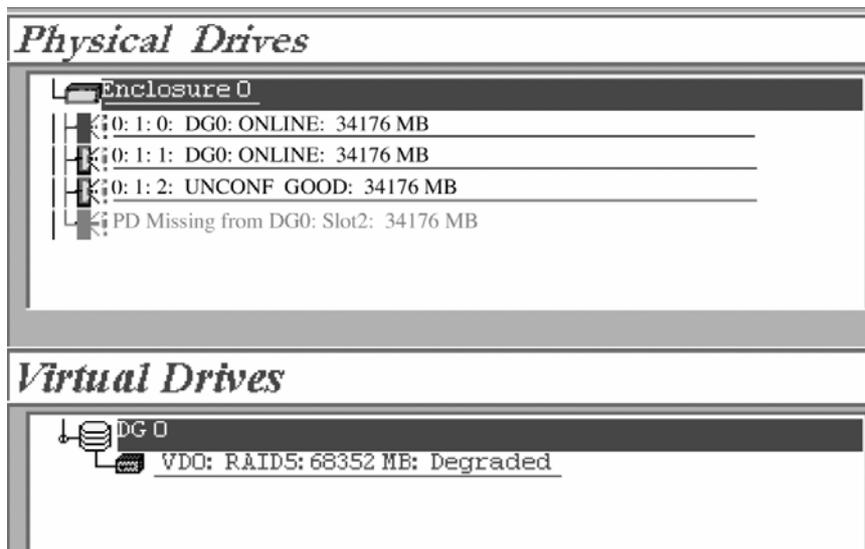
Figure 76: WebBIOS Top Menu

2. Select "():1:2" (newly connected HDD) in [Physical Drives].

The Physical Drive properties screen is displayed.

3. Select "Make Global HSP" or "Make Dedicated HSP" on the lower part of the screen, and click [Go] on the lower center of the screen.
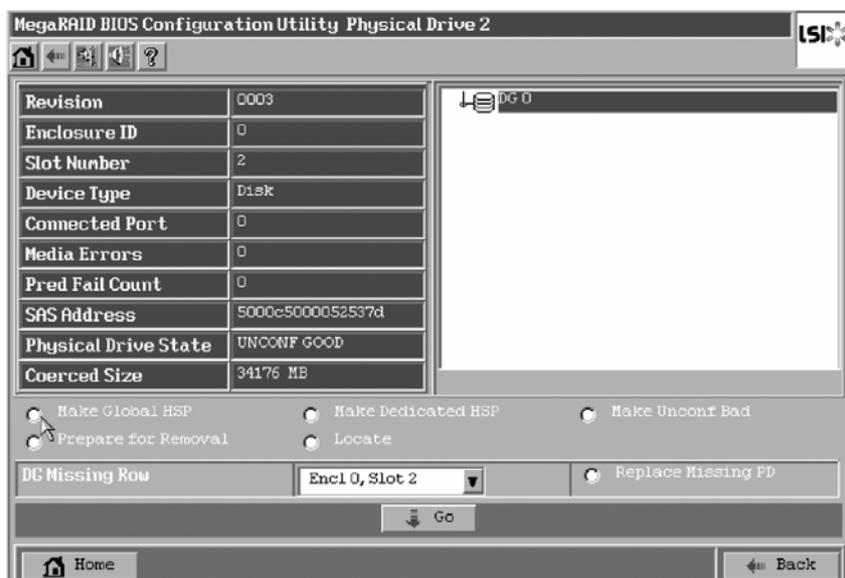
Figure 77: Physical Drive Properties Screen

4. When [Rebuild Progress] is displayed, click [Home] at the lower left of the screen to go back to WebBIOS Top Menu.
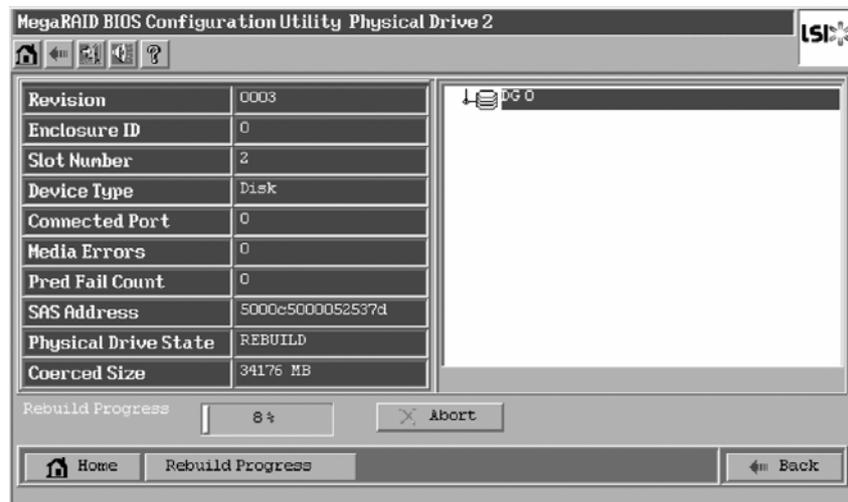
Figure 78: Rebuild Progress Screen

⚠ Caution

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

Setting a Hot Spare

The procedures below are based on the following asuumption:
Add a HDD to a RAID5 virtual disk configured with three HDDs and assign a newly
added HDD as Hot Spare.

1. Start WebBIOS.

    Make sure that the status for the added HDD is indicated as "UNCONF
    GOOD" in the right frame of the Top Menu.
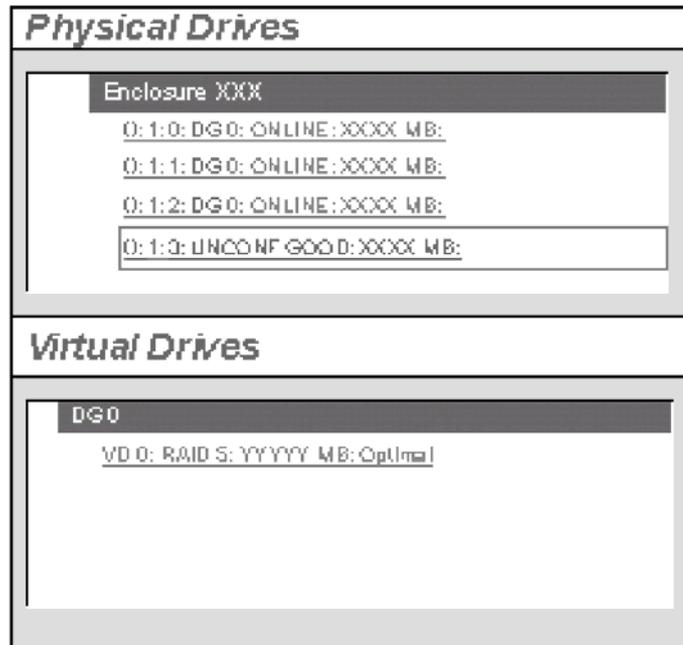
Figure 79: Top Menu Screen

2. Select "():1:3" (newly connected HDD) in [Physical Drives].

3. The Physical Drive properties 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 center of the screen.

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

Dedicated HSP: Indicates the Hot Spare available only for the specific DG.
                    You need to specify the target DG.
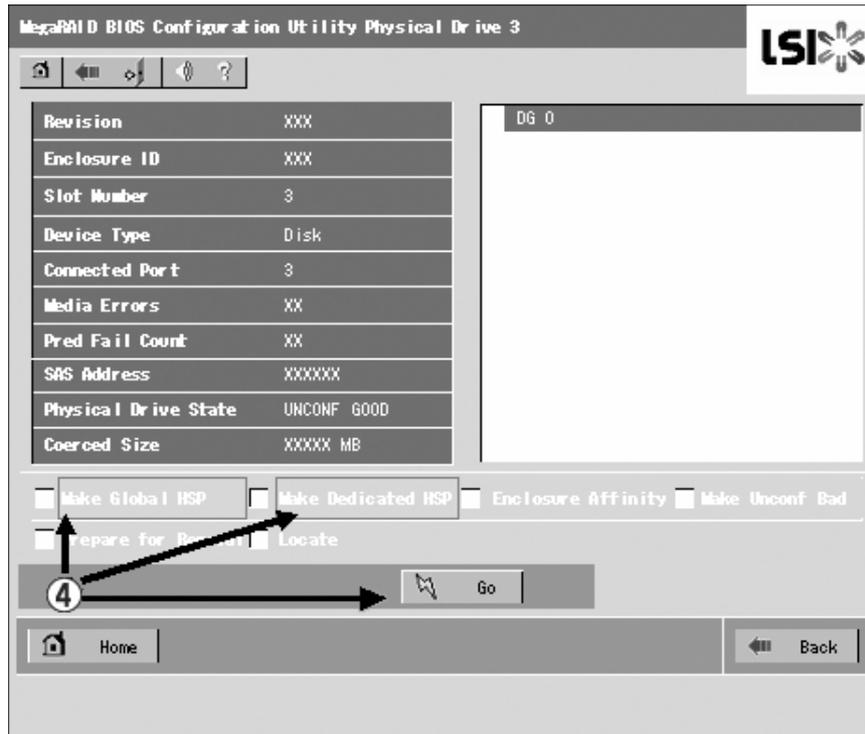
Figure 80: Physical Drive Properties Screen

> *Do not check "Enclosure Affinity" which defines the hot-spare to*
> *a specific enclosure. This setting is not supported in the system.*

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

5. Click [Home] to go back to the WebBIOS Top Menu.
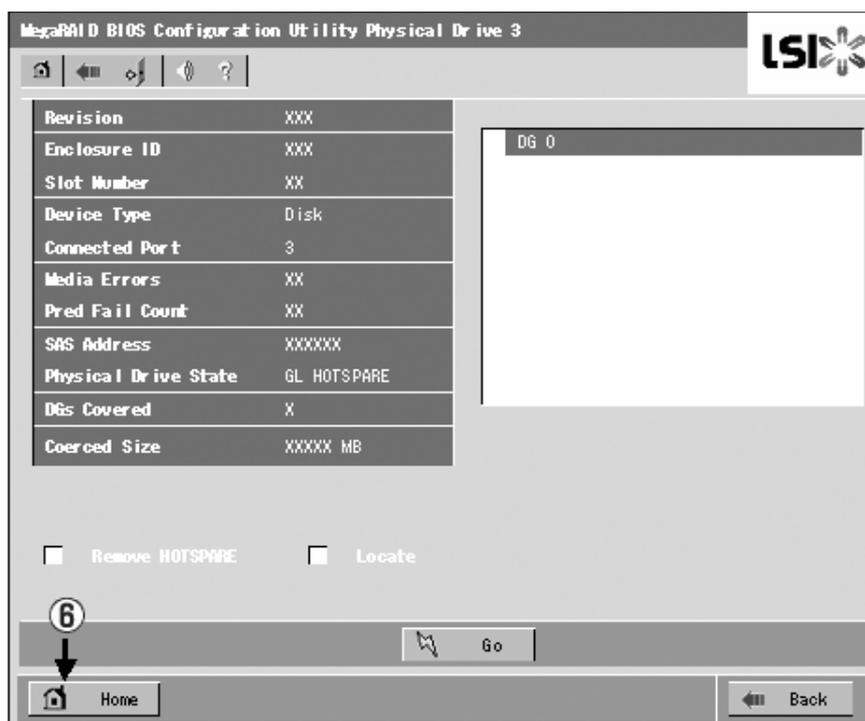
Figure 81: WebBIOS Top Menu

Reconstruction

The procedure described below is based on the following assumption:
Add a HDD to a RAID5 virtual disk configured with three HDDs to make a RAID5 virtual disk configured with four HDDs.

1. Start WebBIOS.

    Make sure that the status for the added HDD is indicated as "UNCONF GOOD" in the right frame of the Top Menu.
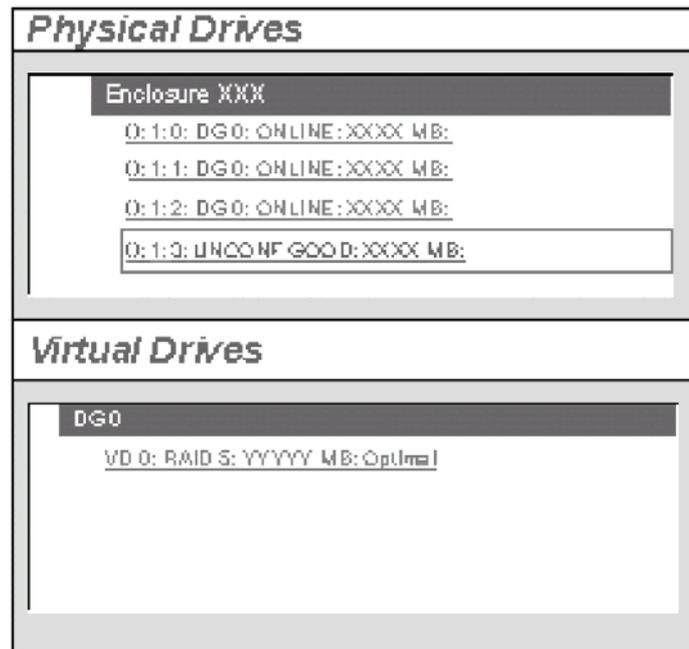
Figure 82: Top Menu Screen

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

3. The VD 0 Settings menu is displayed.
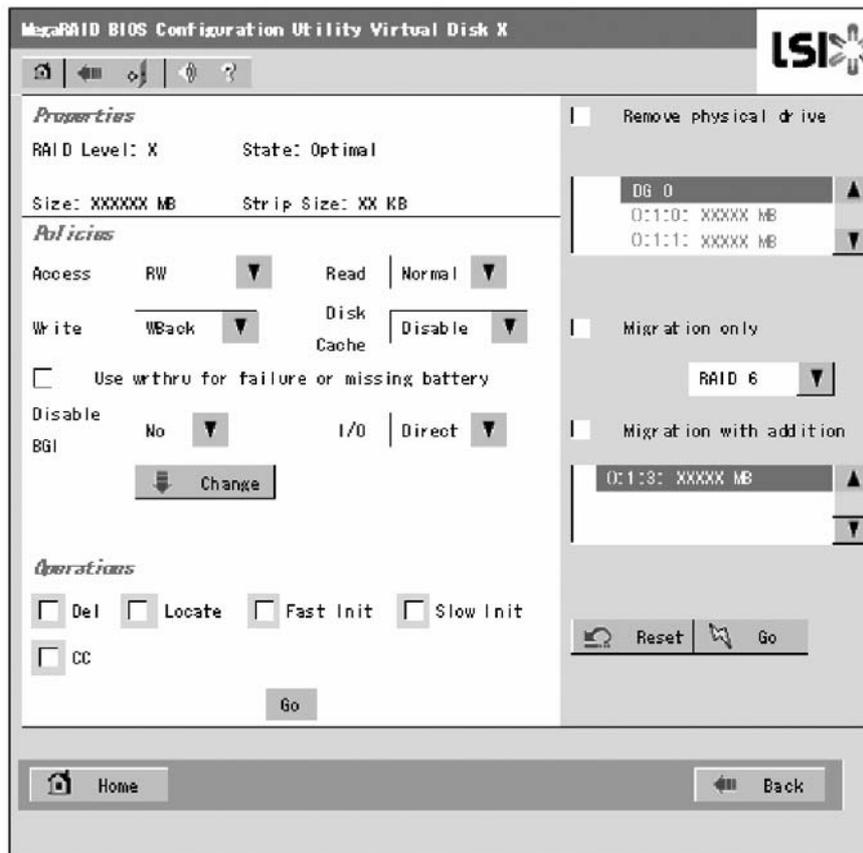
Figure 83: VD Settings Menu

The items required for the reconstruction are displayed.
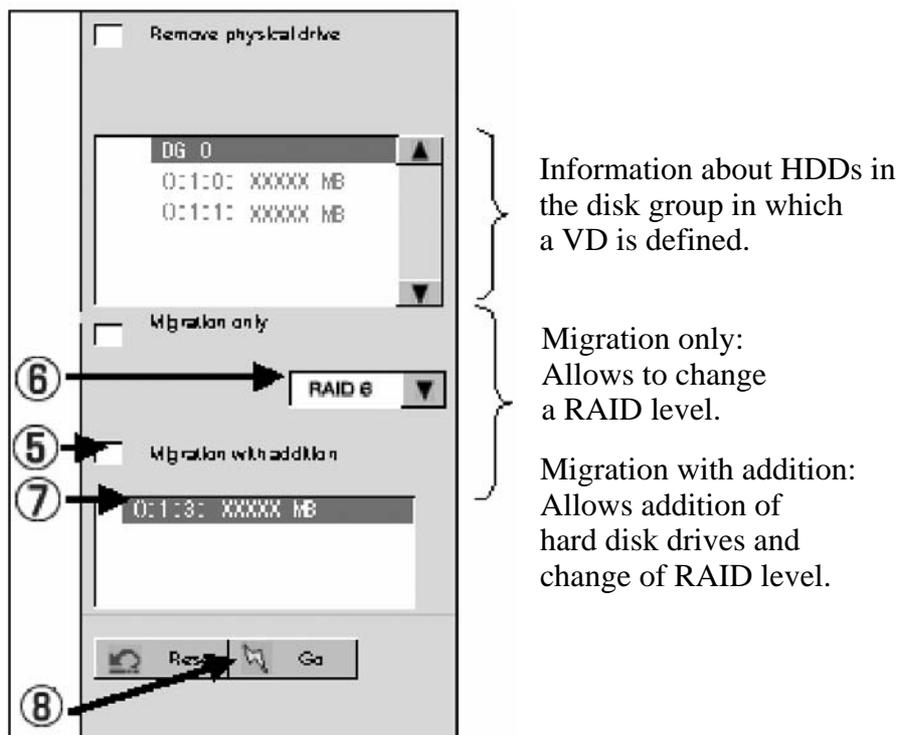
Figure 84: Reconstruction Settings Screen

4. Select "Migration with addition".

5. Specify the RAID level to be used after the reconstruction.

6. Select a HDD to be added.

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

8. The progress of the reconstruction is displayed on the lower left of the screen. Click [Home] to return to the WebBIOS Top Menu.

⚠ **Caution**

■ The capacity of virtual disk may be incorrectly displayed after reconstruction. In this case, perform a Scan Devices from the Top Menu.

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

WebBIOS and Universal RAID Utility

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

The points to keep in mind when using the Universal RAID Utility together with WebBIOS are as follows.

Terms

LSI Software RAID Configuration Utility and Universal RAID Utility use different terms. Please refer to the following list.

Table 27: RAID Terminology Table

WebBIOS	Universal RAID Utility
Adapter	RAID Controller
Virtual Disk	Logical Drive
Disk Group	RAID system
Physical Drive	Physical Device

Number and ID

The numbers assigned to each component are different in both utilities.

Adapter and RAID Controller

WebBIOS manages the Adapter starting from 0. You can see the Adapter number using [Adapter No] in the [Adapter Selection] menu.

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

Also, you can see the number of the Adapter managed by WebBIOS using [ID] in the RAID Controller properties by the Universal RAID Utility.

Virtual Disk and Logical Drive

WebBIOS manages the Virtual Disk starting from 0. You can see a number of Virtual Disk using [VD X] in Virtual Drives.

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

You can also see the Logical Drive number managed by WebBIOS where [ID] in the property of Logical Drive by Universal RAID Utility.

RAID system

WebBIOS manages the RAID system starting from 0. You can see the RAID system number using [DG X] in Physical Drives and Virtual Drives.

The Universal RAID Utility manages the RAID system starting from 1. You can see the RAID system number using [RAID system] in the Logical Drive properties on the RAID Viewer or using [RAID Controller #X RAID system #Y] in the RAID system properties on the raidcmd command.

Physical Drive and Physical Device

WebBIOS manages the Physical Drive using three numbers (Connector number:Enclosure number:Slot number). You can view these numbers shown as [x:x:x] in the Physical Drives box. Note, however, that the Connector number is always shown as "()" because it is not supported with this server. The Enclosure numbers are represented starting from 1, and the Slot numbers are represented starting from 0.

Universal RAID Utility manages Physical Device using a number starting from 1 and the ID, Enclosure number, and Slot number. The numbers of the physical devices connected to the controller are sorted in ascending order based on the ID and assigned

with a number (minimum is 1), starting from the smallest number. The ID is same value than the Connected Port shown in Physical Drives Properties box in WebBIOS. The Enclosure number and Slot number start from 1.

⚠ **Caution**

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

Priority Settings

WebBIOS displays and sets the Rebuild Priority and the Consistency Check Priority of the RAID Controller using a percentage whereas the Universal RAID Utility uses three levels (High/Middle/Low).

Table 28: Priority and Value Settings

Item	WebBIOS Setting Value	Universal RAID Utility Level
Rebuild Priority Rebuild Rate (WebBIOS)	80 to 100	High
	31 to 79	Middle
	0 to 30	Low
Patrol Read Priority Patrol Read Rate (WebBIOS)	80 to 100	High
	31 to 79	Middle
	0 to 30	Low
Consistency Check Priority Consistency Check Rate (Web-BIOS)	80 to 100	High
	31 to 79	Middle
	0 to 30	Low

Table 29: Settings Levels and Values

Item	Setting level of Universal RAID Utility	Setting value
Rebuild Priority Rebuild Rate (WebBIOS)	High	90
	Middle	50

Table 29: Settings Levels and Values

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

Notes:

■ *WebBIOS can set BGI Rate (Background Initialize Priority) whereas the Universal RAID Utility cannot.*

■ *The Universal RAID Utility can set an Initialization Priority, but it can't set it to the LSI Embedded MegaRAID. Therefore, the Universal RAID Utility doesn't display the [Initialization Priority] in the RAID Controller properties. Changing the Initialization Priority by raidcmd command will also fail.*

Upgrading Your System

General Safety Information

⚠ Warning

The DC push-button on/off switch on the front panel does not turn off completely the system AC power. Also, +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cord from the back of the chassis.

Failure to disconnect power before opening your system can result in personal injury and equipment damage.

⚠ Caution

Operating your system with the top covers removed can damage your system components.

For proper cooling and airflow, always replace the top covers before powering on your system.

⚠ Warning

Avoid burns: If the system has been running, any installed processor and heat sink on the processor board(s) will be hot.

To avoid the possibility of a burn, be careful when removing or installing components that are located near processors.

Contact your sales representative or dealer for a list of approved optional peripheral devices.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Equipment Log

Use the equipment log form located at the end of this manual to record the model and serial number of your system, all installed options, and any other pertinent information specific to your system. You will need this information when configuring your system.

Tools Recommended for Upgrading Your System

Depending on the upgrade, you will need one or more of the following tools:

■   Phillips screwdriver (#1 bit and #2 bit)

■   Flat-head screwdriver

■   Small needle nose pliers

■   Pen or pencil

■   ESD workstation or antistatic wrist strap (recommended)

Preparing Your System for Upgrade

To prepare your system for installation or removal of system components perform the following procedure:

1.   Observe the safety and static precautions listed under "General Information" and "Static Precautions" at the beginning of this chapter.

2.   Shutdown the operating system (OS).

     It is not necessary to shutdown to replace hot-swappable components, such as the hard disk drives and the additional power supply units, if applicable.

3.   Unlock and remove the front bezel. (*See "Removing the Front Bezel" on page 55.*)

4.   Power off the server then press the POWER switch on the front panel of the server. The POWER lamp goes out.

5.   Unplug the server power cord(s) from the AC wall outlet(s).

> 📝 **Note**: *If the server power cord is connected to a power control unit such as an UPS (Uninterruptible Power Supply), refer to the UPS user's guide for proper power-off procedures.*

6.   Unplug the I/O cables connected to the rear panel of your server.

The server needs to be pulled out from the rack for installing/removing any internal components other than the hard disk drives and power supply units (redundant power supply model only).

7.   <This step is required only when the optional cable arm is mounted.>
     Remove the cable arm from the server.

8. Push the left and the right unlock buttons on the front of the server, and pull out the server from the rack slowly and carefully. The server clicks to unlatch.
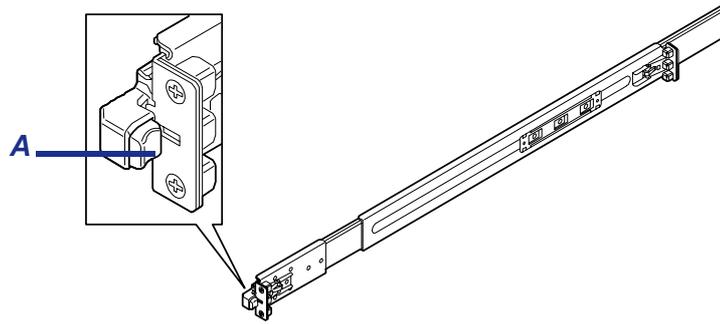
Figure 85: Pushing the Unlock Button

A: Unlock button

9. Push the right and left release levers (blue) forward or rearward to unlock, and slowly pull out the server from the rack.
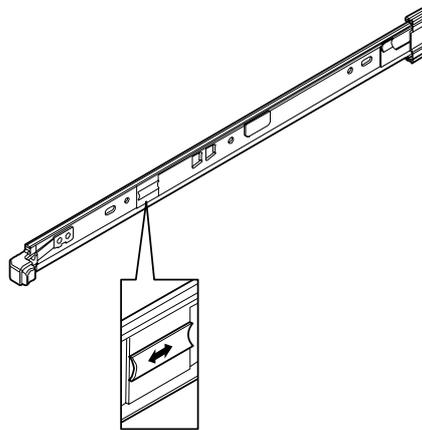
Figure 86: Pushing the Release Levers

⚠ Caution

Do not apply any load on the server when it is pulled out from the rack. Personal injuries may occur if the server falls.

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10. Firmly hold the server, and take it out from the rack.

⚠ Caution

■ Pull out the server slowly holding the bottom of the server by at least two persons.

■ Do not catch your fingers in the levers or rails.

Removing and Replacing the Top Cover

The top cover is made of two separate parts. The front part (Drive Cover) must be removed to install or remove a 5.25-inch optical device. The rear part (Logic Cover) needs to be removed to install or remove DIMM or PCI boards.

This section explains how to:

■ Remove and install the front bezel, see *"Front Bezel" on page 139* and pull the server out from the rack.

■ Remove and install the drive cover, see *"Drive Cover" on page 141*

■ Remove and install the logic cover, see *"Logic Cover" on page 143*

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.

■ 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.

Front Bezel

1. See the section *"Preparing Your System for Upgrade" on page 137* to prepare.

2. 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.
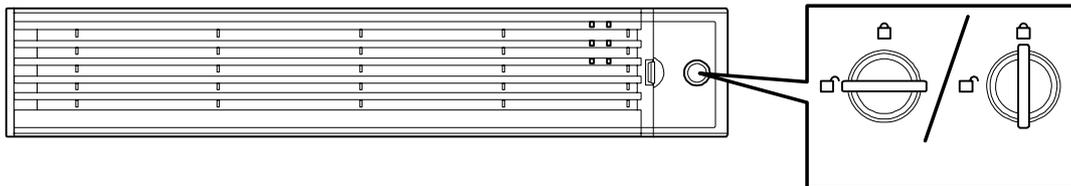
3. Hold the right end of the front bezel lightly to pull it toward you *(1 in figure below)*.

4. 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 *(2 in figure below)*.
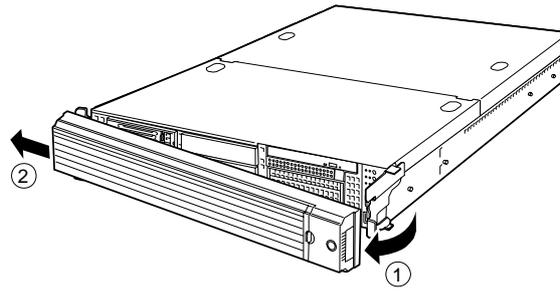
To install the front bezel, latch the tab at the left side of the front bezel on the server frame After the installation, lock the front bezel by using the key for security.
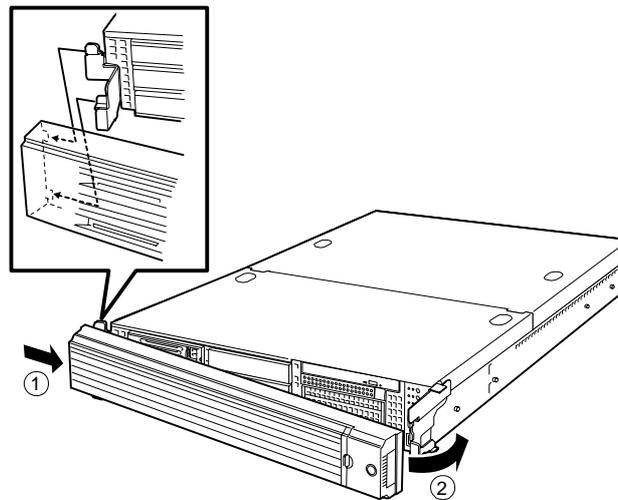
Drive Cover

Open the drive cover when installing/removing a fan assembly, processor, and backup file device or reconnecting an internal cable.

Removal

1. See the section *"Preparing Your System for Upgrade" on page 137* to prepare.
2. Pull out the server from the rack.
3. Slide the drive cover toward the front of the server while pressing the lock button on the cover.
4. Lift off the drive cover from the server.
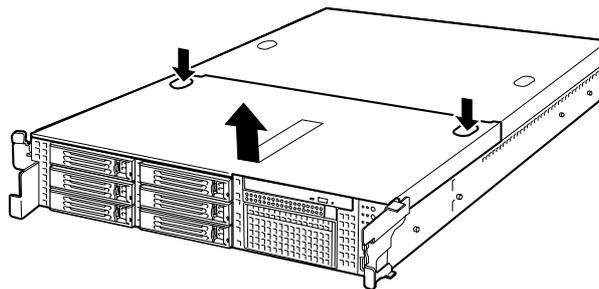
Figure 87: Removing the Drive Cover

Installation

When installing the drive cover, check that the tab of the cover is securely inserted into the slot in the server frame.

Slide the drive cover toward the rear of the server. The drive cover is locked when a distinct "click" is heard. At this time, check the release button for normal state.
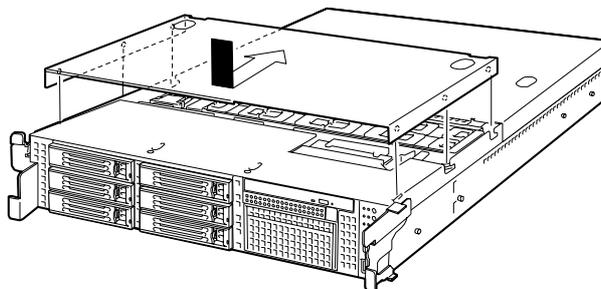
Figure 88: Replacing the Drive Cover

📰 **Note***: The system must be operated with the drive cover installed to ensure proper cooling.*
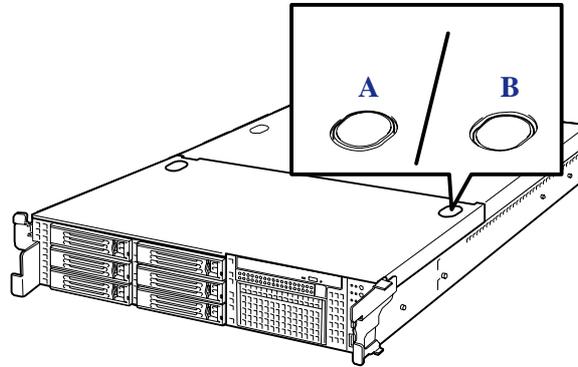
Figure 89: Release Button

A: Closed
B: Open

Logic Cover

Open the logic cover when installing/removing a DIMM, processor, and PCI add-in card or reconnecting an internal cable.

Removal

1. See the section *"Preparing Your System for Upgrade" on page 137* to prepare.
2. Pull out the server from the rack.
3. Loosen a captive thumbscrew at the rear of the server.
4. Slide the logic cover toward the rear of the server and lift off the cover from the server.
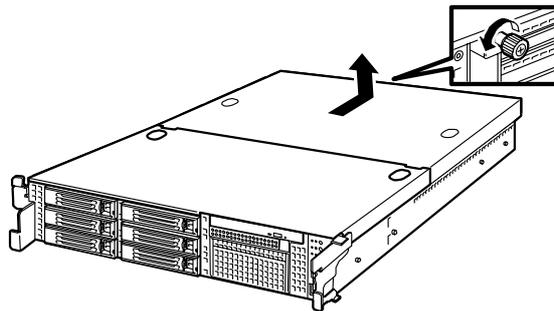
Figure 90: Removing the Logic Cover

Installation

When installing the logic cover, check that the tab of the cover is securely inserted into the slot in the server frame.

Slide the logic cover toward the front of the server and secure the cover with captive thumbscrew.
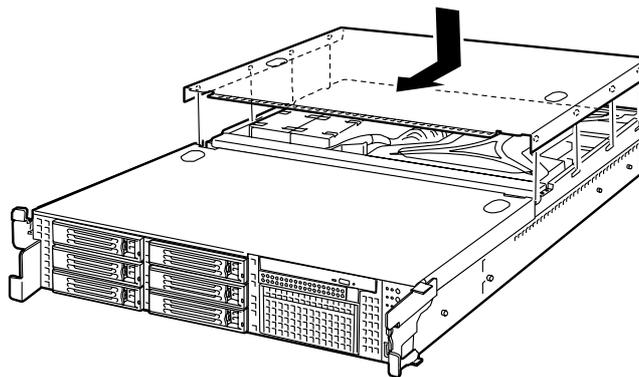
Figure 91: Replacing the Logic Cover

Upgrading Microprocessor

The server may have another CPU installed in addition to the standard CPU (Intel Xeon Processor).

⚠ Caution

■ The CPU 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 CPU. Do not touch the CPU pins by a bare hand or place the CPU directly on the desk. For static notes, see "Static Precautions" on page 135.

■ Do not operate the system until checking that the additionally installed CPU is in normal state.

■ Make sure to use a CPU authorized by Bull. Installing a third-party CPU may cause a failure of the CPU as well as the server. Repair of the server due to failures or damage resulted from installing such a board will be charged.
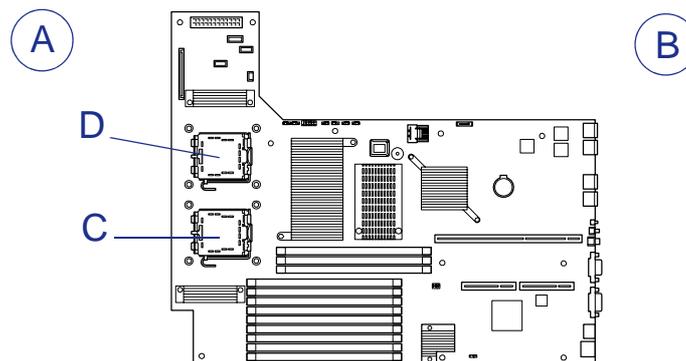
Figure 92: Processor Slots

A: Front Side
B: Rear Side
C: Processor #1
D: Processor #2

 Note: If the different revision of the processor is installed in the multiprocessor system, Windows logs the following information every startup. If this message is logged, it is no problem for operation.

Event Properties

Event

Date:	7/3/2001	Source:	Application Popup
Time:	13:38	Category:	None
Type:	Information	Event ID:	41
User:	N/A		
Computer:	SERVER-1		

Description:

The CPUs in this multiprocessor system are not all the same revision level. To use all processors the operating system restricts itself to the features of the least capable processor in the system. Should problems occur with this system, contact the CPU manufacturer to see if this mix of processors is supported.

Data: ⦿ Bytes ◯ Words

```
0000: 00 00 00 00 01 00 d4 00    ......Ô.
0008: 00 00 00 00 29 00 00 40    ....)..@
0010: 02 00 00 00 29 00 00 40    ....)..@
0018: 00 00 00 00 00 00 00 00    ........
0020: 00 00 00 00 00 00 00 00    ........
```

OK   Cancel   Apply

Installation

Take the following steps to install the CPU.

1. See the section *"Preparing Your System for Upgrade" on page 137* to prepare.
2. Pull out the server from the rack.
3. Remove the logic cover and drive cover. See *"Logic Cover" on page 143* and *"Drive Cover" on page 141*.
4. Remove the PCI riser module. See *"Installing and Removing a PCI Board" on page 166*.
5. Remove two screws securing the support arm.
6. Remove the support arm from the chassis.
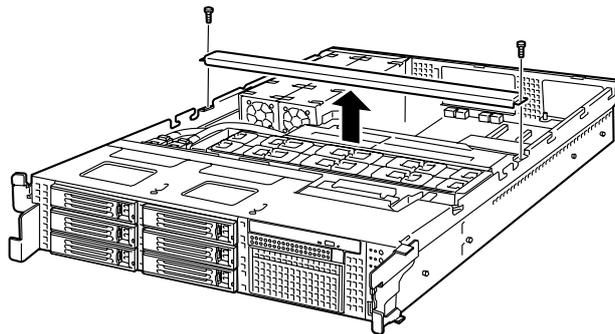
Figure 93: Removing the Support Arm

📝 **Note:** *Loosen the screws when the support arm comes up. Press firmly the support arm before removing the screws.*

7. Remove the processor duct from the chassis.
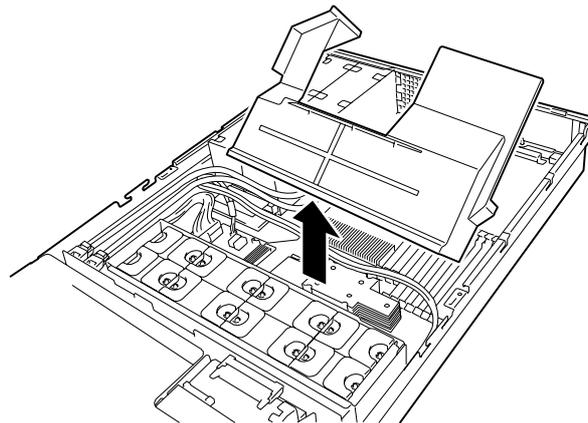
Figure 94: Removing the Processor Air Duct

8. Remove the four screws from the CPU dummy cover, and remove the CPU dummy cover.
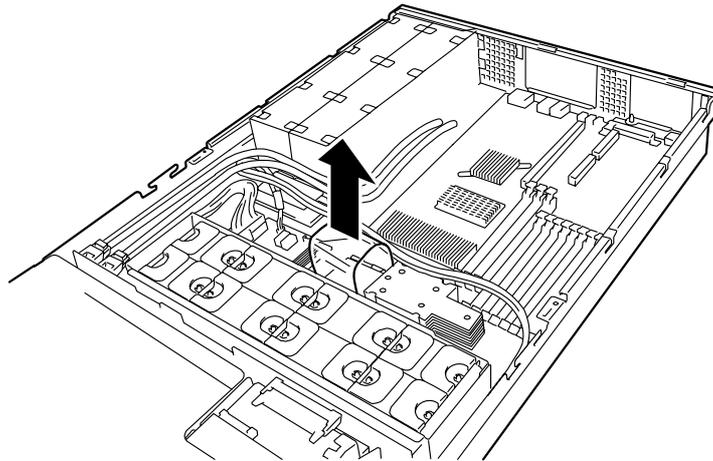
Figure 95: Removing the CPU Dummy Cover

9. Locate the CPU socket which you are going to install CPU.

10. Remove the protective socket cover from the load plate.

⚠ Caution

Do not discard the protective socket cover. Always replace the socket cover if the processor is removed from the socket.
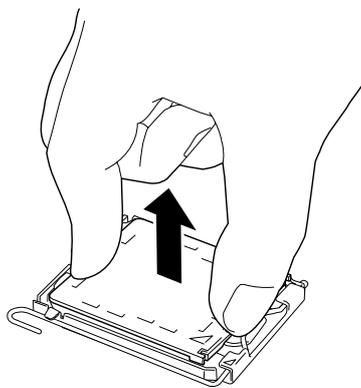
Figure 96: Removing the Protective Socket Cover

11. Open the socket lever by pushing the lever down and away from the socket.
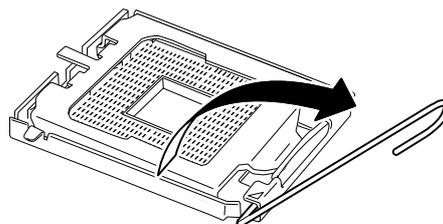
Figure 97: Unlocking the Socket

12. Lift The Load Plate.
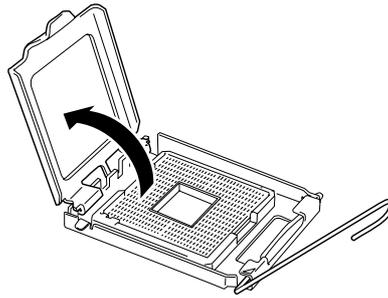
Figure 98: Lifting the Load Plate

⚠ Caution

Do not touch the socket contacts.

13. Remove the processor from the protective cover.

⚠ Caution

■ Hold the processor only at the edges, being careful not to touch the bottom of the processor.

■ Do not discard the protective processor cover.

■ Always replace the processor cover if the processor is removed from the socket.

14. Hold the processor with your thumb and index fingers oriented as shown in the figure below.

⚠ **Caution**

Make sure fingers align to the socket cutouts.
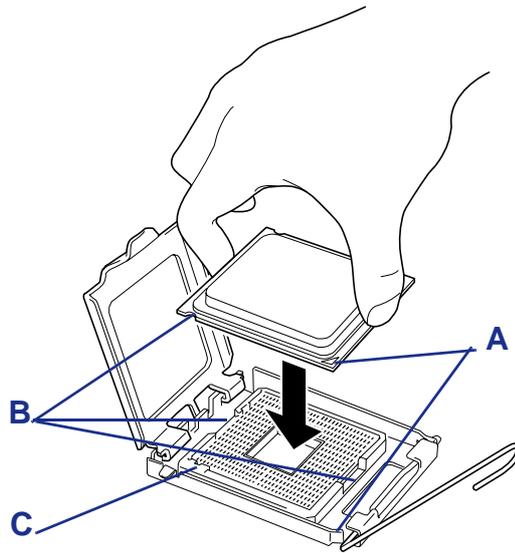
Figure 99: Holding the processor

A: Pin Marker
B: Notches
C: Key

15. Align notches with the socket.

16. Lower the processor straight down without tilting or sliding it in the socket.

17. While pressing down on the load plate, close and engage the socket lever.
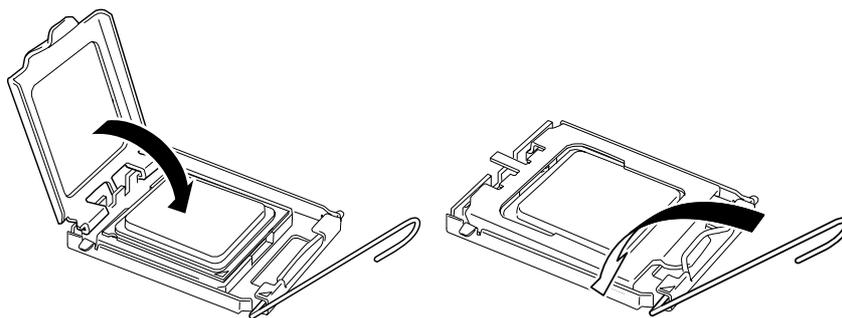
Figure 100: Socket Lever

18. Put the heat sink on CPU and fix the heat sink with four screws.
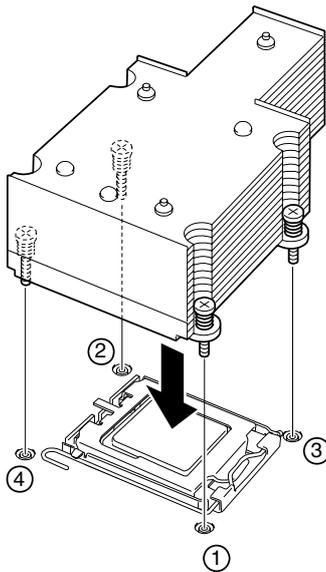
Figure 101: Securing the Heatsink

📖 *Note: Take care of the direction of the heat sink (see figure below)..*
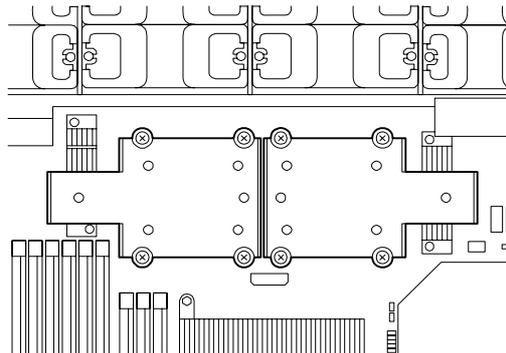
19. Make sure that the heat sink is level.

📖 *Notes:*

■ *If the heat sink is not level, remove it, and then install it again. The following probably causes the heat sink not to be level:*

- *–The CPU is not positioned correctly.*

- *–All screws are not completely tightened.*

■ *Do not move the secured heat sink.*

20. Install the processor air duct.
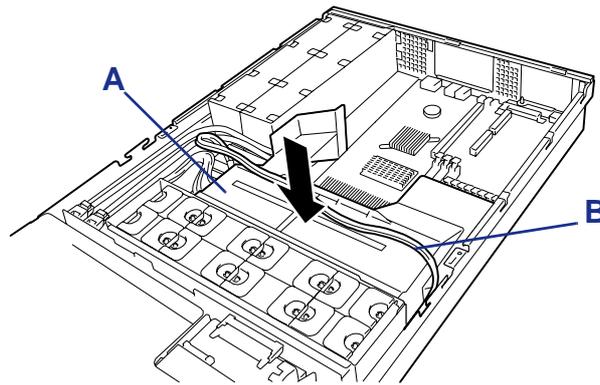
Figure 102: Installing the CPU Air Duct

A: Processor Duct
B: USB Cable

> 📑 **Note:** *Place the internal USB cable onto the processor duct (see figure above).*

21. Reinstall the support arm.
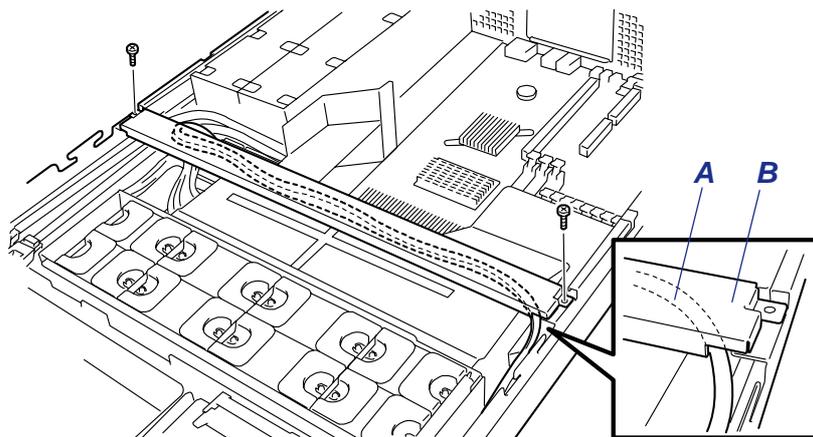
Figure 103: Reinstalling the support arm

A: USB cable
B/ Support arm

📑 *Notes:*

■ *Make sure the support arm holds the processor duct firmly (see figure below)*

■ *Loosen the screws when the support arm comes up. Press firmly the support arm before removing the screws.*
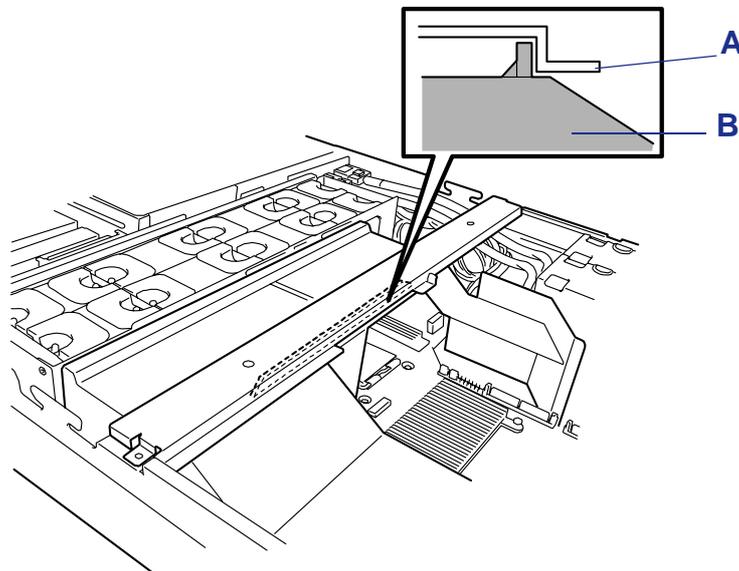
Figure 104: Routing the cable

A: Support arm
B: Processor duct

22. Install the covers you removed previously.

23. Power on the server, start the SETUP utility, and set "Processor Retest" of "Processor Settings" on the Main menu to "Enable".

24. Set "Reset Configuration Data" on the Advanced menu to "Yes".

This setting is required to change the hardware configuration data. See *"BIOS Setup Utility" on page 64* for details.

25. 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 *"POST Error Messages" on page 200*.

26. When adding an additional CPU to a computer running the Windows operating system, change the driver of [Computer] in the Device Manager to [ACPI multi-processor PC] and then update the system.

Removal

To remove the CPU, prepare the removal referring to steps 1 and 12 in the installation procedure and do the reverse procedure of steps 17 to 9.

⚠ Caution

■ Do not remove any CPU unless it is failed.

■ After the operation, heat may make the cool seat at the bottom of the heat sink adhere to the CPU. To remove the heat sink from the CPU, first turn the heat sink to the left and right slightly to make sure that the heat sink can be apart from the CPU. Removing the heat sink with it adhering to the CPU may cause the CPU and/or socket to be defected.
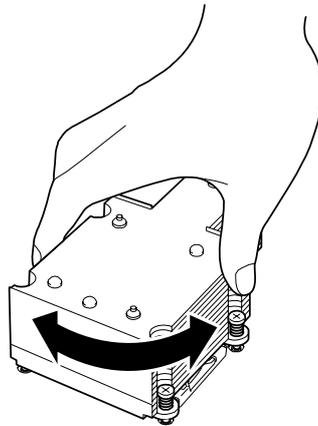
Figure 105: Removing the Heat Sink

Do the following procedure if a CPU is removed (or replaced).

1. Start BIOS Setup to select menus "Main" – "Processor Settings" – "Processor Retest" in the order to clear the error information on the removed CPU (see *"BIOS Setup Utility" on page 64*).

   When a CPU is replaced, select menus "Main" – "Processor Settings" to check that the ID and L2 Cache of the additional CPU are defined normally (see *"BIOS Setup Utility" on page 64*).

2. Set "Reset Configuration Data" on the Advanced menu to "Yes."

   This is required to update the hardware configuration information. See *"BIOS Setup Utility" on page 64* for details.

Installing or Removing Random Access Memory

Install the additional DIMM (Dual Inline Memory Module) to the DIMM socket on the motherboard in the server. The motherboard is provided with twelve DIMM board slots.

🖅 *Note: Up to 48 GB of memory (4 GB DIMM x 12) can be installed.*

⚠ Caution

■ 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 "Static Precautions" on page 135.

■ Make sure to use the DIMM authorized by Bull. 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.

■ When four or more sets of 8GB additional memory boards are installed, the additional PCI slot can contain only one option card and the factory-installed RAID card.

Installation Order

DIMMs must be populated in pairs and in the following order:

Group #1, #2, #3, #4, #5 and #6.
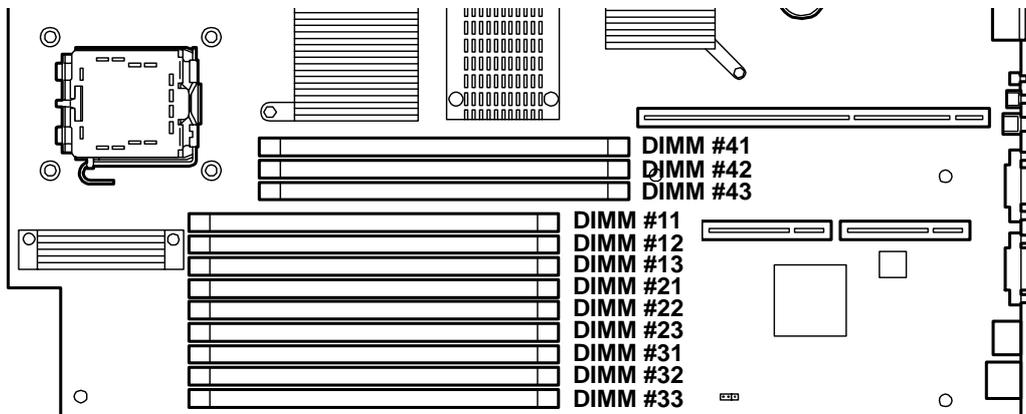
Order	Group	Sockets N°
1	**1**	**#11 and #21**
2	**2**	**#31 and #41**
3	**3**	**#12 and #22**
4	**4**	**#32 and #42**
5	**5**	**#13 and #23**
6	**6**	**#33 and #43**

Figure 106: Locating the DIMM Sockets

⚠ **Caution**

■ Install matched pairs of DIMMs equal in speed and size.

■ Refer to "Using the Memory RAS Features" on page 161 to configure the memory mirrorins and online sare memory features.

Installation

Install a DIMM as described in the following procedure.

⚠ **Caution**

The server supports only low-profile DIMMs (30 mm (1.2 inches) in height). It does not support DIMMs exceeding the specified height.

---

1. See the section *"Preparing Your System for Upgrade" on page 137* to prepare.
2. Pull out the server from the rack.
3. Remove the logic cover and drive cover. See *"Drive Cover" on page 141* and *"Logic Cover" on page 143*.
4. Remove the PCI riser module. See *"Installing and Removing a PCI Board" on page 166*.
5. Remove the two screws securing the support arm.
6. Remove the support arm from the chassis.
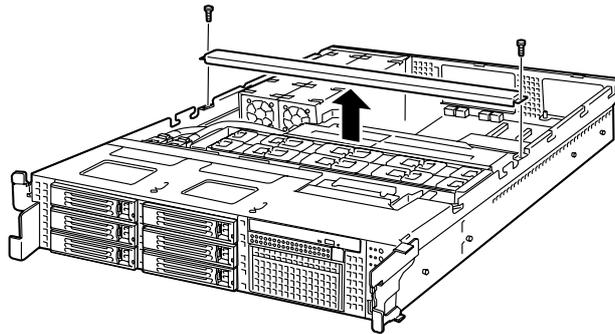
Figure 107: Removing the Support Arm

 Note: Loosen the screws when the support arm comes up. Press firmly on the support arm to remove the screws.

7. Remove the processor duct from the chassis.
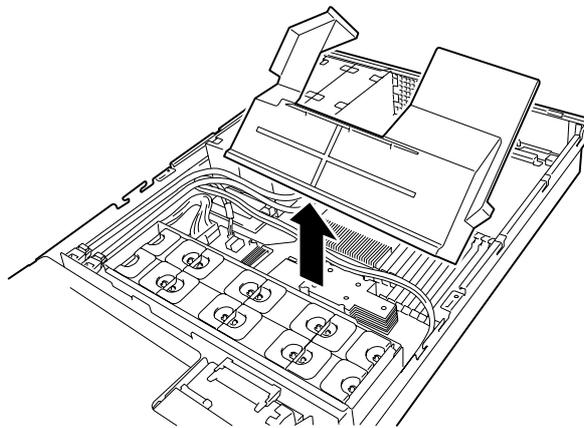
Figure 108: Removing the Processor Duct

8. Locate the DIMM socket of your choice and make sure the clips at both ends of the socket are pushed outwards to the open position.

9. Push the DIMM straight into the socket.

 Note: *Make sure of the orientation of the DIMM.*
Position the DIMM so that a notch in the bottom edge of the DIMM aligns with the keyed socket. Applying too much pressure can damage the socket. Keyed DIMMs insert only one way.

⚠ Caution

To avoid damaging the socket, do not apply excessive force while pressing the DIMM.

The levers automatically close when the DIMM is inserted into the socket.
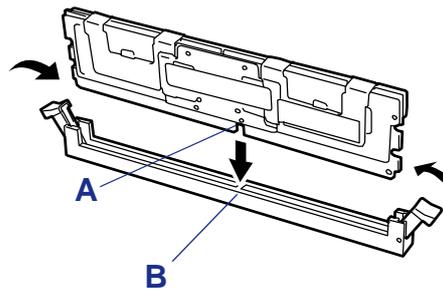
Figure 109: Inserting the DIMM in the Socket

A: Key Slot
B: Key

10. Reinstall the processor duct.
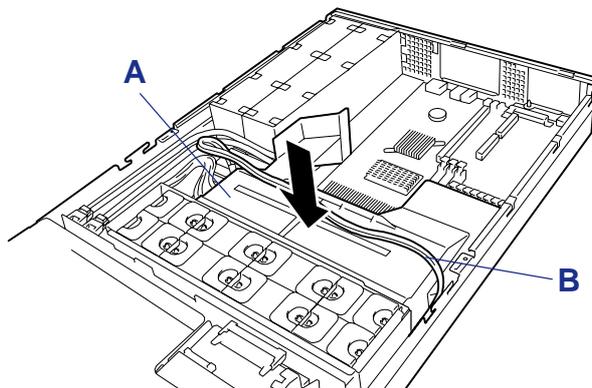
 Note: *Place the internal USB cable onto the processor duct.*

---

11. Reinstall the support arm.
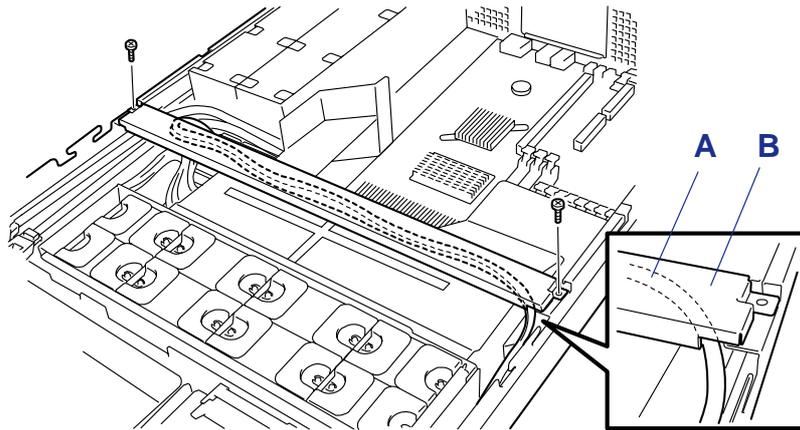
Figure 110: Reinstalling the Support Arm

A: USB cable
B: Support Arm

📰 *Notes:*

■ *Make sure the support arm holds the processor duct firmly (see figure below).*

■ *When the support arm comes up, you may lose the screws. Press firmly the support arm before tightening the screws.*
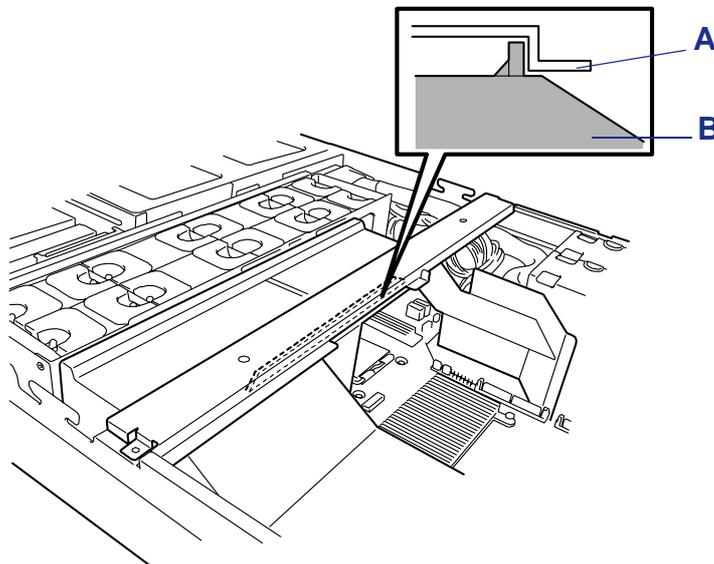
Figure 111: Support Arm (Detail)

A: Support Arm
B: Processor Duct

12. Install the components you removed previously.

13. 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 .

14. Start the SETUP and select [Advanced] → [Memory Configuration] to verify that the installed DIMM shows the status "Normal". (See *"BIOS Setup Utility" on page 64* or details.)

15. Select "Yes" for [Reset Configuration Data] on the [Advanced] menu.

This setting is required to change the hardware configuration data. See *"BIOS Setup Utility" on page 64* for details.

16. If the Windows operating system is in use, set the paging file size to the recommended value (total memory size × 1.5) or a greater value.

Removal

Remove the DIMM according to the following procedure.

📑 *Notes:*

■ *To remove the failed DIMM, check the error message appearing in POST or NEC ESMPRO to identify the DIMM socket (group) in which the failed DIMM is installed.*

■ *The server operates only when at least two DIMMs are installed.*

---

1. See the section *"Preparing Your System for Upgrade" on page 137* to prepare.

2. Pull out the server from the rack.

3. Remove the logic cover and drive cover. See *"Drive Cover" on page 141* and *"Logic Cover" on page 143*.

4. Remove the PCI riser module. See *"Installing and Removing a PCI Board" on page 166*.

5. Remove the two screws securing the support arm.

6. Remove the support arm from the chassis.
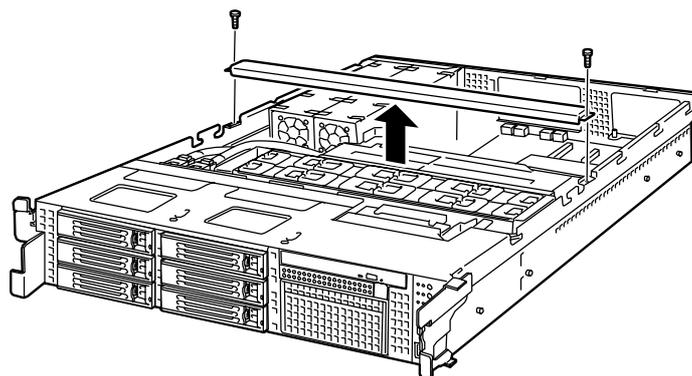
Figure 112: Removing the Support Arm

📑 *Note: Loosen the screws when the support arm comes up. Press firmly on the support arm to remove the screws.*

---

7. Remove the processor duct from the chassis.
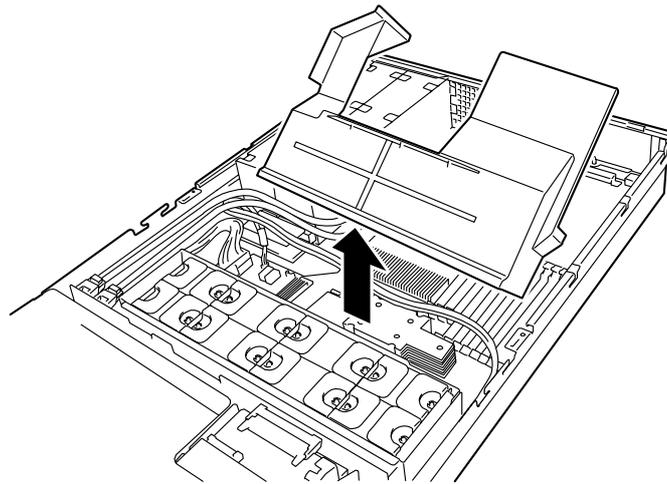
Figure 113: Removing the Processor Duct

8. Open the levers at both sides of the socket from which you remove the DIMM. The DIMM is unlock and ready for removal.
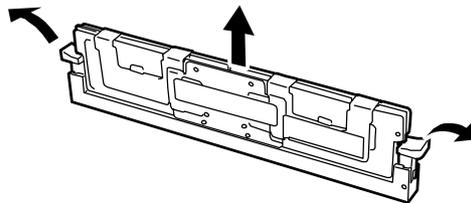
Figure 114: Removing the DIMM from the Socket

9. Hold the DIMM by the edges, lift it away from the socket, and store it in a anti-static package.

10. Install the components you removed in steps 3 to 7.

11. 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 *"POST Error Messages" on page 200*.

12. Start the SETUP and select [Advanced] → [Memory Configuration] → [Memory Retest] → [Enabled] to clear the error information of the removed DIMM. (See *"BIOS Setup Utility" on page 64* for details.)

13. Select "Yes" for [Reset Configuration Data] on the Advanced menu.

This setting is required to change the hardware configuration data. See *"BIOS Setup Utility" on page 64* for details.

Using the Memory RAS Features

The server has the memory mirroring and online spare memory features as well as the x4/x8 SDDC ECC memory feature, which can automatically correct a memory error (multi-bit error) causing system shutdown.

⚠ **Caution**

The memory mirroring and online spare memory features are not available in the normal memory configuration. (The x4/x8 SDDCl ECC memory feature can operate in any configuration.)

The memory area on the motherboard of the server is divided into two memory branches as shown in the figure below.
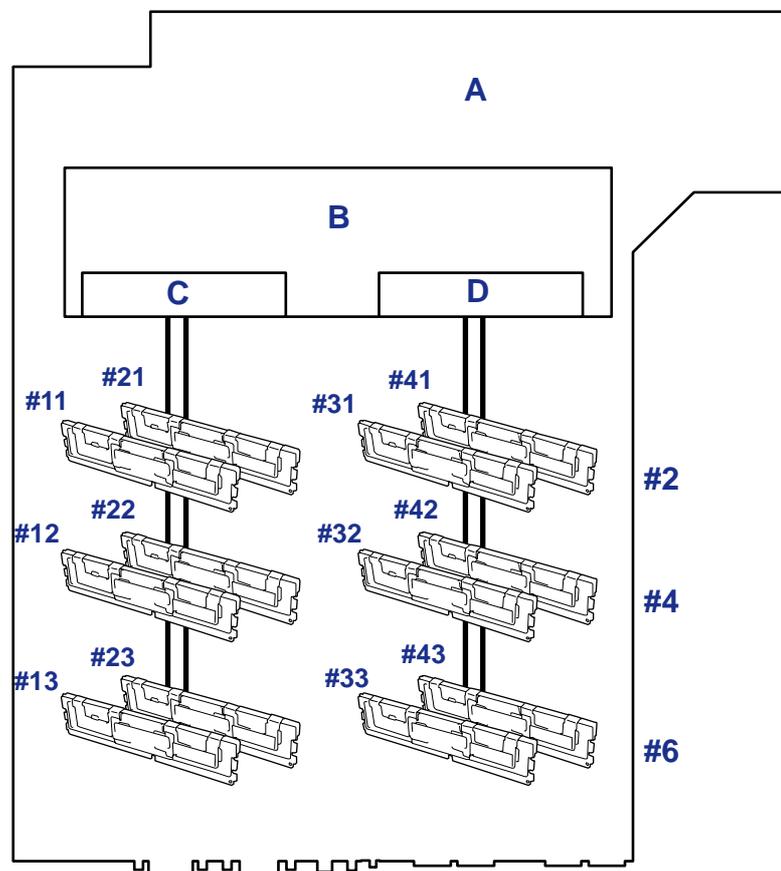
Figure 115: Memory Branches

A: Motherboard
B: Memory Controller
C: Memory Branch #1
D: Memory Branch #2

The memory mirroring and online spare memory features keep memory redundancy between memory branches and within a memory branch by monitoring or altering memory active/inactive status, respectively.

Memory Mirroring

The memory mirroring feature writes the same data into two groups of DIMMs corresponding with each other between memory branches (mirror set) to provide data redundancy.
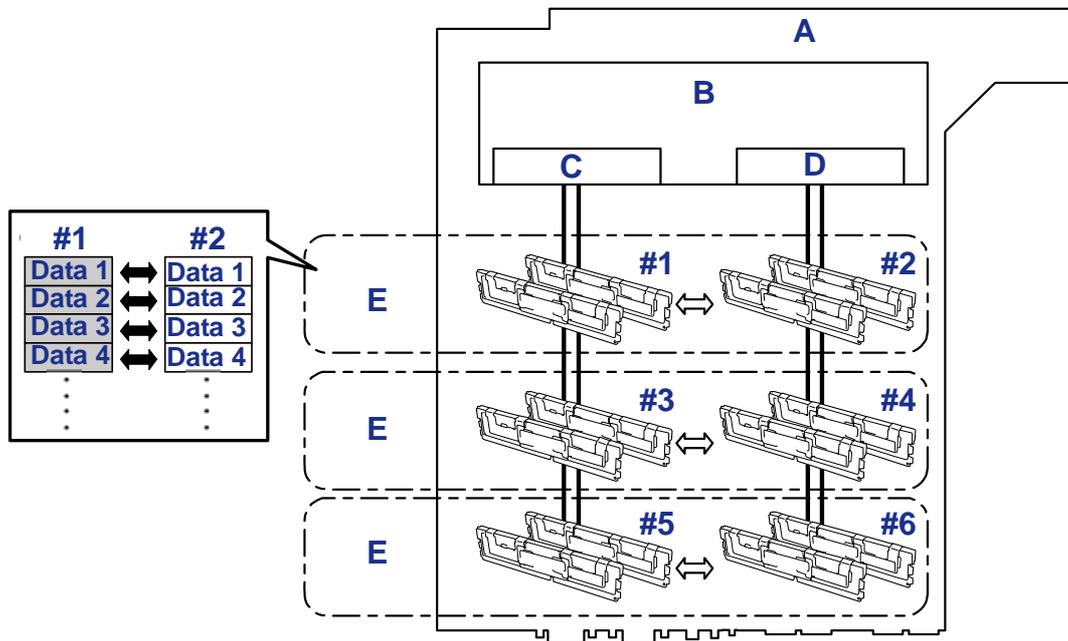
Figure 116: Memory Mirroring

A: Motherboard
B: Memory Controller
C: Branch #0
D: Branch #1
E: Mirroring Pairs

> 📝 **Note:** *The operating system only recognizes half of the total physical capacity.*

The memory mirroring feature can be used under the following conditions:

■ Install memory modules on four memory sockets configuring a mirror set.

■ All the installed memory modules should have the same capacity.

■ Run SETUP, change the parameters appropriately in the [Mirror] menu selected as shown below, save the settings and exit from SETUP.

[Advanced], [Memory Configuration], [Memory RAS Feature], [Mirror]

■ Install memory modules in the following order:

Groups 1 and 2, Groups 3 and 4, Groups 5 and 6

The following mirroring cannot be configured:

■ Memory mirroring between different mirror sets.

■   Memory mirroring within a specific memory branch.

Notes on the Memory Mirroring Configuration

In memory mirroring configuration, the menus related to memory mirroring in the BIOS SETUP are grayed out and cannot be selected in the following cases:

■   When you install additional DIMMs that disable the memory mirroring configuration

■   When you remove DIMMs that take down the memory mirroring

In this case, execute [Load Setup Defaults] to cancel the memory mirroring configuration.

Procedure

1. Note the BIOS SETUP settings.
2. Press **F2** during POST to run BIOS SETUP utility.
3. Select [Exit] → [Load Setup Defaults].
4. When a message "Load default configuration now?" appears, select [Yes].
5. Enter the parameter values you saved in step (1).

> 📑 **Note:** *Executing [Load Setup Defaults] restores the default values for all Setup parameters. You need to specify those parameters again.*

The table below lists examples of DIMM installation patterns enabling the memory mirroring feature to be used.

Example	Memory Set (Group #)		Memory Set (Group #)		Memory Set (Group #)		Capacity	
	#1	#2	#3	#4	#5	#6	Physical	Logical
1	2GB	2GB	-	-	-	-	4GB	2GB
2	2GB	2GB	1GB	1GB	-	-	6GB	3GB
3	2GB	2GB	2GB	2GB	-	-	8GB	4GB
4	2GB	2GB	1GB	1GB	1GB	1GB	8GB	4GB
5	2GB	2GB	1GB	1GB	2GB	2GB	10GB	5GB
6	2GB	2GB	2GB	2GB	1GB	1GB	10GB	5GB
7	2GB	2GB	4GB	4GB	4GB	4GB	12GB	6GB
8	2GB	2GB	2GB	2GB	2GB	2GB	12GB	6GB
9	2GB	2GB	1GB	1GB	4GB	4GB	14GB	7GB
10	2GB	2GB	4GB	4GB	1GB	1GB	14GB	7GB
11	2GB	2GB	2GB	2GB	4GB	4GB	16GB	8GB
12	2GB	2GB	4GB	4GB	2GB	2GB	16GB	8GB
13	2GB	2GB	4GB	4GB	4GB	4GB	20GB	10GB
14	4GB	4GB	4GB	4GB	4GB	4GB	24GB	12GB
15	8GB	8GB	8GB	8GB	8GB	8GB	48GB	24GB

Online Spare Memory

The online memory spare feature puts a group of memory devices within a memory branch into standby status as spare devices. If an unrecoverable error occurs in a DIMM of the running group, the feature automatically changes the running DIMM from the failed one to a DIMM in the standby group to continue the processing.
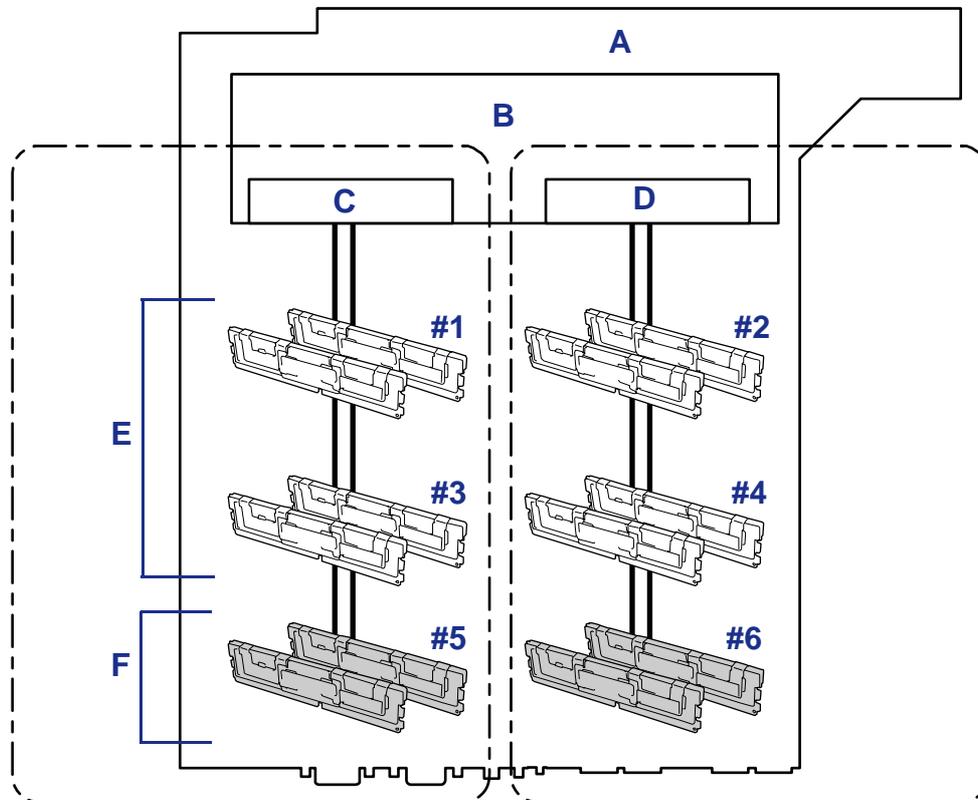
Figure 117: Online Spare Memory

A: Motherboard
B: Memory Controller
C: Branch #0
D: Branch #1
E: In Operation
F: Standbys

> 📝 **Note:** *The operating system recognizes the memory devices as those with capacities less than the actual physical capacities. (The recognized capacities vary depending on the number of DIMMs and the physical capacity per DIMM.)*

The online spare memory feature can be used under the following conditions:

■ Install memory devices to more than one group in each memory branch. The server can operate even if the memory branches are different in the number of DIMMs. For example, no error occurs if memory branches 0 and 1 include four DIMMs (or two groups) and six DIMMs (or three groups), respectively.

■ DIMMs installed in a specific memory branch should have the same capacity. The server operates properly as long as DIMMs of the same capacity are installed in each memory branch. (For example, the server can operate if the total capacity of memory branch 0 is different from that of memory branch 1.)

■ Run SETUP, change the parameters appropriately in the [Sparing] menu selected as shown below, save the settings and exit from SETUP.

[Advanced], [Memory Configuration], [Sparing]

■ Install memory devices in the following order:

Group 1, Group 3, Group 5 for memory branch 0

Group 2, Group 4, Group 6 for memory branch 1

■ The spare memory group must be the group with the largest number within a memory branch.

The following sparing can be neither configured nor set.

■ Sparing to another memory branch.

The table below lists examples of DIMM installation patterns enabling the online spare memory feature to be used. While the following patterns are provided for memory branch 0, the same patterns can also be adapted to memory branch 1.

Example	Memory Branch #0 (Group #)			Capacity	
	#1	#3	#5	Physical	Logical
1	1GB	1GB	-	2GB	1GB
2	1GB	1GB	1GB	3GB	2GB
3	2GB	2GB	-	4GB	3GB
4	2GB	2GB	2GB	6GB	5GB
5	4GB	4GB	-	8GB	6GB
6	4GB	4GB	4GB	12GB	10GB
7	8GB	8GB	-	16GB	12GB
8	8GB	8GB	8GB	24GB	20GB

Depending on the specification of the memory controller, the spare memory is set in units of rank memory.

The logical memory capacity of single rank memory differs from that of dual rank memory when online spare memory is specified.

■ Single rank memory configuration

Logical memory capacity = (Physical memory capacity * Number of DIMMs) – (Physical memory capacity)

■ Dual rank memory configuration

Logical memory capacity = (Physical memory capacity * Number of DIMMs) – (Physical memory capacity / 2)

Installing and Removing a PCI Board

The server has two "riser cards" on the motherboard that enable installation of PCI boards. Three PCI boards can be installed on each riser card. (Up to six PCI boards can be installed in total.)

Insert PCI boards for network extension and file device function extension into PCI board slots in each riser card.

⚠ Caution

■ 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 "Static Precautions" on page 135.

■ Some restrictions are imposed on the combination of PCI boards which can be installed in the server. Contact your sales agent for details.

■ A riser card is designed for installing only low-profile PCI boards or full-height PCI boards. Before installing a PCI board, make sure of the card specification.
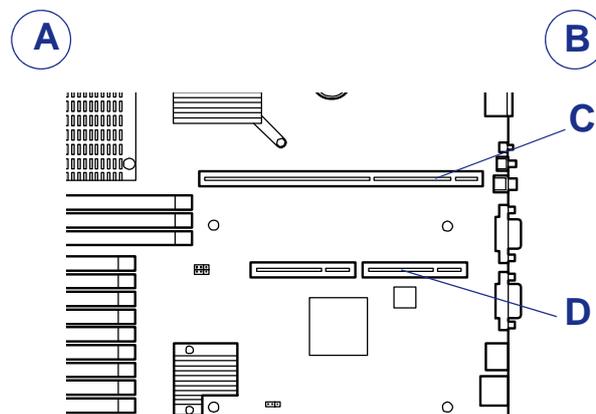
Figure 118: Motherboard Riser Cards

A: Motherboard Front Side
B: Motherboard Rear Side
C: Riser card slot for full-height PCI boards
D: Riser card slot for low-profile PCI boards
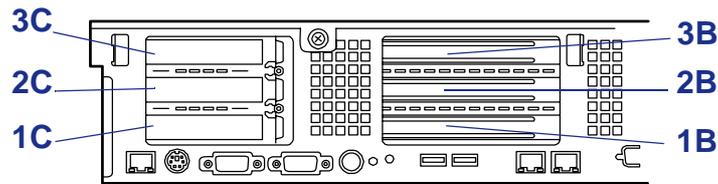
Figure 119: Locating the Riser Cards and PCI Slots

Notes: Observe the following notes on installing/removing a PCI board:

■ *Do not touch the terminals of the riser cards and the leads of electronic components with your bare hand. Fingerprints and dust left on them cause the server to malfunction due to a connection failure or damage to the leads.*

■ *A riser card is designed for installing only low-profile PCI boards or full-height PCI boards. Before installing a PCI board, make sure of the card specification.*

■ *The motherboard is not equipped with a connector for a LED relay cable.*

■ *The system usually searches for the PCI board in the following order:*
PCI Slot 3B → 1B → 2B → 1C → 3C → 2C

When the Riser Card PCI-X or PCIe is installed:
PCI Slot 3B → 2B → 1B → 1C → 3C → 2C

■ *The PCI devices of the same type (including onboard PCI device) may be recognized in different order from that described above, depending on OS or RAID system BIOS utility. Check the slot location of PCI device by PCI bus number, device number and function number shown in the table below.*

	Bus number	Device number	Function number
Onboard NIC1	C	0	0
Onboard NIC2	C	0	1
Slot 1C	18	0	X
Slot 2C	20	0	X
Slot 3C	1C	0	X
Slot 1B	0D*	3	X
Slot 2B	0D*	9	X
Slot 3B	3*	0	X
* On certain PCI devices, other bus numbers may be assigned.			

■ *Set "Disabled" for the optional ROM of a LAN device not to be booted by using the BIOS SETUP utility.*

■ *If an additional LAN device is installed in slot 3C or 3B, it is hard to push the catch of the connector with your finger that is connected to the LAN port. Disconnect the connector*

pushing the catch with a standard screwdriver. At this time, be very careful for the screwdriver not to damage the LAN port or other ports.

■ *If a bootable PCI board (e.g., a RAID controller, SCSI controller, or LAN card) is additionally installed, the boot priority is changed from the default. After the additional installation, start the BIOS SETUP utility, select [Boot] → [Boot Device Priority], and set the new boot priority.*

■ *If an option operating with only 33 MHz is installed in one of the slots (1C, 2C, and 3C, or 1B, 2B, and 3B) on a PCI riser card, the options installed in the other slots of the same riser card are subjected to operation with only 33 MHz.*

■ *Contact your service representative for the acceptable optional PCI board.*

Installation

Take the following steps to install a PCI board on the riser card:

⚠ **Caution**

■ Each riser card supports low-profile or full-height PCI
boards. Before installing a PCI board, check the type of the
PCI board.

■ When installing a PCI board, check that the card connector
matches the connector of the riser card.

---

1. See the section to prepare.
2. Pull out the server from the rack.
3. Remove the logic cover.
4. Lift straight up and remove the riser card from the server.

   If you feel difficult to remove the riser card, lift the riser card while pushing the
   server chassis
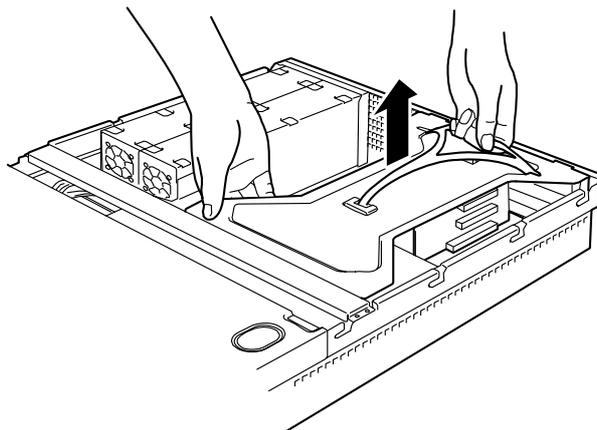
Figure 120: Removing the Riser Card Assembly

5. Locate the slot in which to install the PCI board according to the table shown previously.

6. Remove a screw securing a PCI slot cover.

Low-profile type   **Full-height type**
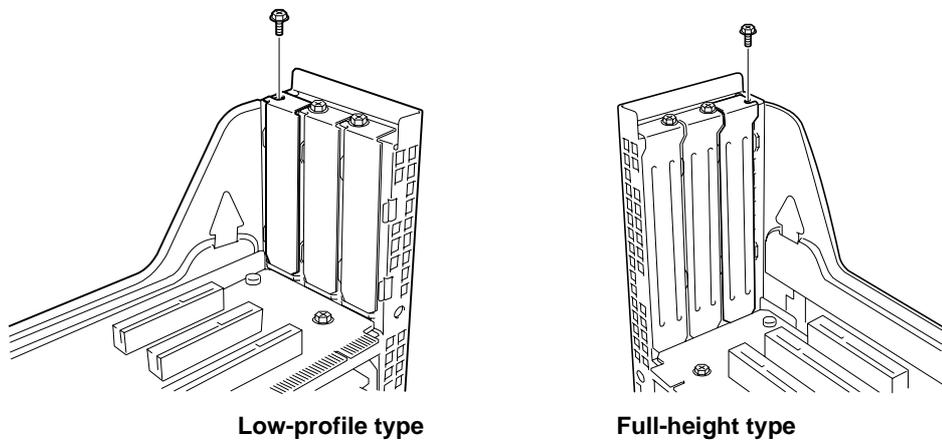
Figure 121: Removing the expansion slot cover screw

7. Remove the PCI slot cover.

📑 *Note: Keep the removed PCI slot cover for future use.*

Low-profile type   **Full-height type**
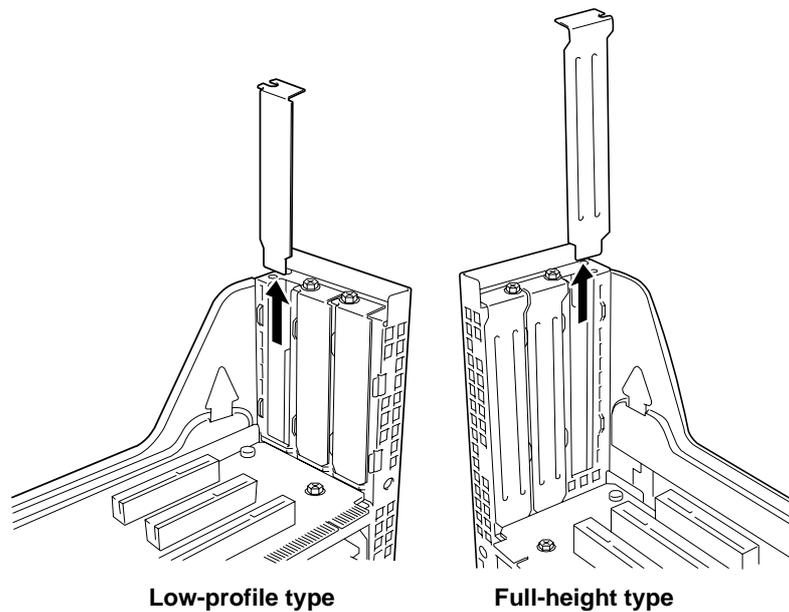
Figure 122: Removing an Extension Slot Cover

8. This step is only required for a PCI board of the full-height/full-length type.

Before installing a PCI board of the full-height/full-length type, remove the retainer *(A in figure below)* from the PCI board, and then unlock and open the card retainer clip on the other side of the guide rail.

A
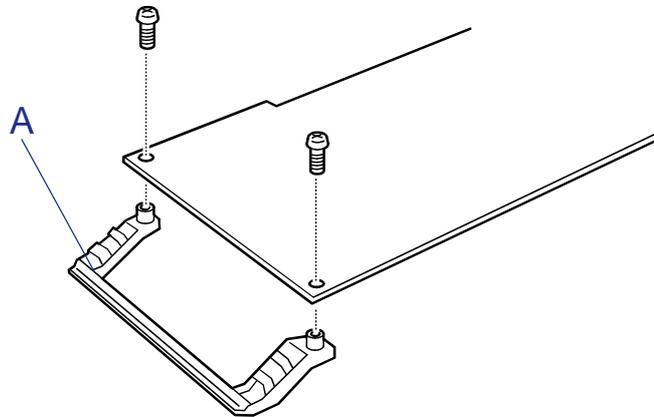
Figure 123: Removing the PCI Board Retainer

9. Install the PCI board on the riser card.

Align the PCI board terminal section with the riser card slot, and firmly push the PCI board until it is fully seated.

B

A
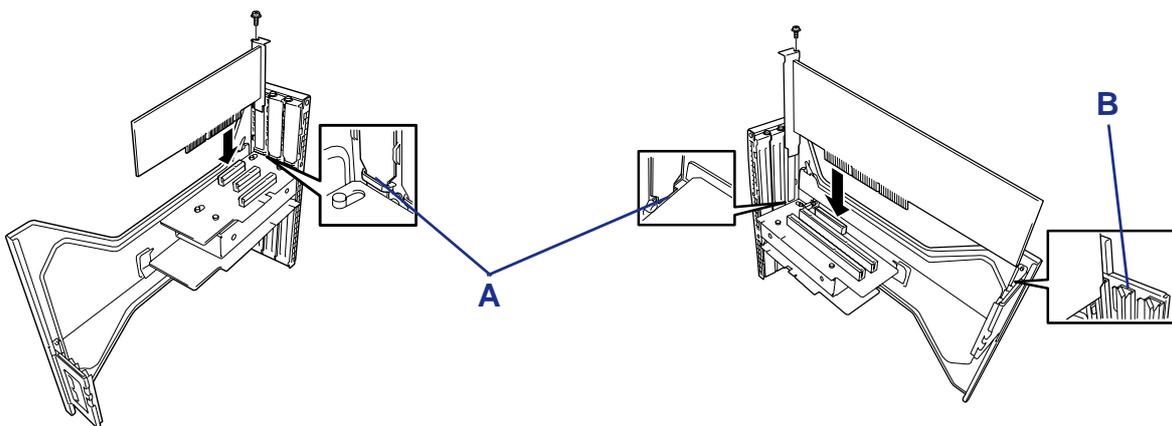
Figure 124: Low-Profile (left) and Full-Height (right) PCI Cards

A: Top end of the PCI board bracket
B: Guide rails

⚠ **Caution**

■ Do not touch the terminals of the riser cards and PCI boards with your bare hand. Fingerprints and dust left on them cause the server to malfunction.

■ If you are unable to install a PCI board correctly, remove it, and then install it again. Be careful not to apply excess force to a PCI board or riser card. Doing so may damage the card.

> 📝 *Notes:*
>
> ■ *Check that the top end of the PCI board bracket is inserted in the designated slot of the riser card.*
>
> ■ *Some PCI boards have a terminal section that extends over the mating connector.*

10. Secure the board with the screw removed earlier.

Low-profile type   **Full-height type**
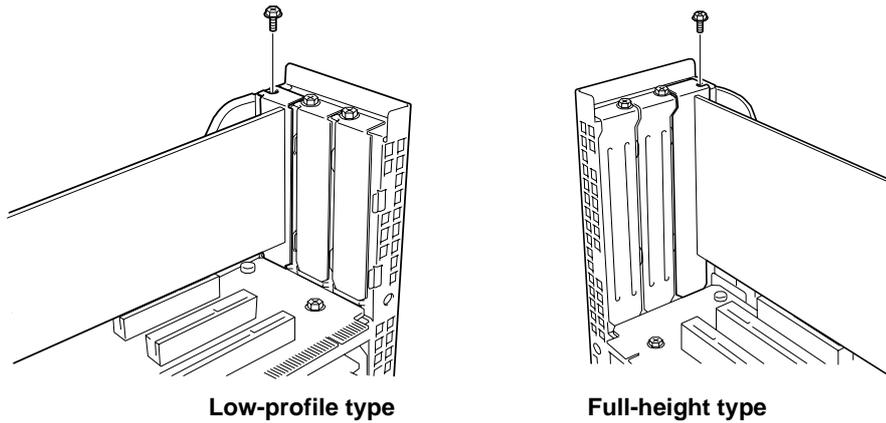
Figure 125: Securing the PCI Card with a Screw

11. Insert the riser card into the slot on the motherboard.

Align the riser card terminal section with the slot on the motherboard, and firmly push the riser card until it is fully seated.
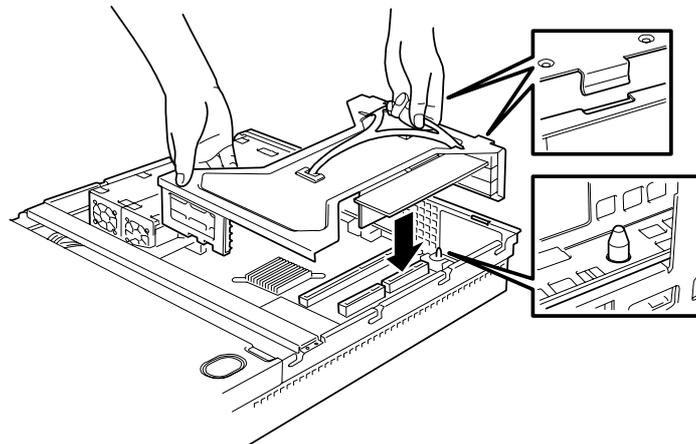
Figure 126: Installing the Riser card Assembly

12. After the insertion, press the riser card down with your fingers until it is fully
    seated.
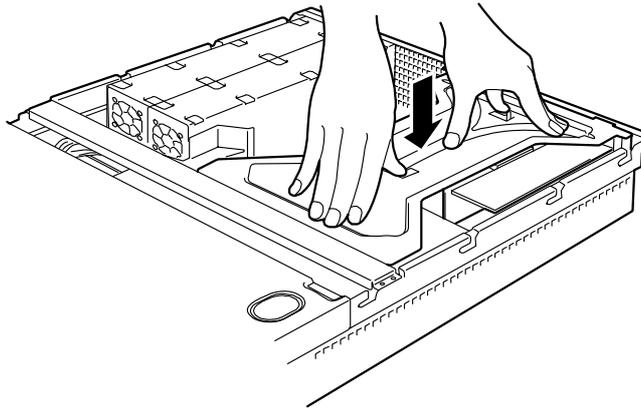
Figure 127: Fully Sating the Riser Card Assembly

13. Install the components you removed previously.

14. 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 *"POST Error Messages" on page 200*.

15. Select "Yes" for [Advanced] → [Reset Configuration Data].

    This setting is required to change the hardware configuration data. See *"BIOS
    Setup Utility" on page 64* for details.

16. Start the BIOS configuration utility in the installed card, and set up the card.

    Presence/absence of the utility and the start and operation methods depend on
    the card. For details, see the manual provided with the card.

Removal

Remove a PCI board in reverse order of the installation steps.

Replacing the Battery

All motherboards use a battery to maintain system configuration information. If it fails to maintain system configuration, replace it with an identical rated battery from the same manufacturer.

Remove the battery from the motherboard as follows:

⚠ Caution

Removing the battery from the motherboard causes the computer to lose system configuration information. Before removing it, run Setup and record the system configuration settings.

Use this information to restore the system after replacing the battery.

---

1. Turn off and unplug the system unit and any external options connected to the system.
2. Remove the cover. See *"Removing and Replacing the Top Cover" on page 139*
3. Locate the battery on the motherboard. See *"System board Features" on page 26*
4. Use your finger to carefully remove the battery from the battery socket on the motherboard.

⚠ Warning

The battery may explode if it is incorrectly replaced or improperly discarded.

Use only an identical rated battery from the same manufacturer.

---

5. With the positive (+) side facing up, press the new battery into the socket.
6. Replace the system unit cover.
7. Connect external peripherals and power cables.
8. Run Setup to reconfigure system parameters.

Installing or Removing a Hard Disk Drive

The server features six device bay slots to install hard disks drives. All drive slots may contain a hard disk approximately 25.4 mm (1 inch) high.

⚠ Caution

■ Do not use any hard disks that are not approved by your sales representative. Installing a third-party hard disk may cause a failure of the server as well as the hard disk. Purchase hard disks of the following models:

SAS hard disk drives:

- 36.3 GB, 15,000 rpm, SAS

- 73.2 GB, 15,000 rpm, SAS

- 146 GB, 15,000 rpm, SAS

- 300 GB, 15,000 rpm, SAS

SATA hard disk drives:

- 80 GB, 7,200 rpm, SATA2/300

- 160 GB, 7,200 rpm, SATA2/300

- 250 GB, 7,200 rpm, SATA2/300

- 500 GB, 7,200 rpm, SATA2/300

- 750 GB, 7,200 rpm, SATA2/300

■ To make an array configuration, specify RAID0, RAID1 or RAID5 as the RAID level.

The Internal RAID Controller supports RAID levels 0, 1, 5, and 6. To use RAID 5 or RAID 6, you need to additionally install the optional RAID Upgrade Kit.

The drive numbers are assigned to the hard disks as shown below:
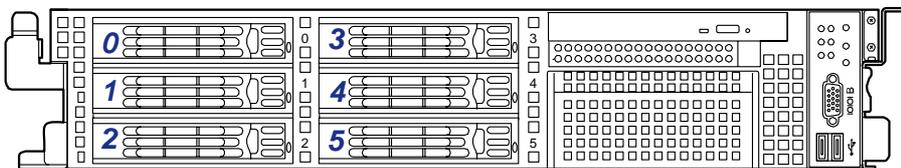
Figure 128: Hard Disk Drives numbers

The hard disk drive bays are connected to the Internal RAID Controller when the server is shipped. To use these drives in a RAID system configuration, you can either:

■ Use the internal RAID controller.

Use WebBIOS or Universal RAID Utility to build, configure, and manage the RAID System.
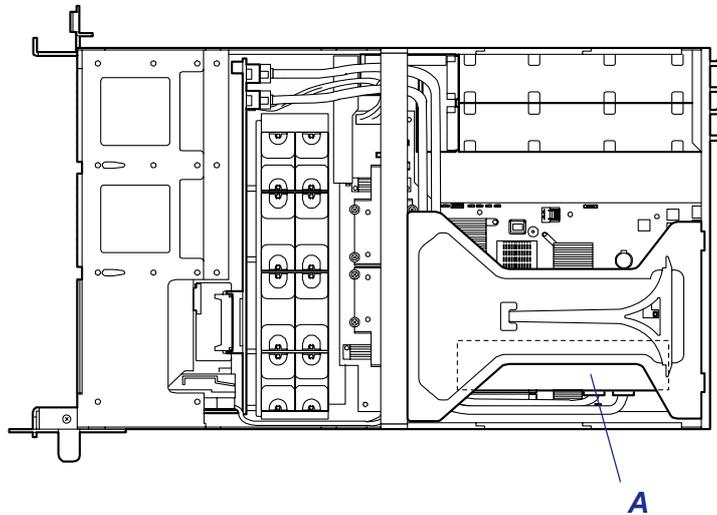
Figure 129: Server with Internal RAID Controller (A)

■ Use an optional RAID controller.

Use WebBIOS or Universal RAID Utility to build, configure, and manage the RAID System.

Installing a Hard Disk Drive

> 📝 *Note: Hard disks can be installed or removed in or from the server only by opening the front bezel.*

⚠ **Caution**

In a RAID system configuration, only use hard disk having the same specifications, including capacity.

1. Read section *"Preparing Your Server for Upgrade" on page 158*.

2. Unlock of the front bezel with the security key and remove the front bezel.

3. Locate the slot in which you are going to install the hard disk drive. Follow an ascending order.

4. Remove the drive carrier.

■ Unlock the hard disk drive handle.
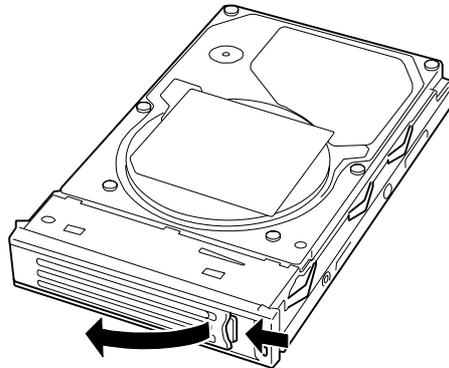
Figure 130: Unlocking the hard disk drive handle

■ Pull out the drive carrier from the chassis.

5. Secure a hard disk drive into the carrier with four screws (one at the front and one at the back on both sides).

6. With the handle fully open, hold the drive carrier and handle, and isert it into the chassis.

⚠ Caution

■ Do not push on the handle until the handle begins to close by itself.

■ Carefully hold the hard disk drive with both hands.

Note: Confirm that the handle is hooked to the frame when having inserted the hard disk drive.
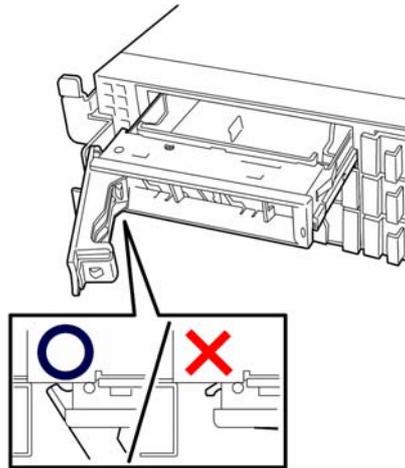
7. When the handle begins to close by itself , slowly close the handle.

The drive carrier clicks into place when it is securely locked.

⚠ **Caution**

■ Be careful not to get your finger caught between the handle and tray.

■ Push the drive further to check if it is firmly secured.
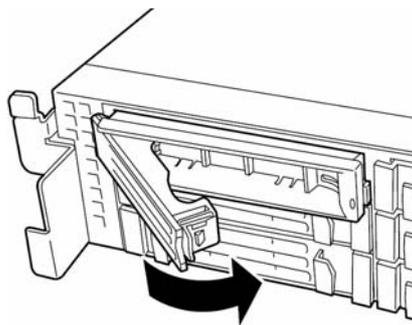
Figure 131: Closing the handle

8. Power on the server, and run the SETUP utility.

Select [Boot] menu to set the boot priority. When you have installed hard disk drive additionally, the boot priority stored in BIOS is cleared.

9. Replace the front bezel you removed in step 2.

There are tabs on the left side of the front bezel. Engage the tabs with the server frame, install the front bezel, and lock it with the security key.

Removing a Hard Disk Drive

> ▤ *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.*

1. Read section *"Preparing Your Server for Upgrade" on page 158*.
2. Unlock the front bezel with the security key and remove the front bezel.
3. Push the lever to unlock and open the handle.
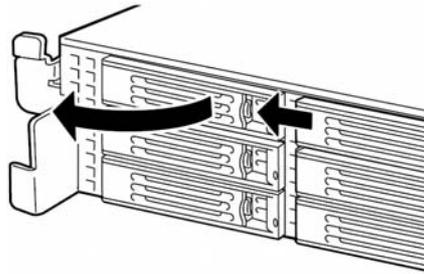
Figure 132: Unlocking the Hard Disk Drive

4. Firmly hold the handle and hard disk drive and pull out the hard disk drive.
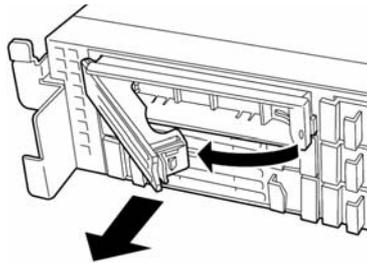
Figure 133: Pulling out the Hard Disk Drive

5. When using the server without replacing the hard disk drive, remove the hard disk drive from the disk tray (remove the four screws) and replace the empty tray into the slot.
6. Power on the server, and run SETUP utility.

    Select [Boot] menu to set the boot priority. When you have removed hard disk drive, the boot priority stored in BIOS is cleared.
7. Replace the front bezel.

Notes on replacing Hard Disk Drives in a RAID Configuration

When the hard disks are in the RAID system configuration, you can restore the state before an error using the auto-rebuild feature that stores the data in the old hard disk into a new one.

The auto-rebuild feature is available for the RAID1, RAID5, or RAID10 RAID system configuration.

Auto-rebuild is carried out when you hot-swap a failed hard disk 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.

⚠ **Caution**

■ When auto-rebuild fails, the DISK lamp lights in amber. Remove and install the hard disk again to restart auto-rebuild.

■ If the RAID system monitoring utility is installed, it may display or act as follows:

- Displays "Rebuild was cancelled" on the screen while auto-rebuild is in progress.

- Appears to stop and restart auto-rebuild.

Observe the following notes for auto-rebuild.

■ Do not power off the server between a hard disk drive error and the completion of the auto-rebuild.

■ Wait at least 90 seconds between the removal and the replacement of a hard disk drive.

■ Do not replace another hard disk drive while a rebuilding is in progress. (The DISK LED flashes alternatively green and amber while rebuilding the hard disk drive.)

Installing and Removing a Power Supply Unit

Your server contains one or two power supplies.

The second power supply is optional and provides a redundant configuration that ensures continued operation of the system in the unlikely event one of the power supplies fails.

Installation

Take the following steps to install a power supply unit:

1. See .

⚠ Caution

Be sure to turn off the power. Failure to do so causes the server to malfunction or fail.

---

2. Pull the cable arm toward the rear of the server, and check the slot for installing an optional power supply unit.

3. Hold and pull the lever of the blank cover and remove the blank cover.
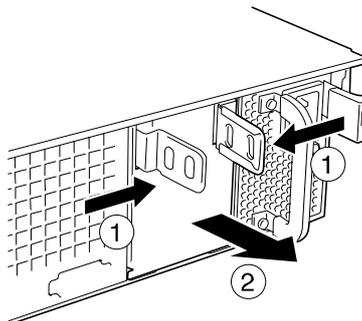
Figure 134: Removing the PSU Slot Blank Cover

Note: Keep the removed blank cover for future use.

---

4. Insert the power supply unit.
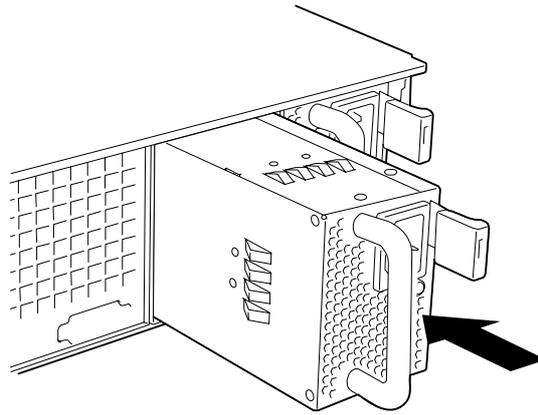
Figure 135: Inserting the Power Supply Unit

⚠ **Caution**

Do not touch the contacts *(A in figure below)* of the power supply unit.
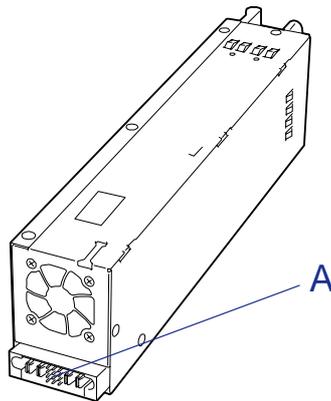
A   **Gold-plated contacts**

Figure 136: Power Supply Unit Contacts

5. Grasp the handle and firmly push the power supply.

The power supply unit is locked when a distinct "click" is heard.
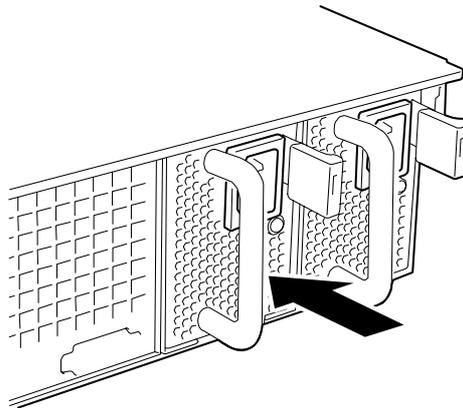
Figure 137: Locking the Power Supply Unit

6. Connect two power cords.

Use the power cords provided with the system. The AC power lamps flash when the power cords are connected.
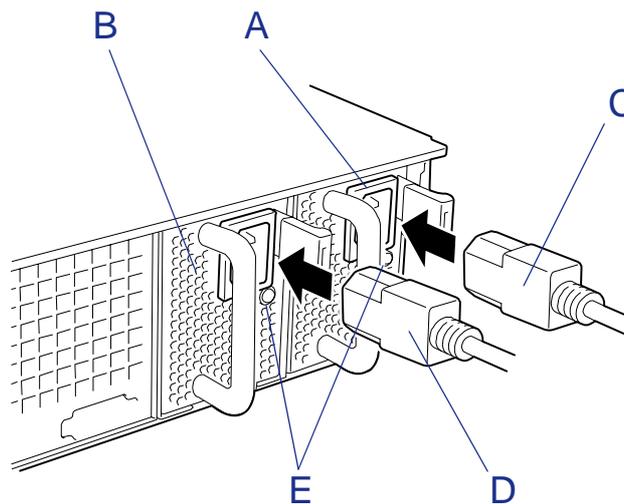
A **Power supply unit 1 (standard)**
B **Power supply unit 2 (option)**
C **Power cord for power supply unit 1**
D **Power cord for power supply unit 2**
E **AC power lamps**

Figure 138: Connecting the Power Cords

7. Power on the server.

The AC power lamps light on.

8. Check, by the Status lamp or on the POST screen, that there are no errors related to the power supply units.

See *"POST Error Messages" on page 200* for details on the error messages.

If the AC power lamps are off, reinstall the power supply units. If the same error message still appears, contact your sales representative.

Replacing a Failing Power Supply Unit

⚠ **Caution**

Do not remove a power supply unit operating normally.

📑 *Note:*

■ *If one power supply unit fails while the server contains two 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.)*

■ *In configuration of two power units, AC power may be supplied only to a single power unit through the power cord connected to the power unit. If so, the power lamp on the other power unit (to which a power cord is not connected) blinks amber. When a power cord is connected to the power unit to supply AC power, the lamp changes to blink green. If the lamp still blinks amber, contact your service representative to ask maintenance.*

---

1. Locate the failing power supply unit by the AC power lamp on the rear of each power supply unit. (The lamp of the failing power supply unit is amber.)
2. Shutdown the system, and press the power switch to turn off the power.
3. Disconnect the power cord from the failed power supply.
4. Hold the handle of the failing power supply.
5. While pressing the lever, pull the power supply to remove it from the chassis.
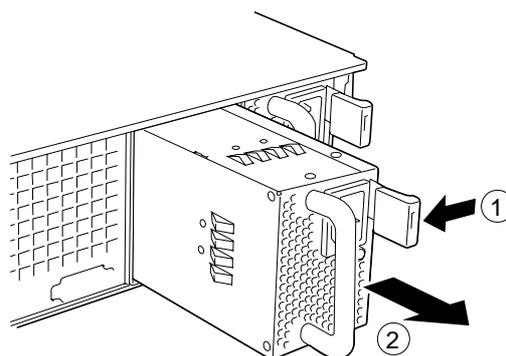
Figure 139: Pulling the Power Supply Unit out of the Chassis

6. If operating the server with a single power supply unit without installing a new one, install the cover you removed in step 3 of installation procedure.

⚠ **Caution**

To maintain the cooling effect in the server, install the blank cover in the vacant slot.

---

7. Install the new power supply unit taking steps 4 to 8 of "Installation", and check that the power supply unit is installed normally.

📄 *Note: If one of the two 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 flashes. The lamp goes on when the power is turned on.)*

Using the Internal Hard Disk Drives in the RAID System

This section describes how to use hard disk drives in the hard disk drive bays of the server in the RAID System. You can build a RAID System using the Internal RAID Controller or an optional RAID Controller

---

⚠ Caution

■ Making hard disks in the RAID system configuration or changing the RAID level initializes hard disks. If the hard disk to be configured in the array has your valuable data stored, make sure to make a backup copy of the data before installing the RAID controller board and configuring the array.

■ At least two hard disk drives are required to configure a Logical drive.

■ Use hard disks of the same capacity and performance (e.g., revolution) for each pack to configure them in the array.

✑ *Notes:*

■ *Choose a controller corresponding to the RAID level and hard disk drives of your choice*

■ *A Logical Drive (except RAID0) increases the disk reliability. However, the available capacity becomes smaller than the total hard disk drive capacity configured in the Logical Drive.*

Internal RAID Controller

To build a RAID System, use the Internal RAID Controller. The hard disk drive bays are connected to the Internal RAID Controller at the factory.

Standard Configuration
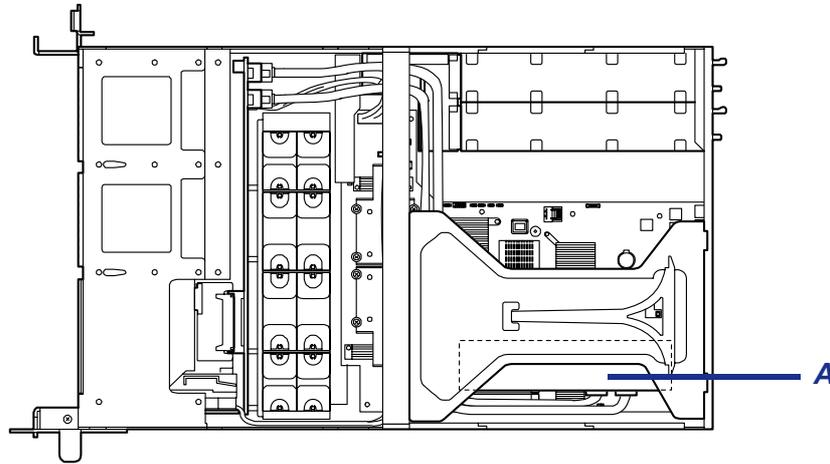
Figure 140: Internal RAID Controller (A)

Use WebBIOS to configure the RAID System.

Notice

Observe the following notes when configuring a RAID System:

■ The installed hard disk drives (SAS drives or SATA drives) must have the same capacity and the same rotational speed. (The minimum number of required disks depends on the configuration of RAID (Redundant Arrays of Inexpensive [Independent] Disks).)

■ Select/set a RAID level "RAID0", "RAID1", "RAID5", or "RAID6".

When installing an operating system in an internal hard disk drive, you should use "Express Setup" to perform all the procedures for the RAID System configuration, OS installation, and the OS setup.

Use Express Setup even when not installing a system. Start Express Setup, select [OS Selection] → [Others]. The installer automatically performs all the procedures for RAID System configuration, and then maintenance utility installation.

When setting up in manual mode, use the RAID System configuration utility of the onboard controller. You can start the utility during POST.

For details, see the online documentation in the ExpressBuilder DVD provided with the server. (The utility varies depending on the RAID Controller.) For details on the data transfer rate, RAID, and RAID System configuration, refer as well to the manual provided with the RAID Controller.

⚠ **Caution**

When an Optional RAID Controller is installed, do not let the system enter hibernation or standby mode.

Disk Expansion Unit

A disk expansion unit is an additional device in which up to 14 hard disk drives can be installed. (The number of hard disk drives depends on the model.)

A server containing a RAID Controller can be connected to one or two of these devices. For more information, see the manuals provided with the RAID Controller and disk expansion unit.

⚠ **Caution**

A disk expansion unit is provided without hard disk drives. The hard disk drives must be purchased separately.

An optional cable may be required to connect with a disk expansion unit. Refer to the manual provided with the disk expansion unit for details.

Connect the disk expansion unit, and use the RAID System configuration utility of the onboard controller to set the disk expansion unit in a RAID System (RAID0, RAID1, or RAID5). (The utility varies depending on the RAID Controller.) For more information on the settings and the methods to use, refer to the online document in the ExpressBuilder DVD provided with the server or to the manual provided with the board.

When a disk expansion unit is set in a RAID System, you can use the "Auto Rebuild" feature of the RAID Controller to restore data if one of the hard disk drives installed in the disk expansion unit fails. (Hot-swap the failing hard disk drive).

Installing and Removing a Backup Device

The server has one slot for installing a backup device such as a magnetic tape drive.

⚠ Caution

■ A SCSI cable and a PCI SCSI controller card are necessary to install a SCSI backup device.

■ Set "OFF" for the terminating resistor of the backup device you are going to install, and set a SCSI ID different from those of other devices. For the settings, see the manual provided with the server.

■ Install only a backup device specified by Bull.

■ The size of a backup device which can be installed in this server is as follows:
Width: Up to about 9 cm (3.5 inches)
Height: Up to about 4 cm (1.6 inches)
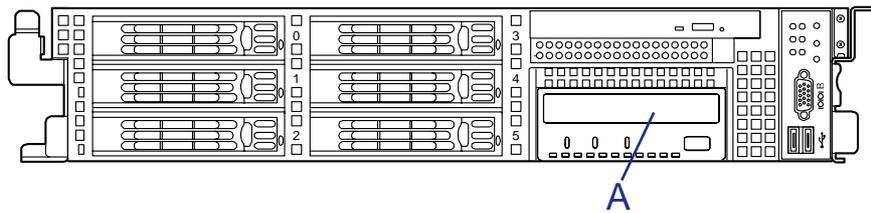
Figure 141: Backup Device Slot

A: Backup device

Installation (IDE File Devices)

1. See the section *"Preparing Your System for Upgrade" on page 137*.
2. Pull out the server from the rack.
3. Remove the drive cover. See *"Drive Cover" on page 141*.
4. Unlock the lever of the optical disc drive, and take it out of the chassis.
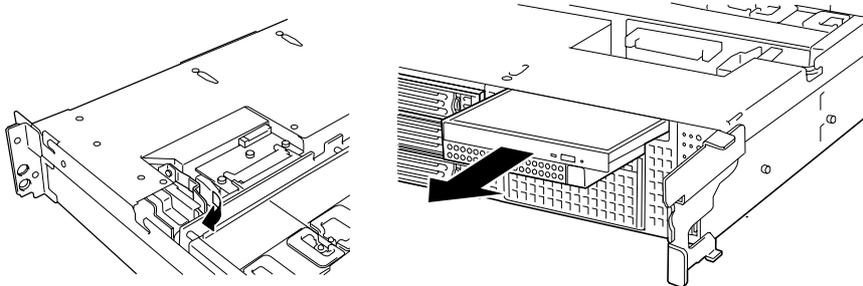
Figure 142: Removing the Optical Disc Drive

⚠ **Caution**

■ Do not touch any other part than release lever when removing the optical disc drive or your fingers may get caught.

■ When an optional USB floppy disk drive is installed, pull the device carrier half-way out, and disconnect the USB cable. Pulling the device carrier completely out while the USB cable being connected may damage the USB connector.
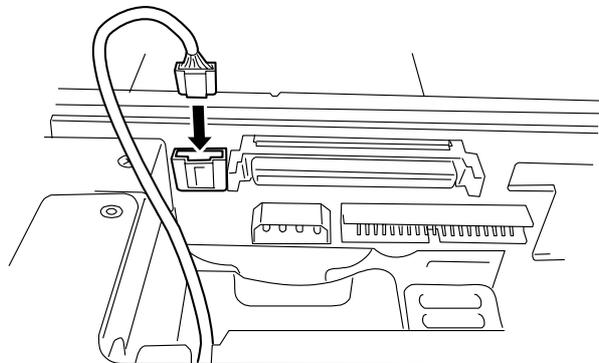
5. While pushing the latching tab that secures the device bay, push the device carrier out of front of the server.
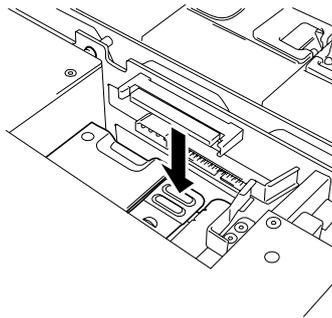
Figure 143: Unlocking the Backup Device Carrier

> ⚠ **Caution**
>
> Be careful not to bend the latching tab by applying excess force.
> If the tab bends, straighten it out as it was.

6. Take out the device carrier from the front of the server.
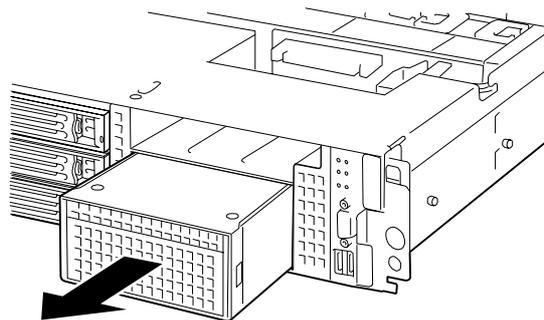
Figure 144: Taking the Backup Device Carrier out of the Chassis

7. Push the tabs at both ends of the front panel.
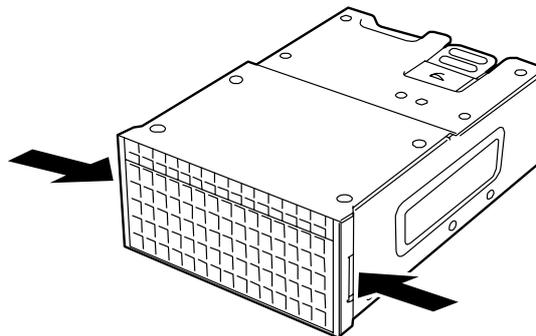
Figure 145: Unlocking the Backup Device Carrier Front Panel

8. Remove the front panel.
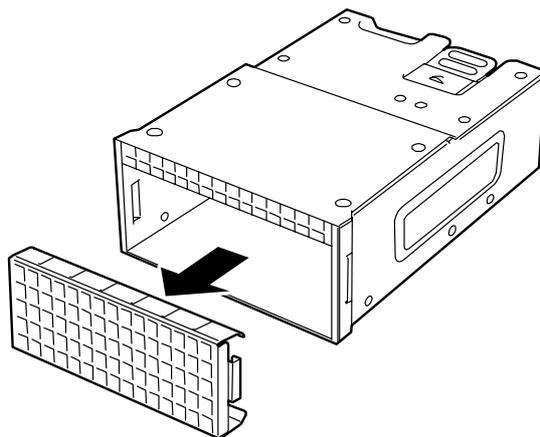
Figure 146: Removing the Backup Device Carrier Front Panel

📝 *Note: Keep the removed front panel for future use.*

9. Insert the backup device into the device carrier.
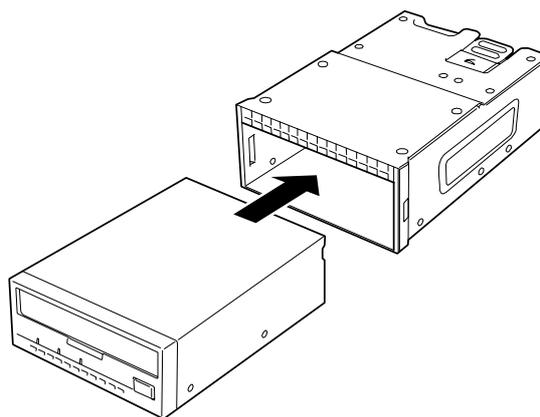
Figure 147: Inserting the Backup Device into the Device Carrier

10. Secure the backup device with the provided screws.
Tighten two screws on each side.
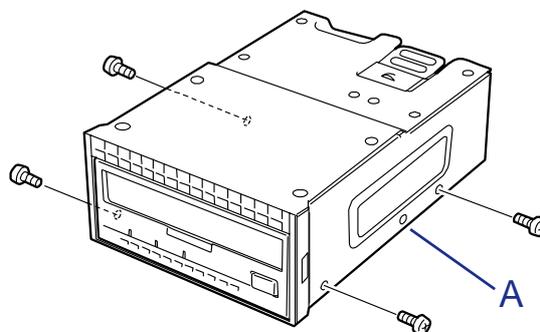
Figure 148: Securing the Backup Device with Screws

A: Screw hole not used

11. Connect the power cable and interface cable to the device.
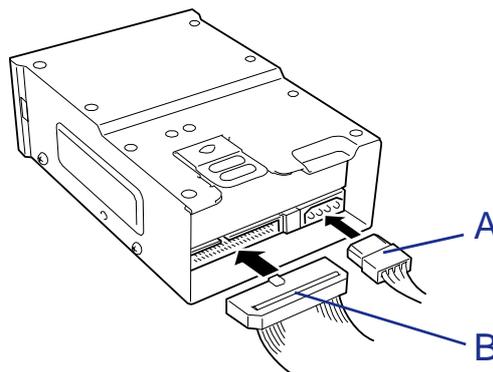
Figure 149: Connecting the Cables to the Backup Device

A: Power cable
B: IDE cable

📄 *Note: Connect the connector marked with "TAPE" of the power cable to the power connector on the device.*

12. Insert the device carrier into the backup device bay halfway.
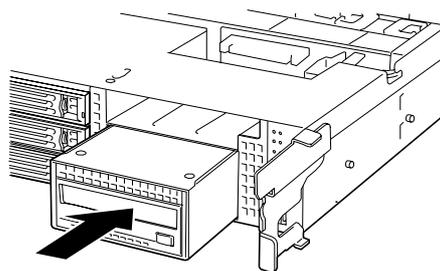
Figure 150: Inserting the Backup Device Carrier

📄 *Note: Be careful not to damage the connected power cable when inserting the device carrier.*

13. Connect the interface cable and power cable to the backplane as shown in figure below.
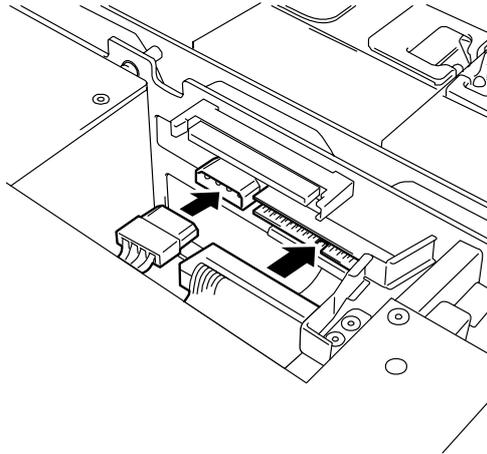
Figure 151: Connecting the Cables to the Backplane

14. Insert the device carrier into the device bay until it locks.

15. Install the components you removed previously.

16. Install the device driver.

Refer to the manual that comes with the device.

Installation (SCSI File Devices)

1. See the section *"Preparing Your System for Upgrade" on page 137*.

2. Pull out the server from the rack.

3. Remove the logic cover and drive cover. See *"Drive Cover" on page 141* and *"Logic Cover" on page 143*.

4. Remove the PCI riser module. See *"Installing and Removing a PCI Board" on page 166*.

5. Remove the support arm from the chassis.
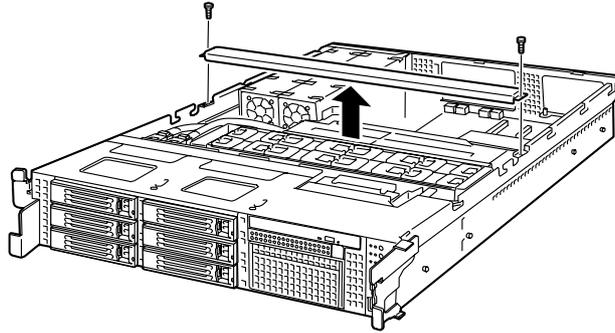
Figure 152: Removing the Support Arm

> 📑 **Note:** *Loosen the screws when the support arm comes up. Press firmly the support arm before removing the screws.*

6. Remove the processor duct from the chassis.
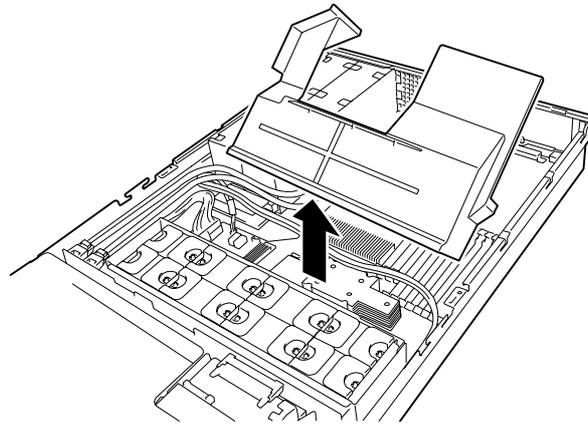
Figure 153: Removing the Processor Air Duct

7. While pulling the lever toward the right side of the server, pull the optical disc drive out of the chassis.
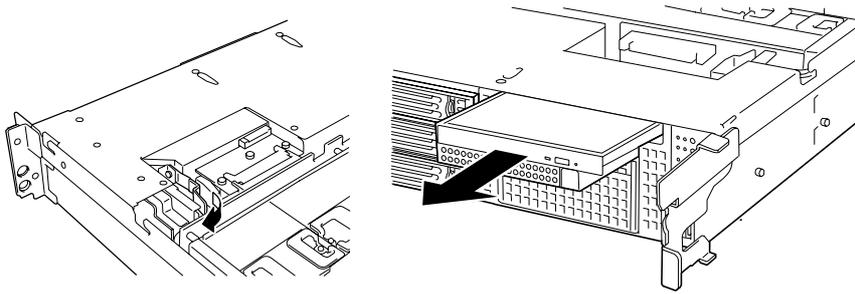
Figure 154: Removing the Optical Disc Drive

⚠ **Caution**

■ Do not touch any other part than release lever when removing the optical disc drive or your fingers may get caught.

■ When an optional USB floppy disk drive is installed, pull the device carrier half-way out, and disconnect the USB cable. Pulling the device carrier completely out while the USB cable being connected may damage the USB connector.

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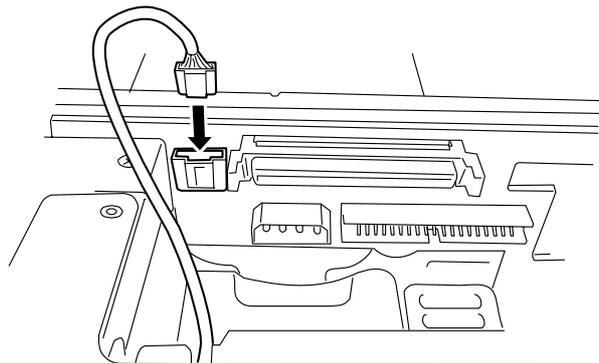
8. While pushing the latching tab that secures the device bay, push the device carrier out of front of the server.
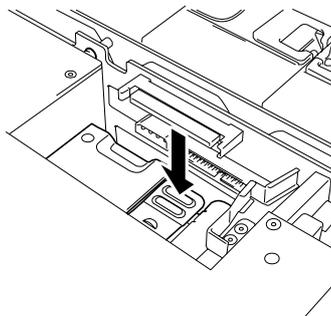
Figure 155: Unlocking the Backup Device Carrier

9. Take out the device carrier from the front of the server.
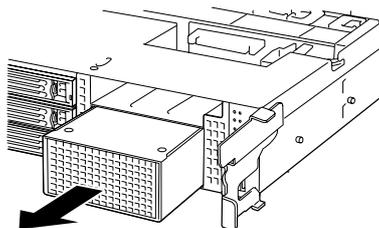
Figure 156: Taking the Backup Device Carrier out of the Chassis

10. Push the tabs at both ends of the front panel.
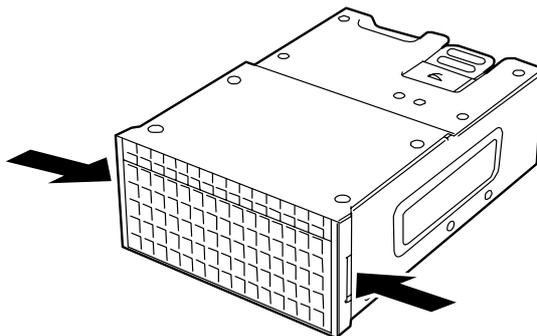
Figure 157: Unlocking the Backup Device Carrier Front Panel

11. Remove the front panel.
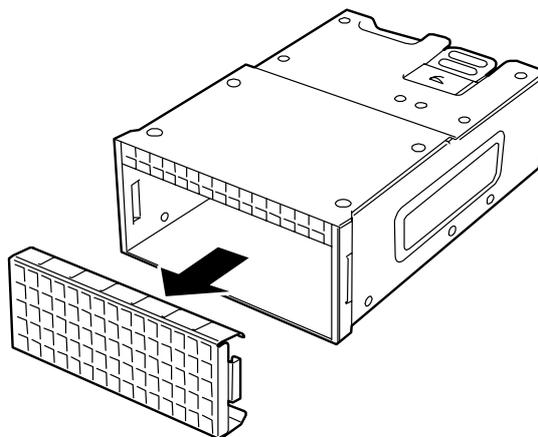
Figure 158: Removing the Backup Device Carrier Front Panel

Note: Keep the removed front panel for future use.

12. Insert the backup device into the device carrier.
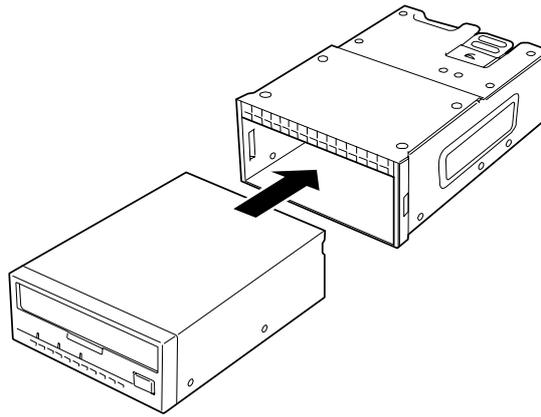
Figure 159: Inserting the Backup Device into the Device Carrier

13. Secure the backup device with the provided screws.
Tighten two screws on each side.
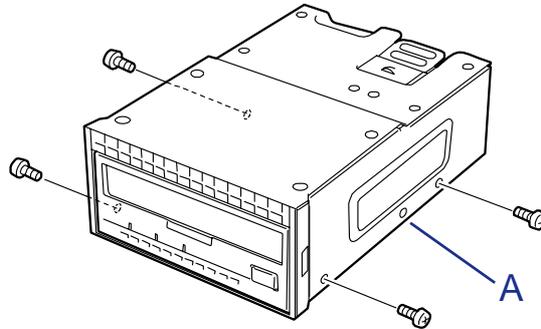
Figure 160: Securing the Backup Device with Screws

A: Screw hole not used

✎ Notes:

■ *Be sure to use the screws provided with the backup device.*

■ *Position the backup device so that the device screw holes align with the screw holes in the device carrier.*

■ *If you find it difficult to connect the cable of a long device, slide the device to the front in order to connect the cable.*

14. Connect the power cable and interface cable to the device.
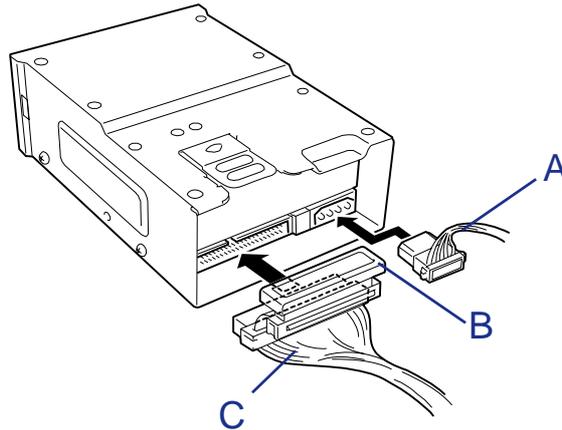
Figure 161: Connecting the Cables to the Backup Device

A: Power cable (attached)
B: SCSI terminator
C: SCSI cable (option)

> *Note: Connect the connector marked with "TAPE" of the power cable to the power connector on the device.*

15. Insert the SCSI cable into the server from the front of the server.
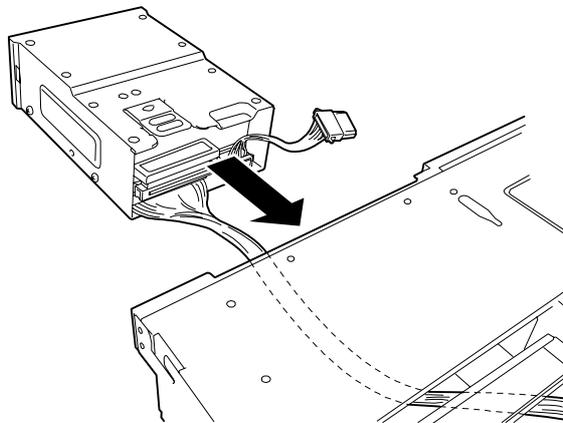
Figure 162: Inserting the SCSI Cable

16. Insert the device carrier into the backup device bay halfway.
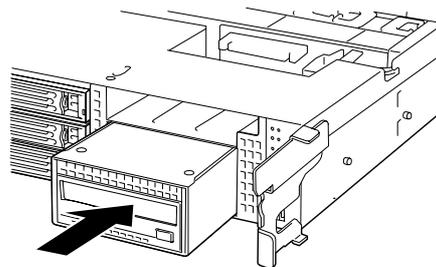
Figure 163: Locking the Backup Device Carrier

17. Connect the power cable to the backplane as shown in figure below.
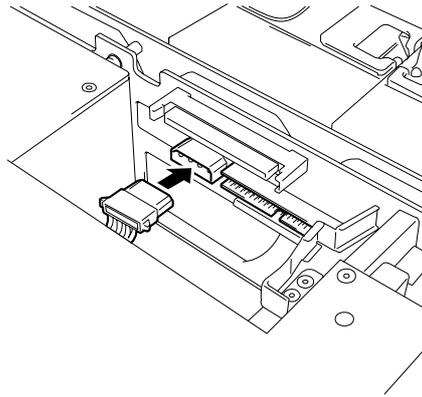
Figure 164: Connecting the Cables to the Backplane

📑 *Note: Place the terminator at the end of the SCSI cable in the device bay. At this time, also confirm that the SCSI cable is not in contact with the latching tab of the device carrier. This prevents the cable from being damaged.*
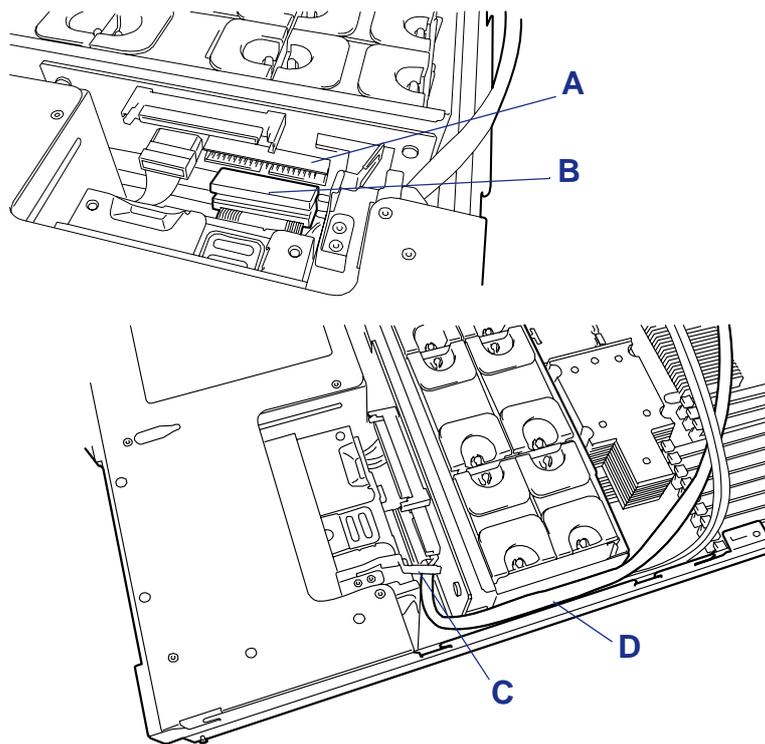
Figure 165: SCSI Cable and Terminator Placement

A: SCSI terminator
B: IDE connector
C: Latching tab
D: SCSI cable

18. Insert the device carrier into the device bay until it locks.

> 📑 *Note: Be careful not to catch the connected power cable in inserting the device carrier.*

19. Route the SCSI cable as shown in figure below.
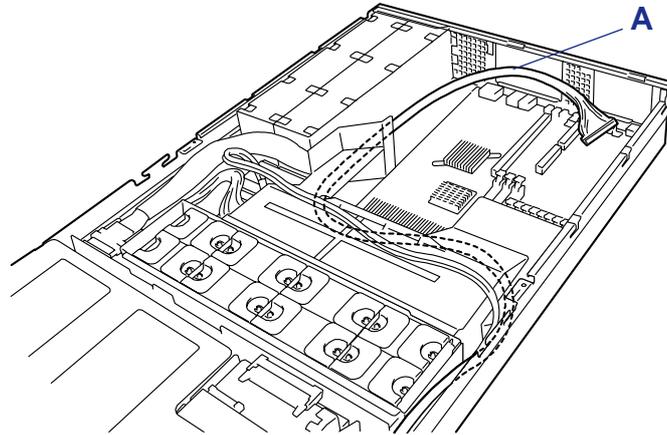
Figure 166: Routing the SCSI Cable

A: SCSI cable

> 📑 *Note: Make sure that the SCSI cable does not make contact with electronic components on the motherboard.*

20. Install the optional SCSI controller to the PCI riser card.

21. Connect the SCSI cable to the SCSI connector on the SCSI controller.
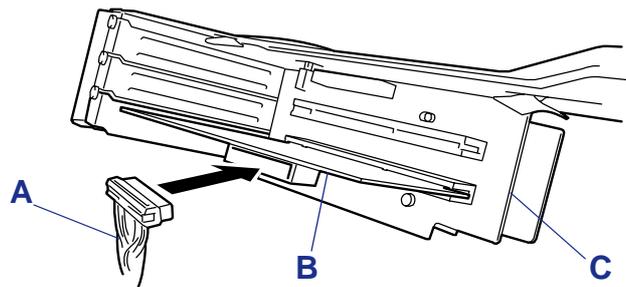
Figure 167: Connecting the SCSI Cable to the SCSI Controller

A: SCSI Cable
B: SCSI Controller
C: PCI Riser Card

22. Install the PCI riser card in the chassis.

23. Install the components you removed previously.

24. Install the device driver.

Refer to the manual that comes with the device.

Installation (USB File Devices)

1. See the section *"Preparing Your System for Upgrade" on page 137*.

2. Pull out the server from the rack.

3. Remove the logic cover and drive cover. See *"Drive Cover" on page 141* and *"Logic Cover" on page 143*.

4. Remove the PCI riser module. See *"Installing and Removing a PCI Board" on page 166*.

5. Remove the support arm from the chassis.
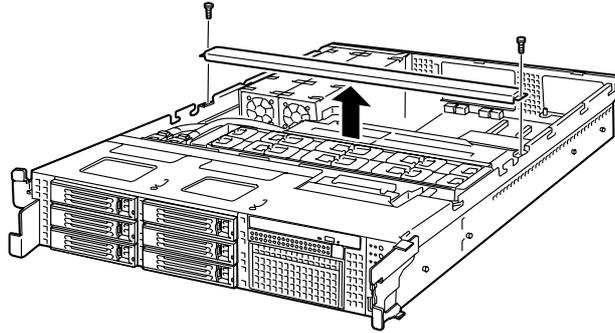
Figure 168: Removing the Support Arm

> 📑 **Note:** *Loosen the screws when the support arm comes up. Press firmly the support arm before removing the screws.*

6. Remove the processor duct from the chassis.
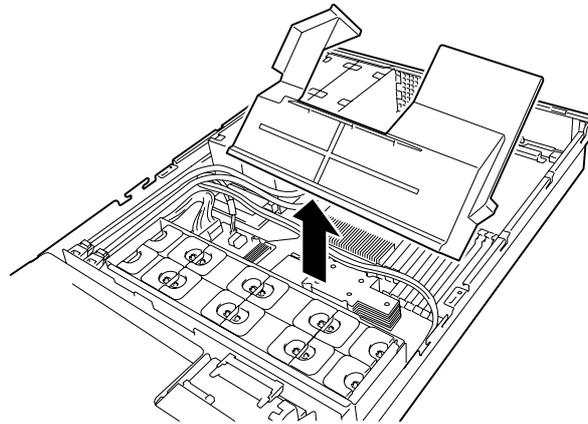
Figure 169: Removing the Processor Air Duct

7. While pulling the lever toward the right side of the server, pull the optical disc drive out of the chassis.
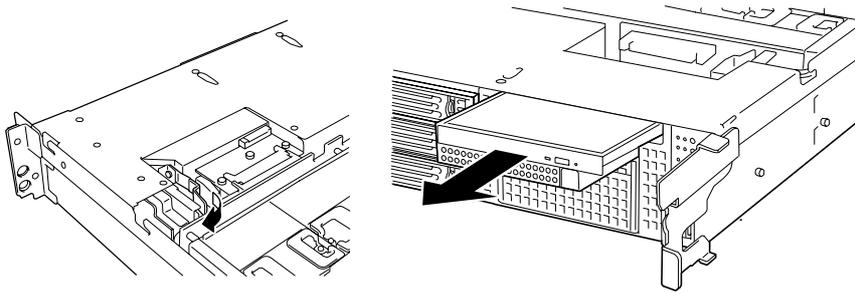
Figure 170: Removing the Optical Disc Drive

⚠ **Caution**

■ Do not touch any other part than release lever when removing the optical disc drive or your fingers may get caught.

■ When an optional USB floppy disk drive is installed, pull the device carrier half-way out, and disconnect the USB cable. Pulling the device carrier completely out while the USB cable being connected may damage the USB connector.

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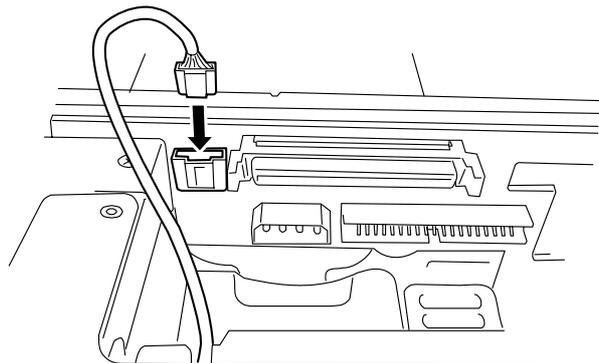
8. While pushing the latching tab that secures the device bay, push the device carrier out of front of the server.
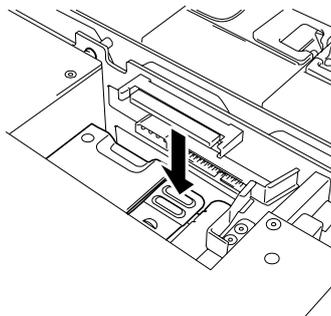
Figure 171: Unlocking the Backup Device Carrier

9. Take out the device carrier from the front of the server.
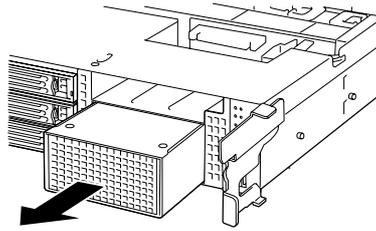
Figure 172: Taking the Backup Device Carrier out of the Chassis

10. Push the tabs at both ends of the front panel.
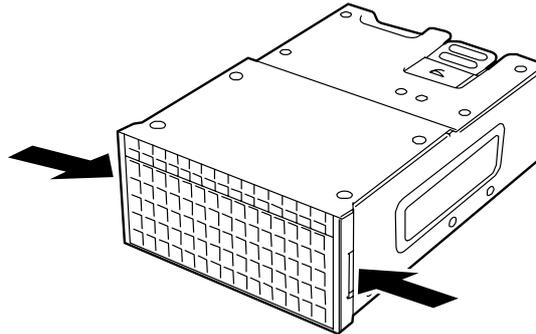
Figure 173: Unlocking the Backup Device Carrier Front Panel

11. Remove the front panel.
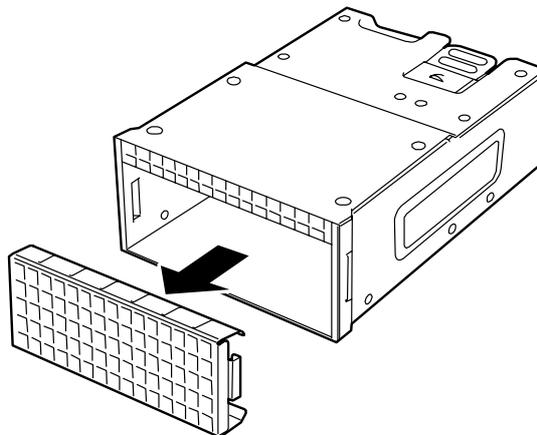
Figure 174: Removing the Backup Device Carrier Front Panel

Note: Keep the removed front panel for future use.

12. Insert the backup device into the device carrier.
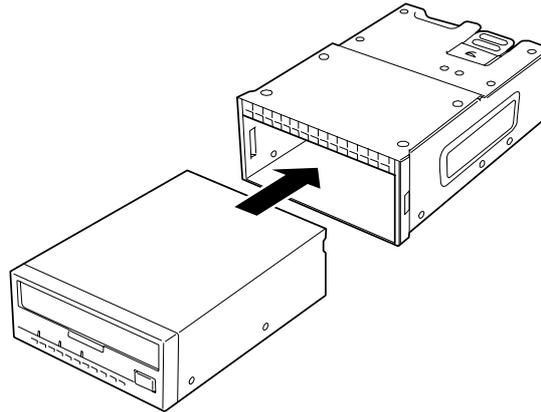
Figure 175: Inserting the Backup Device into the Device Carrier

13. Secure the backup device with the provided screws.
Tighten two screws on each side.
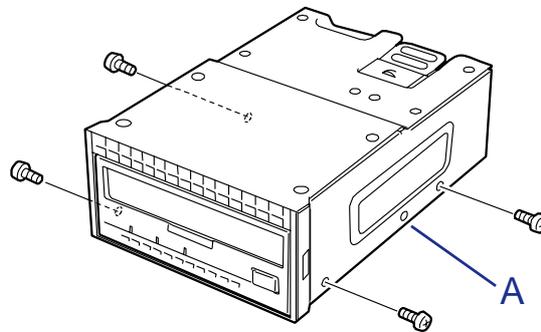
Figure 176: Securing the Backup Device with Screws

A: Screw hole not used

⎙ *Notes:*

■ *Be sure to use the screws provided with the backup device.*

■ *Position the backup device so that the device screw holes align with the screw holes in the device carrier.*

■ *If you find it difficult to connect the cable of a long device, slide the device to the front in order to connect the cable.*

---

14. Connect the power cable and interface cable to the device.
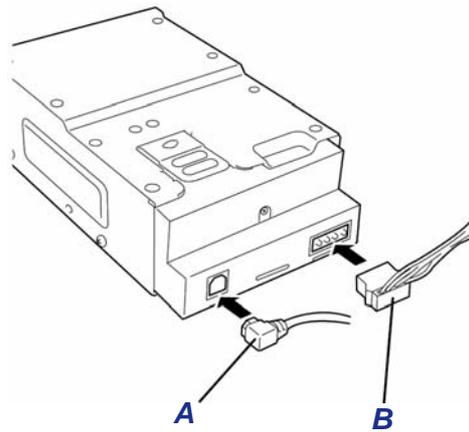
Figure 177: Connecting the Cables to the Backup Device

A: Power cable
B: Interface cable

📃 *Note: Connect the connector marked with "TAPE" of the power cable to the power connector on the device.*

---

15. Insert the USB cable into the server from the front of the server.
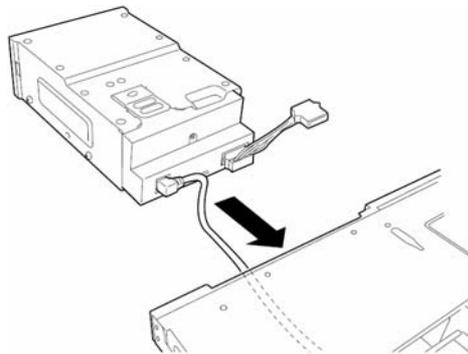
Figure 178: Inserting the USB cable

16. Insert the device carrier into the backup device bay halfway.
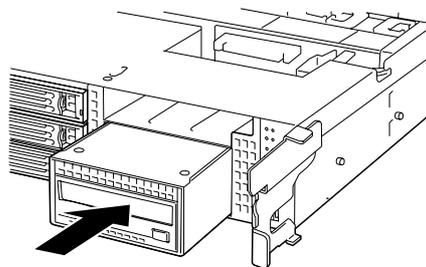
Figure 179: Locking the Backup Device Carrier

17. Connect the power cable to the backplane as shown in figure below.
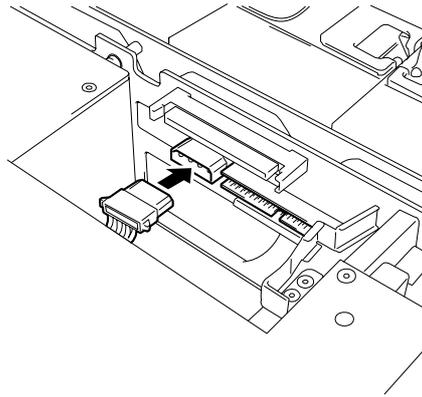
Figure 180: Connecting the Cables to the Backplane

18. Insert the device carrier into the device bay until it locks.

> ≣ *Note: Be careful not to catch the connected power cable in inserting the device carrier.*

19. Route the USB cable as shown in the figure below.
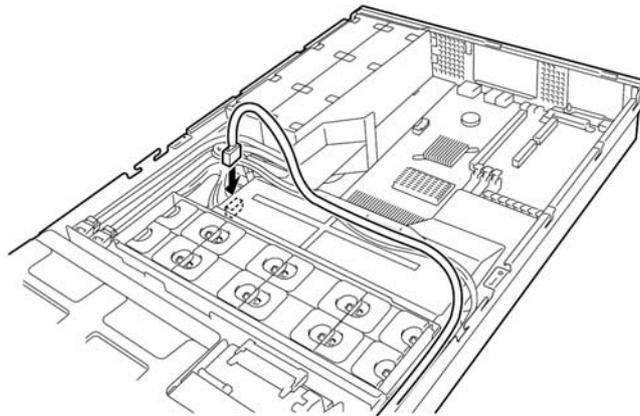
Figure 181: Routing the SCSI Cable

20. Install the components you removed previously.

21. Install the device driver.

Refer to the manual that comes with the device.

Removal

Remove the backup device in reverse order of the installation steps.

Installing and Removing a Redundant Hot-Swap Fan

Your server can include four optional redundant hot-swap fans.
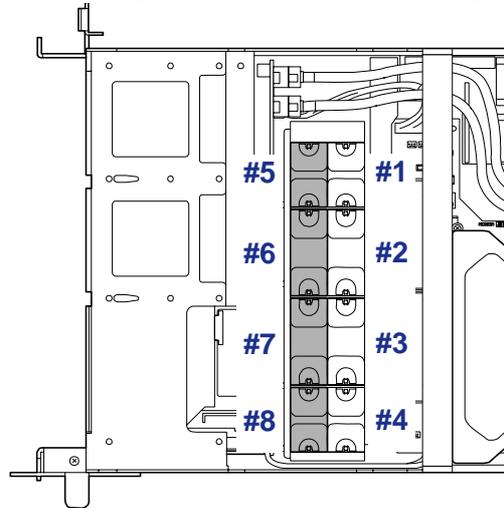
Figure 182: System Fans

Standard: #1, #2, #3, #4
Optional: #5, #6, #7, #8

Installation

1. See the section *"Preparing Your System for Upgrade" on page 137*.
2. Pull out the server from the rack.
3. Remove the drive cover. See *"Drive Cover" on page 141*.
4. Locate the installation slot of your choice.
5. Insert the hot-swap fan into the slot with its labeled side facing the rear of the server until it locks.
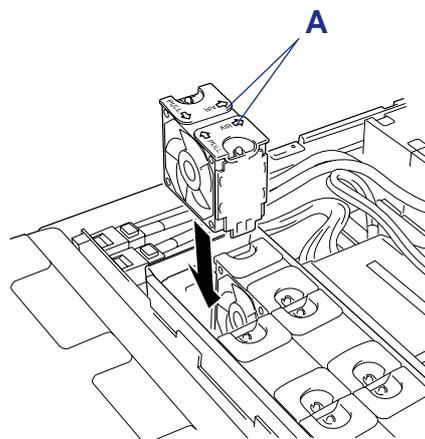
Figure 183: Inserting the Hot-swap Fan

A: Labels

6. Change the Redundant fan jumper setting from the position 1-2 (Normal) to 2-3 (Redundant Configuration).
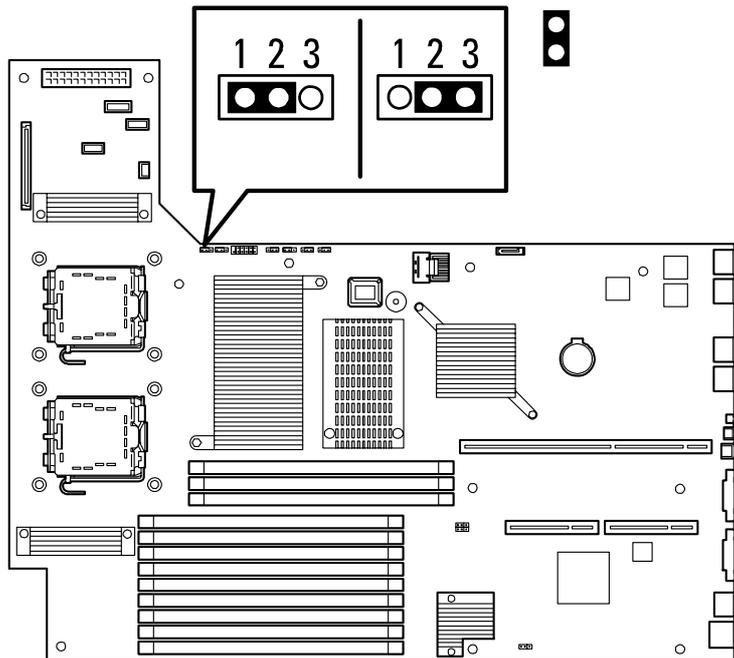
Figure 184: Redundant Fan Jumper

A: Jumper position

⚠ **Caution**

To avoid system malfunction, leave other jumpers at its default position.

---

7. Install the components you removed previously.

Removal

Follow these steps to remove or replace the hot-swap fan.

1. Pull out the server from the rack.

2. Remove the drive cover. See *"Drive Cover" on page 141*.

3. Locate the failed fan.

Fault lamp on the fan turns on when a fan failure occurs. A fan failure is also indicated by NEC ESMPRO and system event log.

4. While pressing release tabs on the top of the fan, pull the fan up to remove from the fan slot.
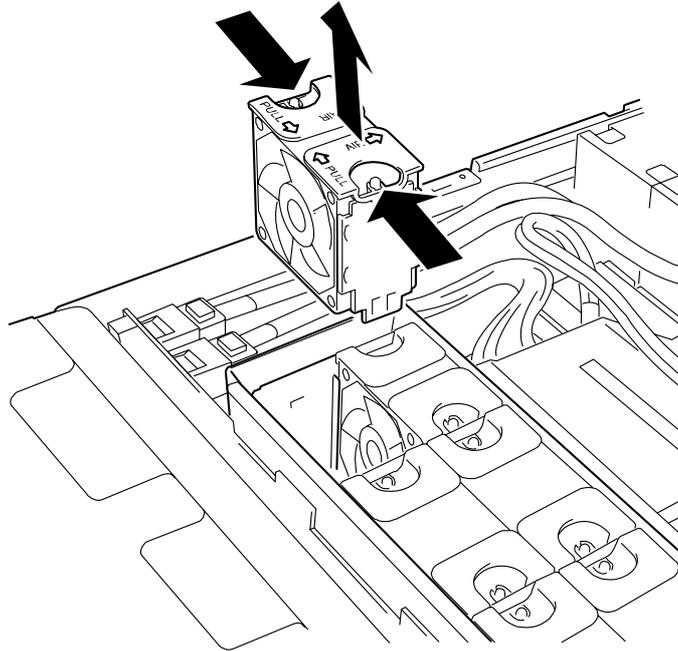
Figure 185: Removing a Fan

5. Install the new fan into the vacant slot.

⚠ Caution

If all the redundant fans are removed, change the redundant fan jumper setting described earlier in the installation procedure.

---

6. Install the components you removed previously.

Problem Solving

This chapter helps you identify and solve problems that may occur during system installation or while using your system. The first section of this chapter tells you how to reset your system in the event of problems. The next few sections provide troubleshooting checklists and procedural steps that help you isolate specific system problems. The last section includes BIOS and system user information.

⚠ Warning

The DC push-button on/off switch on the front panel does not turn off completely the system AC power. +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis.

Not disconnecting power before opening your system can result in personal injury and equipment damage

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⚠ Caution

Running your system with the cover removed can damage your system components.

For proper cooling and airflow, always replace the covers before powering on your system.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Resetting the Server

There are two ways to reset the server.

⚠ **Caution**

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.

■   Hard reset

Press the power switch at the front of the server. (see *"Forcing a Power Shutdown" on page 58*)

⚠ **Caution**

If the remote power-on function is used, cycle the power once to load the OS, and turn off the power again in the normal way.

If the processor is heated excessively, the circuit for protecting expensive components is activated. If so, the POWER/SLEEP switch cannot be used to control the power because the system is entered into the reset status. Pull out the power cord and turn off the power. After a while, check the operation environment (including the ambient temperature). Then connect the power cord and turn on the power. Wait a while before powering the system on again.

■   Soft reset

If the server halts before starting the OS, press and hold **Ctrl** and **Alt** and press **Delete**. This restarts the server.

Troubleshooting Guide

This section provides you a guide to identify a problem and locate its source.

⚠ Warning

The system power and any peripheral devices should be turned off before connecting or disconnecting peripheral devices to or from the system.

Otherwise, you could permanently damage the system or peripheral devices.

---

1. Turn off the server and any peripheral devices. Disconnect all external peripherals from the system, except for the keyboard and monitor. The system´s power cord must be plugged into a grounded electrical outlet.

2. Make sure your keyboard and monitor are properly connected to the system. Turn the monitor on, then adjust its brightness and contrast controls to suit your preference (see your monitor´s documentation).

3. Turn the system on. If the power indicator does not light up, but the system seems to be operating normally, the indicator may need replacement.

4. Monitor the power-on self test (POST) execution. Each time you turn on the system, the POST checks the system board, memory, keyboard, and certain peripheral devices.

5. Check the following during the POST:

   ■ (Error Message Line 1)

   ■ (Error Message Line 2)

   ■ Press **F1** to continue,

   ■ **F2** to enter Setup

   ■ You should note the error and press **F2** to resume the boot-up process, or **F1** to enter Setup.

6. Errors that prevent the boot process from continuing (fatal errors) are communicated by a series of audible beeps. If this type of error occurs, record the information and refer to *"Beep Codes" on page 247*.

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 management PC. Check whether any alert is reported on the Operation Window, Data Viewer, or Alert Viewer of NEC ESMPRO Manager.

Problems at initial System Start-up

Problems that occur at initial system start-up are often caused by incorrect installation of components or incorrect configuration. Hardware failure is a less frequent cause.

■ Are all cables properly connected and secure?

■ Is AC power available at the wall outlet?

■ Are the configuration settings correct in Setup? Are all drivers properly installed?

■ Are all the expansion cards fully seated in their slots on the motherboard?

■ Are all DIMMs installed correctly?

■ Is the processor fully seated in its socket on the motherboard?

■ Are switches and jumpers on the system board correct (if they have been changed from their original default settings)?

■ Are all jumper and switch settings on optional add-on cards and peripheral devices set correctly? Check the documentation included with these devices for details. Ensure that there are no system resource conflicts between hardware components. (For example, two add-on cards could inadvertently share the same interrupt, resulting in a conflict.)

■ Are adapter cards and disk drives correctly installed?

■ Is the keyboard properly connected to the system and is it connected in the right PS/2 port?

■ Is a bootable diskette installed in your system's floppy drive A:?

■ Is the hard disk properly formatted or defined?

■ Is the operating system properly loaded? Check the operating system documentation.

Problems After the System Has Been Running Correctly

After the system hardware and software have been running correctly, problems can indicate equipment failure. Use the checklist below to try and correct the situation.

If the problem recurs after you have checked these items, refer to the *Troubleshooting Guide* section earlier in this chapter.

■ If you are running software from a diskette or CD, try using a new copy.

■ If you are running software from a hard disk drive, make sure that all of the necessary files are installed. There may be a problem with the copy on the hard disk. Reinstall the software on the hard disk and try again.

■ If problems appear intermittently, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), or other random component failures.

■ A transient voltage spike, power cut, or brownout may have occurred. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands. If necessary, exit any open applications and shut down your system power. Reboot the system, then load the software and try again.

■ Voltage spikes can occasionally cause the heads of the disk drive to contact the disk. This can corrupt or destroy data files. If you are experiencing voltage spikes on the AC electrical power line, install an uninterruptible power supply between the power outlet and the system's power cord.

Problems Running New Application Software

Problems occurring when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. Use the checklist below to see if the situation may be easily corrected. If the problem persists after you have checked these items, contact the software vendor's customer service.

■ Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.

■ Is the software an authorised copy? Unauthorised copies often do not work. Obtain an authorised copy of the software.

■ If you are running the software from a CD or diskette, is it a good copy?

■ If you are running the software from a CD, is the disc scratched or dirty?

■ Is the software correctly installed? Were all necessary procedures followed and files installed?

■ Are the correct device drivers installed?

■ Is the software correctly configured for the system?

■ Are you using the software correctly?

Problems and Suggestions

Contact your Authorised Service Representative if the suggested actions do not solve the problem.

Table 30: Problems and Suggestions

What to do	What to do
Application software problems	Make sure all cables are installed correctly.
	Verify that your system hardware configuration is set correctly. In Setup, check the values against the system settings that you previously recorded. If an error is evident (wrong type of drive specified, for example), make the change in Setup and reboot the system. Record your change.
	Make sure the software is properly configured for the system. Refer to the software documentation for information. Try a different copy of the software to see if the problem is with the copy you are using.
	If other software runs correctly on the system, contact the vendor of the failing software.
Characters on screen are distorted or incorrect	Make sure the brightness and contrast controls are properly adjusted. Make sure the monitor's video signal cable and power cables are properly installed. (Shut down system power before reconnecting cables.) Make sure your monitor is compatible with the video mode you have selected. (Check your monitor's documentation.)
Characters do not appear on screen	Make sure the monitor is plugged in and turned on. Are the brightness and contrast controls properly adjusted? Make sure that the video signal cable is properly connected. (Turn the system power off before reconnecting cables). Make sure your system's video adapter card is installed, enabled. Reboot the system.
CMOS RAM settings are wrong	If system settings stored in CMOS RAM change for no apparent reason (for example, the time of day is in error), the backup battery may no longer have enough power to maintain the settings. Replace the battery.
Diskette drive light does not go on when drive is in use or is tested by POST.	Make sure the power and signal cables for the drive are properly installed. Check that the drive is properly configured and enabled in Setup.
Hard drive light does not go on when drive is in use or is tested by POST.	Make sure the power and signal cables for the drive are properly installed. Make sure the front panel connector is securely attached to the system board headers. Check that the drive is properly configured and enabled in Setup. Check the drive manufacturer's manual for proper configuration for remote hard disk drive activity.
Power on light does not go on	If the system is operating normally, check the connector between the system board and the front panel. If OK, the light may be defective.

Solving Problems

Error Messages on the Virtual LCD

The NEC EXPRESSSCOPE Engine 2 (Remote Management Controller) on your server board allows you to monitor the server status on the WEB browser-based screen of the client PC via network.

The virtual LCD (16 digits x 2 lines) in the "Host Information" area displays the POST codes and status message.

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.
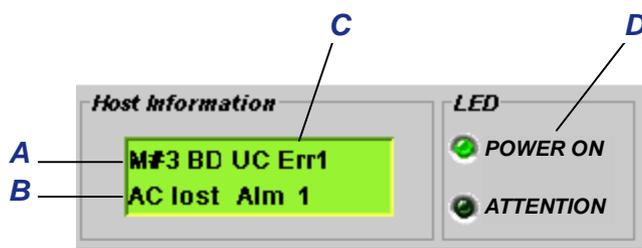
Figure 186: Virtual LCD Screen

A: Message sent from BIOS
B: Message sent from BMC
C: Virtual LCD
D: Status indicators

Figure 187: BIOS Messages (Upper Line)

On-screen message	Description	Action
XX BIOS rev YYYY	POST in progress. XX: POST code, YYYY: BIOS version	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].

Figure 187: BIOS Messages (Upper Line)

On-screen message	Description	Action
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].
Memory C-Err XX	A correctable error frequently occurs in DIMM #XX.	Contact your service representative.
Memory U-Err XX	An uncorrectable error has occurred in DIMM #XX.	
PCI Bus PERR XX	A PERR has occurred in the PCI bus XX.	
PCI Bus SERR XX	A SERR has occurred in the PCI bus XX.	
Mem Err Disable	A correctable memory error frequently occurred.	
Prepare to Boot	POST completed normally.	This is not an error

Figure 188: BMC Messages (Lower Line)

On-screen message	Description
240VA Power Down	Power supply failure occurred.
BB +1.5v Alm XX	Voltage alarm occurred on the motherboard.
BB +1.8v Alm XX	XX=09: high voltage (fetal)
BB +3.3v Alm XX	XX=07: high voltage (warning)
BB +5.0v Alm XX	XX=02: low voltage (warning)
BB +1.2v Alm XX	XX=00: low voltage (fetal)
BB P_Vtt Alm XX	
BB temp1 Alm XX	motherboard thermal error occurred. XX=09: high voltage (fetal) XX=07: high voltage (warning) XX=02: low voltage (warning) XX=00: low voltage (fetal)
DUMP request!	Dump switch is pressed.
OS Shutdown Alm	OS Shutdown Alm occurred.
Power On Cnt Alm	Power Supply Failure occurred.
Power Unit 1 Alm	Power unit #1 Failure occurred.

Figure 188: BMC Messages (Lower Line)

On-screen message	Description
Power Unit 2 Alm	Power unit #2 Failure occurred.
Proc missing	Processor was not found.
Proc 1 T-Trip	Thermal Trip occurred on processor #1 or #2. the system is forcibly turned off.
Proc 2 T-Trip	
Proc 1 Therm % XX	Processor #1 or #2 thermal error occurred.
Proc2 Therm % XX	XX=09: high temperature (fetal)
	XX=07: high temperature (warning)
	XX=02: low temperature (warning)
	XX=00: low temperature (fetal)
Proc1 VccpAlm XX	Voltage alarm occurred on processor #1 and #2.
Proc2 VccpAlm XX	XX=09: high temperature (fetal)
	XX=07: high temperature (warning)
	XX=02: low temperature (warning)
	XX=00: low temperature (fetal)
Processor 1 IERR	IERR occurred on processor #1 or #2.
Processor 2 IERR	
SMI timeout	SMI timeout 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.
Sys Fan 7 Alarm	FAN#7 alarm occurred.
Sys Fan 8 Alarm	FAN#8 alarm occurred.
Sys Fan 9 Alarm	FAN#9 alarm occurred.
Sys Fan 10 Alarm	FAN#10 alarm occurred.
Sys Fan 11 Alarm	FAN#11 alarm occurred.
Sys Fan 12 Alarm	FAN#12 alarm occurred.
Sys Fan 13 Alarm	FAN#13 alarm occurred.
Sys Fan 14 Alarm	FAN#14 alarm occurred.
Sys Fan 15 Alarm	FAN#15 alarm occurred.

Figure 188: BMC Messages (Lower Line)

On-screen message	Description
VBAT Alm XX	Voltage alarm in lithium battery occurred.
	XX=09: high voltage (fetal)
	XX=07: high voltage (warning)
	XX=02: low voltage (warning)
	XX=00: low voltage (fetal)
WDT timeout	Watchdog timer timeout error occurred.

Problems with the Server

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.

- 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 CMOS Setup utility of the server.
<Menu to check: [Advanced] - [AC-LINK]>

■ Did you press the POWER/SLEEP switch?

- Press the POWER/SLEEP switch on the front of the server to turn on the power (the POWER/SLEEP lamp lights).

Fail to power off the server

■ Is the power switch enabled?

- Restart the server and start the BIOS setup utility

■ Is the server running in secure mode?

- The power switch is 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.

No screen display appears and beep occurs.

■ Is the DIMM board installed securely?

- Check whether the DIMM board is inserted into the mating connector securely.

- Check whether DIMMs of different specifications are installed in the specific bank.

- DIMMs must be populated in pairs and in the following order:
  11 and 21, 31 and 41, 12 and 22, 32 and 42, 13 and 23, and 33 and 43.

- Installed DIMMs must be the same speed and must all be registered.

- Take a note of beep code pattern, and take appropriate action according to the table listed in *"Beep Codes" on page 247*.

- Make sure the jumper switches have been returned to their original positions after CMOS clearing. See "Configuring motherboard Jumpers" in Chapter 4 for the positions of the jumper switches.

POST fails to complete:

■   Is the DIMM board installed?

- At least two DIMM boards are required for operation.

- DIMMs must be populated in pairs and in the following order:
   11 and 21, 31 and 41, 12 and 22, 32 and 42, 13 and 23, and 33 and 43.

- Installed DIMMs must be the same speed and must all be registered.

■   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 contain 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?

    - 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.

The Power switch and sleep features are disabled:

■ Is the POWER switch masked by the BIOS feature?

    - The BIOS can disable power-off with the POWER switch after the operating system is started (including shutdown by pressing the POWER switch for at least four seconds).
Run the BIOS SETUP utility to change settings.

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 of the server first and connect it properly.

■ Is the BIOS configuration correct?

    - The keyboard and mouse may have been disabled with the BIOS SETUP utility of the server. Check the settings with the BIOS SETUP utility.

■ Are the server drivers installed?

    - Refer to the manual that comes with your OS to check that the keyboard and mouse drivers are installed. (These drivers are installed along with the OS.) Some OS's allow you to change the keyboard and mouse settings. Refer to manual that comes with your OS to check that the keyboard and mouse settings are correct.

Fail to access to the optical disc:

■ Is the optical disc properly set in the optical disc drive tray?

    - The tray is provided with a holder to secure the optical disc. Make sure that the optical disc is placed properly in the holder.

■ Is the optical disc applicable to the server?

    - The optical disc for Macintosh is not available for use.

    - The playback of an optical disc which does not conform to the optical disc standards is not guaranteed.

■ Is the optical disc drive bay correctly installed?

- Reinstall the optical disc drive bay.

Inserted the correct optical disc *but an error message 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 optical disc dirty or injured?

- Take the optical disc out of the optical disc drive, check that it is not dirty or injured, reset and click [OK].

Fail to access the hard disk

(Refer to the documentation supplied with the RAID controller.)

■ Is the hard disk applicable to the server?

- Operation of any device that is not authorized by Bull is not guaranteed.

■ Is the hard disk properly installed?

■ Is the hard disk properly configured?

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 Bull is not guaranteed.

■ Is the cable connection changed?

■ Are SCSI devices properly configured?

- When the server has external SCSI devices connected, devices settings, including SCSI ID and terminator, are required. Refer to the manual that comes with the SCSI device for details.

■ Is cable length exceeded?

- Refer to the manual that comes with the SCSI device for details.

■ Are the optional SCSI controllers properly configured?

- 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.

Event logs in using Intel Network adapter teaming

Event Type:	Warning
Event Source:	IANSMiniport
Event Category:	None

Event ID:	11
Description:	Adapter link down: Intel(R)PRO/1000 ----

Event Type:	Warning
Event Source:	IANSMiniport
Event Category:	None
Event ID:	13
Description:	Intel(R)PRO/1000 ---- has been deactivated from the team.

Event Type:	Error
Event Source:	IANSMiniport
Event Category:	None
Event ID:	16
Description:	Team #0: The last adapter has lost link. Team network connection has been lost.

Event Type:	Warning
Event Source:	IANSMiniport
Event Category:	None
Event ID:	22
Description:	Primary Adapter does not sense any Probes: Intel(R)PRO/1000 ---- Possible reason: partitioned Team.

Above-mentioned event log will appear when the system starts. There is no problem in LAN driver operation.

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 with the network interface standard.

■ Is the 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.

■ 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.

Wake on LAN does not start from standby state.

■ Is Hub set to Auto-Negotiation? Or, Is the client set to Auto-Negotiation/optimum speed?

- For both hub and client, Wake on LAN does not start from the standby state if the speed is fixed to 1000Mbps.

RAID System and RAID Controller

Check the following if the server configured with a RAID system does not operate properly or if an utility does not operate correctly.

Fail to install the OS:

■ Is the RAID controller configured?

- Provide proper configuration for the RAID controller by using the LSI Software RAID Configuration Utility or WebBIOS.

Fail to start the OS:

■ Did the BIOS of the RAID controller change?

- Set the BIOS correctly using using the LSI Software RAID Configuration Utility or WebBIOS.

■ Does the POST recognize the RAID controller?

- Make sure that the RAID controller is connected correctly, and power on the server.

- The RAID controller on the motherboard may be faulty. Contact your service representative.

Rebuild fails:

■ Is the capacity of the hard disk drive to be rebuilt sufficient?

- The hard disk drive to be rebuilt should have a capacity equal to the failed hard disk drive capacity.

■ Is RAID0 configured?

- RAID0 has no data redundancy, and therefore, Rebuild is disabled in the RAID0 configuration. Replace the failed hard disk drive, create the configuration data again and initialize the hard disk drives. Then recover the data by using backup data.

Auto rebuild fails:

■ Was a sufficient time taken for hot swap of hard disk drives?

- To allow the auto rebuild to operate correctly, wait at least 90 seconds between the removal of the failed hard disk drive and the installation of a new hard disk drive.

■ Is the configuration correct?

Check the auto rebuild settings by using the LSI Software RAID Configuration Utility.
<Menus to check: Top menu - [Objects] - [Adapter] - [Auto Rebuild]>
* Auto Rebuild cannot be specified in WebBIOS.

A hard disk drive fails:

- Contact your service representative.

Cannot enter standby:

- If you use the LSI Embedded MegaRAID™, the system may not enter standby if there is a heavy I/O.

Cannot enter Hibernation:

- If you use the LSI Embedded MegaRAID™, the system may not enter standby if there is a heavy I/O.

Physical device is not correctly displayed on Universal RAID Utility

- If you use the LSI Embedded MegaRAID™, some information on a physical device may not be correctly displayed on the Universal RAID Utility. It is not a problem.

Problems with Windows

In some cases, an event log is registered as follows when you install Windows Server 2003 x64 Editions.

Source: DCOM

Category:Error

Event ID: 10016

Description: The application-specific permission settings do not grant Local Activation permission for the COM server application with CLSID {555F3418-D99E-4E51-800A-6E89CFD8B1D7} to the user {NT AUTHORITY\LOCAL SERVICE} SID {S-1-5-19}.

This security permission can be modified using the component Services administrative tool.

   - The system can be operated normally.

In some cases, an event log is registered as follows when you install Windows Server 2003 x64 Editions.

Event Source:Service Control Manager

Event Type:Error

Event ID:7011

Description:Timeout (30000 milliseconds) waiting for a transaction response from the IMAP4Svc service.

   - If this event disappears when the system is rebooted, the system can be operated normally.

In some case, 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 the "Hardware Management" feature provided by Windows Server 2003 R2, above-shown event log will be registered.

Windows Product Activation

"This copy of Windows must be activated with Microsoft before you can continue. You cannot log on until you activate Windows. To shut down the computer click Cancel."

In Windows Server 2003, the above message will be displayed if you use the operating system without executing the license authentication. Select "Yes", and execute the procedure for license authentication.

Cannot install the operating system correctly.

■   Did you check the notes on installing the operating system?

During 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 OS:

■ Is a floppy disk in the floppy disk drive?

- Take out the floppy disk and restart the server.

■ Is the ExpressBuilder DVD-ROM in the optical disc drive?

- Take out the ExpressBuilder DVD-ROM and restart the server.

■ Is the OS broken?

- Use recovery process to recover the system. (See "Recovery for Windows 2000 System" in this Chapter.)

The OS presents unstable operation:

■ Did you update the system?

- Installing a network drive after installation of the OS may cause unstable operation. Use the ExpressBuilder DVD-ROM to update the system.

The system does not restart automatically when a stop error occurs, though the system is adjusted to automatically restarting:

- When the system does not restart automatically, restart it manually.

The system restarts automatically when a stop error occurs, though the system is NOT adjusted to automatically restarting:

- There is no problem about this issue. Check the System Event Log to check that STOP error occurred.

Cannot turn the power OFF at the blue screen:

- If you want to turn off the power at the blue screen, execute forced shutdown (forced shutdown: continue to press POWER/SLEEP switch for 4 seconds). The power will not be turned off if you press the switch for less than 3 seconds.

The PXE boot (network boot) fails or the server is not found on the network:

■ Is the cable connected properly?

- Connect the proper cable to the network port on the rear of the Express server. In addition, make sure that the used cable conforms to the network interface standard.

■ Is BIOS configuration correct?

-   The internal LAN controller may be disabled with the CMOS Setup utility of the server. Check the setting with the BIOS setup utility.

■   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 and duplex value the same as the value specified for HUB.

■   The Telnet Service is not installed.

-   Adjust the computer name to 14 characters or less, and then install the Telnet Service as described below:

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.

Once the installation of Telnet Service is finished, you can reset the computer name to 15 characters or more.

Power ON/OFF (Wake On LAN) feature does not work:

Immediately after the AC power is turned on, the Remote Power ON/OFF feature (Wake ON LAN) is disabled. Start Windows 2003 once, provide the settings shown below, then shutdown the system.

After restart, the Remote Power On/Off feature will be available except when the AC power is turned off.

1.   Select [Start] → [Administrative Tools] → [Computer Management].
2.   Select Device Manager, double-click [Intel(R) PRO/1000EB Network Connection with I/O Acceleration #n] under Network Adapter, and specify as follows in [Detail] tab.
     PME: [ON]
     Wake On:[Magic Packet]

Fail to start the OS with the /3GB switch

System often fails to start the OS with the /3GB switch.

In this case, please adjust the capacity of the user mode area using the /userva switch in reference to the following URL.

http://support.microsoft.com/kb/316739/en

Problems with ExpressBuilder

When the server does not boot from the ExpressBuilder DVD, check the following:

■ Did you set the ExpressBuilder during POST and restart the server?

- If you do not set the ExpressBuilder during POST and restart the server, an error message will appear or the OS will boot.

■ Is BIOS configuration correct?

- The boot device order may be specified with the CMOS Setup utility of the server. Use the CMOS Setup utility to change the boot device order to boot the system from the optical disc drive first.
  <Menu to check: [Boot]>

If [OS installation ***default***] is selected at BOOT Selection screen, following message is displayed.

After this message appears, check the error and take the appropriate corrective action according to the message listed in the table below.

Message	Cause
This ExpressBuilder version was not designed for this computer. Insert the correct version and click [OK]. (When you click [OK], the computer reboots.)	This ExpressBuilder version is not designed for this server. Execute the ExpressBuilder on the compliant server.
ExpressBuilder could not get the hardware parameters written in this motherboard. This version is not designed for this computer or the motherboard may be broken. (When you click [OK], the computer reboots.)	This message is shown when ExpressBuilder could not find system-specific information because of motherboard exchange and so on.
The hardware parameters written in this motherboard are incorrect. This version is not designed for this computer or the motherboard may be broken.	

Problems with Express Setup

The system partition is created by size smaller than specified value.

■ In Express Setup, there are some cases that the system partition created by size about 8MB smaller than specified size.
It is not a problem in operating the system.

Following message appeared when you tried to install Express Setup to the hard disk drive that has smaller capacity than the specified partition size:

■ Cannot continue the setup.

Specify smaller partition size than the capacity of connected hard disk drive, and then retry the setup.

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.

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.

Problems with Windows Autorun Menu

Cannot read online document:

■ Do you have Adobe Reader installed correctly in your system?

Some online documents are supplied with PDF format. To read the document of PDF format, Adobe Reader is required in your system.

■ Is the operating system Windows XP SP2?

With Windows XP SP2, the following information may appear in browser.

"To help protect your security, Internet Explorer has restricted this file from showing active content that could access your computer. Click here for options..."

1. Click the Information Bar.
    The shortcut menu appears.
2. Click [Allow blocked content].
    The security alert dialog box appears.
3. Click [Yes] on dialog box.

The menu fails to appear:

■ Is your system Windows XP or later, or Windows 2003 or later?

- The Windows Autorun menu is supported by Windows XP/Windows 2003 or later.

- If your system runs on Windows Autorun Menu on Windows 2000 system, you need to setup IE6.0 before using Windows Autorun Menu.

■ Is **Shift** pressed?

- Setting the DVD/CD-ROM with **Shift** pressed down cancels the Autorun feature.

■ Is the system in the proper state?

- The menu may not appear depending on the system registry setting or the timing to set the DVD/CD-ROM. In such a case, start the Explorer and double-click the icon of the optical disc drive.

Some menu items are grayed-out:

■   Is your system environment correct?

  - The menu items are grayed-out when the logon user does not have the authority
     of the Administrator or the system does not meet the requirements to install the
     application. Login with the user having the proper authority on the proper sys-
     tem, and try again.

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.

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...

⚠ Caution

■ Consult with your sales agent before dumping the memory. Dumping the memory while the server is in process 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 CPU stalls.)

⚠ Warning

Do not use a toothpick or plastic stick that could break easily. Do not use any pin easily broken such as a toothpick or plastic pin.

Recovery for Windows Server 2003 x64 Editions and Windows Server 2003

If the system fails to start, recover the system with the recovery console. This method should be used only by a system administrator or a user with expert knowledge.

See the Online Help for details.

Maintenance Tools

Starting the Maintenance Tools

The Maintenance Tools starts according to the following procedure.

1. Turn on first the peripheral devices and then the server.
2. Insert the ExpressBuilder DVD supplied with your server into the optical disc drive of your server.
3. Press **Ctrl**, **Alt**, and **Delete** to reboot the server from the ExpressBuilder. (You may also turn off and then on again to reboot the server.)

   System boots up displaying the Boot Selection menu.
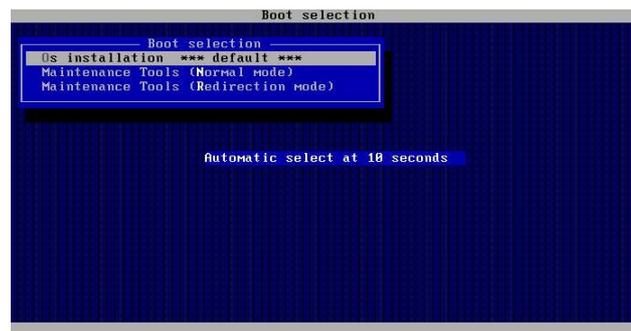
Figure 189: Boot Selection Menu

⚠ Caution

The initial selection of the menu is "OS installation".
"OS installation" starts automatically after the Boot Selection menu has been displayed.

4. When using a local console, "Maintenance Tools (Normal mode)" is selected.

When using the remote console, "Maintenance Tools (Redirection mode)" is selected.

⚠ **Caution**

The initial selection of the menu is "Japanese".
 "Japanese" starts automatically if no other choice is made during the following 5 seconds.

---

5. Select "English", and the following tool menu is displayed.

Figure 190: Using a local console
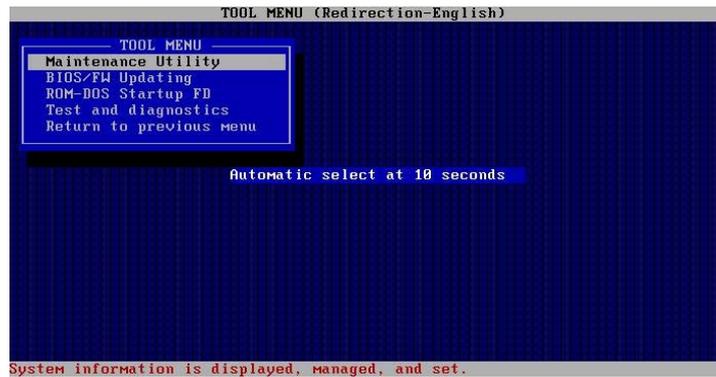
Figure 191: Using a remote console

Function of the Maintenance Tools

The following functions can be executed via the Maintenance Tools.

Maintenance Utility

The Off-line Maintenance Utility is an OS-independent maintenance program.

If you are unable to start the OS-dependent NEC ESMPRO to troubleshoot a problem, the Off-line Maintenance Utility can be used.

⚠ Caution

■ The Off-line Maintenance Utility is intended to be used by your service representative. The ExpressBuilder DVD you have created contains a file that describes the operation of the utility, but we recommend you do not attempt to use the utility by yourself. Contact your service representative and follow their instructions.

■ See the on-line help for more information on the Off-line Maintenance Utility. For further information, ask your service representative.

The Off-line Maintenance Utility provides the following features.

■ IPMI Information Viewer

Allows to view the system event log (SEL), sensor data record (SDR), and the filed replaceable unit (FRU) and to make a backup copy of them.

Using this feature, you can find system errors and events to determine a maintenance part.

■ BIOS Setup Viewer

Allows to export the current configuration data defined with the SETUP utility to a text file.

■   System Information Viewer

Allows to view information on the processor and the BIOS and to export it to a text file.

■   System Information Management

Allows to make a back-up copy of your data.

Without the backup data, the system-specific information and/or configuration may not be restored.

We recommend that only authorized personnel be allowed to restore the backup data.

■   System Management

The parameters of BMC (Baseboard Management Controller) are set for remote control and alert.

BIOS/FW Updating

This menu allows you to update software modules such as the BIOS and firmware of the server using the update disk (3.5-inch floppy disk) that is distributed by your customer service representative.

Reboot the system from the floppy disk, and the various BIOS and firmware programs are updated.

⚠ Caution

Do not turn off the server while the update program is running. If this update process is interrupted, the system is unable to start.

ROM-DOS startup FD

Creates a support disk used to start the ROM-DOS system.

Test and diagnostics

Executes various tests on the server system to check if the server functions are normal and if the connection between the server and the additional board is normal.

Once the Test and diagnostics have been executed, a system check program assigned to each model starts.

Maintenance Tools with Remote Console

This subsection describes the procedure for using the Maintenance Tools via a remote console.

Maintenance Tools contains a remote console feature that allows the system administrator to set up the server from the management workstation (management PC) via the network or the server's COM B (serial) port.

⚠️ **Caution**

■ Do not use this feature on any other computer than the server, or on any other server obtained without a Express-Builder. Doing so may cause a failure of the server.

■ Select "Maintenance Tools (Redirection mode)" for the remote console in the "Boot Selection" menu.

■ The system may fail to operate with a transfer rate of 115.2 Kbps for serial console redirection. Specify a transfer rate different than 115.2 Kbps.

Starting

Use one of the following two methods to start the server.

■ Run the Maintenance Tools from the management PC via the LAN.

■ Run the Maintenance Tools from the management PC via a direct connection (COM2)

⚠️ **Caution**

Do not change the boot device order in the BOOT menu of the BIOS SETUP. ExpressBuilder cannot be used if the optical disc drive is not the first device specified in the boot order.

📝 *Notes*:

The following items of the BIOS setup information will be set as shown below.

■ *LAN Controller:[Enabled]*

■ *Serial Port A:[Enabled]*
   Base I/O Address:[3F8]
   Interrupt:[IRQ 4]

■ *Serial Port B:[Enabled]*
   Base I/O Address:[2F8]
   Interrupt:[IRQ 3]

■ *BIOS Redirection Port:[Serial Port B]*
   - Baud Rate:[19.2K]
   - Flow Control:[CTS/RTS]
   - Console Type:[PC ANSI]

Error Messages

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 OS 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.

> 📄 *Note: Note the on-screen message before contacting your sales agent. 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 and actions to take.

> ▤ Note: Note the displayed messages before consulting with your sales agent. Alarm messages are useful information for maintenance.

Table 31: POST Error Messages

Error code	Error message	Recommended Action
0200	Failure Fixed Disk	Contact your service representative.
0210	Stuck Key.	Disconnect the keyboard and connect it again.
0211	Keyboard error	Disconnect the keyboard and connect it again. If 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.	
02B0	Previous boot incomplete - Default configuration used.	Start the SETUP and check the settings.
0281	Memory size found by the POSt differs from EISA CMOS.	Initialise the EISA CMOS.
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.
02F4	EISA CMOS not writeable.	
02F5	DMA Test Failed.	
02F6	Software NMI Failed.	
02F7	Fail-safe Timer NMI Failed.	

Table 31: POST Error Messages (Continued)

Error code	Error message	Recommended Action
0611	IDE configuration changed	Check IDE configuration.
0612	IDE configuration error - device disabled	
0613	COM A configuration changed	Check COM A configuration.
0614	COM A configuration error - device disabled	
0615	COM B configuration changed	Check COM B configuration.
0616	COM B configuration error - device disabled	
0B22	Processors are installed out of order.	Request the maintenance to replace the CPU.
0B28	Unsupported Processor detected on Processor 1.	Make sure that the server supports the CPU. If you are not sure, contact your service representative to request the maintenance.
0B29	Unsupported Processor detected on Processor 2.	
0B30	FAN1 Alarm occurred.	Contact your service representative to replace the fan.
0B31	FAN2 Alarm occurred.	
0B32	FAN3 Alarm occurred.	
0B33	FAN4 Alarm occurred.	
0B34	FAN5 Alarm occurred.	
0B35	FAN6 Alarm occurred.	
0B36	FAN7 Alarm occurred.	
0B37	FAN8 Alarm occurred.	
0B38	FAN9 Alarm occurred.	
0B39	FAN10 Alarm occurred.	
0B3A	FAN11 Alarm occurred.	
0B3B	FAN12 Alarm occurred.	
0B3C	FAN13 Alarm occurred.	
0B3D	FAN14 Alarm occurred.	
0B3E	FAN15 Alarm occurred.	
0B42	Resource conflict	Contact your service representative.
0B43	Warning: IRQ not configured	
0B45	System Configuration Data Write Error	
0B50	Processor #1 with error taken off-line.	The system is forcibly started because an error was detected in the CPU. Contact your service representative.
0B51	Processor #2 with error taken off-line.	
0B5F	Forced to use processor with error.	
0B60	DIMM group #1 has been disabled	Contact your service representative.
0B61	DIMM group #2 has been disabled	
0B62	DIMM group #3 has been disabled	
0B63	DIMM group #4 has been disabled	
0B64	DIMM group #5 has been disabled	
0B65	DIMM group #6 has been disabled	
0B70	The error occurred during temperature sensor reading.	Contact your service representative.
0B71	System Temperature out of the range.	Contact your service representative to replace the fan.
0B74	The error occurred during voltage sensor reading.	Contact your service representative.
0B75	System voltage out of the range.	

Table 31: POST Error Messages (Continued)

Error code	Error message	Recommended Action
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 1BF or 0BF check failed.	
0B8B	BMC progress check timeout.	
0B8C	BMC command access failed.	
0B8D	Could not redirect the console - BMC Busy -	
0B8E	Could not redirect the console - BMC Error -	
0B8F	Could not redirect the console - BMC Parameter Error -	
0B90	BMC Platform Information Area corrupted.	
0B91	BMC update firmware corrupted.	
0B8A	BMC SEL area full	Start the SETUP and select [Server] - [Event Log configuration] - [Clear All Error Logs] and press Enter to clear event logs.
0B8F	Could not redirect the console BMC Parameter Error	Turn off the power once and then on again to start the server. If the error cannot be corrected, contact your service representative.
0B92	Internal Use Area of BMC FRU corrupted.	This is not a fatal error. Turn off the power once and then on again to restart the server. If 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.	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.	
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.	Update the RMC firmware. If the error cannot be corrected, contact your service representative.
0B9B	Private I2C bus not responding.	Turn off the power once and then on again to start the server. If the error cannot be corrected, contact your service representative.
0B9C	BMC internal exception.	
0B9D	BMC A/D timeout error.	
0B9E	SDR repository corrupt.	
0B9F	SEL corrupt.	
0BB0	SMBIOS – SROM data read error.	Contact your service representative.
0BB1	SMBIOS – SROM data checksum bad.	
8100	Memory Error detected in DIMM group #1.	Contact your service representative to replace the DIMM in the relevant group.
8101	Memory Error detected in DIMM group #2.	
8102	Memory Error detected in DIMM group #3.	
8103	Memory Error detected in DIMM group #4.	
8104	Memory Error detected in DIMM group #5.	
8105	Memory Error detected in DIMM group #6.	
8150	NVRAM cleared by jumper.	

Table 31: POST Error Messages (Continued)

Error code	Error message	Recommended Action
8151	Password cleared by jumper.	Start SETUP and provide the settings again.
8160	Mismatch Processor speed detected on Processor 1.	Start SETUP and set a password again.
8161	Mismatch Processor speed detected on Processor 2.	Contact your service representative.
None	Expansion ROM not initialized – PCI Mass Storage Controller in slot n (n: slot number)	Disable initialization of the optional device expansion ROM by using the BIOS SETUP utility (see "BIOS Setup Utility" on page 64).
	H/W Configuration of BMC is corrupted. !! Update BMC F/W Configuration by configuration tool !! !! Refer to BMC configuration manual !!	Use ExpressBuilder to configure the optional remote management card .

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 1-5-2-1 indicates 1 beep, pause, 5 beeps, pause, 2 beeps, pause, and 1 beeps notifying that a checksum error occurred on ROM.

Table 32: POST Error Beep Codes

Beeps	Error	Recommended Action
1-2	Option ROM initialization error	1. Check if the optional add-in card is properly installed.
		2. Run the BIOS setup utility to check the IRQ assignment.
		3. Ask your service representative to replace the add-in card or motherboard..
3-3	ROM checksum error	Replace the motherboard.
1-2-2-3		
1-3-1-1	DRAM refresh test error	1. Check if the DIMM is properly installed.
		2. Remove the DIMM once, and then re-install it to check if it operates normally.
		3. Ask your service representative to replace the failed DIMM or motherboard.
1-3-1-3	Keyboard controller error	1. Check if the keyboard is properly connected.
		2. Replace the motherboard
1-3-3-1	No memory or capacity check error	1. Check if the DIMM is properly installed.
		2. Remove the DIMM once, and then re-install it to check if it operates normally.
1-3-4-1	DRAM address error	
1-3-4-3	DRAM test Low Byte error	3. Ask your service representative to replace the failed DIMM or motherboard
1-4-1-1	DRAM test High Byte error	
1-5-1-1	CPU startup error	1. Check if the CPU is properly installed.
1-5-2-1	No CPU installed	2. Remove the CPU once, and then re-install it to check if it operates normally.
		3. Ask your service representative to replace the failed CPU.
1-5-4-2	AC power interrupted	The AC power supply is interrupted due to power failure or momentary voltage drop and the system is restarted. This is not an error.
1-5-4-4	Abnormal voltage	Replace the motherboard.
2-1-2-3	BIOS ROM copyright test error	
2-2-3-1	Unexpected interrupt test error	

How to Identify BIOS Revision Level

To identify your system's current BIOS revision level, perform either one or the other of the following procedures:

1. Power-on or reboot the system.
2. When logo displays, press the **ESC** key.
3. The BIOS revision level is displayed. Immediately press **Pause** to have time to read the BIOS version.

Status Indicators

This section explains the indication and meanings of the server lamps.

POWER Lamp

The POWER lamp is on (green) while the server power switch is on. It is off while no power is supplied to the server.

The POWER lamp indicates that the server is running in the power-saving mode (sleep mode). If the OS supports the power-saving mode such as Windows Server 2003, running the command blinks the POWER lamp in green and place the server in the power-saving mode. Press the POWER switch to turn out the POWER lamp and place the server back in the normal mode.

The power-saving mode is only available when the OS supports the power-saving feature. Some OS's 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 is on (green) while the server is operating normally. (The rear panel also has the STATUS lamp on it.) If the STATUS lamp is off or turns amber and flashes, it indicates that the server is in abnormal state.

The table below explains the STATUS lamp indication, the meanings, and the procedures.

📑 *Notes:*

■ *If NEC ESMPRO is installed, you can confirm the cause of a failure by referring to the error log.*

■ *If shutdown processing can be performed through the operating system when you want to restart the system after turning the power off, restart the system by performing shutdown processing. If shutdown processing cannot be performed, restart the system by resetting, forcibly turning the power off, or disconnecting and then connecting the power cord.*

Table 33: Status Lamp Indications

Status lamp indication	Description	Procedure
On (green)	The server is operating normally.	–
Flashing (green)	The server is operating with the memory, CPU, or power supply unit in degraded state. An uncorrectable memory error has often occurred.	Check the AC power lamp indication on the rear panel of the server. Identify the device in degraded state by using the BIOS setup utility "SETUP," and replace it as soon as possible.
Off*	The power is off.	–
	POST is in progress.	Wait for a while. The status lamp turns green when POST is completed.
	A CPU error occurred.	Turn the power off and then turn it on. If the POST screen displays an error message, take notes of the message, and contact your sales representative.
	A CPU temperature alarm was detected.	
	A timeout occurred when the time set for the watchdog timer arrived.	
	A CPU bus error occurred.	
	A memory dump request is made.	Wait until the memory dump is completed.
On (amber)*	A temperature alarm was detected.	Check if the internal fans are clean and if the fan units are firmly connected. If the status lamp indication does not change when the fans are normal, contact your sales representative.
	A voltage alarm was detected.	Contact your sales representative.
	All the power supply units failed.	

Table 33: Status Lamp Indications (Continued)

Flashing (amber)*	One of the following problems was detected in the redundant power configuration: - AC power is not supplied to one of the two power units - Failure of one of the two power units.	Connect the power cord to supply power. If the power supply unit is faulty, contact your service representative;
	A fan alarm was detected.	Check if the fan units are firmly connected. If the status lamp indication does not change when the fans are normal, contact your sales representative.
	A temperature warning was detected.	Check if the internal fans are clean and if the fan units are firmly connected. If the status lamp indication does not change when the fans are normal, contact your sales representative.
	A voltage warning was detected	Contact your service representative.
	An error was detected on one of the hard disk drives.	

Disk Access Lamp

The DISK ACCESS lamp indicates the status of the hard disk mounted in the 3.5-inch disk bay.

The lamp turns green each time access is made to the hard disk.

When the DISK ACCESS lamp turns amber, it indicates that a hard disk failure has occurred. Check the hard disk lamp for the status of the failing hard disk.

ACT Lamp

The ACT lamp is green while the server is connected to the LAN. The lamp flashes while the server is accessed via the LAN (during transmission/reception of packets). The number next to the icon indicates the network port number on the rear panel of the server.

UID Lamp (UID)

Pressing the UID switch toggles the front panel UID lamp (blue) and the motherboard UID lamp on and off. The motherboard 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.

Refer to *"Identification of Servers ~ UID Switch ~" on page 26* for more information on the UID switch.

Disk Access Lamp

The disk access lamp of the optical device drive is on while the drive is accessed.

Hard Disk Lamp
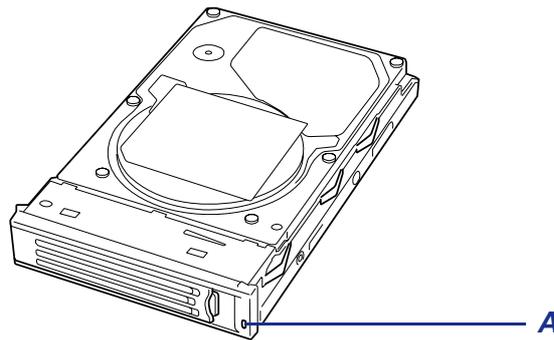
Figure 192: Hard Disk Lamp

The disk lamp (A) located on the drive carrier indicates the following depending on the status:

■   Flashing (green)

The lamp indicates that the hard disk is accessed.

■   On (amber)

The lamp indicates a failure of a hard disk mounted in a RAID configuration.

> 📝 **Note**: *Even if one (two in RAID6) of the hard disks fails in the logical drive (RAID1, RAID6 or RAID6), the server can continue operation. However, replace the hard disk drive as soon as possible, and perform a reconstruction (rebuild) processing. (The failing hard disk drive can be hot-swapped.)*

■   Flashing switching back and forth between green and amber

The lamp indicates that reconstruction (rebuild) processing is being performed for the hard disk. (This flashing does not indicate a failure.) When a failing hard disk is replaced in a RAID system, the system rebuilds the data. (Auto-rebuild function) The lamp switches back and forth between green and amber during rebuild processing.

The lamp goes off when the rebuild processing finishes.
It turns amber when the rebuild processing fails.

⚠ **Caution**

If the server is turned off during rebuild processing, the processing is stopped. Restart the server, mount the new hard disk in hot swap mode, and then perform rebuild processing again. Observe the following notes on using the auto-rebuild function.

■ Do not turn the power off. (Once the power is turned off, the auto-build function does not start.)

■ Let 90 seconds or more pass between when dismounting a
   failing hard disk and when mounting the new one.

■ Do not replace a failing hard disk while rebuild processing is
   being performed for another hard disk.

LAN Connector Lamps

There are two lamps for each of the two LAN ports (connectors) on the rear panel.
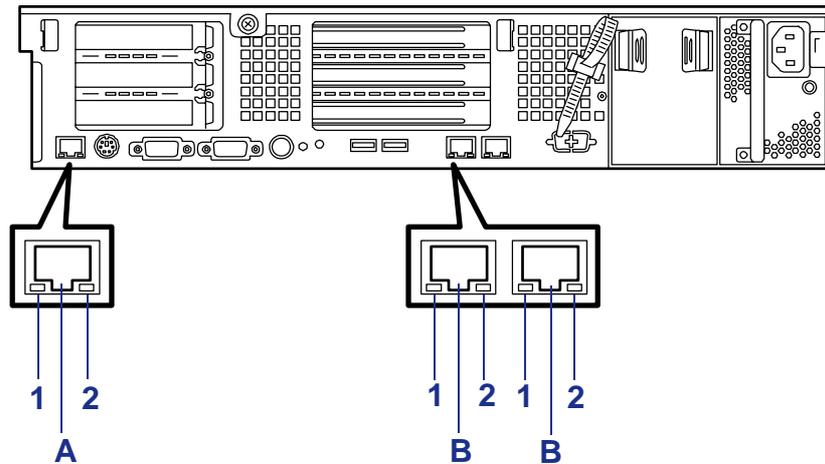

Figure 193: LAN Connector Lamps

A: Management Port
B: LAN Port
1: LINK/ACT LED
2: Speed LED

■ LINK/ACT lamps
Each LINK/ACT lamp indicates the status of the standard network port of the server. While power is supplied to the server and HUB and the connection is correct, the lamp is on (green).
The lamp turns green and flashes while the network port is transmitting/receiving data.
If the lamp does not go on when the LINK state is placed, check if the network cable is in normal state and if it is connected correctly. If the lamp does not go on yet when the network cable is normal, the network (LAN) controller may be faulty. In this case, contact your sales representative.

■ Speed lamp (for data transmission ports)
This lamp indicates whether each of the network ports normally equipped with the server is operated through the 1000BASE-T, 100BASE-TX or 10BASE-T network interface.
If the lamp is lit orange, 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.

■ Speed lamp (for management port)
This LED indicates chether each of the network ports normally equipped with the server is operated through the 100BASE-TX or 10BASE-T network interface. If the LED is lit amber, the network port is operated through 100BASE-TX. If the LED is off, the network port is operated through 10BASE-T.

AC Power LED

There is an AC POWER LED for the power supply unit on the rear. The LED turns green and flashes when the power supply unit receives AC power from the power cord, which is connected to the AC inlet. (Flashing amber indicates no AC power is received in any one of two power supplies in the redundant configuration.)

The LED turns green when the server power switch is turned on. If the LED does not go on when the server power switch is turned on or if it turns amber, the power supply unit is probably faulty. In this case, contact your service representative to replace the power supply unit.
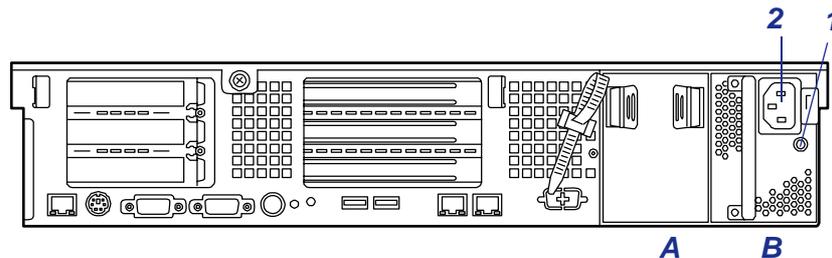
Figure 194: AC Power LED

A: Power supply slot 2
B: Power supply slot 1
1: AC inlet
2: AC Power LED

 Note:

■ *If one power supply unit fails while an optional power supply is mounted, the system can continue operation with the other power supply unit (redundant function). The failing power supply unit can be hot-swapped, that is, replaced without shutting down the system.*

■ *In configuration of two power units, AC power may be supplied only to a single power unit through the power cord connected to the power unit. If so, the power lamp on the other power unit (to which a power cord is not connected) blinks amber. When a power cord is connected to the power unit to supply AC power, the lamp changes to blink green. If the lamp still blinks amber, contact your service representative to ask maintenance.*

Appendix 1: Specifications

Table 34: Specifications

Item		Bull NovaScale R460 E1
CPU	Type	Quad-core Intel® Xeon™ processor
	Standard	1
	Maximum	2
Chipset		Intel 5000P (1333 MHz)
Memory	Minimum	2 GB (1 GB x 2)
	Maximum	48 GB (4 GBx12, the standard DIMM must be replaced.)
	Memory module	DDR2-667 FB-DIMM with x4/x8 SDDC feature
	Error check	ECC
Graphics (VRAM)		8 MB, integrated on mootherboard 1064x768, 1280x1024 16 million colors max.
Auxiliary storage device	Floppy disk (option)	3.5-inch drive x 1 (USB)
	Hard disk (standard)	None
	Hard disk (maximum)	SATA: 4.5 TB (750 GB x 6) SAS: 1.8 TB (300 GB x 6)
	Hot-swap hard disk drive	Supported
	Optical Device Drive	CD-RW/DVD-ROM Drive (DVD: x3 to x8 speed, CD: x10 to x24 speed)
	Internal backup device	One IDE, SCSI, USB device of 3.5-inch (9 cm) width and 1.6-inch (4cm) height can be installed. A separate interface cable is required.
Additional bay	Hard disk bay	6 slots
	3.5-inch floppy disk drive	1 slot
	3.5-inch device bay	1 slot
Additional slot	Full height	PCI EXPRESS (x8) x 1 slot PCI-X (64-bit/100 MHz) x 2 slots When the optional PCI-X riser card is installed: - 64-bit PCI-X (133MHz): 1 slot, - 64-bit PCI-X (100MHz): 2 slots When the optional PCI-EXPRESS riser card is installed: - PCI-EXPRESS (x8): 1 slot, - PCI-EXPRESS (x4): 2 slots
	Low Profile	PCI EXPRESS (x8) x 1 slot PCI EXPRESS (x4) x 2 slots Contains the factory-installed RAID controller.
LAN interface		1000Base-T/100Base-TX/10Base-T (2 ports) 100Base-TX/10Base-T management port (1 port)

Table 34: Specifications (Continued)

External interface	Keyboard/mouse	MINI DIN 6-pin connector (1 port)
	USB	4-pin (4 ports, 2 at the front, 1 at the rear)
	Serial	D-sub 9-pin (2 ports, 1 at the front, 1 at the rear)
	Network	RJ-45 (2 ports)
	Display	MINI D-sub 15-pin
	SCSI	Option
Cabinet design		Rack-mount type (2U)
External dimensions		445 (width) x 88 (height) x 722 (depth) mm, excluding the front bezel
Weight (Max.)		21 kg (31 kg)
Redundant power supply		Supported (option)
Redundant fan		Supported (option)
Power supply		100 to 120 VAC ±10%, 200 to 240 VAC ±10%, 50/60 Hz ±1 Hz
Environmental requirements	Temperature	10 to 35 °C (operating), -10 to 55 °C (non-operating, storage)
	Humidity	20 to 80% RH (no condensation)

Appendix 2: IRQs

The factory-set interrupt requests and I/O port addresses are listed below. Find an appropriate one to install an optional device.

Interrupt Requests

The factory-set IRQs are assigned as follows:

Table 35: Interrupt Requests

IRQ	Peripheral Device (Controller)	IRQ	Peripheral Device (Controller)
0	System timer	12	Mouse
1	Keyboard	13	Numeric processor
2	-	14	Primary IDE
3	COM2 serial port	15	Secondary IDE
4	COM1 serial port	16	USB
5	PCI	17	VGA
6	-	18	-
7	PCI	19	USB
8	Real-time clock	30	LAN1
9	ACPI compliant system	31	LAN2
10	PCI	49	Onboard SAS 1
11	BMC IRQ	50	Onboard SAS 2

Appendix 3: Maintenance

This chapter describes the daily maintenance of the server and precautions when relocating or storing the server.

Making Backup Copies

We recommend 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, consult with your sales agent.

When you have changed the hardware configuration or BIOS configuration, select "System Information Management" and then "Save" of the Off-line Maintenance Utility to make a backup copy of the system information.

Also make a backup copy of the RAID system configuration data if your system is in the RAID system 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 RAID controller board. Refer to the manual supplied with the board.

Cleaning

Clean the server on a regular basis to keep the server in a good shape.

⚠ Warning

■ Do not disassemble, repair, or alter the server

■ Do not look into the optical device drive

■ Do not remove the lithium battery

■ Disconnect the power plug before working with the server

⚠ Caution

■ Avoid installation in extreme temperature conditions

■ Make sure to complete board installation

■ Protect the unused connectors with the protective cap

Cleaning the External Surfaces of the Server

⚠ Caution

■ To avoid altering the material and color of the server, do not use volatile solvents such as thinner and benzene to clean the server.

■ The power receptacle, the cables, the connectors on the rear panel of server, and the inside of the server must be kept dry. Do not moisten them with water.

For daily cleaning, wipe the external surfaces of the server with a dry soft cloth

If stains remain on the surfaces:

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, 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 of the Server

One important item in a good maintenance program is regular and thorough cleaning of the interior of the server, especially around the motherboard.

Dust buildup inside the server can lead to several problems. As dust acts as a thermal insulator, a buildup can prevent proper system cooling. Excessive heat will shorten the life of 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.

To clean the interior of the server, you will need a small vacuum cleaner (with plastic tipped nozzle and electrostatic protection), a computer grade canned air, and a small brush.

⚠ Warning

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.

⚠ Caution

Do not use the brush made of chemical fabric, or the cleaning material that will generate an electrostatics.

To clean the interior of the server:

1. Turn off the server and unplug all power cables.
2. Remove the logic cover and the drive cover.
3. Use a small brush to loosen any dust and debris on the motherboard.
4. Use computer grade canned air to blow dust off components on the motherboard.
5. Use a small vacuum cleaner with plastic tip to vacuum out dust and debris from the interior of the server.
6. Reinstall the logic cover and the drive cover.
7. Reconnect all power cables and turn on the server.

Cleaning the Keyboard

1. Power off the server and peripheral devices.
    The POWER/SLEEP lamp is off.
2. Wipe the keyboard surface with a dry cloth.

Cleaning the Mouse

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.

To clean the mouse:

1. Prepare cold or lukewarm water, neutral detergent, alcohol, two dry soft clothes, and cotton swabs.
2. Power off the server.
   The POWER/SLEEP lamp goes off.
3. Turn the mouse upside down, and rotate the mouse ball cover counterclockwise to remove it.
4. Take out the ball from the mouse. Cover the bottom of the mouse with your hand, and turn your hand holding the mouse (the mouse is on your palm with the button upward). The mouse ball is released onto your palm.
5. Soak a soft cloth in 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 an Optical Drive and Optical Disc

A dust-accumulated tray or a dusty optical drive may cause the device not to read data correctly.

To Clean an Optical Drive:

1. Power the server.
   The POWER/SLEEP lamp is lit.
2. Press the optical drive tray Open/Close button on the front of the optical drive.
   The tray os openning.
3. Hold the disc and take it out from the tray.

> **Note**: *Do not touch the signal side of the disc with your fingers.*

4. Wipe the tray with a dry soft cloth.

⚠ Caution

Do not wipe the lens of the optical drive. Doing so may damage the lens and may cause a malfunction of the drive.

5. Push on the tray front to close the tray.

To Clean an Optical Disc:

Wipe the signal side of the disc with a dry soft cloth.

⚠ Caution

■ Wipe disks from the center to the outside.

■ Use only a specific cleaner if necessary. Cleaning an optical disc with record spray/cleaner, benzene, or thinner causes damage to the disk contents. At worst, inserting the disc into the server may cause a failure.

System Diagnostics

The System Diagnostics runs several tests on the server.

Select [Maintenance Tools] - [Test and diagnostics] in the ExpressBuilder to diagnose the system.

Test Items

The following items are tested in system diagnostics.

■ Memory

■ CPU cache memory

■ Hard disk used as a system

⚠ Caution

When executing the System Diagnostics, make sure to remove 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).

⚠ **Caution**

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 is 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. Reboot the server with the ExpressBuilder DVD.
   - ■ Select [Maintenance Tools (Normal mode)] when using the local console of the server.
   - ■ Select [Maintenance Tools (Redirection mode)] when using a remote console.
5. Select [English].
6. Select [Tests and Diagnostics].
7. Select [End-User Mode] and the system diagnostics starts.

   The diagnostics will be completed in approximately three minutes. At that time, the screen of the display changes. Diagnosis tool title: shows a name of this diagnosis and Version information.
   - ■ Test windows title: shows the progress of diagnosis. When it completes, it shows "Test End".
   - ■ Test Result: shows the information including time of start, end and progress, and result of the diagnosis.
   - ■ Guide line: shows a description of keys to navigate the window.
   - ■ Test window: Move the cursor and press **Enter** to view the detail of the diagnosis.

If an error is detected during the System Diagnostics, the test result shows "Abnormal End" in red color. Move the cursor and press **Enter** on the diagnosis which error occurred. Take a note of the error message showed, and contact your sales agent.

8. Follow the Guide line shown in the bottom of the screen and press **Esc** to show the End user Menu.

   ■ <Test Result> shows the screen of the diagnosis completed aforementioned.

   ■ <Device List> shows the information of all the devices connected.

   ■ <Log Info> shows the log information and error messages of the diagnosis. it can be saved to a floppy disk. To save the log information to a floppy disk, insert a formatted floppy disk to a floppy disk drive and select <Save [F]>.

   ■ <Option> gives access to the different option menus.

   ■ <Reboot> restarts the server.

9. Select <Reboot> in the Enduser Menu above.
   The Express Server restarts and ExpressBuilder boot the system.

10. Exit ExpressBuilder, and remove the DVD-ROM from the optical device drive.

11. Turn off the server and unplug the power cord from the receptacle.

12. Reconnect all the LAN cables to the server.

13. Plug the power cord.

This completes the System Diagnostics.

Appendix 4: Installing and Using Utilities

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

ExpressBuilder

The ExpressBuilder helps you install the Operating system/the Management software or use the maintenance utilities.

When you insert the ExpressBuilder disk into the DVD drive and reboot the system, the following menu appears.
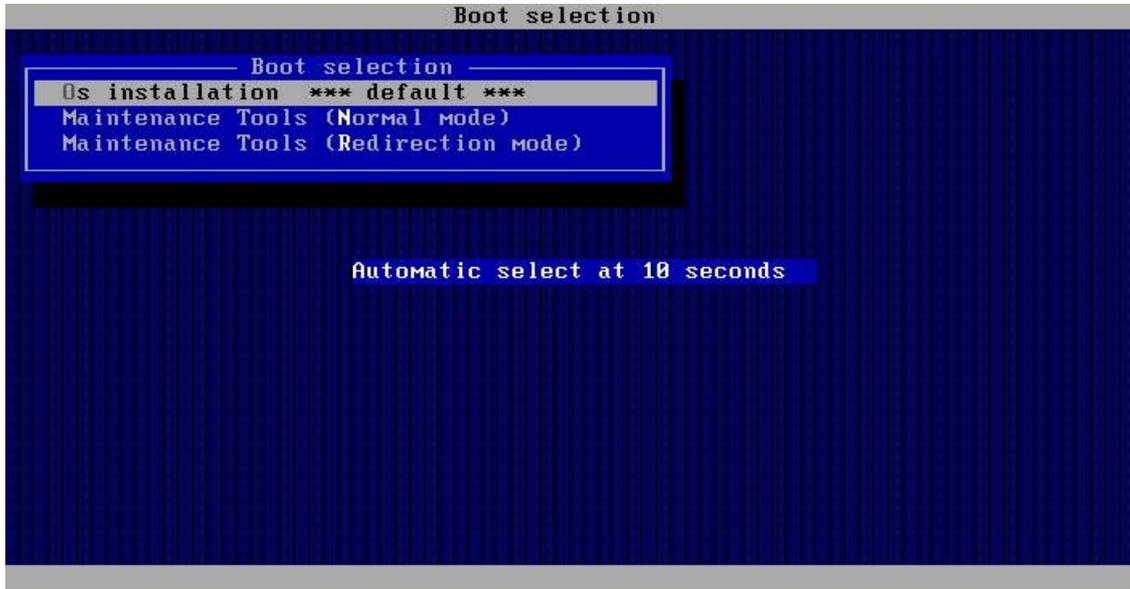
■   OS installation

If you select this item, the Top menu appears.
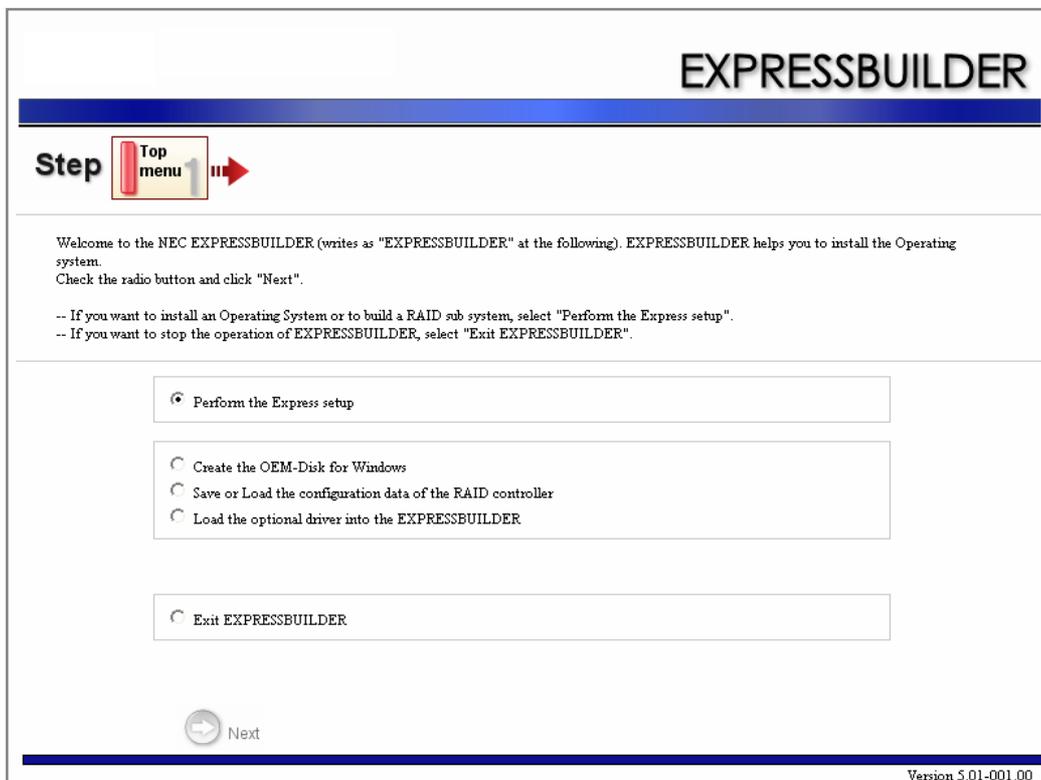
<div align="center">⚠ **Caution**</div>

■ This tool is a Configuration Tool built on Windows PE 2.0
technology.
An automatic reboot occurs after 72 hours from the start.

■ The configuration with Windows PE 2.0 supports Windows
Server 2003 (32bit) and Windows Vista Business (32-bit
(x86)), no other operating system is supported.

You can use the Express Setup (see *"Appendix 5: Installing the Operating System with Express Setup" on page 288*) or the following functions from this menu.

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

-   Load the driver
    This function is not usually used. You may have to use it if you add a new
    device to the server. (see *"Appendix 5: Installing the Operating System with Express Setup" on page 288*.)

■ Maintenance Tools (Normal Mode)

If you select this item, the Tool menu appears.

You can use the below functions for maintenance.

- Maintenance Utility
  The Maintenance Utility is usually used by the service representative.
  (See *"Maintenance Utility" on page 239*)
- BIOS/FW Updating
  You can update the system BIOS using a floppy disk (prepare a 3.5"
  floppy disk). (See *"BIOS/FW Updating" on page 240*).
- ROM-DOS Startup FD
  The ROM-DOS Startup FD is used to start the ROM-DOS system.(See
  "ROM-DOS startup FD" on page 240).
- Test and diagnostics
  This function allows you to diagnose this computer. (See *"Test and diag-
  nostics" on page 240*).

■ Maintenance Tools (Redirection Mode)

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

📰 **Note**: *If you operate this computer via the Remote KVM
function, select the "Maintenance Tools (Normal mode)".*
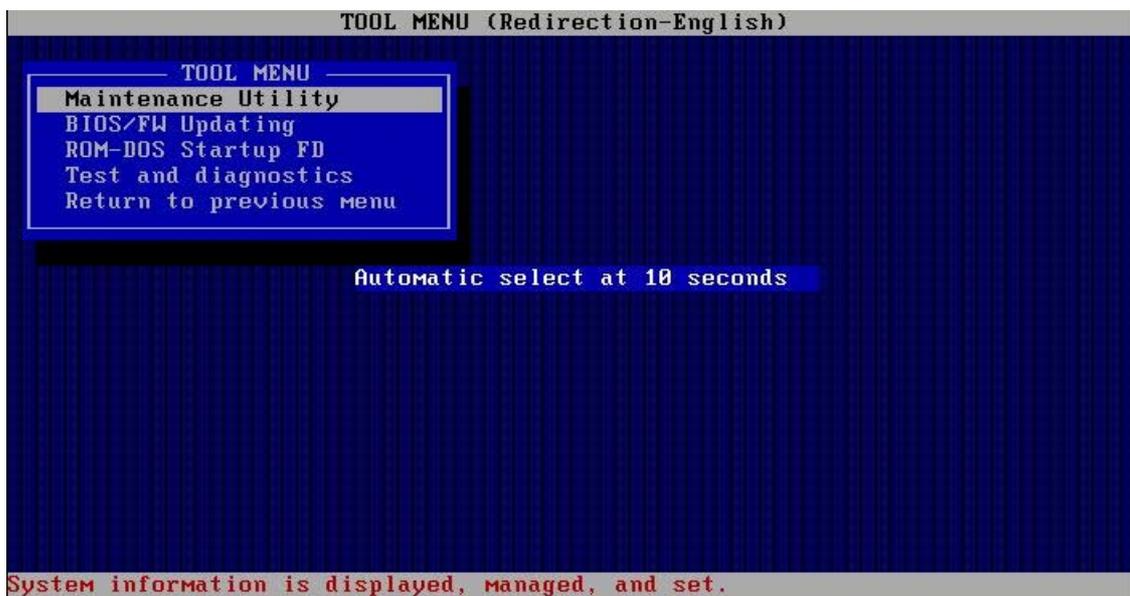
The menu's functions are the same as the "Maintenance Tools (Normal Mode)".

Autorun Menu

When the ExpressBuilder disk is inserted into the DVD drive, Windows automatically launches the menu as shown below.
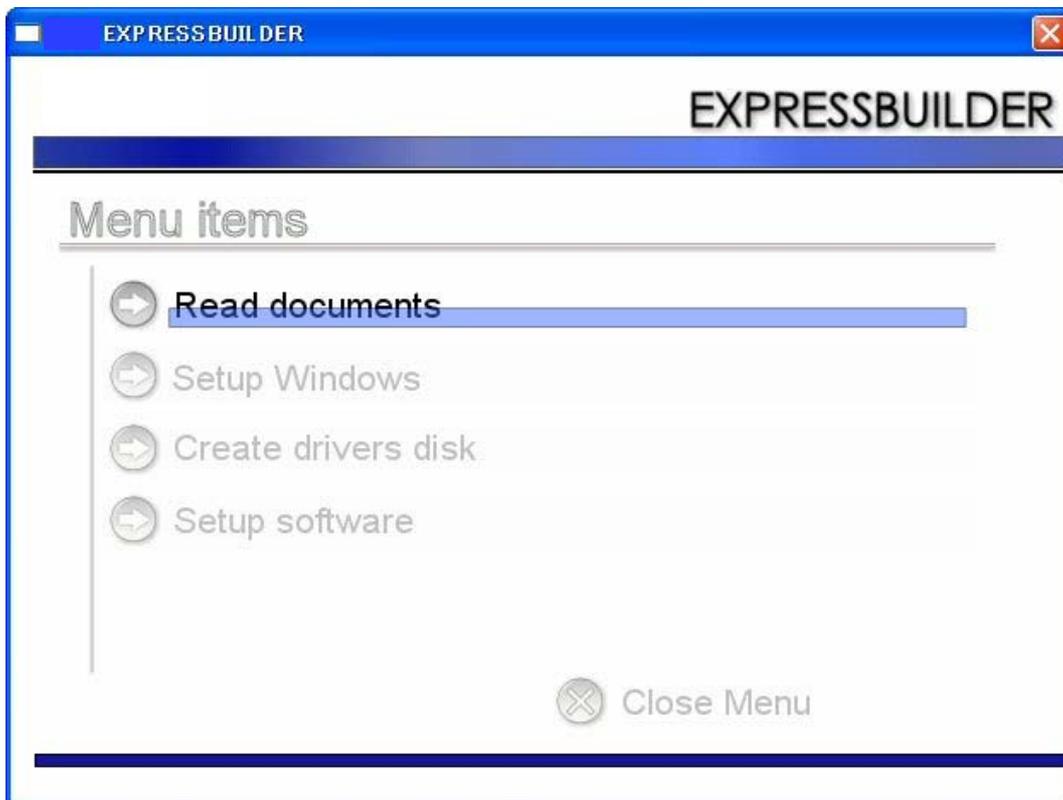
This menu is used to:

■   Read the User's Guide or the other documents,

■   Update the server system (Windows drivers), and

■   Install the management software.

📝 *Notes*:

■   *This menu requires Microsoft Windows XP, Vista or Windows Server 2003 (or later).*

■   *Some documents are provided in PDF format. Use the Adobe Reader to view or print these documents.*

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

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

To use the menu, click on the menu items, or click the right mouse button on the menu window.

Parameter File Creator

"Parameter File Creator" is a tool to create the [Parameters file] that is used for configuring the server with the Express Setup (see *"Appendix 5: Installing the Operating System with Express Setup" on page 288* for details).

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

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

⚠ Caution

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

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

Parameters File

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

Follow the procedure below.

⚠ Caution

Do not remove the ExpressBuilder DVD from the drive during the parameters file creation.

---

1. Start the OS.
2. Insert the ExpressBuilder DVD into the optical disc drive.
   The menu appears.

3. Right-click on the screen or left-click [Setup Windows]. The menu displayed below appears.
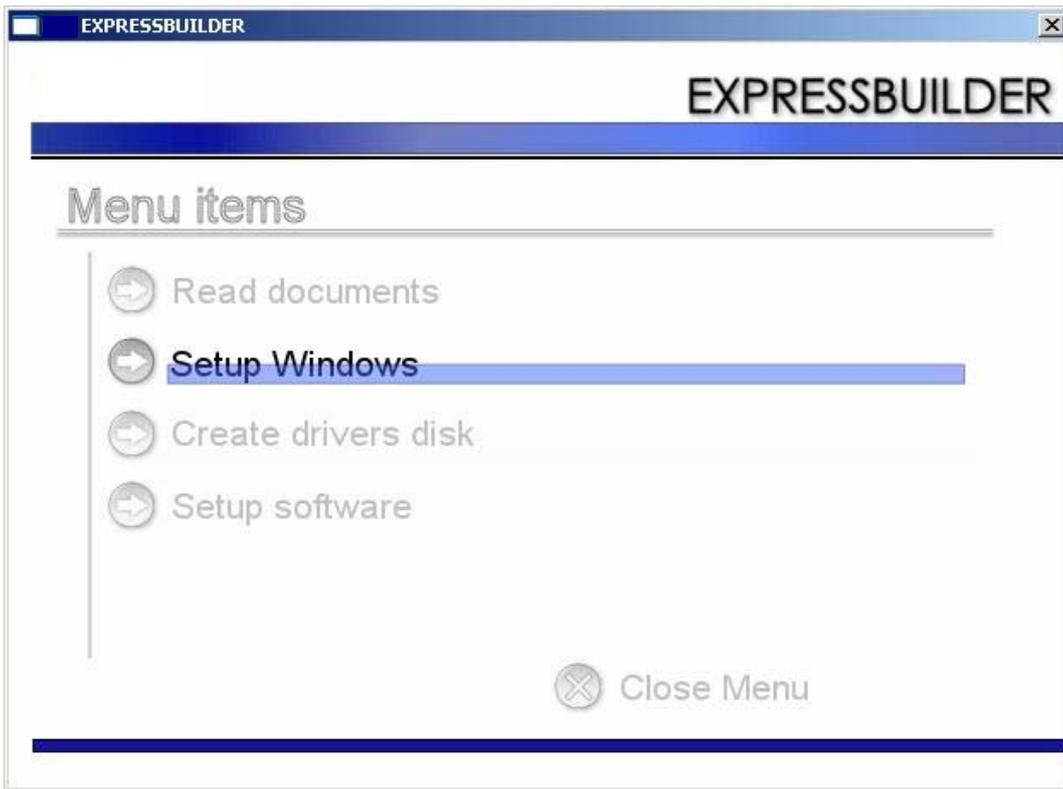
4. Click [Parameter File Creator].
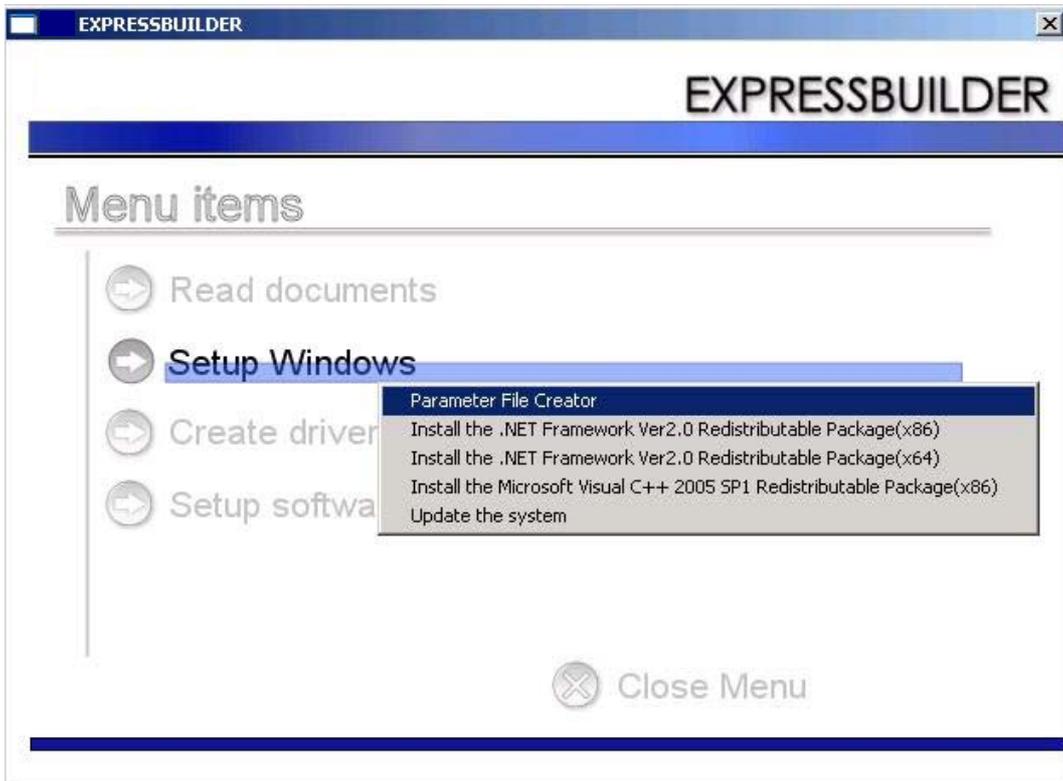
The Parameter File Creator is displayed.

5. [Load Parameters] step is displayed.

Select [Do not load parameters] from the menu, and click [Next].
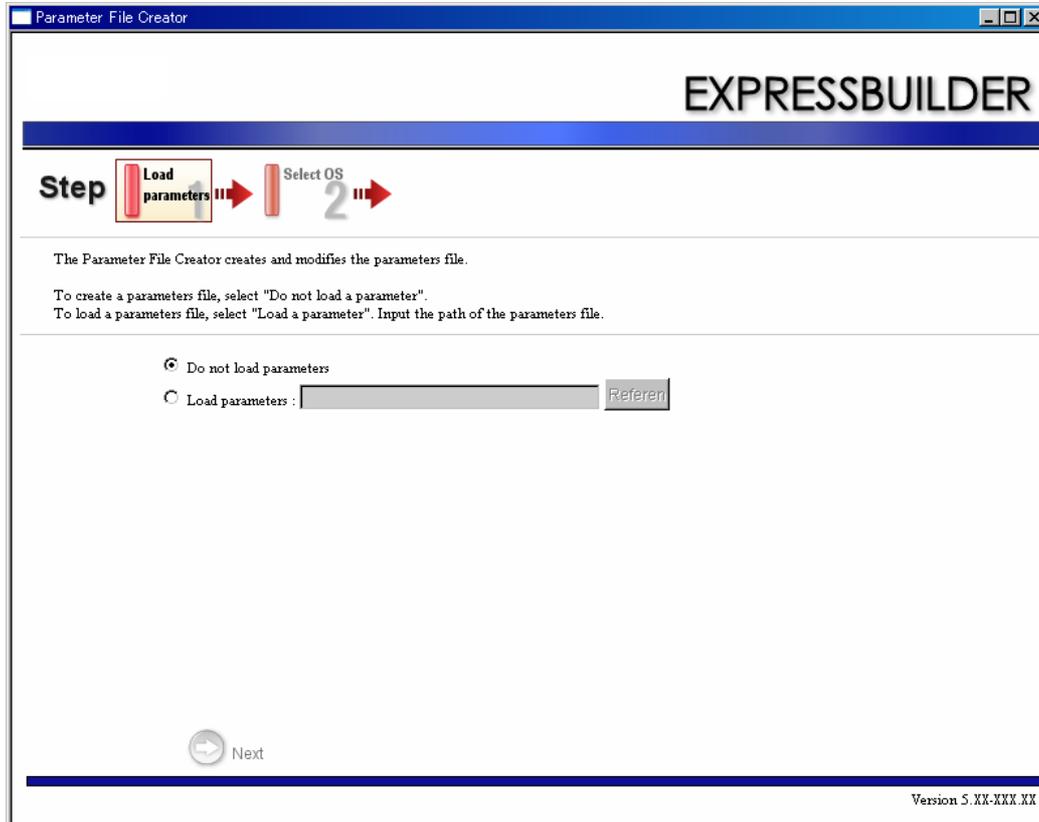
6. Select the Operating System to install.

Select [Install the Windows (32bit editions)] from the menu, and click [Next].
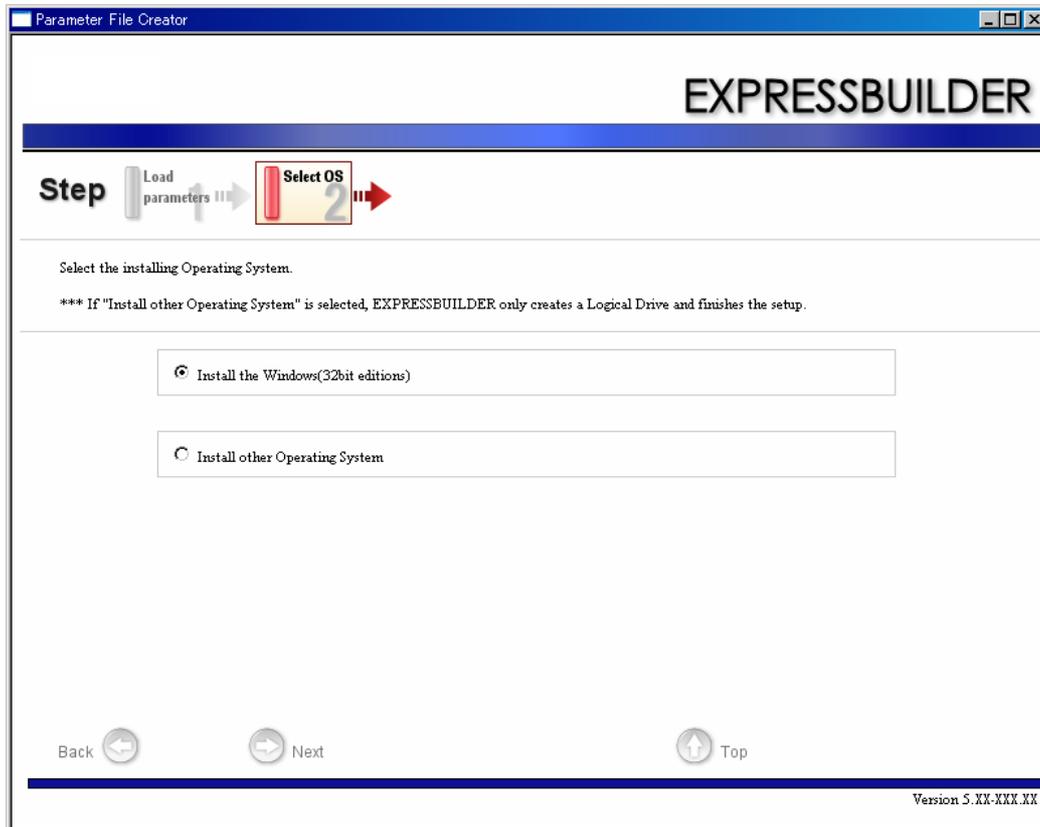
7. Enter the virtual disk settings.

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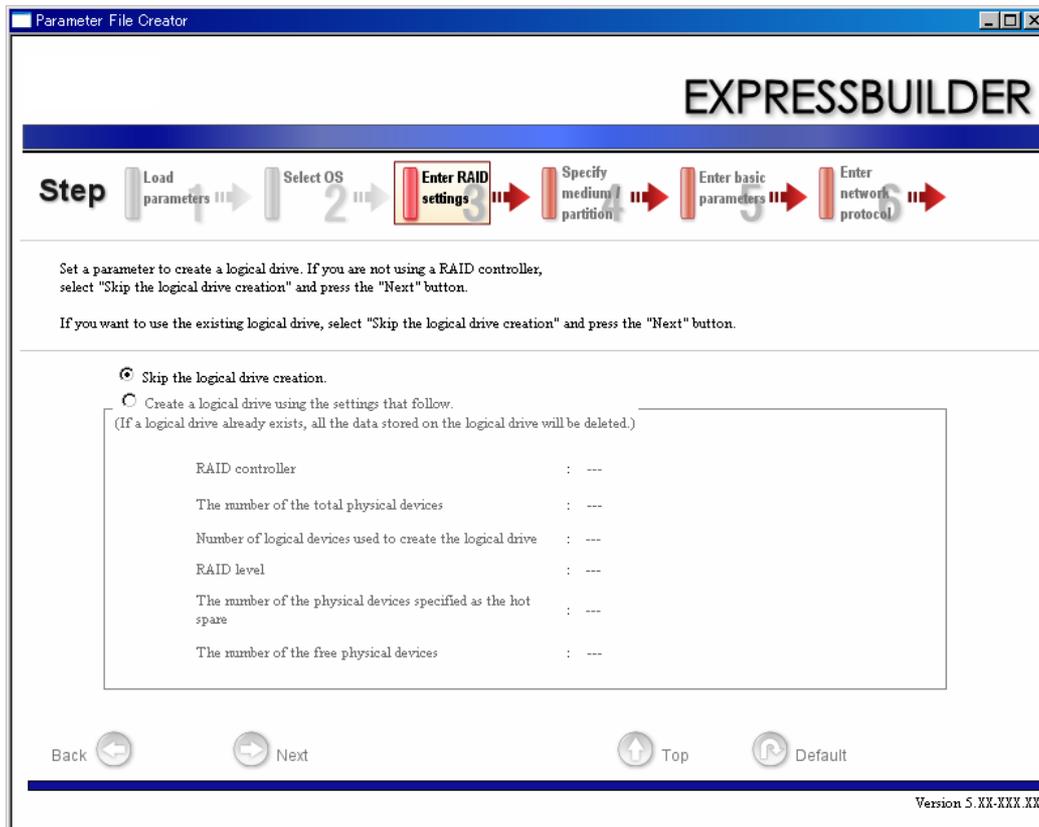
⚠ Caution

At "The number of the total physical devices", the Parameter File Creator displays the upper limit that the RAID controller can support.

The total of "The number of physical devices used to create the logical drive" and "The number of the physical devices specified as the hot spare" must not exceed "The number of the total physical devices" which are connected to the target system.

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

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

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

modify if necessary, and click [Next].

⚠ **Caution**

About the partition size

■ Specify a partition size larger than the required minimum size for the OS installation.

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

First partition deleted	Second partition retained	Third partition retained

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

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

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

⚠ Caution

The Computer name and User name are required parameters.

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

10. Enter the network protocol settings.

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

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

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

12. Select the components to install.

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

13. Select the applications to install.

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

14. Save the parameters.

The [Save parameters] step is displayed.

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

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

Otherwise, select [Do not save parameters].

15. Saved to a floppy disk.
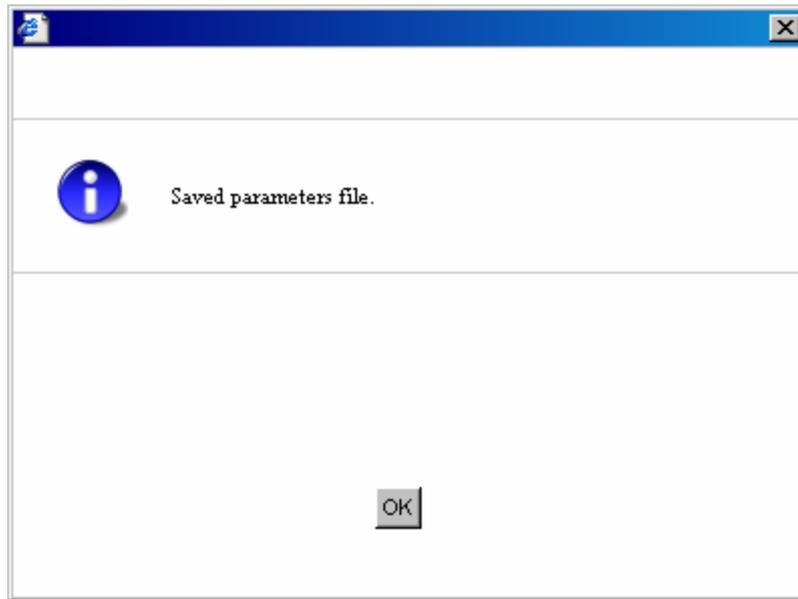
The floppy disk containing the parameters file has been created.
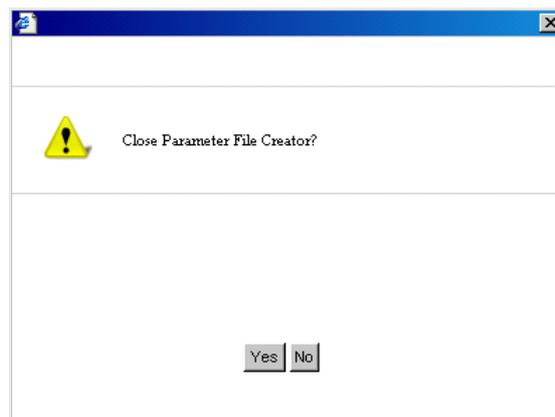
Click [Yes] to exit the Parameter File Creator.

📑 *Notes:*

■ *If you wish to modify the existing information file (parameters file), click "Load Parameters" at the [Load Parameters] screen. Refer to the help to modify the information file.*

■ *If you wish to abort the operation , click* ⊠ *at the upper-right corner of the screen.*

NEC ESMPRO

NEC ESMPRO lets a system administrator manage remote servers across a network. NEC ESMPRO monitors server hardware and software configurations, failures, and performance.

Using the 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 the server usage.

> *Note: For installation procedure and detailed explanations on NEC ESMPRO, refer to the online documentation provided on the ExpressBuilder DVD.*

Functions and Features

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 CPU, memory, disks, RAID system, and LAN boards.

- Software resources, such as operating system information and the 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 CPU load, memory usage, disk usage, and LAN traffic. Usage threshold values can help the system administrator monitor and prevent server overloads.

> *Note: For the installation procedure and detailed explanations on NEC ESMPRO, refer to the online documentation provided on the ExpressBuilder DVD.*

NEC DianaScope

NEC DianaScope is a software used for the remote management of the BULL NovaScale series.

See the online documentation for details on the functions and installation of NEC DianaScope.
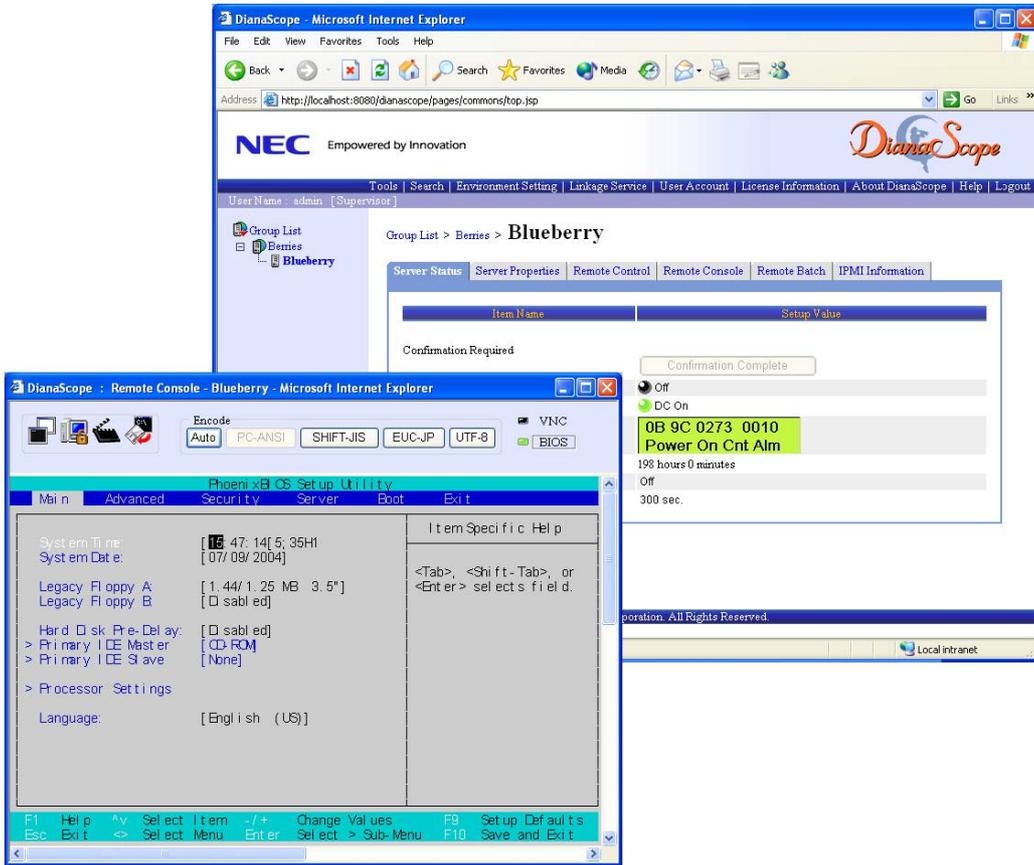
📝 *Note: You need the server license to activate NEC DianaScope for this product.*

Universal RAID Utility

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

■   Internal RAID Controller

■   LSILogic MegaRAID SAS 8480E RAID controller (External SAS HDD)

Before attempting to operate the Universal RAID Utility, read the "Universal RAID Utility User's Guide" included in ExpressBuilder DVD.

Setup with Express Setup

You can install the Universal RAID Utility using the Express Setup contained in the ExpressBuilder DVD.

When you start the Express Setup, a dialog to specify an application appears. Select [Universal RAID Utility] on the dialog.

Manual Setup

Windows

Before installing the Universal RAID Utility, you need to install the following software:

■   Microsoft .NET Framework 2.0

■   The Runtime component of the Microsoft Visual C++ 2005 SP1

This software is provided on the ExpressBuilder DVD. Click [Setup Windows] → [Install the .NET Framework Ver 2.0 Redistributable Package(x86)] (If CPU architecture is x64, [Install the .NET Framework Ver2.0

Redistributable Package(x64)]) in [Autorun Menu] for the setup of Microsoft.NET Framework 2.0.

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

When the above software ins istalled, click [Setup Software] → [Universal RAID Utility].

Linux

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

There is the install image of Universal RAID Utility in the following directory of ExpressBuilder.

/*BBB*/lnx/pp/uraidutl

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

Using Universal RAID Utility via Network

Universal RAID Utility doesn't have the function of management to computer installed RAID Controller via network. If you want to manage it via network, please use the function of remote console (ex. Remote Desktop of Windows).

Easy Configuration

You can not use the function of Easy Configuration to LSI Embedded MegaRAID.

Creating Logical Drive of RAID 6

You must use four or more Physical Devices for creating the Logical Drive of RAID 6 by Universal RAID Utility. If you want to create the Logical Drive from three Physical Devices, you need to use WebBIOS.

Appendix 5: Installing the Operating System with Express Setup

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

■ Microsoft® Windows® Server 2003 Standard Edition / Microsoft® Windows® Server 2003 Enterprise Edition

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

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

⚠ Caution

Before installing the operating system, adjust the system date and time by using the BIOS SETUP utility.

About Express Setup

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

⚠ Caution

Executing the Express Setup erases all data on the hard disk drive.
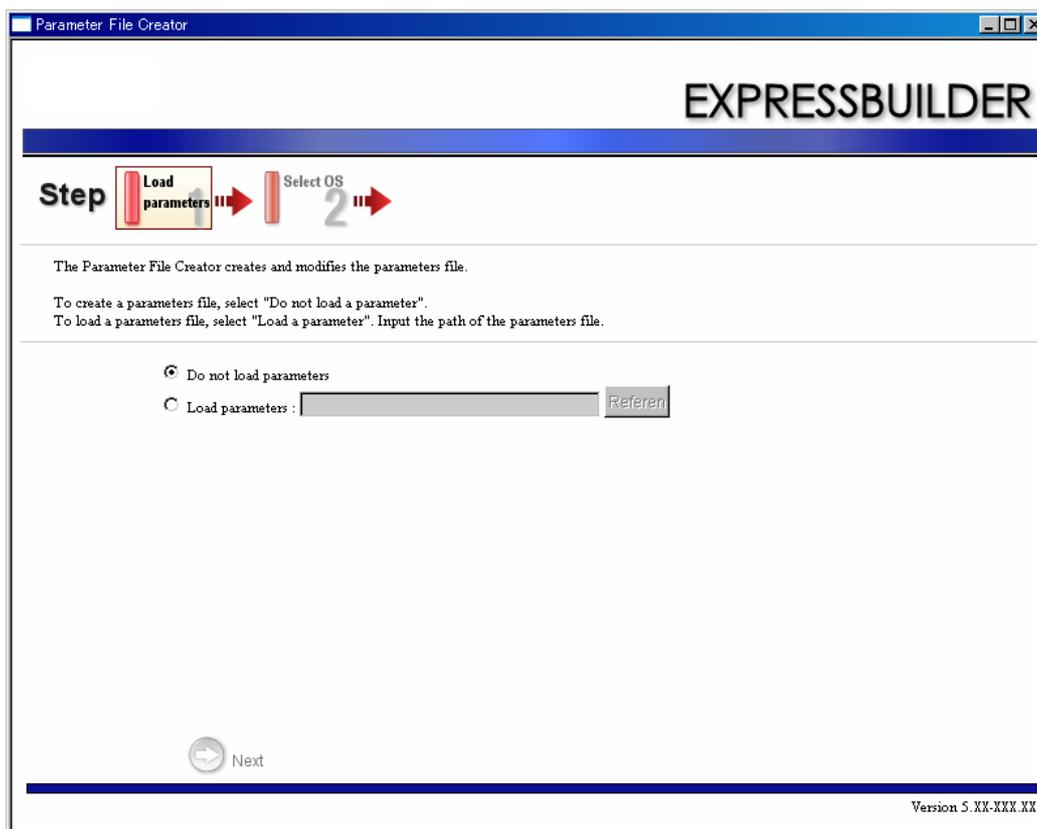
You can also use the "Parameters File" during "Express Setup" in order to save or backup the installation parameters.

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

📑 *Notes:*

■ *If you want to create a parameters file, have a blank floppy disk (MS-DOS 1.44MB format) ready.*

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

■ *If you want to use the drivers located on the "OEM-Disk for Mass Storage Device" that ships with optional boards, a parameters file is mandatory.*

■ *You can create a parameters file in advance using the "Parameter File Creator" included in the* ExpressBuilder.

Microsoft Windows Server 2003

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

⚠ Caution

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

📑 **Notes**:

■ *Express Setup does not support the installation of Windows Server x64 Editions. If you want to install it, see "Appendix 7: Installing Microsoft Windows Server 2003 x64 Editions without using the Express Setup Tool" on page 341.*

■ *If you install Windows Server 2003 without using Express Setup, see "Appendix 6: Installing Microsoft Windows Server 2003 without Using Express Setup" on page 320.*

Notes on the Windows Installation

Check the following before starting the Express Setup.

About the Windows family

This computer supports the following Windows editions:

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

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

Express Setup does not support the installation of Windows Server 2003 x64 Editions.

To install other OS, contact your sales maintenance representative.

BIOS Settings

Confirm the BIOS settings before installing Windows Server 2003.

Service Packs supported by the ExpressBuilder

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

■ Windows Server 2003 R2 x64 Edition

- OS installation media (with Service Pack 2)

- OS installation media (No Service Pack) + Service Pack 2

- OS installation media (No Service Pack)

■ Windows Server 2003 R2

- OS installation media (with Service Pack 2)

- OS installation media (No Service Pack) + Service Pack 2

- OS installation media (No Service Pack)

■ Windows Server 2003

- OS installation media (with Service Pack 1)

- OS installation media (with Service Pack 1) + Service Pack 2

About the Hardware Components

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

Installing on the Mirrored Volume

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

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

Mounting MO Device

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

About Removable Media

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

Connecting Hard Disk Drive

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

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

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

You cannot re-install Windows Server 2003 if the current partition of the hard disk drive upgraded to Dynamic Disk remains. If you want to keep the current partition, see *"Appendix 6: Installing Microsoft Windows Server 2003 without Using Express Setup" on page 320* or *"Appendix 7: Installing Microsoft Windows Server 2003 x64 Editions without using the Express Setup Tool" on page 341*.

About the System Partition Size

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

Size necessary to install the system+ Paging File Size + Dump File Size + Application Size

Size necessary to install the system
= 3500MB (Windows Server 2003 R2)

= 3500MB (Windows Server 2003 with Service Pack1)

= 3500MB (Windows Server 2003 R2 with Service Pack2)

= 5300MB (Windows Server 2003 R2 + ServicePack 2 CD-ROM)

Paging File Size (Recommended)= Mounted Memory Size * 1.5

Dump File Size= Mounted Memory Size + 12MB

Application Size= Required Size

⚠ **Caution**

■ The above-mentioned paging file size is recommended for collecting debug information (memory dump). A paging file with an initial size large enough to store the dump file in the boot drive is required.
The correct debug information might not be able to be collected due to a virtual memory shortage if the paging file is insufficient, so set a size large enough for the entire system.

■ The maximum paging file size which can be set on one partition is 4095MB. If the above paging file size exceeds 4095MB, specify 4095MB for the paging file size.

■ The maximum dump file size for the system with more than 2GB memory mounted is '2048MB + 12MB'.

■ If you wish to install any application program or the like, add
the necessary space to the partition to install these pro-
grams.

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

2900 MB + (512 MB * 1.5) + (512 MB + 12 MB) = 4192 MB.

Divide the partition of the recommended size onto multiple disks as written below if it cannot be reserved in one disk.

1. Set the "Size required for installation + Paging file size".

2. Set the debugging information (equivalent to the dump file size) to be written to a separate disk.

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

Installing the Service Pack

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

Installing Windows Server 2003

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

1. Turn the power of peripheral device on, and then turn on the server.

2. Insert the ExpressBuilder DVD into the optical disc drive of the server.

3. Press the RESET switch or press **Ctrl**, **Alt**, and **Delete** to reboot from the ExpressBuilder. (You may also turn off and then on again to reboot the server.)

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

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

   The Top menu appears.

4. Select [Perform the Express setup] from the Top Menu, and click [Next].
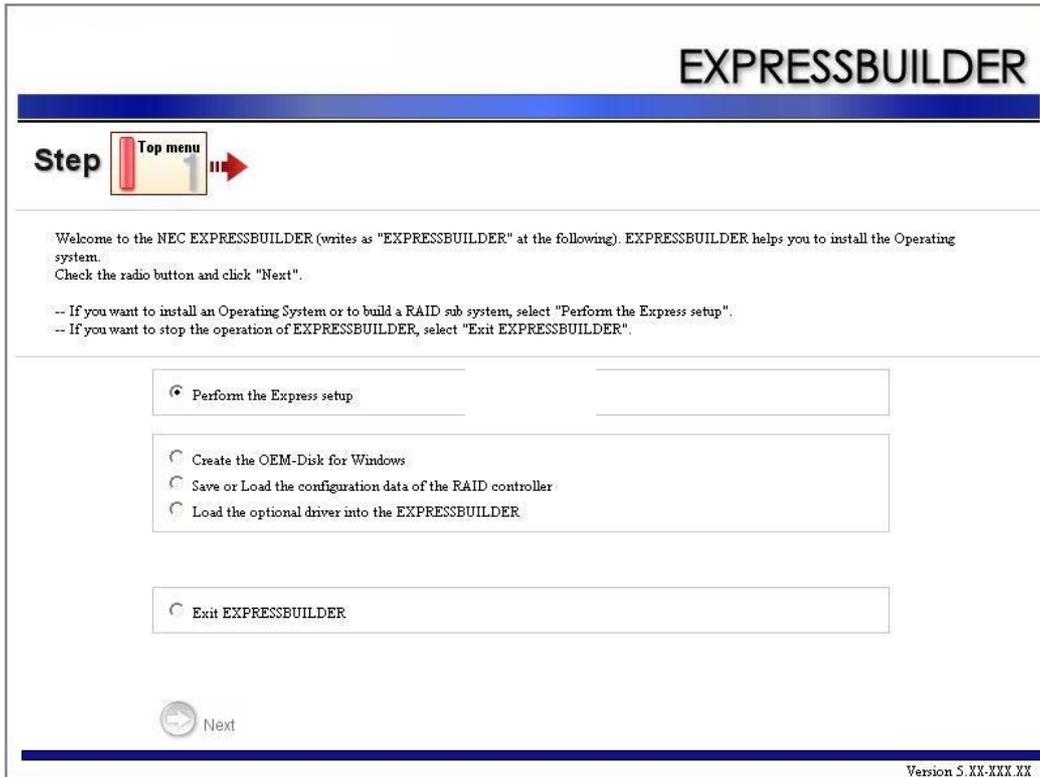
5. The [Load parameters] step is displayed.
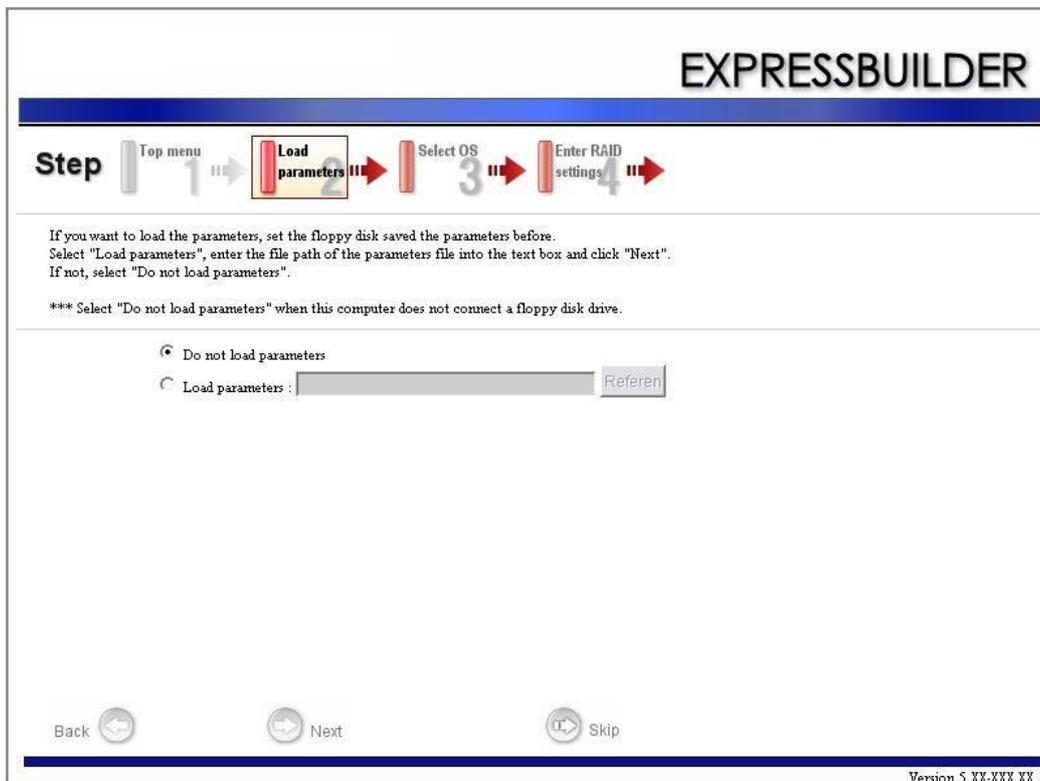
[Do not load parameters]

> **a.** Select [Do not load parameters].
>
> **b.** Click [Next].

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

[Load parameters]

> **a.** Insert the floppy disk containing the parameters file.
>
> **b.** Select [Load parameters], and enter the file path of the parameters file into the text box.
>
> **c.** Click [Next].

6. Select the installing Operating System.
   Select [Install the Windows (32bit editions)] from the menu, and click [Next].
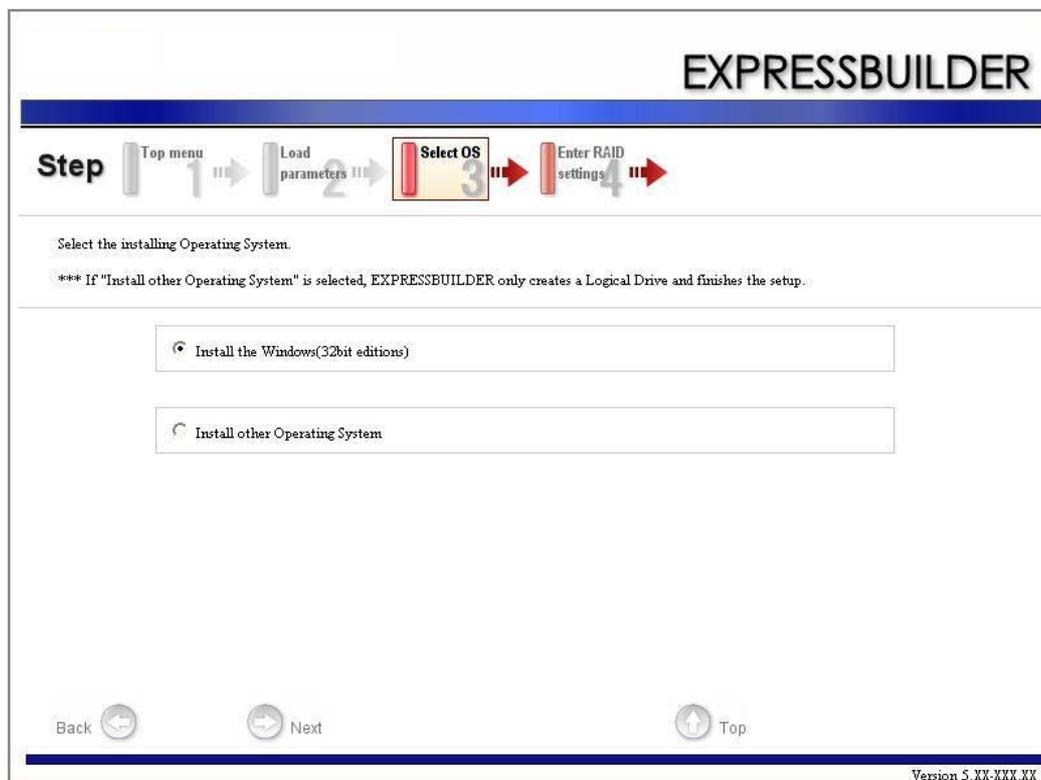
7. Enter the virtual disk settings.

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

> 📝 **Notes**: *You can use only physical devices that have an identical model number to configure a logical drive.*

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

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

⚠ Caution

About the partition size

■ Specify a partition size larger than the required minimum size for the OS installation.

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

First partition deleted	Second partition retained	Third partition retained

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

---

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

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

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

---

10. Enter the network protocol settings.

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

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

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

12. Select the components to install.

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

13. Select the applications to install.

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

14. Save the parameters.

The [Save parameters] step is displayed.

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

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

Otherwise, select [Do not save parameters].

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

16. Copy the optional Mass Storage Driver module.

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

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

17. Remove the ExpressBuilder DVD from the optical disc drive when prompted to do so.

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

Insert the Windows Server 2003 CD-ROM into the optical disc drive.

The [Agree Software License Agreement] screen appears.

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

⚠ **Caution**

■ If you do not agree to this agreement, the setup terminates and Windows Server 2003 will not be installed.

■ If "NetWare Gateway (and Client) Service" is specified to install, the window to specify the details of "NetWare Gateway (and Client) Service" pops up on the first logon. Specify the appropriate value.

---

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

    a. Follow the message to take Windows Server 2003 CD-ROM out of the optical disc drive.

    b. Follow the message to insert Windows Server 2003 Service Pack 2 into the optical disc drive.

⚠ **Caution**

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

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

20. If you install Microsoft Windows Server 2003 R2, insert the Microsoft Windows Server 2003 R2 Standard Edition DISC 2 or the Microsoft Windows Server 2003 R2 Enterprise Edition DISC 2 into the optical disc drive drive after the OS installation.

Follow the on-screen messages to complete the installation.

When the installation is finished, remove the optical disc from the optical disc drive, and restart the system.

Installing and Setting the Device Drivers

Follow these steps to install and configure the device drivers.

PROSet

> 📝 **Notes**: *All the operations related to Intel® PROSet is must be executed with administrator privileges. Operation via a [Remote Desktop Connection] is prohibited.*
>
> *To close the adapter teaming properties window without making any changes, click the Cancel button.*
>
> *Clicking the [OK] button will cause a temporary loss of network connectivity.*

Using PROSet enables the following items:

■   Detailed information of the adapter confirmation.

■   Loop back test, packet transmission test diagnosis and so on.

■   Teaming setup.

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

PROSet is necessary to use these features.

Follow the procedure below to install PROSet.

   1.   Insert the ExpressBuilder DVD into the optical disc drive.
   2.   The [Windows Explorer] dialog starts.

   ■   Procedure using a standard start menu
       Click Start menu and click [Windows Explorer].

   ■   Procedure using a classic start menu
       Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].

   3.   Run "dxsetup.exe" in the following directory.
       \001\win\winnt\dotnet\dl3\proset\win32
       The [Intel(R) PROSet - InstallShield Wizard] dialog starts.
   4.   Click [Next].
   5.   Choose "I accept the terms in the license agreement" and click [Next].
   6.   Click [Next].
   7.   Select [I accept the terms in the license agreement] and click [Next].
   8.   Click [Install].
       When [InstallShield Wizard Completed] window is displayed, click [Finished].

9. Remove the ExpressBuilder DVD from the drive, and restart the system.

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

Network Driver

Specify the details of the network driver.

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

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box appears.

   ■ Procedure using a standard start menu
   Click Start menu, click [Control Panel], click [Network Connections], and click [Local Area Connection].

   ■ Procedure using a classic start menu
   Click the Start menu, click [Settings] and click [Network Connections].
   The [Network Connections] dialog box appears.
   Right-click [Local Area Connection] and click [Properties] from the pop-up menu.

2. Click [Configure].
   The properties dialog box for the network adapter appears.

3. Click [Advanced] and specify a [Link Speed & Duplex] identical to the value specified for the HUB.

4. Click [OK] on the properties dialog box for network adapter.

[When PROSet is installed]

1. The [Intel PROSet] dialog box appears.

   ■ Procedure using a standard start menu
   Click Start menu, point to [Control Panel], [administrative tools], click [Computer Management] and then double click the [(Network Adapter Name)] in the Network Adapter list.

   ■ Procedure using the classic start menu
   Click Start menu, point to [Settings] and click [Control Panel].
   Click [Administrative Tools].
   Click [Computer Management] and then double click the [(Network Adapter Name)] in the Network Adapter list.

2. Click the [Link] and specify a [Speed & Duplex] value identical to the value specified for the HUB.

3. Click [Apply] and click [OK].

If necessary, add or delete any protocols and services.

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

> 📑 **Note**: We recommend you add [Network Monitor] at [Adding Services]. [Network Monitor] can monitor the frame (or the packet) that the computer installing [Network Monitor] sends or receives. This tool is valuable when analyzing network troubles. For more information on how to install the tool, see *"Solving Problems Settings" on page 313* described later in this chapter.

Optional Network Board Driver

Most drivers are automatically installed.

If this is not the case:

■ either install the driver stored in the ExpressBuilder using the oprocedure described below,

■ or refer to the installation manual provided with the board, if applicable.

Installation of the Optional Network Board Driver

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

    The [(Network Adapter Name) Properties] appears.

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

3. Click the [Driver] tab and click [Update Driver...].

    The [Hardware Update Wizard] appears.
4. Select the [Install from a list or specific location(Advanced)] radio button and click [Next].
5. Select the [Search for the best driver in these locations] radio button and check off the [Search removable media (floppy, CD-ROM...)] check box.
6. Check the [Include this location in the search] check box and specify a path.

    Click [Next].
7. Click [Finish].

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

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

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

⚠ **Caution**

■ AFT/ALB setup must be operated after installing the drivers and restarting the system.

■ All the adapters specified as a group of Adapter Teaming must exist on the same LAN. If they are connected to separate switches, they will not work normally.

■ The adapters specified as a group of Adaptive Load Balancing (ALB) can be connected only to the Switching Hub.

■ When replacing the motherboard or optional network card, make sure to remove the adapter teaming before the exchange and recreate the adapter team once the exchange is completed.

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

1. The [Intel (R) PROSet] dialog box appears.

   ■ Procedure using the standard start menu
   Click the Start menu, point to [Control Panel], [Administrative tools], and click [Computer Management] and then double click the [(Network Adapter Name)] in the Network Adapter list.

   ■ Procedure using the classic start menu.
   Click the Start menu, point to [Settings] and click [Control Panel].
   Click [Administrative Tools].
   Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.

2. Select the [Teaming] tab and then check [Team with other adapters] and click [New Team...].

   The [New Team Wizard] dialog box appears. Click [Next].

   *Specify a name for the team if necessary.

3. Select the adapters to include in the team.

4. Select "Adapter Fault Tolerance" or "Adaptive Load Balancing" and click [Next].

5. Click [Finish].

6. If necessary to set the adapter priority setting, do as follows.
    If not, go to step 7.

    a. Click [Settings] tab on [TEAM:xxx #yy Properties].

    b. Click [Modify Team].

    c. Point to the adapter [Intel(R)PRO/1000....]and click [Set Primary] or [Set Secondary].

    d. Click [OK].

    e. The setup will go back to [EAM:xxx #yy Properties] and the priority setting will display in list ().

    f. Click [OK]

7. The setup will go back to [Intel (R) PROSet for Wired Connections] dialog box, so click [OK].

8. Restart the system.

Graphics Accelerator Driver

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

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

1. Insert the ExpressBuilder into the optical disc drive. Close the Autorun menu if it is displayed.

2. Click the Start menu, point to [Programs], [Accessories] and click [Windows Explorer].

3. Run "setup.exe" in the following directory.

    \001\win\winnt\dotnet\video\setup.exe.

4. Follow the on-screen message to proceed with the installation.

    If the dialog message "Digital Signature could not been found." appears, select [Yes] to continue.

5. Remove the ExpressBuilder from the optical disc drive, follow the on-screen instructions and restart the system.

SCSI Controller Driver

Update your system with the ExpressBuilder DVD attached to your system.

The SCSI controller driver will be installed automatically.

Installing SAS Controller Driver (LSI SAS3443E-R)

Update your system with the ExpressBuilder DVD attached to your system.

The SAS controller driver will be installed automatically.

Installing the RAID controller Driver (LSILogic MegaRAID SAS 8480E)

The RAID controller driver will be installed automatically.

Installing the Adaptec 29320 Controller Board

The driver may sometimes not be installed during the OS installation. In this case, please install the driver as described in the procedure below.

1. Start [Device Manager] from [Start] menu → [Control Panel] → [Administrative Tools]→ [Computer Management].
2. Double-click the SCSI Controller which the Device Manager lists as "Other device".
3. Click [Update Driver].
4. When the "Update Device Driver Wizard" appears, select "No, not this time" and click [Next].
5. Select "Install from a list or specific location [Advanced]" and click [Next].
6. Select "Don't search. I will choose the driver to install" and click [Next].
7. Select "SCSI and RAID controller" and click [Next].
8. Click [Have Disk..].
9. Insert the "Windows Server 2003 OEM-Disk for ExpressBuilder" into the floppy disk drive, enter "a:\" into "copy manufacturer's file from:" and click [OK].
10. Specify the following driver and click [Next].

    [Adaptec SCSI Card 29320ALP -Ultra320 SCSI] (When N8103-75 board is installed.)

The installation of the driver is completed. Restart the system according to the on-screen messages.

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

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

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

■ Microsoft Knowledge Base - Article ID: 833721

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

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

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

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

■ Microsoft Knowledge Base - Aritcle ID: 291988

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

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

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

<Example of Boot.ini file>

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

---

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

Solving Problems Settings

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

Memory Dump (Debug Information)

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

⚠ **Caution**

Cautions for the Memory Dump

■ The maintenance service representative is in charge of collecting memory dump. You only need to specify the memory dump.

■ If any trouble occurs after specifying the process below, a message informing that the system has a virtual memory shortage may appear, but continue to start the system. If you restart the system in such case, the memory dump may not be stored correctly.

Follow the procedure below to specify the memory dump.

1. Select [Control Panel] and click [System].

   The [System Properties] dialog box appears.

2. Select the [Advanced] tab.

3. Click [Settings] on the [Startup and Recovery] group box.

⚠ **Caution**

Windows Server 2003 x64 Editions

■ We recommend you specify "Complete Memory Dump" to write the debug information.
   If the mounted memory size is larger than 2GB, "Complete Memory Dump" cannot be specified so specify "Kernel Memory Dump" instead.

■ Specify a drive where there is a free area larger than the size of "the memory capacity mounted on Express server + 1MB".

■ In case the mounted memory size exceeds 2GB due to the added memory, change the write debugging information to [Kernel Memory Dump] before adding memory. The size of the debugging information (memory dump) changes when

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adding memory. Check the size of the empty space in the debugging information (memory dump) write destination drive.

⚠ **Caution**

Windows Server 2003

■ We recommend you specify "Complete Memory Dump" to write the debug information.
If the mounted memory size is larger than 2GB, "Complete Memory Dump" cannot be specified so specify "Kernel Memory Dump" instead.

■ Specify a drive where there is a free area larger than the size of "the memory capacity mounted on Express server + 12MB" (In case the memory capacity is larger than 2GB, a free area of "2048+12MB" or more).

■ In case the mounted memory size exceeds 2GB due to the added memory, change the write debugging information to [Kernel Memory Dump] before adding memory. The size of debugging information (memory dump) changes when adding memory. Check the size of the empty space in the debugging information (memory dump) write destination drive.

4. Specify "Complete memory dump" and modify [Dump file:] in the [Write debugging information] group box.

e.g. To write the debug information in D drive, write the file name "MEMORY.DMP".

D:\MEMORY.DMP

5. Click [Settings] on the [Performance] group box.

The [Performance Options] window appears.

6. Click the [Advanced] tab on the [Performance Options] window.

7. Click [Change] on the [Virtual memory] group box.

8. Modify [Initial Size] in the [Paging file size for selected drive] box to a value larger than [Recommended], and click [Set].

⚠ **Caution**

■ The above-mentioned paging file size is recommended for collecting debug information (memory dump). A paging file with an initial size large enough to store the dump file in the boot drive is required.

Correct debug information might not be collected due to a
virtual memory shortage when the paging file is insufficient,
so set a paging file size large enough for the entire system.

■ For more information on the "Recommended" value, see
"About the System Partition Size" on page 293.

■ If the memory is expanded, re-specify the paging file to suit
the new memory size.

9. Click [OK].

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

Windows Dr. Watson

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

1. Click [Run] on Start menu.

2. Type "drwtsn32.exe" in the [Open] box, and click [OK].

The [Dr. Watson for Windows] dialog box appears.

3. Specify the location in which to store the diagnostic information in the [Log
File Path] box.

The diagnostic information will be stored with the file name
"DRWTSN32.LOG".

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

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

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

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

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

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

6. Click [OK].

Network Monitor

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

1. Point to [Settings] from the Start menu and click [Control Panel].

   The [Control Panel] dialog box appears.

2. Double-click [Add or Remove Programs].

   The [Add or Remove Programs] dialog box appears.

3. Click [Add/Remove Windows Component].

   The [Windows Components Wizard] dialog box appears.

4. Click [Management and Monitoring Tools] and then click [Details].

   The [Management and Monitoring Tools] dialog appears.

5. Click to select the [Network Monitor Tools] check box, and then click [OK].

6. The [Windows Components Wizard] dialog box appears again, so click [Next].

7. If the setup asks to install the disk, insert the OS CD-ROM into optical disc drive and click [OK].

8. Click [Finish] in the [Windows Component Wizard] dialog box.

9. Close the [Add or Remove Programs] dialog box.

10. Close the [Control Panel] dialog box.

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

Installing Maintenance Utilities

Various maintenance utilities are included in your ExpressBuilder.

See *"Appendix 4: Installing and Using Utilities" on page 267* for more information on installing the utilities to your server or management workstations.

Updating the System - Applying Service Pack -

⚠ Caution

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

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

Execute "Updating the System" in following cases.

■ Modified system configuration.

■ Recovered the system using recovery process.

See *"Updating the System - Applying Service Pack -" on page 348* section in Appendix D for details on the update process.

Making Backup Copies of System Information

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

Save the information after completing the system setup.

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

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

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

Installing with the OEM-FD for Mass Storage Device

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

Installation of a Mass storage device not supported by Express Setup

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

1. Read the manual supplied with the mass storage device before setting the server.
2. If the mass storage device is a RAID Controller, configure the RAID system before running the ExpressBuilder.
3. Boot the system from the ExpressBuilder DVD.
4.
   a. When the "Use Existing Array" dialog box appears, check "Skip Creating a Virtual disk".
   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 to the mass storage device into the floppy disk drive.

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

Appendix 6: Installing Microsoft Windows Server 2003 without Using Express Setup

This section describes the procedures for installing Windows Server 2003 without using the Express Setup tool.

Notice

Service Packs supported by ExpressBuilder

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

■ Windows Server 2003 R2

- OS installation media (with Service Pack 2)

- OS installation media (No Service Pack) + Service Pack 2

- OS installation media (No Service Pack)

■ Windows Server 2003

- OS installation media (with Service Pack 1)

- OS installation media (with Service Pack 1) + Service Pack 2

Installing Service Pack

You can install the Service Pack on the server. If the Service Pack is not attached to your system, prepare it yourself.

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

Updating System

If you change the configuration of the system, update your system with the ExpressBuilder DVD delivered with your system.

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 where the 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.

Magneto-Optical device

If you specify the file system as NTFS with a MO Device connected during the installation, the file system will not be converted normally. Disconnect the MO device and restart the installation from the beginning.

Media such as DAT

Do not connect such devices to the server before installing the operating system.

Floppy Disk Drive

No internal floppy disk drive is included in your system. Prepare an optional USB floppy disk drive if necessary.

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 the user data, and reinstall Windows Server 2003 R2 as described in *"Windows Server 2003 Clean Installation" on page 326*.

> ▤ **Note**: The "in-place upgrade" is an overwrite upgrade from an installed Windows Server 2003 to Windows Server 2003 R2.

About the System Partition Size

The minimum size for the partition where 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

Size necessary to install the system

= 3500 MB (Windows Server 2003 R2)

= 3500 MB (Windows Server 2003 with Service Pack 1)

= 3500 MB (Windows Server 2003 R2 with Service Pack 2)

= 5300 MB (Windows Server 2003 R2 + Service Pack 2)

= 5300 MB (Windows Server 2003 R2 with Service Pack 1
    + Service Pack 2)

Paging File Size (Recommended)= Mounted Memory Size $\times$ 1.5

Dump file Size= Mounted Memory Size + 12 MB

Application size = Required size

⚠ **Caution**

■ The above-mentioned paging file size is recommended for collecting debug information (memory dump). A paging file with an initial size large enough to store the dump file in the boot drive is required.
It may be impossible to collect correct debugging information due to a virtual memory shortage if the paging file is insufficient, so we recommend you set a paging file large enough for 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 minimally required 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

If the required partition size is larger than the size of a hard disk drive, we recommend you split the file across several disks.

1. Set the "Size required for installation + Paging file size".

2. Set the debugging information (equivalent to the dump file size) so that it is written to a separate disk.

(If necessary, install an additional new disk.)

Installing Microsoft Windows Server 2003

You will need the following for the installation of the Windows Server 2003:

■ ExpressBuilder DVD

■ 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), or Microsoft Windows Server 2003 R2 Enterprise Edition (CD-ROM).

■ Microsoft Windows Server 2003 Service Pack (CD-ROM).

■ User's Guide

■ Getting Started

■ Windows Server 2003 OEM-Disk for ExpressBuilder

Before installing, create Windows Server 2003 OEM-Disk for ExpressBuilder.

Creating "Windows 2003 OEM-Disk for ExpressBuilder"

You can create the Windows 2003 OEM-Disk for ExpressBuilder with the following two procedures:

Creating from the menu which appears when running BULL NovaScale Server with ExpressBuilder

Use this procedure if you have only the BULL NovaScale Server to create the Windows 2003 OEM-Disk for ExpressBuilder.

■ If you have only the BULL NovaScale Server to create the Windows Server 2003 OEM-Disk for ExpressBuilder, use this procedure.

1. Prepare a 3.5-inch floppy disks.
2. Turn on your BULL NovaScale Server.
3. Insert the ExpressBuilder DVD in the optical device drive.
4. Pressthe Reset switch or press **Ctrl** + **Alt** + **Delete** to reboot the server. (You may also turn off and then on again to reboot the server.)
The system will boot from the DVD and the ExpressBuilder starts.
5. Select [Create the OEM-Disk for Windows] from the [Tools Menu].
6. Select [Create a Windows Server 2003 OEM-Disk for ExpressBuilder] from [Create OEM-Disk] and click [Perform].
7. Insert a diskette in the floppy disk drive according to the on-screen instruction. Windows Server 2003 OEM-Disk for ExpressBuilder will be created.
8. Write-protect and label the diskette, then keep it in a safe place.

Creating from the [Autorun Menu]

This menu requires Microsoft Windows XP, Microsoft Windows Vista, Microsoft Windows Server 2003 (or later).

You can create the Windows Server 2003 OEM-Disk for ExpressBuilder from the [Autorun Menu], if you have the computer on which one of the above operating system operates.

Follow the steps below:

1. Prepare a 3.5-inch floppy disks.
2. Start the operating system.
3. Insert the ExpressBuilder DVD in the optical device drive.
   The Autorun menu is displayed.
4. Click [Create drive disk, and select [OEM Disk for Windows Server 2003].

> ⊜**Note**: *You can do the same operation using the menu displayed by a 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.
6. Write-protect and label the diskette, then keep it safely.

Windows Server 2003 Clean Installation

This section explains how to perform a clean installation of Windows Server 2003.

1. Turn the system on.
2. Insert the Windows Server 2003 CD-ROM in the optical device 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 be displayed. If the screen is not displayed, **Enter** was not pressed properly.

    Retry after turning the system off and then on again.

4. Press **F6** in the few seconds when the window is in one of the following states:
    – "Setup is inspecting your computer's hardware configuration..." is displayed.
    – A screen with a solid blue background is displayed.

    📑 **Note**: *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 devices.

    The following message is then displayed.

    > Please inert the disk labeled
    >
    > manufacturer-supplied hardware support disk
    >
    > into Drive A:
    >
    > *Press ENTER when ready.

6. Insert the Windows Server 2003 OEM-Disk for ExpressBuilder into the floppy drive, and press **Enter**.
    A list of mass storage devices is displayed.
7. Select the [Intel(R) ESB2 SATA AHCI Controller (Server ESB2)] and press **Enter**.
8. Select the proper SCSI Adapter and press **Enter**.
    - [LSI MegaRAID SAS RAID Controller Driver (Server 2003 32-bit)]
    - [LSI MegaRAID SAS RAID Controller Driver (Server 2003 32-bit)]
    - [LSI Embedded MegaRAID (Windows XP/2003)]

9. When prompted to do so, press **Enter** to start the "Welcome to Setup" wizard. Once the installation of Windows Server 2003 is finished, the system reboots automatically.

    ■ Windows Server 2003: go to step 13.

    ■ Windows Server 2003 R2: go to step 10.

10. Log on to the system, the [Windows Setup] screen is displayed.

Figure 195: Windows Setup Screen

⚠ Caution

■ In some cases, 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 optical disc 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 optical disc drive, and restart the system.

13. Once the installation is completed, execute the tasks described in *"Driver Installation and Device Settings" on page 333* and *"Updating System" on page 320*.

Procedure for License Authentication

The Product Key used in the procedure for license authentication must match with the COA label.

 Notes:

■ *Execute the activation within 30 days. The system may be locked once 30 days have passed.*

■ *The COA label may be attached to your server.*

Updating the System - Applying Service Pack -

To ensure normal system operation you should update your system in the following cases:

- The CPU was expanded from single processor to multi-processor.

- The system configuration was modified.

- The system was recovered using the recovery process.

The system update reinforces the system security. We recommend you apply this update. It does not need to be applied again when the Windows Server 2003 CD-ROM (in which ServicePack 2 is included) is installed.

Go on to .

Update the System and then apply the "Hotfix (KB921411)".

⚠ Caution

In the situation below, make sure to update the system and to apply the "Hotfix (KB921411)".

■ Modified system configuration

■ Recovered the system using recovery process.

 Note: If you use Windows Server 2003 CD-ROM which includes Service Pack 2, the application of "Hotfix (KB921411)" is not required.

Applying the Hotfix (KB921411)

Apply the "Hotfix (KB921411)" before updating the system.

1. Log on to the system using an account with administrator authority (such as administrator).

2. Insert the ExpressBuilder DVD into the optical disc drive of the server.

3. Click the Start menu, select [Run], and then execute the following command.

    <When the English version of Windows Server 2003 R2 is used>

    \002\win\winnt\dotnet\qfe\enu\kb921411.exe

    <When the Simplified Chinese version of Windows Server 2003 R2 is used>

    \002\win\winnt\dotnet\qfe\chs\kb921411.exe

    <When the French version of Windows Server 2003 R2 is used>

    \002\win\winnt\dotnet\qfe\fra\kb921411.exe

4. When the following message is displayed, click [Next].

Figure 196: Software Update Installation Wizard

    Follon the on-screen messages.

5. When the following message is displayed, make sure to click [Finish] to restart the system.
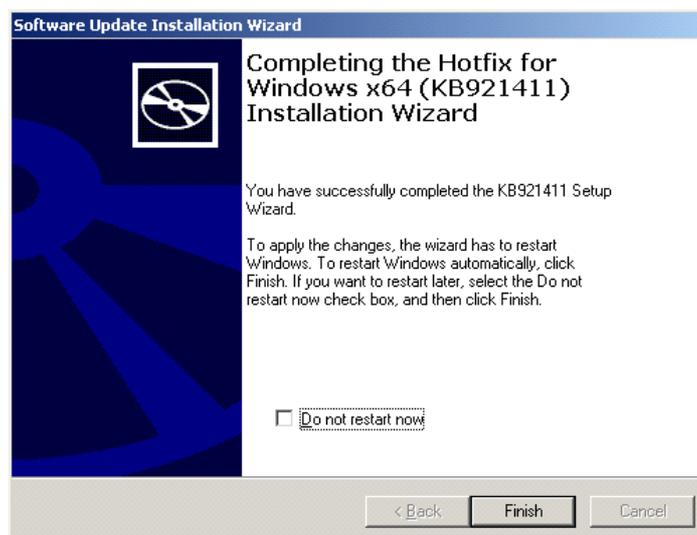
Figure 197: Software Update Installation Wizard

The Hotfix (KB921411) was successfully applied.

Updating the System"

The System Update applies the drivers necessary for the BULL NovaScale.

Follow this process after the Hotfix for Windows Server 2003 (KB921411) has been applied.

> 📑 **Note**: *If you install your system using the Windows CD-ROM that contains the Service Pack 2, you do not have to apply the Service pack 2 again.*

1. Log on to the system using an account administrator authority (such as administrator).
2. Insert the ExpressBuilder DVD into the optical disc drive.

   The Autorun Menu is displayed
3. Left-click on [Setup Windows], and then click [Update the system].

> 📑 **Note**: *You can also right-click on the Autorun Menu.*

Follow the on-screen messages to proceed. The [OK] dialog box is displayed.

4. Click [OK] to restart the system.

When the reboot starts, immediately remove the ExpressBuilder DVD from the optical disc drive.

⚠ **Caution**

During the "Updating the System", the following message may be shown, but there is no impact to the operation. Do not click [cancel] since it may be taken away after a few seconds.

Recovery Process

If the System Update is executed before the application of the "Hotfix for Windows x64 (KB921411)", "!" may be displayed on the USB root hub.

If "!" is displayed on the USB root hub, follow the process below:

1. Start the Windows Explorer, and click the [Tools] and [Folder Options].

2. Select the [Files and Folders] - [Hidden files and folders] - [Show hidden files and folders] radio button from Advanced settings in the [View] tab.

3. Check the following check box in the [Files and Folders] from Advanced settings in the [View] tab, and then click [OK].

  ■ Hide extensions for know file type

  ■ Hide protected operating system files [Recommended]

When the message "You have chosen to display protected operating system files..." is displayed, click [Yes].

4. Make sure of the files.

Open "<System drive:>\WINDOWS\system32\drivers" directory, and make sure usbhub.sys and usbport.sys exist in the directory.

If you can not find them, copy the files according to the following process.

        a.   Open the "<System drive:>\WINDOWS\system32\dllcache" directory.

        b.   Copy usbhub.sys and usbport.sys from the directory noted above to "<Systemdrive:>\WINDOWS\system32\drivers".

5. Restart the system.

6. Refer to *"Applying the Hotfix (KB921411)" on page 328* and apply the "Hotfix for Windows (KB921411)".

7. Refer to *"Updating the System"" on page 330* and execute the system update.

8. Restart the system.

The process is finished.

Driver Installation and Device Settings

This section describes how to install and setup various standard drivers mounted on the device.

For information on installing and setting up a driver that is not described in this section, please refer to the document delivered with the driver.

PROSet

PROSet is a utility that checks the function of network contained in the network driver.

Using PROSet enables the following items:

■   Verify 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.

To install PROSet:

1. Insert the ExpressBuilder DVD into the optical device drive. If the Autorun menu is displayed, close the menu screen.
2. The [Windows Explorer] dialog starts.

    ■   In the case of the standard start menu, click Start menu and click [Windows Explorer].

    ■   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:

    <optical disc drive Letter>:\002\win\winnt\w2k3amd\dl3\proset\winx64

    The [Intel(R) PROSet - InstallShield Wizard] dialog starts.

4. Click [Next].
5. Choose "I accept the terms in the license agreement" and click [Next].
6. Click [Install].
7. When [InstallShield Wizard Completed] window is displayed, click [Finished].
8. Remove the ExpressBuilder DVD from the optical disc drive and restart the system.

Network Driver

Specify the details of the network driver.
The standard network driver that is 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 is displayed.

   ■ Procedure with the standard start menu: click Start menu, [Control Panel], [Network Connections], and [Local Area Connection].

   ■ Procedure with the classic start menu:

      a. Click Start menu, Click [Settings] and Click [Network Connections]. The [Network Connections] dialog box is displayed.

      b. Right-click [Local Area Connection] and click [Properties] from pop-up menu.

2. Click [Configure].
   The property dialog box for the network adapter is displayed.

3. Click [Advanced] and specify the same value for [Link Speed & Duplex] and for the HUB.

4. Click [OK] on the property dialog box for network adapter.

[When PROSet is installed]

1. The [Intel PROSet] dialog box appears.

   * Procedure with the standard start menu

      Click Start menu, point to [Control Panel], [Administrative tools], and click [Computer Management] and then double click the [(Network Adapter Name)] in the Network Adapter list.

   * Procedure with the classic start menu

      a. Click Start menu, point to [Settings] and click [Control Panel].

      b. Click [Administrative tools].

      c. Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.

2. Click [(Network Adapter Name)] in the list.

3. Click the [Link] and specify the [Speed & Duplex] value the same as the value specified for HUB.

4. Click [Apply] and click [OK].

You can 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 displayed from [Network and Dial-up Connection].

> *Note: We recommend you add [Network Monitor] at [AddingServices]. [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.*

Re-install the Network Driver

The network driver will be installed automatically.

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

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

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

Refer to *"Adapter Fault Tolerance (AFT)/Adaptive Load Balancing (ALB)" on page 308* for more information.

Graphics Accelerator Driver

The drivers for the graphics accelerator cards that are installed in the server will setup automatically.

If you remove an additional graphics card, make sure to remove its corresponding driver.

Should it be necessary to install manually the drivers, follow the procedure below.

1. Insert the ExpressBuilder DVD into the optical disc drive.

   If the autorun menu is displayed, close the menu screen.
2. Click the Start menu, point to [Programs], [Accessories] and click [Windows Explorer].
3. Run "setup.exe" in the following directory.

   \002\win\winnt\w2k3amd\video\setup.exe
4. Follow the on-screen messages to proceed with the installation.

   If the "Digital Signature could not been found." dialog message appears, select [Yes] to continue.
5. Remove the ExpressBuilder DVD from the optical disc drive, restart the system.

Installing SCSI Controller Drivers

Update the drivers for your system using the ExpressBuilder DVD shipped with your system.

The SCSI drivers will be installed automatically.

Installing SAS Controller Driver (LSI SAS3443E-R)

Update your system with the ExpressBuilder DVD attached to your system.

The SAS controller driver will be installed automatically.

Installing a RAID controller Driver (LSILogic MegaRAID SAS 8480E)

Troubleshooting

The driver may sometimes not be installed during the OS installation. In this case, please install the driver as described in the procedure below.

1. Start [Device Manager] from [Start] menu → [Control Panel] → [Administrative Tools]→ [Computer Management].
2. Double-click the RAID Controller which the Device Manager lists as "Other device".
3. Click [Update Driver].
4. When the "Update Device Driver Wizard" appears, select "No, not this time" and click [Next].
5. Select "Install from a list or specific location [Advanced]" and click [Next].
6. Select "Don't search. I will choose the driver to install" and click [Next].
7. Select "SCSI and RAID controller" and click [Next].
8. Click [Have Disk..].
9. Insert the ExpressBuilder DVD into the optical disc drive, enter "\002\win\winnt\oemfd\dotnet\fd1" into "copy manufacturer's file from:" and click [OK].
10. Specify the following driver and click [Next].

    LSI Logic MegaRAID SAS 8480E RAID Controller]

The installation of the driver is completed. Restart the system according to the on-screen messages.

About the Windows Activation

Windows Server 2003 must be activated before it can be used. The Windows activation process is as follows.

📄**Note**: *The activation process is not required for Windows Server 2003 R2.*

---

1. Click [Run] on [Start] menu.

   Type the following in the [Open:] box, and click [OK].

   oobe/msoobe /a

   Figure 198: "Run" Dialog Box

2. When the screen below is displayed, click [Next].
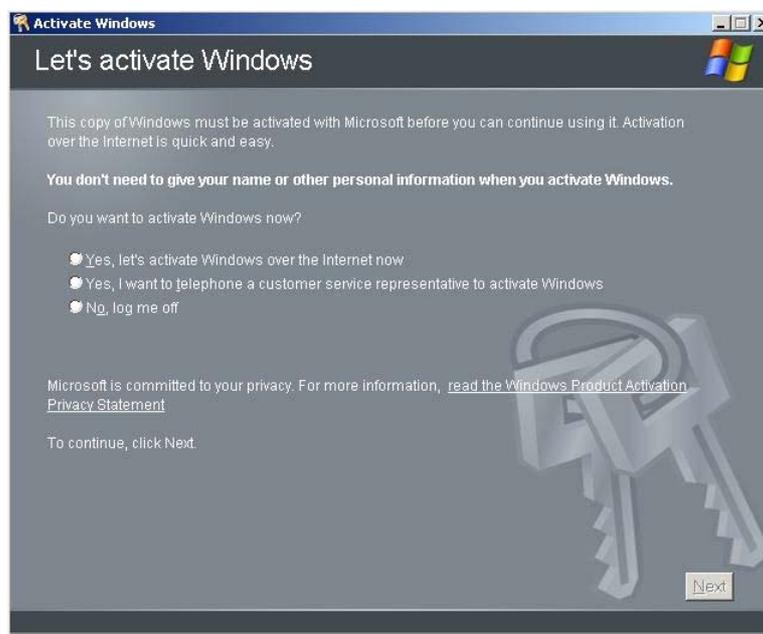
   Figure 199: Windows Activation Screen (1)

   The following screen is displayed.

3. Follow the on-screen messages to proceed with the activation.

Available Switch Options for the Windows Server 2003 Boot.ini File

Refer to *"Available switch options for the Windows Server 2003 Boot.ini file." on page 312*.

Setting for Collecting Memory Dump (Debug Information)

Use the procedure described in .

Appendix 7: Installing Microsoft Windows Server 2003 x64 Editions without using the Express Setup Tool

This section describes the procedures for installing Windows Server 2003 x64 Editions without using the Express Setup tool.

Notice

Service Packs supported by ExpressBuilder

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

■ Windows Server 2003 R2 x64 Edition

- OS installation media (with Service Pack 2)

- OS installation media (No Service Pack) + Service Pack 2

- OS installation media (No Service Pack)

Installing Service Pack

You can install the Service Pack on the server. If the Service Pack is not attached to your system, prepare it yourself.

Updating System

If you change the configuration of the system, execute "Update the system" in the Windows Autorun 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 where the 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.

Magneto-Optical device

If you specify the file system as NTFS with a MO Device connected during the installation, the file system will not be converted normally. Disconnect the MO device and restart the installation from the beginning.

Media such as DAT

Do not connect such devices to the server before installing the operating system.

Floppy Disk Drive

No internal floppy disk drive is included in your system. Prepare an optional USB floppy disk drive if necessary.

About the System Partition Size

The system partition size 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 (Windows Server 2003 x64 Editions)

= 4100 MB (Windows Server 2003 x64 Editions with Service Pack 2)

= 5900 MB (Windows Server 2003 x64 Editions with Service Pack 2 CD)

Paging File Size (Recommended)= Mounted Memory Size $\times$ 1.5

Dump file Size= Mounted Memory Size + 1 MB

Application Size = Required Size

⚠ **Caution**

■ The above-mentioned paging file size is recommended for collecting debug information (memory dump). A paging file with an initial size large enough to store the dump file in the boot drive is required.
It may be impossible to collect correct debugging information due to a virtual memory shortage if the paging file is insufficient, so we recommend you set a paging file large enough for the entire system.

■ Regardless of the size of the mounted memory, or the Write debugging information (type of memory dump), the maximum size of the dump file is 'The size of the mounted memory + 1MB'.

■ If you 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 minimal size of the partition 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

If the required partition size is larger than the size of a hard disk drive, we recommend you split the file across several disks.

1. Set the "Size required for installation + Paging file size".
2. Set the debugging information (equivalent to the dump file size) so that it is written to a separate disk.

    (If necessary, install an additional new disk.)

Installing
Microsoft Windows Server 2003 x64 Editions

You will need the following for the installation of the Windows Server 2003 x64 Editions:

■ ExpressBuilder DVD

■ Microsoft Windows Server 2003 R2 Standard x64 Edition (CD-ROM) / Microsoft Windows Server 2003 R2 Enterprise x64 Edition (CD-ROM)

■ Microsoft Windows Server 2003 x64 Editions Service Pack 2 (CD-ROM)

■ User's Guide

■ Getting Started

■ Windows Server 2003 x64 Editions OEM-Disk for ExpressBuilder

Before installing, create Windows Server 2003 x64 Editions OEM-Disk for ExpressBuilder.

Creating the "Windows 2003 x64 EditionsOEM-Disk for ExpressBuilder"

You can create the Windows 2003 x64 Editions OEM-Disk for ExpressBuilder using one of the following two procedures:

Creating from the menu which appears when running BULL NovaScale Server with ExpressBuilder

Use this procedure if you have only the BULL NovaScale Server to create the Windows 2003 OEM-Disk for ExpressBuilder.

1. Prepare a 3.5-inch floppy disks.
2. Turn on your BULL NovaScale Server.
3. Insert the ExpressBuilder DVD in the optical device drive.
4. Press the reset switch or press **Ctrl** + **Alt** + **Delete** to reboot the server. (You may also turn off and then on again to reboot the server.)
   The system will boot from the DVD and the ExpressBuilder starts.
5. Select [Create the OEM-Disk for Windows] from the [Tools Menu].
6. Select [Create a Windows Server 2003 x64 Editions OEM-Disk for ExpressBuilder] from [Create OEM-Disk] and click [Perform].
7. Insert a diskette in the floppy disk drive according to the on-screen instruction. Windows Server 2003 x64 Editions OEM-Disk for ExpressBuilder will be created.
8. Write-protect, label the diskette, then keep it in a safe place.

Creating from the [Autorun Menu]

This menu requires Microsoft Windows XP, Microsoft Windows Vista, Microsoft Windows Server 2003 (or later).

You can create the Windows Server 2003 x64 Editions OEM-Disk for ExpressBuilder from the [Autorun Menu], if you have the computer on which one of the above operating system operates.

Follow the steps below:

1. Prepare a 3.5-inch floppy disks.
2. Start the operating system.
3. Insert the ExpressBuilder DVD in the optical device drive.
   The Autorun menu is displayed.
4. Click [Create drive disk, and select [OEM Disk for Windows Server 2003 x64].

   Note: You can do the same operation using the menu displayed by a right-click.

5. Insert the floppy disk into the floppy disk drive according to the message.
   Windows Server 2003 x64 Editions OEM-Disk for ExpressBuilder will be created.
6. Write-protect and label the diskette, 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 the system on.
2. Insert the Windows Server 2003 x64 Editions CD-ROM in the optical device 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 be displayed. If the screen is not displayed, **Enter** was not pressed properly.

    Retry after turning the system off and then on again.

4. Press **F6** in the few seconds when the window is in one of the following states:
    – "Setup is inspecting your computer's hardware configuration..." is displayed.
    – A screen with a solid blue background is displayed.

    ◢ **Note**: *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 devices.
    ```

    The following message is then displayed.

    ```
                         Please inert the disk labeled

              manufacturer-supplied hardware support disk

                              into Drive A:

                       *Press ENTER when ready.
    ```

6. Insert the Windows Server 2003 x64 Edition OEM-Disk for ExpressBuilder into the floppy disk drive, and press **Enter**.

    A list of mass storage devices is displayed.

7. Select the [Intel(R) ESB2 SATA AHCI Controller (Server ESB2)] and press **Enter**.
8. Select the proper SAS Adapter and press **Enter**.

    Continue performing tasks according to the subsequent messages that appear.

9. When prompted to do so, press **Enter** to start "Welcome to Setup".

10. Once the installation of Windows Server 2003 x64 Edition is completed, the system reboots automatically.

11. Log on to the system, the [Windows Setup] screen is displayed.

Figure 200: Windows Setup Screen

⚠ **Caution**

■ In some cases, the [Windows Setup] screen may not be displayed.
Be sure to install Microsoft Windows Server 2003 R2 x64 Edition DISC 2 according to the following procedures.

■ You can install Microsoft Windows Server 2003 R2 x64 Edition DISC 2 after the application of "System update".
Be sure to install Microsoft Windows Server 2003 R2 x64 Edition DISC 2. In this case, note that the [Windows Setup] screen is not displayed.

---

12. Insert Microsoft Windows Server 2003 R2 x64 Edition DISC 2 CD-ROM into the optical disc drive.

Confirm the parameters and click [OK].

13. When the installation has completed, remove Microsoft Windows Server 2003 R2 x64 Edition DISC 2 CD-ROM from the optical disc drive, and restart the system.

Once the installation is completed, be sure to execute the tasks described in *"Driver Installation and Device Settings" on page 352* and *"Updating System" on page 341* of this chapter.

Procedure for License Authentication

The Product Key used in the procedure for license authentication must match with the COA label.

📋 *Notes*:

■ *Execute the activation within 30 days. The system may be locked once 30 days have passed.*

■ *The COA label may be attached to your server.*

Updating the System - Applying Service Pack -

To ensure normal system operation you should update your system in the following cases:

- The CPU was expanded from single processor to multi-processor.

- The system configuration was modified.

- The system was recovered using the recovery process.

The system update reinforces the system security. We recommend you apply this update. It does not need to be applied again when the Windows Server 2003 x64 Editions CD-ROM (in which ServicePack 2 is included) is installed.

If you install the Windows Server 2003 x64 Editions CD-ROM which contains Service Pack 2, you do not have to apply "Hotfix for Windows x64" or "Hotfix for Windows Server 2003 (KB921411)". Go on to .

Update the System and then apply the "Hotfix (KB921411)".

⚠ Caution

In the situation below, make sure to update the system and to apply the "Hotfix (KB921411)".

■ Modified system configuration

■ Recovered the system using recovery process.

✎ **Note**: *If you use Windows Server 2003 x64 Editions CD-ROM which includes Service Pack 2, the application of "Hotfix (KB921411)" is not required.*

Applying the Hotfix (KB921411)

Apply the "Hotfix (KB921411)" before updating the system.

1. Log on to the system using an account with administrator authority (such as administrator).
2. Insert the ExpressBuilder DVD into the optical disc drive of the server.
3. Click the Start menu, select [Run], and then execute the following command.
   <When Windows Server 2003 x64 Editions is used>
   \002\win\winnt\w2k3amd\qfe\jpn\kb921411.exe

4. When the following message is displayed, click [Next].
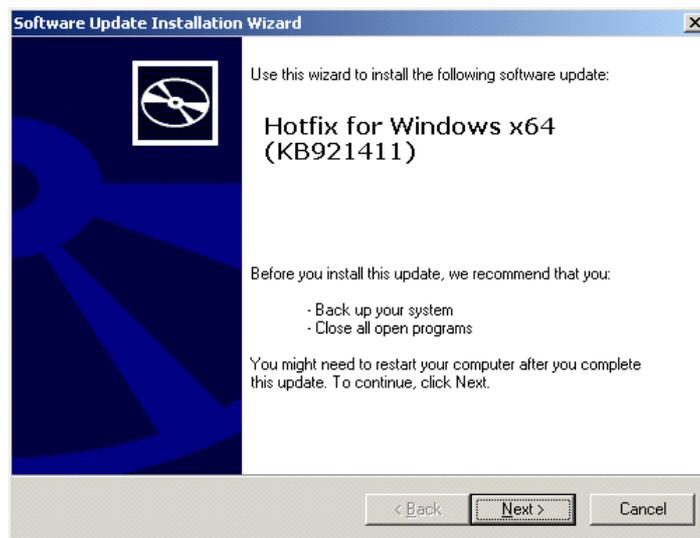
Figure 201: Software Update Installation Wizard

Follon the on-screen messages.

5. When the following message is displayed, make sure to click [Finish] to restart
the system.
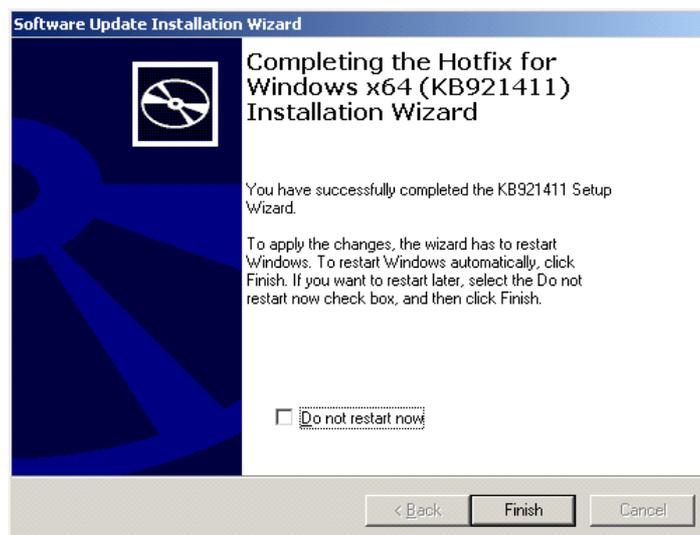
Figure 202: Software Update Installation Wizard

The Hotfix (KB921411) was successfully applied.

Updating the System"

The System Update applies the drivers necessary for the BULL NovaScale.

Follow this process after the Hotfix for Windows x64 (KB921411) or the Hotfix for
Windows Server 2003 (KB921411) have been applied.

> 📝 **Note**: *If you install your system using the Windows CD-ROM that contains the Service Pack 2, you do not have to apply the Service pack 2 again.*

1. Log on to the system using an account administrator authority (such as administrator).

2. Insert the ExpressBuilder DVD into the optical disc drive.

   The Autorun Menu is displayed

3. Left-click on [Setup Windows], and then click [Update the system].

> 📝 **Note**: *You can also right-click on the Autorun Menu.*

Follow the on-screen messages to proceed. The [OK] dialog box is displayed.

Updating the system ⊠

ⓘ Windows Server 2003 x64 Edition has been updated. If you change or add any components to your system, you will need to reapply the update.Click [OK] to run the updated system.

OK

4. Click [OK] to restart the system.

   When the reboot starts, immediately remove the ExpressBuilder DVD from the optical disc drive.

⚠ Caution

During the "Updating the System", the following message may be shown, but there is no impact to the operation. Do not click [cancel] since it may be taken away after a few seconds.

Found New Hardware Wizard

Welcome to the Found New Hardware Wizard

Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy

Can Windows connect to Windows Update to search for software?

○ Yes, this time only
○ Yes, now and every time I connect a device
○ No, not this time

Click Next to continue.

< Back   Next >   Cancel

Recovery Process

If the System Update is executed before the application of the "Hotfix for Windows x64 (KB921411)", "!" may be displayed on the USB root hub.

If "!" is displayed on the USB root hub, follow the process below:

1. Start the Windows Explorer, and click the [Tools] and [Folder Options].
2. Select the [Files and Folders] - [Hidden files and folders] - [Show hidden files and folders] radio button from Advanced settings in the [View] tab.
3. Check the following check box in the [Files and Folders] from Advanced settings in the [View] tab, and then click [OK].

    ■ Hide extensions for know file type

    ■ Hide protected operating system files [Recommended]

    When the message "You have chosen to display protected operating system files..." is displayed, click [Yes].
4. Make sure of the files.

    Open "<System drive:>\WINDOWS\system32\drivers" directory, and make sure usbhub.sys and usbport.sys exist in the directory.

    If you can not find them, copy the files according to the following process.

    a. Open the "<System drive:>\WINDOWS\system32\dllcache" directory.
    b. Copy usbhub.sys and usbport.sys from the directory noted above to "<Systemdrive:>\WINDOWS\system32\drivers".
5. Restart the system.
6. Refer to *"Applying the Hotfix (KB921411)" on page 348* and apply the "Hotfix for Windows x64 (KB921411)".
7. Refer to *"Updating the System"" on page 349* and execute the system update.
8. Restart the system.

    The process is finished.

Driver Installation and Device Settings

This section describes how to install and setup various standard drivers mounted on the device.

For information on installing and setting up a driver that is not described in this section, please refer to the document delivered with the driver.

PROSet

📝 **Notes**: *All the operations relating to Intel® PROSet is must be executed using administrator privileges. Operation using the [Remote Desktop Connection] is prohibited.*

To close the adaper teaming properties dialog box without making any changes, please click on [Cancel].

Clicking the [OK] button will cause a temporary loss of network connectivity.

PROSet is a utility that checks the function of network contained in the network driver.

Using PROSet enables the following items:

■   Verify 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.

To install PROSet:

1. Insert the ExpressBuilder DVD into the optical device drive. If the Autorun menu is displayed, close the menu screen.
2. The [Windows Explorer] dialog starts.

    ■   In the case of the standard start menu, click Start menu and click [Windows Explorer].

    ■   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:

    <optical disc drive Letter>:\002\win\winnt\w2k3amd\dl3\proset\winx64

    The [Intel(R) PROSet - InstallShield Wizard] dialog starts.

4. Click [Next].

5. Choose "I accept the terms in the license agreement" and click [Next].

6. Click [Install].

7. When [InstallShield Wizard Completed] window is displayed, click [Finished].

8. Remove the ExpressBuilder DVD from the optical disc drive and restart the system.

Network Driver

Specify the details of the network driver.

The standard network driver that is mounted will be installed automatically, but the link speed and duplex mode need to be specified manually.

IP addresses cannot be set when the "Internet Protocol (TCP/IP)" check box is OFF. Check ON the "Internet Protocol (TCP/IP)" check box to be able to set IP addresses.

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box is displayed.

   ■ Procedure with the standard start menu: click Start menu, [Control Panel], [Network Connections], and [Local Area Connection].

   ■ Procedure with the classic start menu:

   a. Click Start menu, Click [Settings] and Click [Network Connections]. The [Network Connections] dialog box is displayed.

   b. Right-click [Local Area Connection] and click [Properties] from pop-up menu.

2. Click [Configure]. The property dialog box for the network adapter is displayed.

3. Click [Advanced] and specify the same value for [Link Speed & Duplex] and for the HUB.

4. Click [OK] on the property dialog box for network adapter.

[When PROSet is installed]

1. The [Intel PROSet] dialog box appears.

   * Procedure with the standard start menu

      Click Start menu, point to [Control Panel], [Administrative tools], and click [Computer Management] and then double click the [(Network Adapter Name)] in the Network Adapter list.

   * Procedure with the classic start menu

   a. Click Start menu, point to [Settings] and click [Control Panel].

   b. Click [Administrative tools].

   c. Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.

2. Click [(Network Adapter Name)] in the list.

3. Click the [Link] and specify the [Speed & Duplex] value the same as the value specified for HUB.

4. Click [Apply] and click [OK].

You can 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 displayed from [Network and Dial-up Connection].

Note: We recommend you add [Network Monitor] at [AddingServices]. [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.

---

5. Check the [Include this location in the search] check box and and specifiy the correct path.

6. Click [Next].

7. Click [Finish].

Re-install the Network Driver

The network driver will be installed automatically.

Optional Network Board Driver

If you want to use an optional Network Board (Gigabit adapter), the network driver will be installed automatically. Therefore, the driver attached to the Network board should not be used. If necessary, install the driver stored in ExpressBuilder DVD.

When using 100BASE TX adapters:

    "\002\win\winnt\w2k3amd\dl3\pro100\winx64"

When using 1000BASE T adapters:

    "\002\win\winnt\w2k3amd\dl3\pro1000\winx64"

If the installation procedure is not clear, refer to the installation procedure described below.

If available, you can also refer to the manual provided with the board.

Installing the Optional Network Board Driver

1. Start Device Manager.

2. Click [Network adapters] and Double-Click [(Network Adapter Name)].
[(Network Adapter Name) Properties] is displayed.

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

3. Click the [Driver] tab and click [Update Driver...].
[Hardware Update Wizard] is displayed.

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 specifiy the
correct path. See .

7. Click [Next].

8. Click [Finish].

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

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

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

This feature includes AFT feature.

⚠ **Caution**

■ AFT/ALB setup must be operated after installing the drivers
and restarting the system.

■ All the adapters specified as a group of Adapter Teaming
must exist on the same LAN. If they are connected to the
separate switches, they will not work normally.

■ The adapters specified as a group of Adaptive Load Balanc-
ing (ALB) can be connected to only Switching Hub.

■ When exchanging the motherboard or the optional network
card, make sure to remove the adapter team before the
exchange and recreate the adapter team once the exchange
is completed.

If you want to use AFT/ALB feature:

1. Open the Teaming Wizard.

    * The procedure in the case of the standard start menu

        Click Start menu, point to [Control Panel], [administrative tools], and click [Computer Management] and then double click the [(Network Adapter Name)] in the Network Adapter list.

    * The procedure in the case of the classic start menu

        a. Click Start menu, point to [Settings] and click [Control Panel].

        b. Click [Administrative Tools].

        c. Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.

2. Select [Teaming] tab and then check on [Team with other adapters] and click [New Team...].

    The [New Team Wizard] dialog box appears. Click [Next]. (Specify a name for the team if it necessary.)

3. Select the adapters to include in the team.

4. Select "Adapter Fault Tolerance" or "Adaptive Load Balancing" and click [Next].

5. Click [Finish].

6. If it is necessary to set the adapter priority setting, follow the steps below. Otherwise, go through to step 7.

    a. Click the [Settings] tab on [TEAM:xxx #yy Properties].

    b. Click [Modify Team].

    c. Point to the adapter [Intel(R)PRO/1000....] and click [Set Primary] or [Set Secondary].

    d. Click [OK].

    e. The setup will go back to [EAM:xxx #yy Properties] and the priority setting will display in the list ().

    f. Click [OK]

7. The setup goes back to the [Intel(R) PROSet for Wired Connections] dialog box. Click [OK].

8. Restart the system.

Graphics Accelerator Driver

The drivers for the graphics accelerator cards that are installed in the server will setup automatically.

If you remove an additional graphics card, make sure to remove its corresponding driver.

Should it be necessary to install manually the drivers, follow the procedure below.

1. Insert the ExpressBuilder DVD into the optical disc drive.

    If the autorun menu is displayed, close the menu screen.

   2. Click the Start menu, point to [Programs], [Accessories] and click [Windows Explorer].

   3. Run "setup.exe" in the following directory.

   \002\win\winnt\w2k3amd\video\setup.exe

   4. Follow the on-screen messages to proceed with the installation.

   If the "Digital Signature could not been found." dialog message appears, select [Yes] to continue.

   5. Remove the ExpressBuilder DVD from the optical disc drive, restart the system.

Installing SCSI Controller Drivers

Update the drivers for your system using the ExpressBuilder DVD shipped with your system.

The SCSI controller drivers will be installed automatically.

Installing SAS Controller Driver (LSI SAS3443E-R)

Update your system with the ExpressBuilder DVD attached to your system.

The SAS controller driver will be installed automatically.

Installing a RAID controller Driver (LSILogic MegaRAID SAS 8480E)

Troubleshooting

The driver may sometimes not be installed during the OS installation. In this case, please install the driver as described in the procedure below.

   1. Start [Device Manager] from [Start] menu → [Control Panel] → [Administrative Tools]→ [Computer Management].

   2. Double-click the RAID Controller which the Device Manager lists as "Other device".

   3. Click [Update Driver].

   4. When the "Update Device Driver Wizard" appears, select "No, not this time" and click [Next].

   5. Select "Install from a list or specific location [Advanced]" and click [Next].

   6. Select "Don't search. I will choose the driver to install" and click [Next].

   7. Select "SCSI and RAID controller" and click [Next].

   8. Click [Have Disk..].

   9. Insert the ExpressBuilder DVD into the optical disc drive, enter "\002\win\winnt\oemfd\dotnet\fd1" into "copy manufacturer's file from:" and click [OK].

The installation of the driver is completed. Restart the system according to the on-screen messages.

About the Windows Activation

Windows Server 2003 x64 Editions must be activated before it can be used. The Windows activation process is as follows.

1. Click [Run] on [Start] menu.

Type the following in the [Open:] box, and click [OK].

oobe/msoobe /a
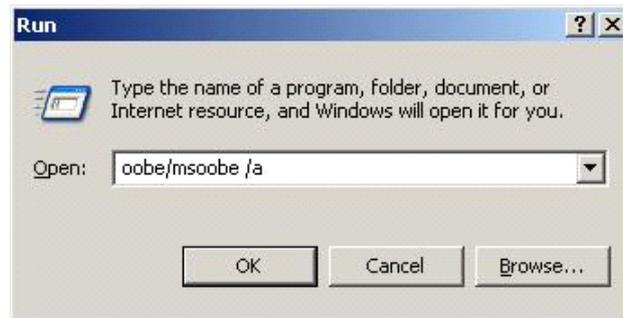
Figure 203: "Run" Dialog Box

2. When the screen below is displayed, click [Next].
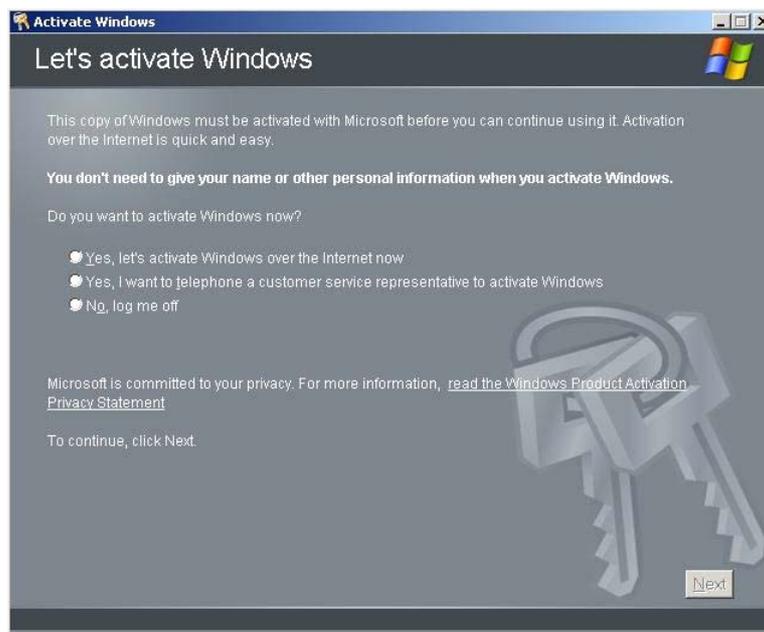
Figure 204: Windows Activation Screen (1)

The following screen is displayed.

3. Follow the on-screen messages to proceed with the activation.

Figure 205: Windows Activation Screen (2)

Setting for the Memory Dump Collection (Debug Information)

Use the procedure described in *"Memory Dump (Debug Information)" on page 313*.

Appendix 8: Equipment Log

Use this equipment log form to record pertinent information about your system. You will need some of this information to run the System Setup Utility. Be sure to update the equipment log when you add options.

Record the model and serial numbers of the system components, dates of component removal or replacement, and the name of the vendor from whom the component was purchased. Be sure to record the same information for any components added to the system, such as a power supply, hard disk drives, add-in boards, or printers.

Record the model and serial numbers of the unit and system board. The model and serial numbers of the system unit are recorded on a label attached to the rear of the unit.

The location of serial numbers on add-in boards, hard disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another. Literature accompanying these products should illustrate or describe the location of model and serial numbers.

Hardware

Main Unit						
	Model name		Serial No.		Date installed	
CPU						
#1	Clock		Serial No.		Date installed	
#2	Clock		Serial No.		Date installed	
Memory						
#11, #21	Size		Serial No.		Date installed	
#31, #41	Size		Serial No.		Date installed	
#12, #22	Size		Serial No.		Date installed	
#32, #42	Size		Serial No.		Date installed	
#13, #23	Size		Serial No.		Date installed	
#33, #43	Size		Serial No.		Date installed	
Monitor						
	Type		Model name		Serial No.	
					Date installed	
Hard Disk						
SAS Port 0	Type			Serial No.		
	Capacity			Date installed		
	Type number					
SAS Port 1	Type			Serial No.		
	Capacity			Date installed		
	Type number					
SAS Port 2	Type			Serial No.		
	Capacity			Date installed		
	Type number					
SAS Port 3	Type			Serial No.		
	Capacity			Date installed		
	Type number					
SAS Port 4	Type			Serial No.		
	Capacity			Date installed		
	Type number					
SAS Port 5	Type			Serial No.		
	Capacity			Date installed		
	Type number					

Backup Device						
	Size		Capacity		Serial No.	
	Model name		Type number		Date installed	
PCI Slot #1B						
	Model name				Serial No.	
					Date installed	
PCI Slot #2B						
	Model name				Serial No.	
					Date installed	
PCI Slot #3B						
	Model name				Serial No.	
					Date installed	
PCI Slot #1C						
	Model name				Serial No.	
					Date installed	
PCI Slot #2C						
	Model name				Serial No.	
					Date installed	
PCI Slot #3C						
	Model name				Serial No.	
					Date installed	
Printer						
	Model name				Serial No.	
	Manufacturer				Date installed	
Additional cabinet for disk						
	Model name				Serial No.	
					Date installed	
External Peripheral Device 1						
	Model name				Serial No.	
	Manufacturer				Date installed	
External Peripheral Device 2						
	Model name				Serial No.	
	Manufacturer				Date installed	
External Peripheral Device 3						
	Model name				Serial No.	
	Manufacturer				Date installed	

External Peripheral Device 4				
	Model name		Serial No.	
	Manufacturer	364	Date installed	

Software

Firmware version				
OS	Apply	Name:		Version
Application of RUR media		Name:		Version
File system	FAT	HPFS	NTFS	
	Others (			)
Bundled software installed				
Licensed software installed				
Application running when a failure occurred				

Software

Technical publication remarks form

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Reference:	86 A1 85EV 00	Date:	January 2008

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Reference	Designation	Qty
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COMPANY: _____

ADDRESS: _____

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For Bull Affiliated Customers:
Customer Code: _____

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