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Glossary

Equipment Log

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Using This Guide

Welcome to the EXPRESS5800/120Lg Service Guide. This service guide has all the information found in the System User's Guide, including disassembly and reassembly instructions for all field replaceable units (FRUs). This service guide also contains technical specifications, and a complete parts list, including an exploded view of the system.

If you have any comments regarding this service guide or if you think something needs to be changed, please contact us. Limit your comments to issues concerning the documentation only, and indicate which service guide you are referring to. For all other service related issues, use your normal feedback channels.

This guide contains the following information:

- Chapter 1, "System Overview" provides an overview of your system and describes your system's major system components. See this chapter to familiarize yourself with the features of your system.
- Chapter 2, "Setting Up Your System" tells you how to select a site, unpack the system, install the system, make cable connections, and power on your system. This chapter also familiarizes you with your system's controls and indicators.
- Chapter 3, "Configuring Your System" tells you how to configure the system and provides instructions for running the BIOS Setup Utility. This chapter also provides information on system board jumper settings.
- Chapter 4, "Disassembly and Reassembly" provides you with instructions for upgrading your system with an additional processor, optional memory, options cards, and peripheral devices. This chapter also provides the disassembly and reassembly instructions for all field replaceable units (FRUs).
- Chapter 5, "Problem Solving" contains helpful information for solving problems that might occur with your system.
- Appendix A, "Specifications" includes hardware information about your system.
- Appendix B, "Installing and Configuring Windows 2000[®]" contains instructions to install and configure hardware and software used with the Microsoft Windows 2000 Operating System.
- Appendix C, "IRQ and I/O Port Addresses" lists the factory-set interrupt requests (IRQs) and I/O Port addresses.
- Appendix D, "Internal Cabling Diagrams" includes system standard configuration and RAID cabling information.
- "Glossary" defines the standard acronyms and technical terms used in this manual.
- "Equipment Log" provides you with a sample equipment log for documenting the system configuration and future updates you may make to your system.

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.

Note: 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 uppercase letters. For example, **AUTOEXEC.BAT**.

Related Documents

In addition to this guide, the following system documentation is included with your server either as electronic files on EXPRESSBUILDER or as paper copy shipped with your server.

- *System Release Notes*

Release Notes provide you with the latest information about your system. This information was not available to be included in your user's guide at the time it was developed and released.

- *Getting Started Sheet*

The Getting Started Sheet provides several easy-to-follow steps to become familiar with your server documentation and to complete your installation successfully.

Safety Notices



- **Caution:** 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:** Lithium batteries can be dangerous. Improper handling of lithium batteries may result in an explosion. Dispose of lithium batteries as required by local ordinance or as normal waste if no local ordinance exists.
- **Warning:** The detachable power supply cord is intended to serve as the disconnect device.
- **Warning:** This equipment has a 3-wire, grounded power cord. To prevent electrical hazards, do not remove or defeat the ground prong on the power cord. Replace the power cord if it gets damaged. Contact your dealer for an exact replacement.
- **Warning:** The DC push-button on/off switch on the front panel does not turn off 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.

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 molded-on NEMA type 5-15 P plug cap at one end and a molded-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.

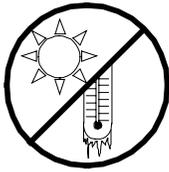
- **Warning:** Under no circumstances should the user attempt to disassemble the power supply. The power supply has no user-replaceable parts. Inside the power supply are hazardous voltages that can cause serious personal injury. A defective power supply must be returned to your dealer.

Safety Notices for Users Outside of the U.S.A. and Canada

- **PELV (Protected Extra-Low Voltage) Integrity:** To ensure the extra-low voltage integrity of the equipment, connect only equipment with mains-protected electrically-compatible circuits to the external ports.
- **Remote Earths:** To prevent electrical shock, connect all local (individual office) computers and computer support equipment to the same electrical circuit of the building wiring. If you are unsure, check the building wiring to avoid remote earth conditions.
- **Earth Bonding:** For safe operation, only connect the equipment to a building supply that is in accordance with current wiring regulations in your country. In the U.K., those regulations are the IEE.

Care and Handling

Use the following guidelines to properly handle and care for your system.



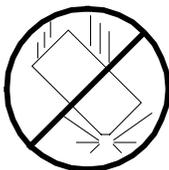
Protect the system from extremely low or high temperatures. Let the system warm (or cool) to room temperature before using it.



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.

1

System Overview

- Overview
- System Features
- System Chassis Features
- Standard Features
- Power Supplies
- Peripheral Bays
- System Functions
- Security

Overview

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

This server is conveniently housed and available as a tower-based system (see Figure 1-1) or as a rack-mount system (fits into a standard EIA 19-inch rack assembly).

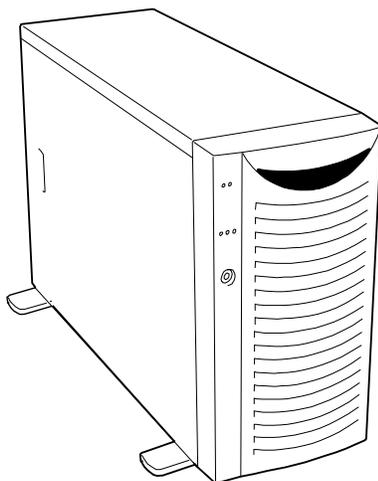


Figure 1-1 Tower System Front View

Your server may include hot-swap SCSI hard disk drive bays. The hot-swap SCSI hard disk drive bays hold up to six 1.0-inch SCSI hard disk drives that can be swapped in or out of the system without powering it down, if RAID is configured in the system.

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

System Features

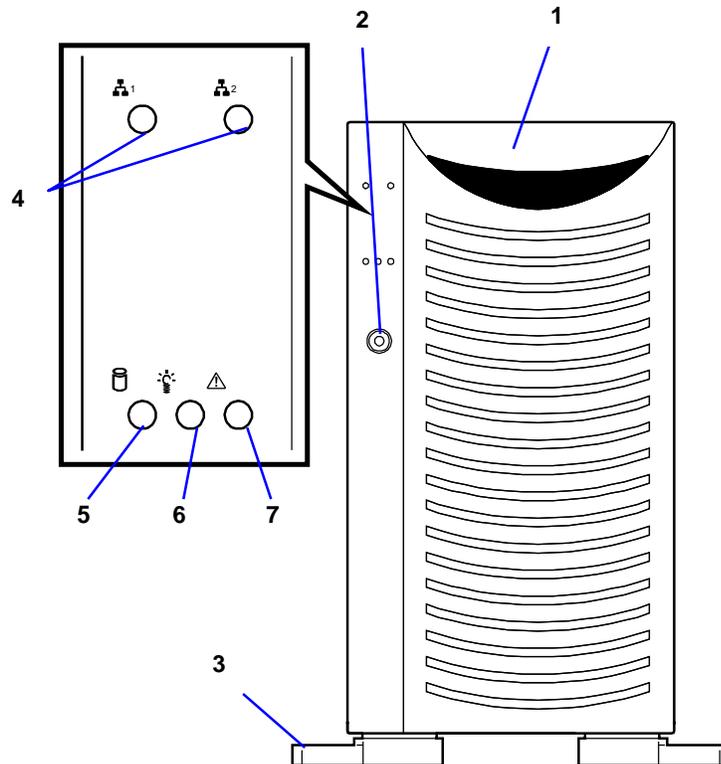
Your system features the following major components:

- Single or dual high-performance Intel™ Xeon™ 1.80GHz or 2.66GHz processors.
- 256 MB to 4 GB of ECC SDRAM two way interleaved memory, using up to four DIMMs.
- Six PCI expansion slots for add-in boards (four 64-bit/100MHz PCI slots and two 32-bit/33MHz PCI slots).
- A maximum of six hot-swap SCSI hard disk drive bays accessible from the front of the chassis.
- Hot-swap SCSI disk drive backplane; a failed drive can be removed and replaced with a new drive without system power being turned off (if an optional Redundant Array of Independent Disks (RAID) controller is installed.)
- High degree of SCSI disk fault tolerance and advanced disk array management features through the use of RAID technology, if an optional RAID controller is installed.
- Embedded PC-compatible support (serial, parallel, mouse, keyboard, diskette, USB, LAN, and video).
- Integrated onboard ATI RAGE XL Video Graphics Array (VGA) controller with 8MB of video memory (VRAM).
- Adaptec SCSI controller providing Ultra-320/160 SCSI interfaces.
- Integrated Network Interface Controller (NIC), a dual channel Gigabit Ethernet LAN controller supporting 10Base-T/100Base-TX/1000Base-T network systems.
- Dual channel enhanced IDE controller.
- Four slot, 5.25-inch removable media device bay.
- IDE CD-ROM drive and 3 ½-inch diskette drive.
- Three integrated Universal Serial Bus (USB) ports, one located at the front panel and two located at the rear panel.
- Hardware monitors (temperature, fans, and voltage) and software monitors to indicate failures.
- Chassis that supports up to two power supply modules. The additional power supply is needed to provide hot-swappable redundant power (i.e., the system will continue to operate with a single power supply failure). With two power modules installed, one power module can be easily removed or installed from the back of the chassis without turning the system power off.
- Fully lockable front bezel including Server Management software that monitors the front bezel intrusion switch.

System Chassis Features

Figure 1-2 shows the system front view features seen with the front door closed.

Front View



1 Front door

Open this door to access the POWER switch, 5.25-inch devices, the CD-ROM drive, or the floppy disk drive, or to install/remove hard disks to 3.5-inch bays. You can lock the front door using the provided security key.

2 Key lock

When locked, secures the front door not allowing access to the front system controls.

3 Stabilizers (4)

Use the stabilizers to prevent the server from falling down.

4 LAN ACCESS lamp (green)

Lights in green while the server is connected to the network. Blinking in green indicates the network activity. Numbers printed near the lamps indicate the LAN port number.

5 DISK ACCESS lamp (green/amber)

Lights in green while the internal hard disk is in access. When any one of the internal hard disks fails, this lamp lights in amber.

6 POWER/SLEEP lamp (green)

Lights in green when the server is powered on. Off when the server is powered off. Blinks when the system is placed in the sleep mode.

7 STATUS lamp (green/amber)

Lights in green while the server is in successful operation. When any error is detected, this lamp lights in amber.

Figure 1-2. Front View (Door closed)

Front View (Door Opened)

Figure 1-3 shows the system front view features seen with the front door opened.

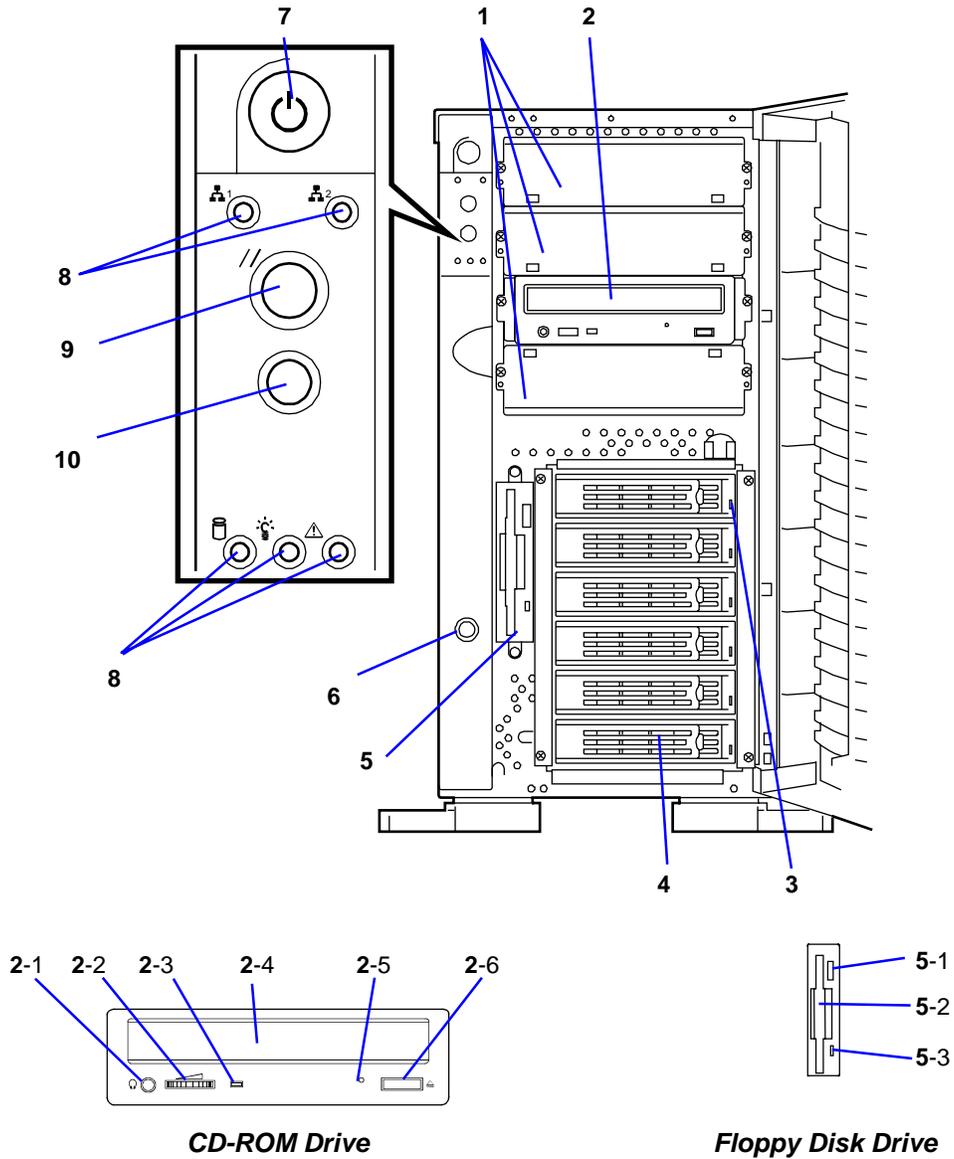


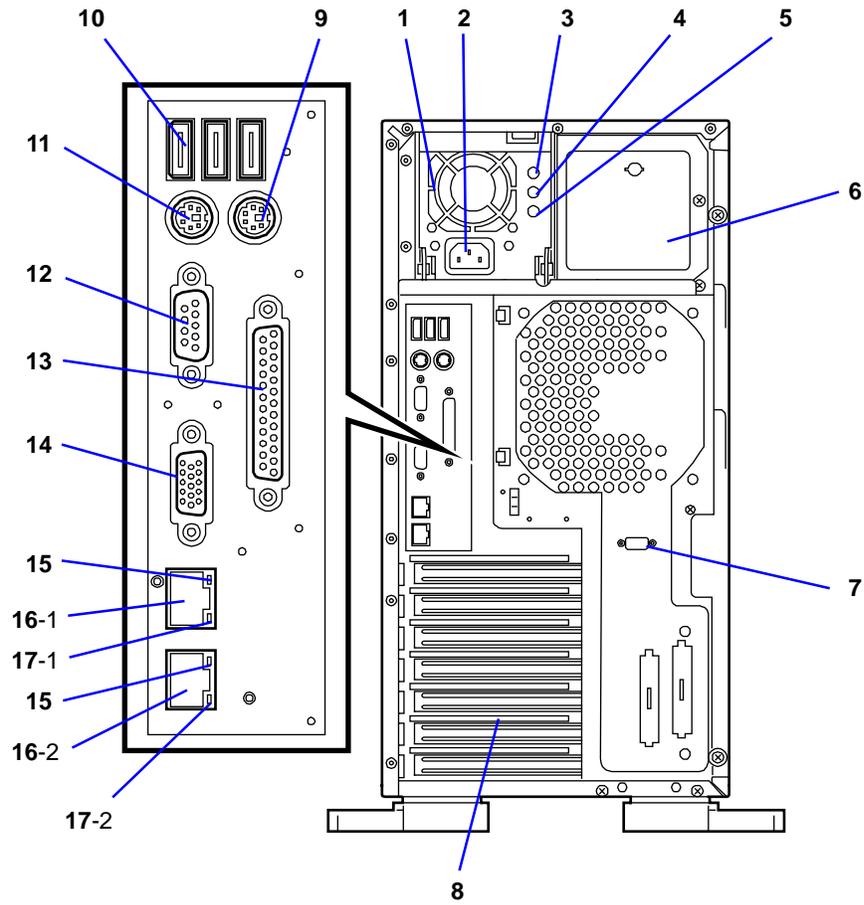
Figure 1-3. Front View (Door opened)

-
- 1 5.25-inch device bay**
Backup tape drives may be installed in the 5.25-inch device bay.
 - 2 CD-ROM drive**
The CD-ROM drive reads data from the inserted CD-ROM.
 - 2-1** Headphone jack
 - 2-2** Volume control
 - 2-3** Access lamp (lights in amber while being accessed)
 - 2-4** CD-ROM slot
 - 2-5** Emergency hole
 - 2-6** Open/Close button
 - 3 Disk lamp (green/amber)**
The disk lamp is lit green if a hard disk installed in the server is accessed. If a hard disk is defected, the lamp is lit amber. During the rebuild processing, the lamp is lit green or amber alternately. (This occurs only in the disk array configuration.)
 - 4 3.5-inch hard disk drive bay**
The 3.5-inch hard disk drive bay contains up to six hard disks. Hard disks having the thickness of 1 inch can be inserted into the slots.
The SCSI IDs are defined as follows:
ID0 to ID5 from bottom to top.
 - 5 3.5-inch floppy disk drive**
Insert a 3.5-inch floppy disk to the 3.5-inch floppy disk drive to read data from the disk or write data to the disk.
 - 5-1:** Eject button
 - 5-2:** Disk inserting section
 - 5-3:** Floppy disk access lamp (lit green during accessing)
 - 6 Cover open sensor**
The cover open sensor detects the open of the front door.
 - 7 Power switch**
The power switch is used to turn on/off the power. If you press the switch once, then the POWER/SLEEP lamp goes on and the power is turned on. If you press the switch again, the power is turned off. The system is forcibly shut down when the power switch is pressed continuously for four seconds or longer.
 - 8 Lamps** (see the figure on the previous page)
 - 9 Reset switch**
The reset switch is used to reset the server.
 - 10 Dump switch (NMI switch)**
Non-maskable Interrupt switch.
The dump switch is used to collect the event logs having occurred in the server.

Figure 1-3. Front View (Door opened)

Rear View

Figure 1-4 shows the system rear view features.

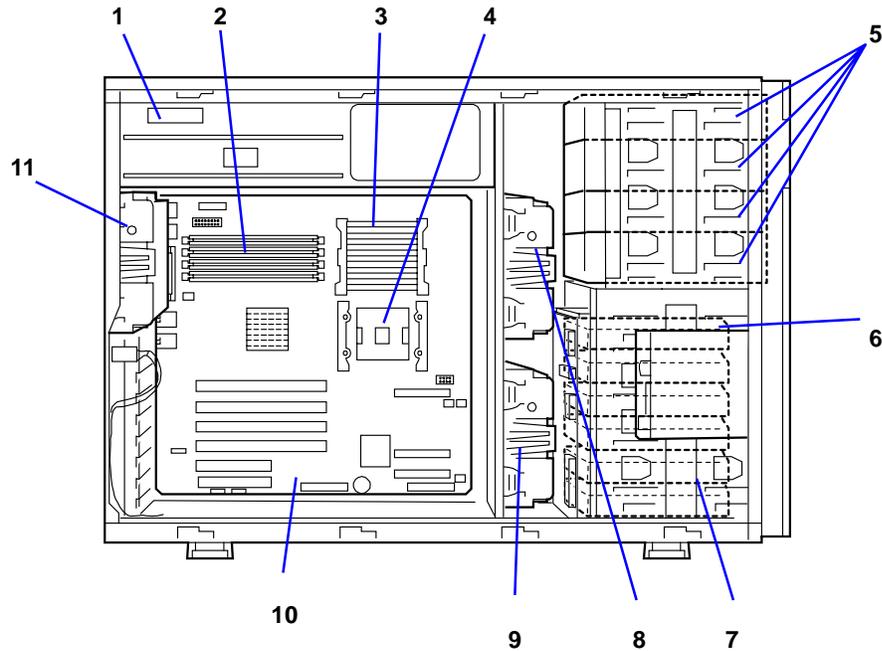


-
- 1 Power supply**
The power unit supplies DC powers to the server.
 - 2 AC inlet**
The AC inlet is connected with the power cord.
 - 3 DC power lamp**
The AC power lamp blinks green if the power supply receives the AC power through the power cord. The lamp goes on green when the power of the server is turned on.
 - 4 Power status lamp**
The lamp goes on if the power is defected.
 - 5 AC power lamp**
If the power cord is plugged to the AC inlet to supply AC power to the power supply unit, this lamp goes on.
 - 6 Additional power supply slot**
An optional power supply may be installed on the slot.
 - 7 Serial port B connector**
The serial port B connector is used to connect the server to a device with the serial interface. The server cannot be directly connected to a leased line through the connector.
 - 8 Additional PCI board slots**
Optional PCI boards may be inserted into the slots.
 - 9 Mouse connector**
The mouse connector is connected with the mouse coming with the server.
 - 10 USB-1 - USB-3 connectors**
The USB-1 to USB-3 connectors are connected with devices accepting the USB interface. Connector 1 to connector 3 are assigned from right to left.
 - 11 Keyboard connector**
The keyboard connector is connected with keyboard coming with the server.
 - 12 Serial port A connector**
The serial port A connector is connected with a device having the serial interface.
 - 13 Printer port connector**
The printer port connector is connected with a printer with the Centronics interface.
 - 14 Monitor connector**
The monitor connector is connected with the display unit.
 - 15 Link/ACT lamp**
The Link/ACT lamp shows the LAN access status.
 - 16 LAN connector**
The LAN connector is connected with a network system on LAN. The value following the bold-faced number indicates the port number.
16-1 LAN2 supports 1000BASE-T/100BASE-TX/10BASE-T network subsystem.
16-2 LAN1 supports 100BASE-TX/10BASE-T network subsystem.
 - 17 Speed lamp**
Indicates the LAN transfer rate.
17-1 1000/100/10 lamp
17-2 100/10 lamp

Figure 1-4. Rear View

Internal View

Figure 1-5 shows an internal view of your system with the air duct covers removed.

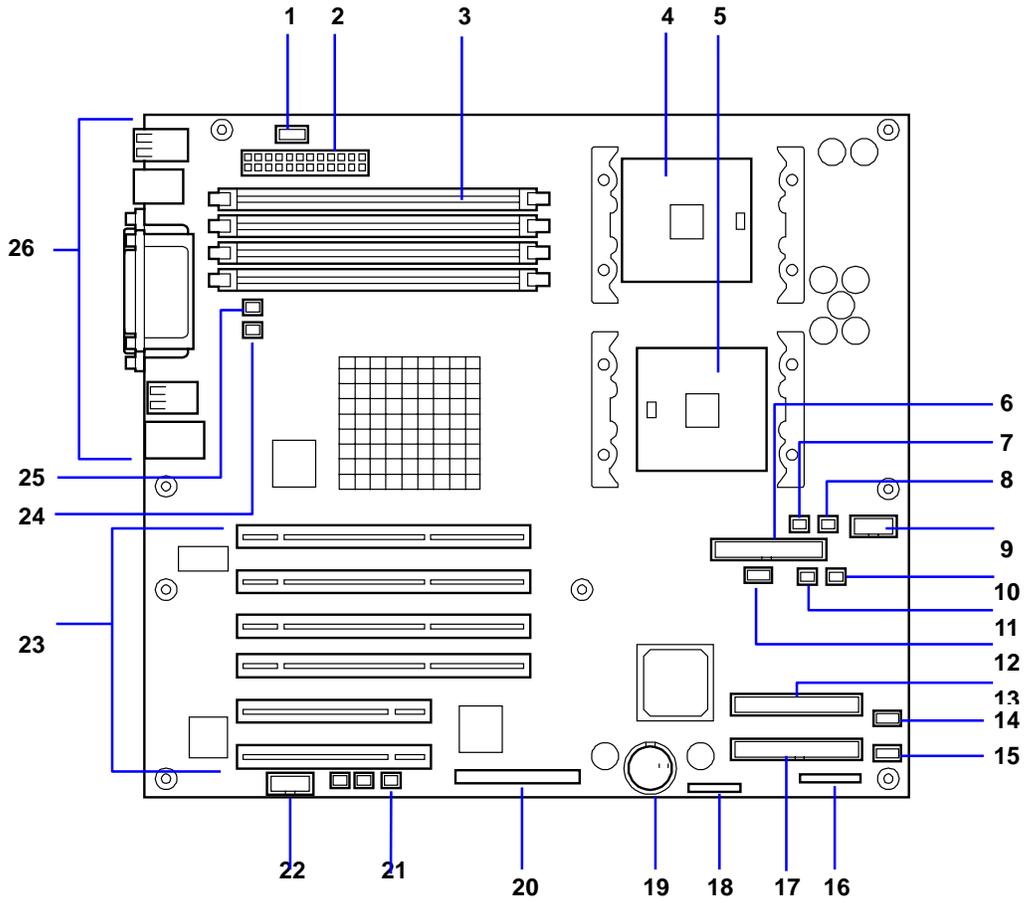


- 1 Power supply**
- 2 DIMMs** (factory-installed in slots #1A and #1B.)
- 3 CPU1** (factory-installed)
- 4 CPU2**
- 5 5.25-inch device bays (4 slots)**
A standard CD-ROM drive is installed in slot #3. The device bay can include a maximum of two optional file devices.
- 6 3.5-inch floppy disk drive**
- 7 3.5-inch hard disk drive bay**
The hard disk drive bay can hold up to six 1.0-inch SCSI hard disk drives.
- 8 Cooling fan (Fan 5: option)**
- 9 Cooling fan (Fan 3: option)**
- 10 Mother board**
- 11 Cooling fan (Fan 1)**

Figure 1-5. Internal View

System Board Features

Figure 1-6 shows details of the system board.



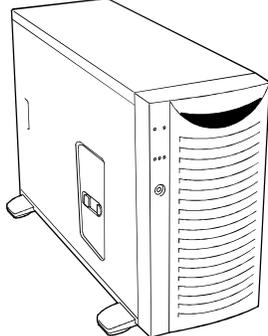
-
- 1 Power signal connector
 - 2 Power connector
 - 3 DIMM sockets (slots #1A, #1B, #2A, and #2B from top to bottom)
 - 4 CPU1 socket
 - 5 CPU2 socket
 - 6 Floppy disk drive connector
 - 7 Cooling fan connector (Fan 5)
 - 8 Cooling fan connector (not used)
 - 9 Power connector
 - 10 HSBP (B) connector (not used)
 - 11 HSBP (A) connector (not used)
 - 12 USB connector
 - 13 IDE connector (for CD-ROM drive)
 - 14 Cooling fan connector (not used)
 - 15 Cooling fan connector (Fan 3: option)
 - 16 Front panel interface connector
 - 17 IDE connector (not used)
 - 18 Jumper switch for clearing CMOS/password
 - 19 Lithium battery
 - 20 Ultra320 (A) connector (for built-in hard disk)
 - 21 DAC LED connector
 - 22 Serial (COM B) connector
 - 23 PCI board slots
(slots PCI #1, PCI #2, PCI #3, PCI #4, PCI #5, and PCI #6 arranged from top to bottom)
PCI #1 to #4: 64-bit/100 MHz
PCI #5, #6: 32-bit/33 MHz
 - 24 Cooling fan connector (Fan 1)
 - 25 Cooling fan connector (Fan 2: option)
 - 26 External connection connector

Figure 1-6. System Board

Standard Features

High performance

- Intel® Xeon™ Processor
N8100-865F: 1.8GHz
N8100-866F: 2.66GHz
- High-speed 1000BASE-T/100BASE-TX/
10BASE-T interface
(1000Mbps/100Mbps/10Mbps supported)
- High-speed disk access
(Ultra320 SCSI)



High-reliability

- Memory monitoring feature (single-bit error correction/double-bit error detection)
- CPU/memory/cooling fan degradation feature (logical isolation of a failed device)
- Bus parity error detection
- Temperature detection
- Error notification
- Internal CPU fan monitoring feature
- Internal voltage monitoring feature
- BIOS password feature
- Security feature (security lock)
- Redundant power supplies (1+1)

Management Utilities

- ESMPRO
- Management Workstation Application (MWA)

Power Saving Feature

- Sleep feature
(available for Windows 2000)

Expandability

- Wide variety of optional I/O slots
Four 64-bit, 100 MHz PCI slots
Two 32-bit, 33 MHz PCI slots
- Large memory of up to 4 GB
- Six SCSI hard disk drive bays (hot-swappable)
- Remote power-on feature
- Up to two Intel Xeon processors
- Two power supplies (Redundancy)
- USB interface (A USB-support driver is required.)
- Convert to rack-mount type (N8143-56F Rack Conversion Kit is required.)

Many Available Features

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

Self-diagnosis

- Power On Self-Test (POST)
- Test and Diagnosis

Maintenance Features

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

Easy and Fine Setup

- EXPRESSBUILDER (system setup utility)
- SETUP (BIOS setup utility)
- SCSI*Select* (SCSI device utility)
- Configuration Diskette Creator

Xeon™ Processors

Depending on system configuration, each system includes one or two Intel Xeon 1.80GHz or 2.66GHz processors. Each processor plugs into a INT3/FCPGA socket package. The processor includes a 512K cache. When two processors are installed, both processors must be of identical bus and core speed.

The processor external interface operates at a maximum of 400MHz. The second-level cache is located on the substrate of the processor cartridge. The cache includes burst pipelined synchronous static RAM (BSRAM).

System Memory

The system board contains four 168-pin DIMM sockets. Memory is partitioned as two banks of registered SDRAM DIMMs (DDR200 compatible) that must be populated in pairs, each providing 72 bits of buffered two-way interleaved memory (64-bit main memory plus ECC). Your system may include from 256 MB to 4 GB of memory, using up to four DIMMs.

System memory begins at address 0 and is continuous (flat addressing) up to the maximum amount of DRAM installed (exception: system memory is noncontiguous in the ranges defined as memory holes using configuration registers). The system supports both base (conventional) and extended memory.

PCI Riser Slots

The server's expansion capabilities meet the needs of file and application servers for high performance I/O by providing PCI expansion slots.

The system board has four full-length, full height 64-bit/100MHz PCI slots and two 32-bit/33MHz PCI slots.

Video Controller

The system board uses an ATI RAGE XL PCI graphics accelerator with 8 MB of video SDRAM. The embedded SVGA video subsystem supports:

- Resolutions up to 1600 x 1200 under 2D and 1024 x 768 under 3D
- CRT and LCD monitors up to 100 Hz vertical refresh rate.

The system board supports disabling of the onboard video through the BIOS setup menu or when a plug in video card is installed in any of the PCI slots.

SCSI Controller

The system board includes an embedded Adaptec AIC7901W SCSI controller. The AIC7901W provides Ultra-320/160 SCSI functions. As implemented on the system board, the interface attaches to an Ultra-320/160 SCSI backplane that supports up to six Ultra-320/160 SCA drives.

Network Controller

The system board uses a dual-channel Ethernet Controller and supports 10Base-T/100Base-TX/1000Base-T network subsystems.

The Network controller supports the following features:

- 64-bit, 100 MHz PCI-X interface
- Integrated IEEE 802.3 10Base-T, 100Base-TX, and 1000Base-T compatible PHY
- IEEE 802.3u auto-negotiation support
- Chained memory structure similar to the 82557, 82558, 82559 and 82596
- Full duplex support at 10 Mbps, 100 Mbps, and 1000 Mbps operation
- Low power +3.3 V devices.

On the system board, NIC1 can be used as both a network interface and server management interface.

Keyboard and Mouse

The keyboard/mouse controller is PS/2-compatible.

RJ-45 Serial Port

The rear RJ-45 serial port is a fully functional serial port that supports any standard serial device and provides support for serial concentrators. For server applications that use a serial concentrator to access the server management features of the mother board, a standard 8-pin CAT-5 cable from the serial concentrator is plugged directly into the rear RJ-45 serial port. The 8 pins of the RJ-45 connector can be configured to match either of two pin-out standards used by serial port devices.

To accommodate either standard, the J5A2 jumper block located directly behind the rear RJ-45 serial port must be jumpered appropriately according to the desired standard.

ACPI

An Advanced Configuration and Power Interface (ACPI) aware operating system can place the system into a state where the hard drives spin down, the system fans stop, and all processing is halted. However, in this state the power supply is still on and the processors are still dissipating some power such that the power supply fan and processor fans are still running.

 **Note:** ACPI requires an operating system that supports its feature.

CAUTION

Only when the AC power is disconnected is the system completely off.

The sleep states are defined as follows:

- 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 restores the system state from the disk and resumes 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 chipset and the BMC are running in this state.

System Board Management Controller (BMC)

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

The BMC supports the Management Workstation Application (MWA), which allows remote server management via a modem or direct connection to a manager system. Events monitored by the manager system include over-temperature and over-voltage conditions, fan failure, or chassis intrusion.

Information on the Management Workstation Application (MWA) may be found in Appendix B of this User's Guide.

One major function of the BMC 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 BMC maintains the nonvolatile Sensor Data Records (SDRs), from which sensor information can be retrieved. The BMC provides an ISA host interface to SDR sensor information, so that software running on the server can poll and retrieve the server's current status.

The BMC performs the following:

- Monitors server board temperature and voltage
- Monitors processor presence and controls Fault Resilient Boot (FRB)
- Detects and indicates 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.

Power Supplies

The system contains one auto-sensing 450-watt power supply at an operating frequency of 50/60 Hz.

A second optional power supply may be added as part of a fault-tolerant hot-swap design. With two power supplies installed, in the unlikely event of a power supply failure, the load is transferred to the remaining power supply without interruption to normal operation. In this case the faulty power supply can be replaced without powering down the system.

NOTE: The power supplies are not hot-swappable unless there are two power supplies installed.

The power supplies are designed to comply with existing emission standards and provide sufficient power for a fully loaded system configuration.

Peripheral Bays

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

- A 3.5-inch front panel bay for installing the standard 3.5-inch floppy disk drive (supports 720KB and 1.44MB floppy disk media)
- Four 5.25-inch device bays for installing half-height or full-height 5.25-inch peripheral devices such as an optional tape drives.
- The SCSI hard disk drive bays for installing up to six SCSI hard disk drives.

The SCSI disk drives can be easily installed or removed. The drive carrier allows you to access to disk drives from the front of the system. If disk drives are provided with RAID configuration within the system, a disk drive can be swapped with another without power interruption in the system (hot-swap).

NOTE: The SCSI hard disk drive bays contain a hot-swap back plane that require an 80-pin single connector attachment (SCA) connector on the drives that you install.

System Functions

The following subsections describe select system functions.

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.

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

Remote Power-On Feature (Wake On LAN)

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

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

The remote power-on feature is not available in the following cases. Press the POWER switch once to start the 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 Chapter 4.)

Security

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

Security with Mechanical Locks and Monitoring

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

The computer chassis includes an intrusion switch for the front cover and intrusion/interlock switches for the left side cover (as viewed from the front). When any these covers are opened, the switch transmits an alarm signal to the system board, where server management software processes the signal. The side cover switch also operates as interlock switch.

Software Locks via the System Setup Utility

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

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period – 2 to 120 minutes.
- Set and enable an administrative password.
- Set and enable a user password
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches.
- Activate a hot-key combination to enter secure mode quickly.
- Disable writing to the floppy disk drive when secure mode is set.

2

Setting Up the System

- Overview
- Selecting a Site
- Unpacking the System
- Making Connections
- Connecting the Power Cord
- Using 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.

Selecting a Site

The system operates reliably in a typical office environment. Choose a site that is:

- Near grounded, three-pronged power outlets.

 **Note:** For the United States and Canada, this means a NEMA 5-15R outlets for 100-120 VAC or NEMA 6-15R outlets for 200-240 VAC. For other international sites, this means three-pronged power outlets applicable for the electrical code of the region.

WARNING

Be sure the power service connection is through a properly grounded outlet.

CAUTION

When two power supplies are installed in the system the power plug from each of the power supplies must be plugged into the same common ground power outlets.

- Clean, dust-free, and well ventilated. Front and rear ventilating openings kept free of obstructions. Away from sources of heat, vibration or physical shock.
- Isolated from strong electromagnetic fields and electrical noise produced by electrical devices (such as air conditioners, large fans, large electric motors, radio and TV transmitters, and high-frequency security devices)
- Spacious enough to provide at least ten inches (25 centimeters) in front of the system, five inches (13 centimeters) behind the system and three inches (eight centimeters) on each side of the system for proper cooling, airflow, and cable clearance.
- Easily accessible for system maintenance and installation of system upgrades.

Unpacking the System

WARNING

The non-hot-swap system can weigh up to 40 pounds (18 kg) and the hot-swap system can weigh up to 77 pounds (35 kg). If the system contains numerous optional boards and peripheral devices, it will weigh more. To avoid personal injury, make sure you have someone help you lift or move 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.

Making Connections

If your system normally operates without a video display or keyboard (for example, as a network server), you must install a video display and keyboard to configure the system. You may remove them after running the BIOS Setup Utility. For information on running the BIOS Setup Utility, refer to Chapter 3 "Configuring Your System" of this User's Guide.

Refer to the previous figure (Rear Features and Controls) and connect your keyboard, monitor, and mouse. Connect any external peripheral devices such as a printer or modem by following the instructions included with these devices.

CAUTION

Damage to the system may result if the keyboard/mouse cable is inserted or removed when power is applied to the system.

Inserting a telephone line connector into a RJ-45 LAN port may result in personal injury and equipment damage.

The server is provided with connectors for wide variety of peripheral devices on its front and rear. Figure 2-1 illustrates available peripheral devices for the server in the standard configuration and locations of the connectors for the devices.

CAUTION

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

- Before connecting a third-party peripheral device or interface cable to the server, consult with your sales agent. Some third-party devices may not be used with the server.
- The total length of a cable (including the connection cable within a SCSI device) is limited by the SCSI standard. Ask your service representative for details. (The internal SCSI cable of the server is 0.1 m long.)
- The LAN connector and the serial port 2 connector of this server have the same shape. Be careful not to connect a cable to the wrong connector. Tag all LAN and serial port cables.

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

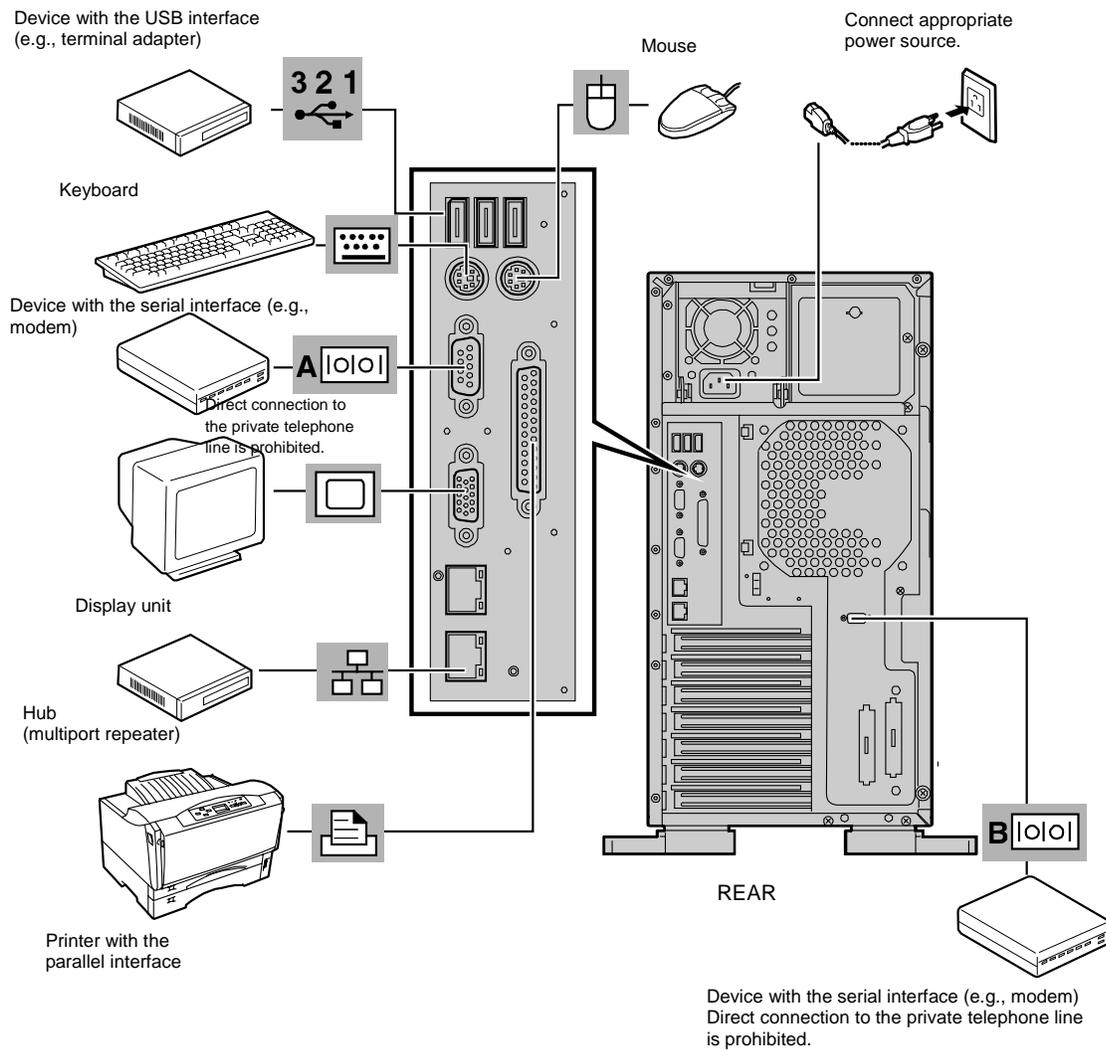


Figure 2-1. Making Connections

Connecting the Power Cord

Plug the female end of each AC power cord shipped with your system into the input receptacle on the rear of each power supply shipped with your system. Plug the male end of the power cord into NEMA 5-15R outlet for 100-120 VAC or NEMA 6-15R outlet for 200-240 VAC.

If a power cord supplied with the system is not compatible with the AC wall outlet in your region, obtain a suitable power cord that meets the following criteria.

- The power cord must be rated for the available AC voltage and have a current rating that is at least 125% of the current rating of the system.
- The power cord connector that plugs into the wall outlet must be terminated in a grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region.
- The power cord connector that plugs into the system must be an IEC- type CEE-22 female connector.
- The power cord must be less than 1.8 meters (6.0 feet) long.

When connecting the power cord to a power control unit such as an UPS unit, confirm that the power control unit is powered OFF. Connecting the power cord while power is supplied to the power control unit may cause a failure.

WARNING

A power cord is provided for each power supply shipped with your system. Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

Using the System

The following subsections describe how to use this server system properly and safely, including an explanation of the server system power on/off sequences, what the POST program checks in the server, and how to perform a forced power shutdown.

When using the server system the following precautions should be observed.

- Do not delete the hard disk partition exclusively provided for maintenance of the server although it may appear on the operating system (OS). Deleting the hard disk partition may cause malfunction of the server.
- Make sure you power off the server before connecting or disconnecting cables between the server and peripheral devices. Connecting or disconnecting the cables while the server is powered on may cause malfunction or failures within the server.

-
- Verify that the access lamp on the diskette drive is unlit before turning off the server or ejecting the floppy disk. Turning off the server or ejecting the floppy disk while the access lamp is lit may damage data being stored on the floppy disk.
 - After turning off the server, wait at least 40 seconds before turning it on again. Cycling the power immediately may cause malfunction or failures of the server.
 - Before relocating the server, turn off the power and unplug the power cord from the outlet. Moving the server when it is powered may cause malfunction or failures of the server.
 - Some software includes a command to eject the CD-ROM tray or a media in a device mounted in the 5.25-inch device bay. Make sure that the front door of the tower-based cabinet is open before running the command. Running this command with the front door closed may cause the CD-ROM tray or the media to hit against the front door, resulting in a possible failure of the CD-ROM.
 - Clean the server regularly. Regular cleaning prevents failures of the server and its components.
 - Lightning may cause a momentary voltage drop. To prevent this problem, an uninterruptible power supply unit is recommended.
 - Only use options qualified for the server. A non-qualified option may be mounted or connected to the server, but it may fail to operate normally or even cause failures. These types of failures are not covered under warranty.

Opening the Front Door of the Tower Cabinet

You must open the front door of the tower cabinet to turn the server power on or off, place the server in sleep mode, mount or dismount a floppy disk, mount or dismount a hard disk drive, or mount or dismount 5 1/4-inch removable media devices.

 **Note:** The standard CD-ROM drive and some options for the 5 1/4-inch devices such as a CD-ROM drive have a function to eject a tray or media using a software command. Before issuing a software command to eject a tray or media, confirm that the front door is open. If the command is executed while the front door is closed a tray or media may run into the front door resulting in an error or may cause the unit to fail.

Powering On Your System

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. Open the front door (tower-based system only) and press the push-button power on/off switch on the front panel. Verify that the system power-on LED is lit. 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 display unit.

 **Note:** For error messages that appear on the display unit, refer to subsection *POST Error Codes and Messages* in Chapter 5 of 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* in Chapter 5 of this User's Guide.

After you have successfully powered on your system, insert the EXPRESSBUILDER CD-ROM into the CD-ROM device, reboot the system and follow the screen prompts to run EXPRESSBUILDER.

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. Press the power on/off switch on the front panel of the server. The power-on LED goes out.
3. Power off the peripheral devices.

 **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.

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.

3

Configuring Your System

- Configuring Your System
- BIOS Setup Utility
- SCSISelect Utility
- Configuring the RAID Controller
- Configuring System Board Jumpers

Configuring Your System

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

The *SCSISelect* Utility detects the SCSI host adapters on the system board. Use this utility if you need to configure the two SCSI controllers in your system or to perform a SCSI disk format or verify disk operation on the SCSI disk drives. The Adaptec Configuration Utility is also used to configure any SCSI removable media devices installed in your system.

If your system has been factory configured, the BIOS Setup or *SCSISelect* 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, or upgrade your system board.

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

Use the EXPRESSBUILDER CD-ROM to create the device driver diskettes.

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

Menu	Use
Main	Use this menu for basic system configuration.
Advanced	Use this menu for setting the Advanced Features available on your system.
Security	Use this menu to set User and Supervisor Passwords and the Backup and Virus-Check reminders.
Server	Use this menu for configuring unique Server features.
Boot	Use this menu to configure Boot Device priority.
Exit	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.

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.
HOME or END	Move cursor to top or bottom of window.
PAGE UP or PAGE DOWN	Move cursor to next or previous page.
F5 or -	Select the previous value for the field.
F6 or + or SPACE	Select the next value for the field.
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

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.	
Floppy A	Disabled 1.44/1.25 Mb 3½" 720Kb 3.5" 2.88MB 3.5"	Hidden if not detected.	
Floppy B	Disabled 1.44 / 1.25 Mb 3½" 720Kb 3.5" 2.88MB 3.5"	Hidden if not detected.	
Hard Disk Pre-delay	Disabled 3 seconds 6 seconds 9 seconds 12 seconds 15 seconds 21 seconds 30 seconds	Allows additional time for slower spin-up drives to come ready.	
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) French, German Spanish, Italian	Selects which language BIOS displays. Note: This feature <i>immediately</i> changes to the language BIOS selected.	

Primary and Secondary Master and Slave IDE Submenus

Feature	Choices or Display Only	Description	Your Setting
Type	Auto None	Select Auto if a device is attached to the IDE channel.	
Multi-Sector Transfer	Disabled 2 Sectors 4 Sectors 8 Sectors 16 Sectors	Specifies the number of sectors that are transferred per block during multiple sector transfers. This field is informational only, for Type Auto.	
PIO Mode	Standard FPIO 1 FPIO 2 FPIO 3 FPIO 4 FPIO 3 / DMA 1 FPIO 4 / DMA 2	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	Mode 2	Selects the Ultra DMA mode used for moving data to/from the drive. This field is informative only for Type Auto.	

Processor Settings Submenu

Feature	Choices or Display Only	Description	Your Setting
Processor POST Speed Setting	Information Only	Displays measured processor speed.	
Processor Retest	Disabled Enabled	If yes, BIOS will clear historical processor status and retest all processors on the next boot. After retesting, BIOS resets this option automatically to "Disable".	
Hyper-Threading	Disabled Enabled	Specifies whether Hyper-Threading Technology is enabled or disabled.	
Processor 1 CPUID	CPUID Not Installed Disabled	Reports CPUID for Processor 1, if present. If empty, reports Vacant. If disabled by BMC, reports Disabled.	
Processor 1 L2 Cache Size	Information Only	Displays L2 Cache Size for Processor 1.	
Processor 2 CPUID	CPUID (OFXX) Not Installed Disabled	Reports CPUID for Processor 2, if present. If empty, reports Vacant. If disabled by BMC, reports Disabled.	
Processor 2 L2 Cache Size	Information Only	Displays L2 Cache Size for Processor 2.	

Advanced Menu

Feature	Choices or Display Only	Description	Your Setting
PCI Configuration	Select sub-menu.		
Peripheral Configuration	Select sub-menu.		
Memory Configuration	Select sub-menu.		
Advanced Chipset Control	Select sub-menu.		
Boot-time Diagnostic Screen	Disabled Enabled	Specifies whether POST messages are displayed. If this item is set to "Disabled," the logo appears during POST. The Boot-time Diagnostic Screen is automatically enabled if redirection is enabled.	
Reset Configuration Data	No Yes	Select 'Yes' if you want to clear the System configuration Data during next boot. Automatically reset to 'No' in next boot.	
Numlock	On Off	Sets power on Numlock state.	

PCI Configuration Menu

Feature	Choices or Display Only	Description	Your Setting
Onboard NIC 1 (10/100MB)	Select sub-menu.		
Onboard NIC 2 (1.0GB)	Select sub-menu.		
Onboard SCSI	Select sub-menu.		
Onboard Video	Select sub-menu.		
PCI Slot 1 ROM	Disabled Enabled	Used to enable or disable an option ROM that may be present on a PCI add-in card connected to the full-height riser card.	
PCI Slot 2 ROM	Disabled Enabled	Used to enable or disable an option ROM that may be present on a PCI add-in card connected to the full-height riser card.	
PCI Slot 3 ROM	Disabled Enabled	Used to enable or disable an option ROM that may be present on a PCI add-in card connected to the full-height riser card.	
PCI Slot 4 ROM	Disabled Enabled	Used to enable or disable an option ROM that may be present on a PCI add-in card connected to the low-profile riser card.	
PCI Slot 5 ROM	Disabled Enabled	Used to enable or disable an option ROM that may be present on a PCI add-in card connected to the low-profile riser card.	
PCI Slot 6 ROM	Disabled Enabled	Used to enable or disable an option ROM that may be present on a PCI add-in card connected to the low-profile riser card.	

Onboard NIC 1 / Onboard NIC 2 Submenu

Feature	Choices or Display Only	Description	Your Setting
Onboard NIC 1	Enabled Disabled	Enables or disables onboard LAN controller.	
Onboard NIC 2	Enabled Disabled	Enables or disables onboard LAN controller.	
Onboard NIC 1 ROM	Enabled Disabled	Enables or disables onboard LAN controller expansion ROM.	
Embedded NIC 2 ROM	Enabled Disabled	Enables or disables onboard LAN controller expansion ROM.	

Onboard SCSI Submenu

Feature	Choices or Display Only	Description	Your Setting
Onboard SCSI	Enabled Disabled	Enables or disables onboard SCSI controller.	
Onboard SCSI ROM	Enabled Disabled	Enables or disables onboard SCSI ROM	

Onboard Video Submenu

Feature	Choices or Display Only	Description	Your Setting
Onboard Video	Enabled Disabled	Enables or disables onboard video controller.	

Peripheral Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Serial Port A (DB-9) Address	Disabled 3F8 2F8 3E8 2E8	Used to configure the base I/O address for serial port 1.	
Serial Port A (DB-9) IRQ	4 3	Used to configure the interrupt for serial port 1.	
Serial Port 2 B (RJ45) Address	Disabled 3F8 2F8 3E8 2E8	Used to configure the base I/O address for serial port 2.	
Serial Port B (RJ45) IRQ	4 3	Used to configure the interrupt for serial port 2.	
Parallel Port Address	Disabled 378 278 3BC	Disables the parallel port or selects base address for parallel port.	
Parallel Port IRQ	5 7	Selects the interrupt (IRQ) for parallel port.	
Parallel Port Mode	Normal	Selects the parallel port operation mode.	

	Bi-Directional EPP ECP	
EPP Version	1.7 1.9	Selects the version for Enhanced Parallel Port (EPP) mode.
ECP Mode DMA Channel	0 1 2 3	Selects the DMA channel for Extended Capabilities Port (ECP) mode.
Legacy USB Support	Disabled Keyboard Only Auto Keyboard and Mouse	Disables or enables support for USB keyboards and mice. Set to Enable for use with a non-USB aware operation system such as DOS.
PS/2 Mouse Support	Disabled Enabled	Specify whether the mouse is enabled or disabled.

Memory Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Extended Memory Test	1 MB 1 KB Every-Location Disabled	Extended memory test options run during POST. 1MB: Tests every 1-MB memory. 1KB: Tests every 1-KB memory. Every-Location: Tests every memory location. Disabled: Initializes memory.	
DIMM Bank #1 (DIMM1A, DIMM1B)	Installed Disabled Not Installed	Indicates the current memory status. "Normal" indicates the normal status, "Error" indicates a memory error, and "None" indicates no DIMM installed (view only). Bank #1 indicates DIMMs in DIMM sockets #1A and #1B. (Memory is interleaved so that two DIMMs are used per bank.)	
DIMM Bank #2 (DIMM2A, DIMM2B)	Installed Disabled Not Installed	Indicates the current memory status. "Normal" indicates the normal status, "Error" indicates a memory error, and "None" indicates no DIMM installed (view only). Bank #2 indicates DIMMs in DIMM sockets #2A and #2B. (Memory is interleaved so that two DIMMs are used per bank.)	
Memory Retest	Disabled Enabled	Clears memory error information and retests all DIMMs on the next system boot. This option will be automatically reset to [Disabled] on the next system boot.	

Advanced Chipset Control Submenu

Feature	Choices or Display Only	Description	Your Setting
Wake on Ring	Disabled Enabled	Enables or disables the remote power-on features via serial port (modem).	
Wake on LAN	Disabled Enabled	Enables or disables the remote power-on features via network .	

Wake on PME	Disabled Enabled	Enables or disables the remote power-on features by PCI device (PCI Power Management Enable wake up event) installed to the PCI riser C.
Wake on RTC Alarm	Disabled Enabled	Enables or disables the remote power-on features using RTC Alarm features.

Security Menu

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

Feature	Choices or Display Only	Description	Your Setting
User Password is	Installed Not Installed	Indicates whether the user password is set (view only).	
Administrator Password is	Installed Not Installed	Indicates whether the administrator password is set (view only).	
Set Admin Password	Up to 7 alphanumeric characters	Press Enter to display the administrator password entry screen. With the administrator password, all SETUP menus are available for access. This option is available only when you log into the SETUP utility with the administrator password.	
Set User Password	Up to 7 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 Administrator Password is specified.	
Password On Boot	Disabled Enabled	Specify whether to request a password entry at boot-up. Administrator password setup is required.	
Fixed Disk Boot Sector	None Write Protect	Prevents data from being written to IDE hard disks. The server does not support IDE hard disks.	
Secure Mode Timer	1 minute 2 minutes 5 minutes 10 minutes 20 minutes 60 minutes 120 minutes	Set the period from no input from the keyboard or mouse to the point at which the system enters into the secure mode. If this item is set to "Disabled," the system does not enter the secure mode.	
Security Hot Key CTRL-ALT-	L Z	Specify the hot key to invoke secure mode features. Pressing the assigned key along with Ctrl and Alt invoke secure mode. This option is enabled when User Password is set.	
Secure Mode Boot	Disabled Enabled	Specify whether the system boots in secure mode. This option is enabled when User Password is set.	
Video Blanking	[Disabled] Enabled	Specify whether to turn off the monitor when secure mode is activated.	
Power Switch Inhibit	Disabled Enabled	Enables or disables the POWER switch. If "Enabled" is selected, power-off with the POWER switch becomes unavailable after OS boot-up. (Forced shut down also becomes unavailable. Forced shut down is a feature to shut down by pressing the POWER switch for at least four seconds.)	
Diskette Write Protect	[Disabled] Enabled	Controls access to the floppy disk drive during the secure mode.	

Server Menu

Feature	Choices or Display Only	Description	Your Setting
System Management	Select Submenu		
Console Redirection	Select Submenu		
Event Log Configuration	Select Submenu		
Assert NMI on PERR	Disabled Enabled	Sets support of PCI PERR.	
Assert NMI on SERR	Disabled Enabled	Sets support of PCI SERR.	
FRB-2 Policy	Disable BSP Do not Disable BSP Retry 3 Times Disable FRB2 Timer	Set this item to "Disable BSP."	
BMC IRQ	Disabled IRQ 5 IRQ 11	Sets the BMC IRQ.	
AC-Link	Stays Off Last State Power On	Sets the AC-LINK feature. Determines the mode of operation if a power loss occurs.	
Temperature Sensor	Disabled Enabled	Enables or disables temperature sensor monitoring feature.	
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.	
Platform Event Filtering	Disabled Enabled	Disable or enable the event report function of Baseboard Management Controller (BMC).	
Boot Monitoring	Disabled 5 minutes 10 minutes 15 minutes 20 minutes 25 minutes 30 minutes 35 minutes 40 minutes 45 minutes 50 minutes 55 minutes 60 minutes	Indicates whether the boot monitoring function is enabled or disabled and the timer value on booting. To use this function, install ESMPRO Agent. Do not use this function if the system is booted from OS without installation of ESMPRO Agent or CD-ROM. Set this item to "Disabled" if ARCServe uses the Disaster Recovery Option.	

Server Menu (Continued)

Feature	Choices or Display Only	Description	Your Setting
Boot Monitoring Policy	Retry 3 Times Retry Service Boot Always Retest	<p>This item indicates the processing at the occurrence of timeout during boot monitoring.</p> <p>If [Retry 3 times] is selected, the system is reset after the occurrence of timeout and OS boot is retried up to three times. The failure in the third boot causes the boot to be tried from the service partition*.</p> <p>If [Retry Service Boot] is selected, the system is reset after the occurrence of timeout and OS boot is retried up to three times. Then the boot is tried from the service partition for three times. The system halts if the system fails to boot from the service partition.</p> <p>If [Always Retest] is selected, the system is reset after the occurrence of timeout and OS boot is retried repeatedly.</p> <p>* If no service partition exists in the system, BIOS continues to bootup from the system partition.</p>	

System Management Submenu

Feature	Choices or Display Only	Description	Your Setting
Board Part Number	–	Indicates the part number of mother board. (View only)	
Board Serial Number	–	Indicates the serial number of mother board. (View only)	
System Part Number	–	Indicates the system part number. (View only)	
System Serial Number	–	Indicates the serial number of system. (View only)	
Chassis Part Number	–	Indicates the part number of chassis. (View only)	
Chassis Serial Number	–	Indicates the serial number of chassis. (View only)	
BIOS Version	–	Indicates BIOS version number. (View only)	
BMC Device ID	–	Indicates the device ID of BMC (Baseboard Management Controller). (View only)	
BMC Firmware Revision	–	Indicates BMC (Baseboard Management Controller) firmware revision number. (View only)	
BMC Device Revision	–	Indicates BMC (Baseboard Management Controller) device revision number. (View only)	
PIA Revision	–	Indicates the revision of PIA (Platform Information Area). (View only)	
SDR Revision	–	Indicates the revision of SDR (Sensor Data Record). (View only)	
Primary HSBP Revision	–	Indicates primary HSBP (Hot-Swap Backplane) revision number. (View only)	

Secondary HSBP Revision	–	Indicates secondary HSBP (Hot-Swap Backplane) revision number. (View only)
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Console Redirection Submenu

Feature	Choices or Display Only	Description	Your Setting
BIOS Redirection Port	Disabled Serial Port A (DB-9) Serial Port B (RJ45)	Specify the serial port to which a hardware console is connected.	
ACPI Redirection Port	Disabled Serial Port A (DB-9) Serial Port B (RJ45)	Specify the serial port to which an ACPI console is connected.	
Baud Rate	9600 19.2k 57.6k 115.2k	Selects a baud rate for communications with the connected HW console.	
Flow Control	No Flow Control CTS/RTS XON/XOFF CTS/RTS+CD	Select a flow control method.	
Terminal Type	VT100+ VT-UTF8 PC ANSI	Specify the type of remote console.	

Event Log Submenu

Feature	Choices or Display Only	Description	Your Setting
Clear All Event Logs	No Yes	Clears the DMI event log after a system reboot.	

Boot Menu

Feature	Choices or Display Only	Description	Your Setting
Boot Device Priority	Select sub-menu.		
Hard Disk Drives	Select sub-menu.		
Removable Devices	Select sub-menu.		
ATAPI CDROM Drives	Select sub-menu.		

Boot Device Priority Submenu

Feature	Choices or Display Only	Description	Your Setting
1st Boot Device	ATAPI CD-ROM	Attempts to boot from an ATAPI CD-ROM drive.	
2nd Boot Device	Removable Devices	Attempts to boot from a removable media device.	
3rd Boot Device	Hard Drive	Attempts to boot from a hard drive device.	
4th Boot Device	IBA 4.1.04 Slot 0118	Attempts to boot from a network devices connected to the LAN port 1.	
5thBoot Device	IBA GE Slot 0120v1109	Attempts to boot from a network devices connected to the LAN port 2.	

Hard Drives Submenu

Item	Description
1. Drive #1 (or actual drive name)	"Other bootable cards" cover all the boot devices not reported to the system BIOS through BIOS Boot Specification mechanisms. It may or may not be bootable, and may not correspond to any device.
2. Other bootable cards	

Removable Devices Submenu

Item	Description
Lists Bootable Removable devices in the system.	Select one of the detected devices. This list includes legacy 1.44-MB floppy drives and 120-MB floppy drives.
Lists ATAPI CDROM Drives	Selects the Boot sequence from available devices.

Exit Menu

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.

Choices	Description
Exit Saving Changes	Exit after writing all modified Setup item values to NVRAM.
Exit Discarding Changes	Exit leaving NVRAM unmodified. User is prompted if any of the setup fields were modified.
Load Setup Defaults	Load default values for all SETUP items.
Load Custom Defaults	Load values of all Setup items from previously saved Custom Defaults. NOTE: This is hidden if custom defaults are not valid or present.
Save Custom Defaults	Stores Custom Defaults in NVRAM.
Discard Changes	Read previous values of all Setup items from NVRAM.

SCSISelect Utility

The SCSISelect Utility detects and configures the SCSI controller located on the system board or an optional SCSI controller board installed in your system. This utility may be started with a simple key operation while POST is in progress and requires no specific start-up disk.

The SCSISelect Utility is used mainly to set the transfer rate of connected SCSI device. Use the SCSISelect Utility to:

- Change default values
- Check and/or change SCSI device settings that may conflict with those of other devices in the server.

Running the SCSISelect Utility

You access the SCSISelect Utility when you turn on or reboot your system.

To run the utility, perform the following procedure:

1. Power-on or reboot the system.
2. When this message appears on the video monitor:
Press Ctrl-A to run SCSI Utility...
3. Press **Ctrl+A** to run this utility. The SCSI utility starts. When the Adaptec SCSI Utility detects more than one AIC-79xx host adapter, it displays a selection menu listing the bus and device number of each adapter. When the selection menu appears, select the channel you wish to configure as follows:

Bus : Device : Channel	Selected SCSI Adapter
04 : 07 : A*	AIC-7901

*Internal SCSI connector.

4. Once you select the adapter, the following screen is displayed:

Menu	Description
Configure/View Host Adapter Settings	Configure host adapter and device settings.
SCSI Disk Utilities	The utility scans the SCSI bus for SCSI devices, reports a description of each device. Run these utilities <i>before</i> configuring SCSI devices.

5. If you wish to format a disk, verify disk media, or display a list of devices and their SCSI IDs, select "SCSI Disk Utilities". If you wish to configure the adapter or a device, select "Configure/View Host Adapter Settings".

Adaptec SCSI Utility Configuration Settings

The following keys are active for all Adaptec SCSI Utility screens:

Key	Action
Arrows	Up and down arrows move from one parameter to another within a screen.
ENTER	Displays options for a configurable parameter. Selects an option.
ESC	Moves back to previous screen or parameter or EXIT if at the Main menu.
F5	Switches between color and monochrome.
F6	Resets to host adapter defaults.

The following table shows the normal settings for the Adaptec SCSI Utility and provides a place for you to record any changes you make to these settings.

Table 3-1. SCSISelect Utility Setup Configurations

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
SCSI Bus Interface Definitions		
SCSI Controller ID	7	
SCSI Controller Parity	Enabled	
SCSI Controller Termination	Enabled	
Additional Options		
Boot Device Configuration	Press ENTER for menu	
Master SCSI Controller	AIC-7901 at Slot 0004:07:00	
SCSI Device Configuration	Press ENTER for menu	
Sync Transfer Rate (MB/Sec)	320	
Packetized	Yes	
QAS	Yes	
Initiate Wide Negotiation	Yes	
Enable Disconnection	Yes	
Send Start Unit Command	Yes	
BIOS Multiple LUN Support	No ¹	
Include in BIOS Scan	Yes ¹	
Advanced Configuration	Press ENTER for menu.	
Reset SCSI Bus at IC Initialization	Enabled	

¹ No effect if BIOS is disabled.

Table 3-1. SCSISelect Utility Setup Configurations (continued)

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
Display <Ctrl-A> Messages During BIOS Initialization	Enabled	
Extended Int13 Translation for DOS Drives >1 GByte	Enabled	
POST Display Mode	Verbose	
SCSI Controller Int13 Support	Enabled ¹	
Domain Validation	Enabled ¹	
Support Removable Disks Under Int13 as Fixed Disks	Disabled ^{1, 2}	
BIOS Support for Bootable CDROM	Enabled ¹	
BIOS Support for Bootable CDROM	Enabled ¹	

¹ No effect if BIOS is disabled.

² Do not remove media from a removable media drive if it is under BIOS control.

SCSI Disk Utilities

This utility scans the SCSI bus for SCSI devices, reports a description of each device. Run these utilities before configuring SCSI devices.

To enter the utility, select "SCSI Disk Utilities" on the Options menu.

The SCSI ID scan begins displaying the message as shown below.

```
Scanning SCSI ID : 0  LUN Number : 0
```

When the SCSI ID scan completes, the screen listing SCSI IDs and associated devices appears.

```
Select SCSI Disk and press <Enter>

SCSI ID #0 : No device
SCSI ID #1 : No device
SCSI ID #2 : No device
SCSI ID #3 : No device
SCSI ID #4 : No device
SCSI ID #5 : No device
SCSI ID #6 : No device
SCSI ID #7 : Adaptec AIC-7901
SCSI ID #8 : No device
SCSI ID #9 : No device
SCSI ID #10 : No device
SCSI ID #11 : No device
SCSI ID #12 : No device
SCSI ID #13 : No device
SCSI ID #14 : No device
SCSI ID #15 : No device
```

With this screen you can determine the SCSI IDs for installed options. You can also view the device information by selecting a device and pressing **Enter**.

The following sub menu appears.

SCSI ID#4	: xxxxxxxxx		
Firmware	: xxxx xxx		
Capacity	: xxGB		
<table border="1"><tr><td>Format</td></tr><tr><td>Verify Disk Media</td></tr></table>		Format	Verify Disk Media
Format			
Verify Disk Media			

The following table lists submenu items and descriptions.

Submenu item	Description
Format	Formats the selected device.
Verify Disk Media	Verifies all the sectors in the selected device. If one or more bad sectors are found, the sectors are remapped.

Exiting Adaptec SCSI Utility

To exit the Adaptec SCSI Utility, press ESC until a message prompts you to exit (if you changed any settings, you are prompted to save the changes before you exit).

Configuring the RAID Controller

RAID (Redundant Array of Independent Devices) options are available for your system, providing added security and high availability.

If you order a system with a RAID controller, the system is pre-configured at the factory according to Table 3-2 below.

Table 3-2. RAID Configurations

Number of Hard Drives	RAID Level Configured	Hard Drives in Array	Description
1	7	1	JBOD (RAID 7) Known as <i>Just a Bunch of Drives</i> , JBOD allows the controller to access the drives independently. This configuration has no redundancy and does not use striping.
2	1	2	Mirroring (RAID 1) Drives are paired and mirrored. All data is 100% duplicated on an equivalent drive (fully redundant).
3	5	3	Striping with Parity (RAID 5) Data is striped across several physical drives. Parity protection is used for data redundancy.
4 or more	5	4 (one standby drive)	Striping with Parity (RAID 5) with a standby drive The array consists of three ON-LINE drives and one STANDBY drive. The standby replacement drive, or hot spare, is one of the most important features RAID provides to achieve automatic, non-stop service with a high degree of fault-tolerance.

If you want to change the RAID level or add additional hard disks to the array, use the RAID configuration utility. The RAID configuration utility is included with the RAID controller.

If you are adding the RAID controller to an existing system, the RAID configuration utility allows you to configure your disk array before reinstalling your network operating system. The RAID controllers support various versions of RAID technology (referred to as RAID levels). To use any RAID level, you must configure the RAID controller using the RAID configuration utility prior to installing your Network Operating System. For an explanation of this utility, refer to the documentation that was shipped with the RAID controller. It describes RAID technology and provides tips on making your array perform well in your specific application. It also covers array hardware preparation, configuration, and initialization. After completing the steps in the manual, you can install your Network Operating System.

If you want to remotely configure the array (from a PC client); increase array capacity online; or monitor statistics on disk and controller activity, you must install the array manager provided with your RAID subsystem. Increasing array capacity is covered in the user's guide shipped with the option.

Configuring System Board Jumpers

Before You Begin

Only a qualified technical person should perform the procedures in this section.

CAUTION

Electrostatic discharge (ESD) can damage the system board. Modify the system board only at an ESD workstation. Otherwise, wear an antistatic wrist strap attached to chassis ground.

The system board jumpers enable you to set specific operating parameters for your system. A jumper is a small plastic-encased conductor (shorting plug) that slips over two jumper pins.

Figure 3-1 shows the location of system board jumpers. Referring to Figure 3-1, jumper A is the CMOS clear configuration jumper. Jumper B shown in Figure 3-1 is the password clear configuration jumper. Table 3-3 lists the factory default settings for the CMOS and password configuration jumpers.

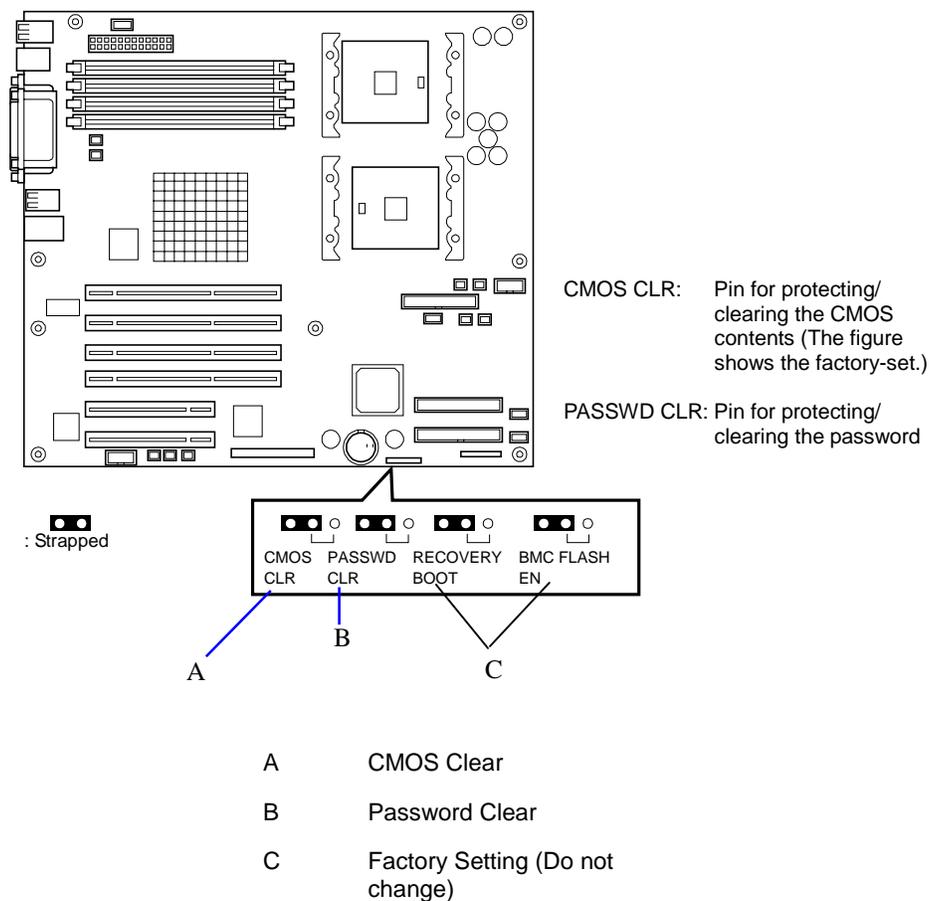


Figure 3-1. System Board Jumpers

Table 3-3. Password/CMOS System Board Jumper Summary

Jumper	Function	Jumper On/Off (default in bold)	What it does at system reset.
A	CMOS clear	Off, Protect On, Erase	Preserves the contents of CMOS. Clears CMOS.
B	Password disable	Off, Enable On, Disable	Enables password protection. Disables the password.
C	Reserved	Off, Not Used	Do Not Change.

Moving System Board Jumpers

 **CAUTION**

Before doing the procedures in this section, 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 moving the jumpers can result in personal injury and equipment damage.

Observe static precautions. Use an antistatic wrist strap.

Clearing CMOS

Clear CMOS as follows.

1. Shut down the OS.
2. Press the POWER switch to turn off the power of the server. (The POWER/SLEEP lamp goes off.)
3. Remove the side cover. Refer to Chapter 4 for information on removing the side cover.
4. Remove the system power cord from the back of the system.
5. Locate the position of the CMOS jumper on the system board. See Figure 3-1. To change a jumper setting, use a pair of needle-nose pliers or your fingers to remove the jumper from its current location. Position the jumper over the two pins shown at Figure 3-1, A and press it onto the pins. Be careful not to bend the pins. Also refer to Table 3-3 for system board jumper setting descriptions.
6. Connect the power cord, power on the system and after POST completes, power down the system and unplug the power cord.
7. Remove the CMOS jumper to its original position.
8. Replace the side cover, connect the power cord, and power on the system.
9. Press **F2** at the prompt to run the BIOS Setup utility, and select “Get Default Values” at the Exit menu.

Clearing and Changing the Passwords

To clear and change the passwords:

- 1.** Shut down the OS.
- 2.** Press the POWER switch to turn off the power of the server. (The POWER/SLEEP lamp goes off.)
- 3.** Remove the side cover. Refer to Chapter 4 for information on removing the side cover.
- 4.** Remove the system power cord from the back of the system.
- 5.** Locate the position of the password jumper on the system board.
See Figure 3-1. To change a jumper setting, use a pair of needle-nose pliers or your fingers to remove the jumper from its current location. Position the jumper over the two pins shown at Figure 3-1, B and press it onto the pins. Be careful not to bend the pins. Also refer to Table 3-3 for system board jumper setting descriptions.
- 6.** Connect the power cord, power on the system and after POST completes, power down the system and unplug the power cord.
- 7.** Remove the password jumper to its original position.
- 8.** Replace the side cover, connect the power cord, and power on the system.
- 9.** Press **F2** at the prompt to run the BIOS Setup utility. Specify a new password, if desired.

4

Disassembly and Reassembly

- General Information
- Static Precautions
- Equipment Log
- Tools Recommended for Upgrading Your System
- Preparing Your System for Disassembly and Reassembly
- Side Access Panel
- Processor Air Duct
- Modifying the System Board
- Hard Disk Drives
- Hot-Swap Power Supply
- Non-Hot-Swap Power Supply
- Front Cooling Fan Unit
- Removable 5.25-inch Media Devices
- PCI Boards
- RAID Controller Board
- Diskette Drive and Carrier Assembly
- Front Bezel and Front Bezel Hinge (Tower-Based System)
- Front Panel
- Hot-Swap HDD Bay

-
- Hot-Swap SCSI Backplane
 - Replacing the Rear Cooling Fan
 - System Board
 - Power Supply Back Board
 - Tower Feet
 - I/O Shield
 - LED/Switch Assembly
 - Intrusion Switch Assembly

General Information

WARNING

The DC push-button on/off switch on the front panel does not turn off 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 side access panels removed can damage your system components. For proper cooling and airflow, always replace the side access panels 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 Disassembly and Reassembly

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

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system's cabinet. For rack-mount systems you must remove the front panels of the system chassis.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 2). The power-on LED goes out.
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Unplug all the I/O cables connected to the rear panel of your system.

Side Access Panel

To install options in your system, you must remove the access panel on the left-hand side of the system (as viewed from the front). The side access panel on the right-hand side of the system (as viewed from the front) does not have to be removed.



CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.



WARNING

If you are removing the side access panel after the system is set up, you must first power off the system and all external devices and then **unplug** the system power cord(s).

To remove the left side access panel (see Figure 4-1):

1. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* described earlier in this chapter.
2. The left-hand side access panel is secured to the chassis with two thumbscrews. Loosen the thumbscrews securing the side access panel.
3. Using the indentation on the side of the panel, slide the side access panel toward the rear of the system. This unlocks the locking fingers behind the side access panel.
4. Pull the side access panel out and away from the chassis.

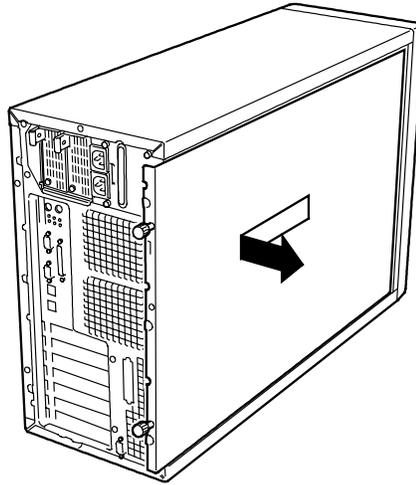


Figure 4-1. Removing the Left-Hand Side Access Panel

To install the left side access panel (see Figure 4-2):

1. Check to make sure that no tools or loose parts have been left inside the system chassis.
2. Make sure all option boards are firmly seated in their respective slots and that all interior cables are properly connected.
3. Insert the locking fingers on the top and bottom of the side access panel into their slots on the chassis. Then slide the side access panel forward as far as it will go.

 **Note:** Ensure that the side access panel is installed properly and securely fastened. A cover sensor (intrusion switch) monitors the left-hand side access panel.

4. Tighten the side access panel thumbscrews.

 **Note:** If your system is already set up, plug the system back in, reconnect the peripherals, and power on the peripherals and system.

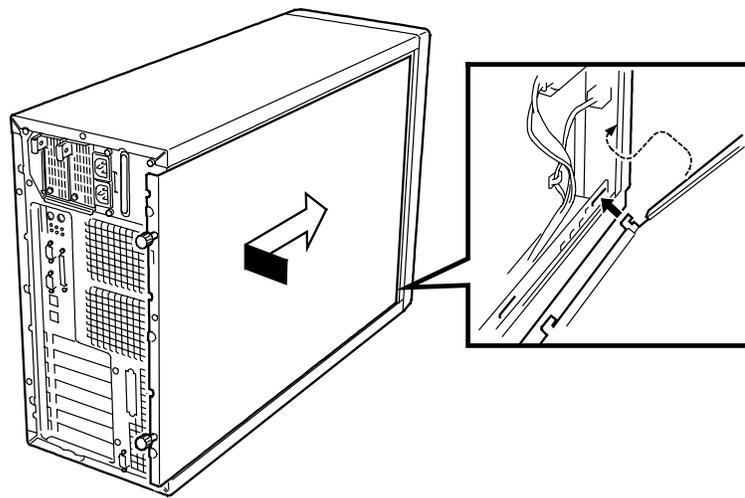


Figure 4-2. Installing the Left-Hand Side Access Panel

Processor Air Duct

To install or remove the DIMM or a processor, you will need to remove the air duct.

IMPORTANT: Do not assemble the server without installing the air duct. If the duct is not installed in the system, reduced cooling efficiency and can affect performance or cause damage due to overheating.

Removal

Follow these steps to remove the air duct.

1. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* described earlier in this chapter.
2. Remove the side cover.
3. Hold the left side of the air duct, and push the right end of the tab to release from the chassis. See Figure 4-3.
4. Remove the duct from the chassis.

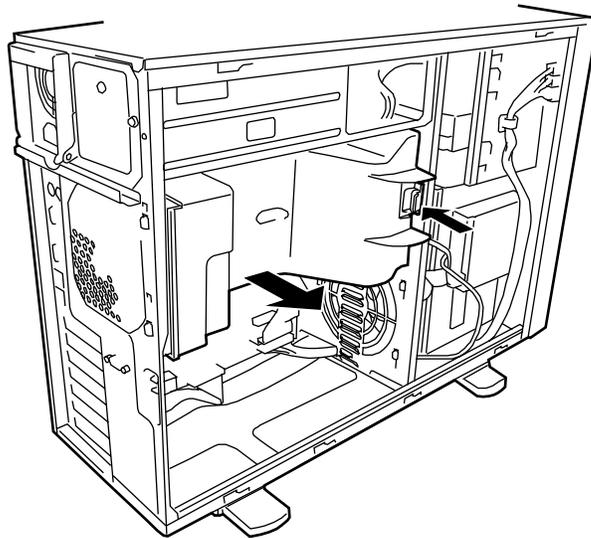


Figure 4-3. Removing the Air Duct

Installation

Follow these steps to install the air duct.

1. Holding the internal cables clear, place the air duct into the chassis. See Figure 4-4.
2. Adjust the air duct until the tab on the right end of the duct is aligned with the slot on the chassis.

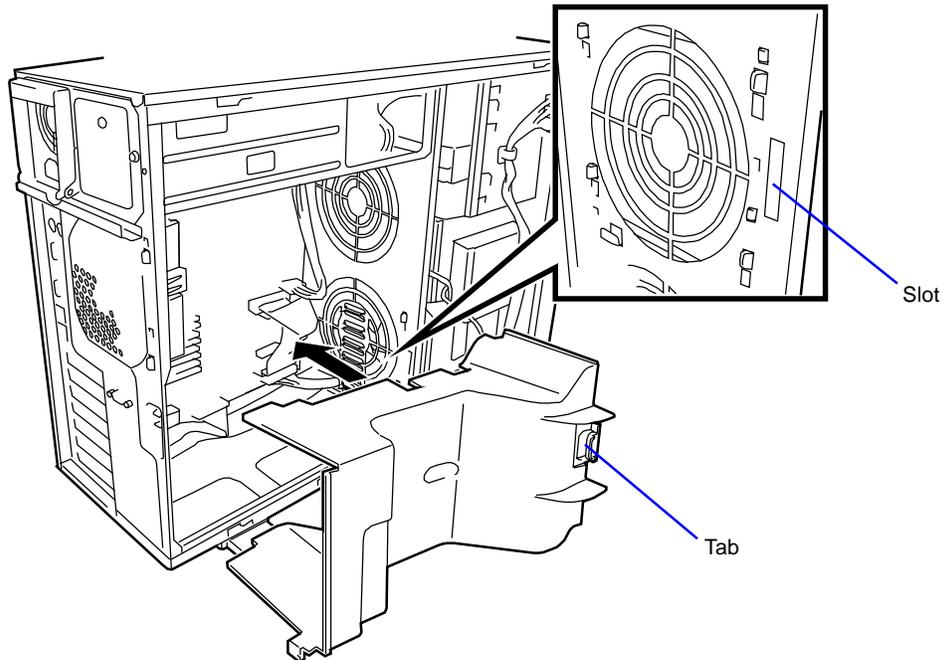


Figure 4-4. Installing The Air Duct

3. Reinstall the side cover.

Modifying the System Board

The following sections provide procedures for upgrading and configuring the system board in your system. Topics covered include:

- Replacing the real-time clock battery
- Removing and installing a processor
- Installing or removing DIMMs.

CAUTION

Electrostatic discharge (ESD) can damage add-in boards and other components; place them on an antistatic surface. Modify the system board only at an ESD workstation. Otherwise, wear an antistatic wrist strap attached to chassis ground.

Replacing the Real-time Clock Battery

You may need to replace the real-time clock (RTC) battery because of its life span. The battery powers the clock in the absence of power. When the battery starts to weaken, it loses voltage, and the system settings stored in CMOS RAM (for example, the date and time) may be wrong.

The 3V battery (Vendor Part #CR2032) is a commodity part available through many vendors. It is located on your system board (See Figure 4-5). Notice the plus (+) sign on the battery. This sign will assist you in correctly positioning the battery on the system board. Contact your sales representative or dealer for a list of approved devices.

CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by manufacturer. Dispose of lithium batteries as required by local ordinance or as normal waste if no local ordinance exists. Do not expose the component to excessive heat or fire. Keep all batteries away from children

CAUTION

Observe static precautions. Use an antistatic wrist strap.

To replace the RTC battery, perform the following procedures:

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system's cabinet. For rack-mount systems you must remove the front panels of the system chassis.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 1). The power-on LED goes out.
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.

 **CAUTION**

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

8. Remove the processor air duct. See *Processor Air Duct Removal* earlier in this chapter.
9. If present, remove the protective plastic cover located over the top of the lithium battery (see Figure 4-5).
10. Insert the tip of a small flat-bladed screwdriver, or equivalent, under the plastic tab on the plastic retainer (see Figure 4-5, A).
11. Gently push down on the screwdriver to lift the battery (see Figure 4-5, B).
12. Remove the battery from its socket (see Figure 4-5, C).
13. Dispose of the battery according to local ordinance.
14. Remove the new lithium battery from its package, and, being careful to observe the correct polarity (plus sign (+) up) insert it into the battery socket.
15. If applicable, reinstall the plastic cover on the lithium battery socket.
16. Reinstall the air duct.
17. Reinstall the left-hand side access panel on the system chassis.
18. Plug in the system power cord(s), and turn on the system.

19. Run the BIOS Setup to restore the configuration settings to the real-time clock.

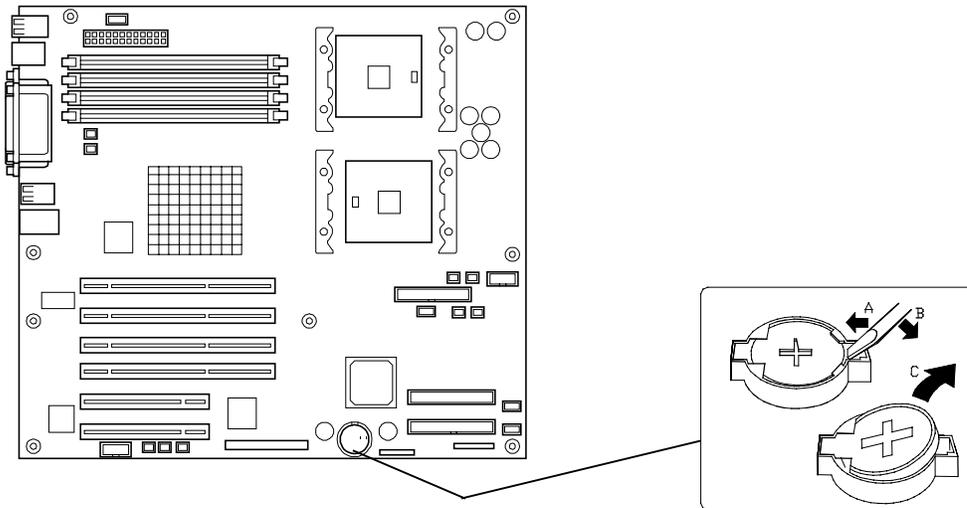


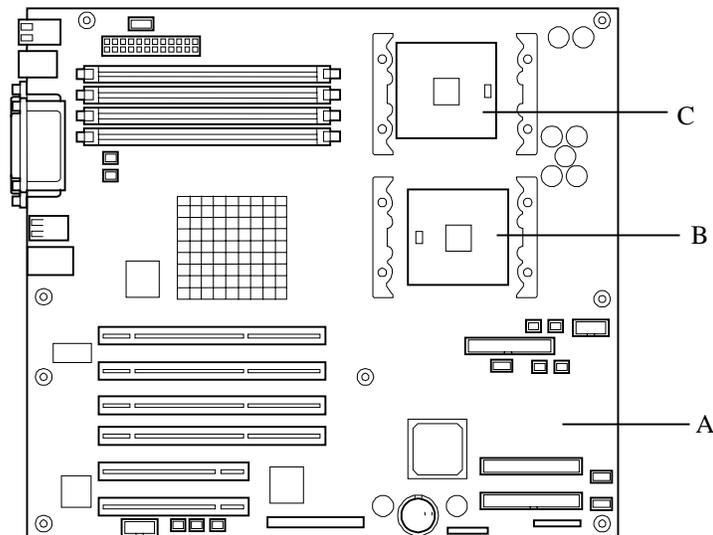
Figure 4-5. Replacing the Real-Time Clock Battery

Removing and Installing a Processor

This subsection provides the procedures for removing and installing a Xeon processor in your system. The system board has sockets for two processors. Each Xeon processor plugs into a standard Xeon ZIF socket. The processor comes with up to 512K cache. The primary processor connector is shown in the illustration below (see Figure 4-6, C). The secondary processor connector is shown in the illustration below (Figure 4-6, B).

CAUTION

Electrostatic discharge (ESD) can damage components; place them on an antistatic surface. Modify the system board using an antistatic wrist strap attached to chassis ground.



A – System board
B – CPU #2
C – CPU #1

Figure 4-6. System Board Xeon Processor Locations

WARNING

If the system was running, any processor and heat sink installed is hot. To avoid the possibility of a burn, let the components cool for 10 minutes before continuing with these procedures.

CPU Installation

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system's cabinet.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 1). The power-on LED goes out.
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.

CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

8. Remove the processor air duct. See *Processor Air Duct Removal* earlier in this chapter.
9. Locate the CPU socket which you are going to install CPU.
10. Raise the locking lever on the socket. See Figure 4-7.

IMPORTANT: Open the lever until it stops. The bar can be opened to approx. 120 degrees.

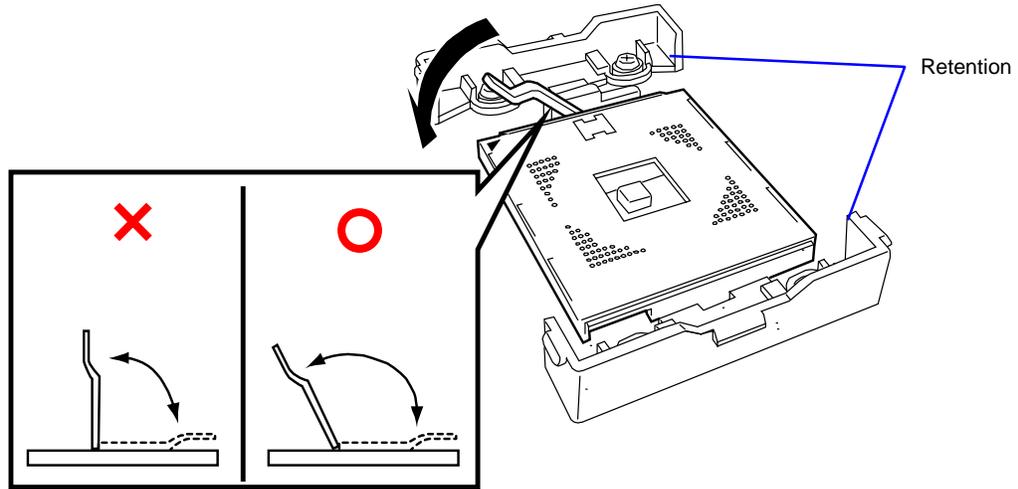


Figure 4-7. Raising the Locking Lever

11. Aligning the pins of the CPU with the socket, insert the CPU slowly and gently into the socket. See Figure 4-8.

IMPORTANT: Be aware of CPU direction. Pin layouts on two corners among four differ from others to prevent an incorrect insertion. Confirm the pin mark and pin layout on the socket, and insert the CPU correctly.

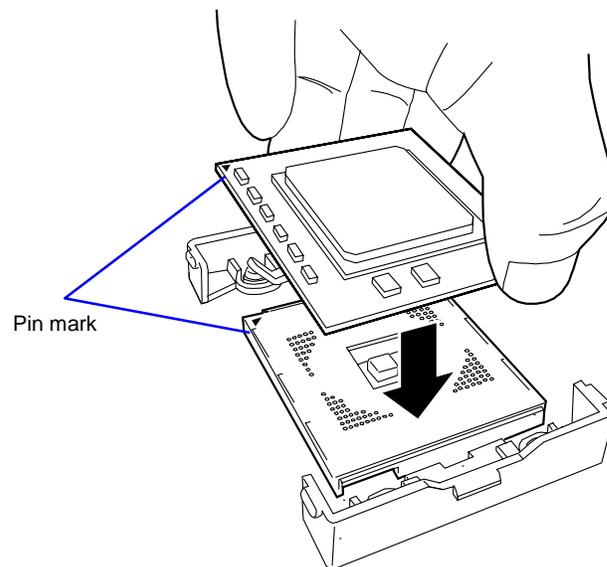


Figure 4-8. Installing a CPU

12. Push the CPU lightly to the socket, and push down the lever to secure the CPU. See Figure 4-9.

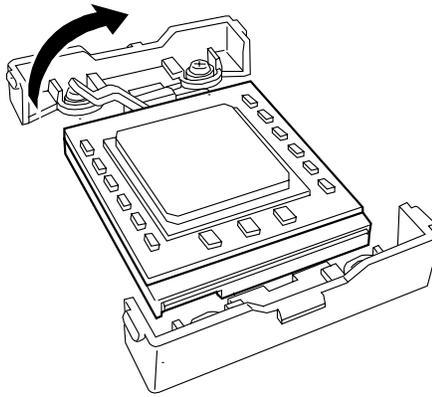


Figure 4-9. Closing the Locking Lever

- 13.** Very carefully apply the thermal interface material (heat radiation sheet) on top of the processor so that it is completely covered. See Figure 4-10.

 **Notes:** The thermal material may already be applied to the heat sink.

The thermal interface material is very fragile, it must be handled very carefully. If the cooling sheet is damaged, it must be replaced with a new one. Reuse of the cooling sheet is not permitted.

Do not stick multiple cooling sheets on a processor, only one is needed. Keep any remaining cooling sheets as spares.

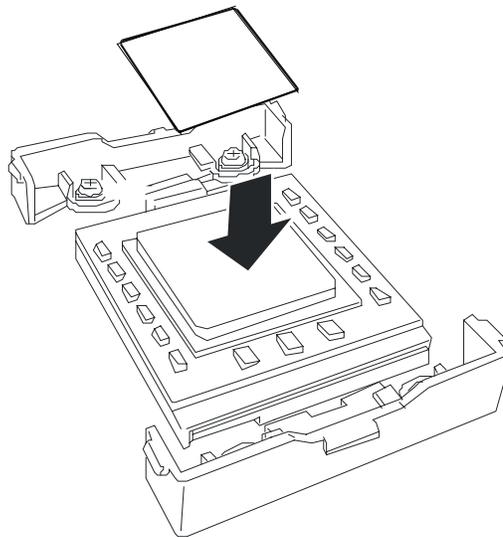


Figure 4-10. Installing the Thermal Cooling Sheet

- 14.** Install the heat sink on CPU. See Figure 4-11.

NOTE: Be aware of direction of heat sink (see figure below).

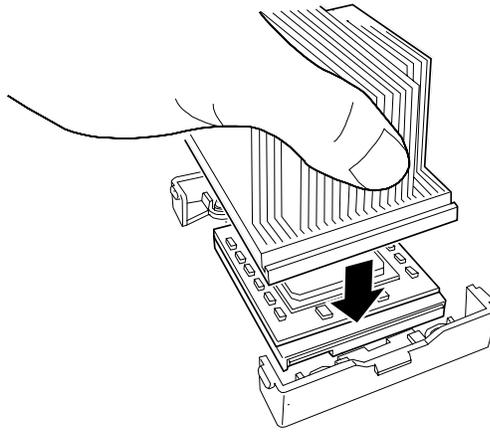


Figure 4-11. Installing the Heatsink

15. Install both heat sink clips as follows:



CAUTION

Do not allow the heat sink to rock back and forth while securing the heat sink clips. If the CPU becomes dislodged from the socket, catastrophic failure may occur.

- Place the heat sink clip on the center tab of the retention module and rotate the clip towards the heat sink to engage the center tab (1). Repeat this step with the second clip (2). See Figure 4-12.
- While ensuring the heat sink is level and secure with one hand, snap one end of the clip down over the corresponding tab on the retention module (3). Then snap the opposite corner clip (4). Snap the remaining end of the clips down over the corresponding tabs (5) (6). Be sure the clip is adequately engaged with the tab. Ensure the heat sink is absolutely level.

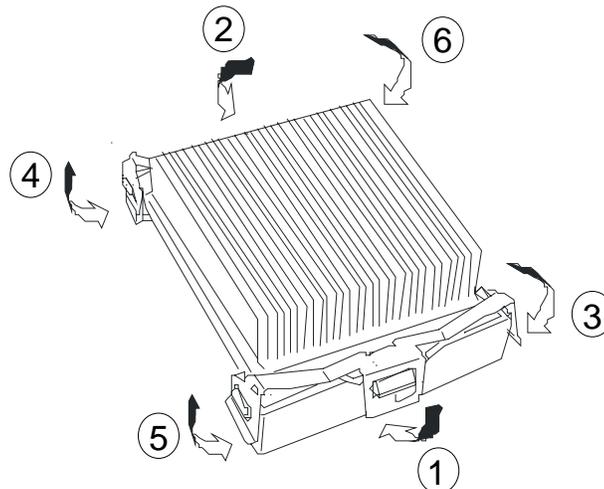


Figure 4-12. Securing the Processor Heatsink

16. Ensure 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.
 - The wire clip is not engaged correctly.
 - Do not move the secured heat sink.
-

17. Reinstall the processor air duct.

18. Reinstall the left-hand side access panel on the system chassis.

19. Plug in the system power cord(s), and turn on the system.

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

21. Verify that POST displays no error messages.

22. If POST displays an error message, take a note on the message and see the POST error messages listed in Chapter 5.

23. Run the BIOS Setup Utility. Set "Reset Configuration Data" on the Advanced menu to "Yes". This setting is required to change the hardware configuration data.

24. When adding a CPU to a server with one CPU installed perform the procedure below:

For Windows 2000, change the driver of [Computer] in the device manager to [ACPI multi-processor PC] and then update the system.

CPU Removal

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* described earlier in this chapter.
3. Remove the left-hand side access panel as described earlier in this chapter.

CAUTION

Observe static precautions. Use an antistatic wrist strap.
Hold the processor only by its edges.

4. Locate the appropriate processor on the CPU board. See Figure 4-6.
5. Remove the heat sink from the top of the processor by inserting a small screwdriver into the slots on its heat sink clips. Release the clip pressure points in the order (1-6) shown in Figure 4-13.

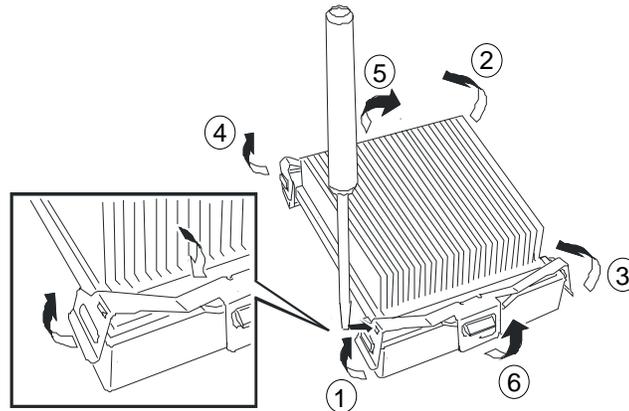


Figure 4-13. Removing the Processor Fan Heatsink

6. Swing its processor socket lever up until it is in the unlocked position and carefully remove the processor. See Figure 4-14.

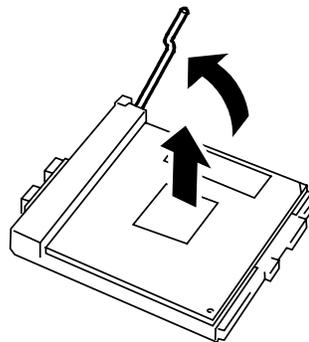


Figure 4-14. Removing the Processor

7. If you are adding or replacing a processor, refer to *Installing a Processor* earlier in this chapter.

8. Reinstall the air duct.
9. Reinstall the left-hand side access panel on the system chassis.
10. Plug in the system power cord(s) and power up the system.

DIMMs

The system board contains four DIMM sockets (Figure 4-15). Each socket can hold a single 72-bit DIMM module with 256MB, 512MB, or 1GB of memory. When all four sockets are populated, the system board supports a maximum of 4 GB of memory with 1GB DIMMs.

Memory is partitioned as two banks of SDRAM that must be populated in pairs, each providing 72 bits of buffered two-way interleaved memory (64-bit main memory plus ECC). DIMMs will always be installed in sockets 1 and 2.

 **Note:** DIMMs are always added in pairs.

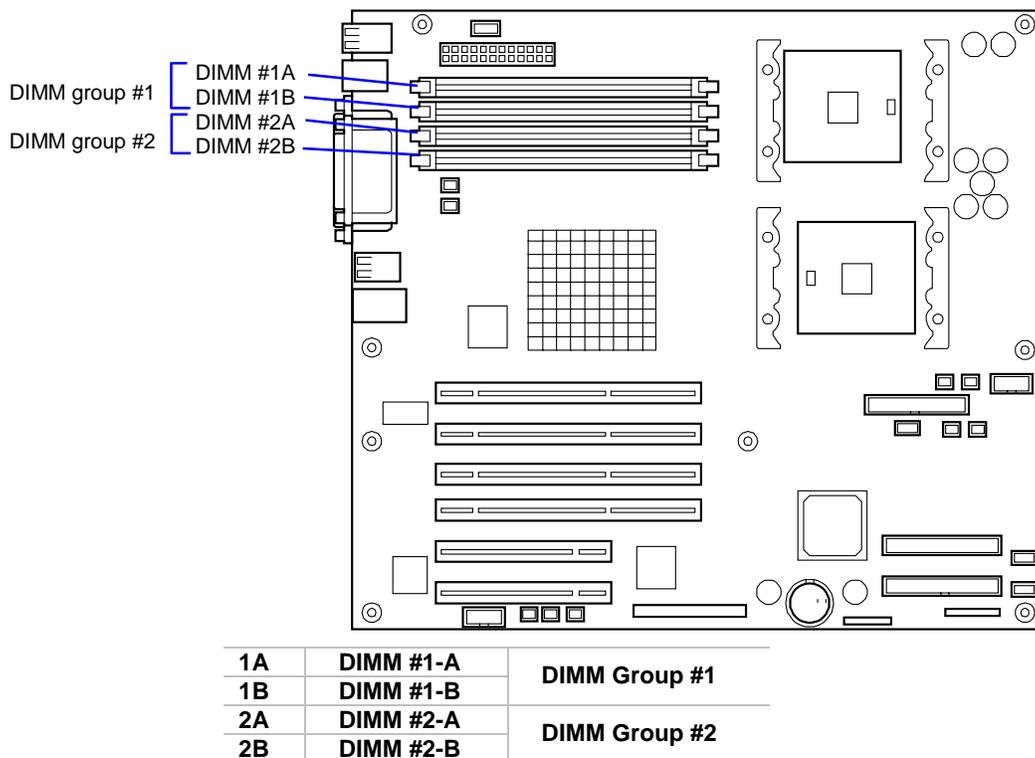


Figure 4-15. DIMM Locations on the System Board

Installing DIMMs

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system's cabinet. For tower-based systems see *Opening the Front Bezel of the Tower Cabinet* in Chapter 2. For rack-mount systems you must remove the front panels of the system chassis.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 1). The power-on LED goes out.
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.

CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

8. Remove the processor air duct. See *Processor Air Duct Removal* earlier in this chapter.
9. If applicable, locate the appropriate DIMM sockets on the system board (see Figure 4-14).
10. Remove the DIMM connector covers from its socket (see Figure 4-16). Save the DIMM connector cover for future use.

 **Note:** If you are replacing a DIMM, you must first remove the DIMM from its socket (see *Removing DIMMs* later in this chapter).

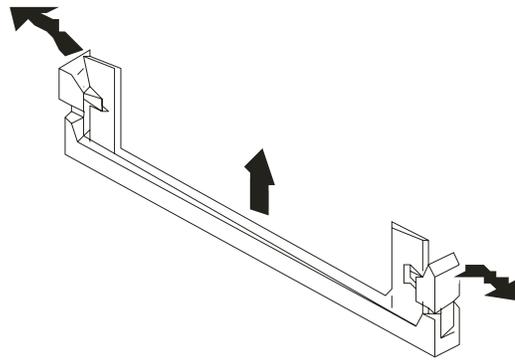


Figure 4-16. Removing the DIMM Connector Cover

11. Holding a DIMM module only by the edges, remove it from its antistatic package.



CAUTION

Observe static precautions. Use an antistatic wrist strap.
Hold the DIMM only by its edges.

12. Position the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket. See Figure 4-17.
13. Insert the bottom edge of the DIMM into the socket, and press down firmly on the DIMM until it seats correctly.
14. Gently push the plastic ejector levers on the socket ends to the upright position to ensure that they are installed correctly.

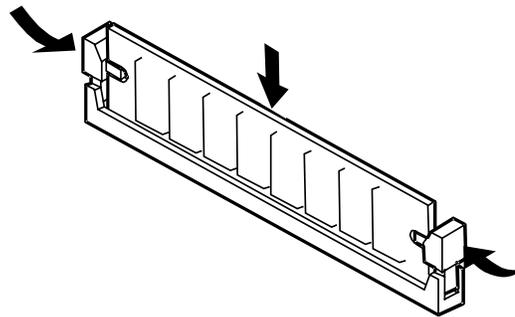


Figure 4-17. Inserting Memory DIMMs

15. Repeat the steps to install each additional DIMM.
16. Reinstall the processor air duct.
17. Reinstall the left-hand side access panel on the system chassis.
18. Plug in the system power cord(s) and power up the system.

Removing DIMMs



CAUTION

Use extreme care when removing a DIMM. Too much pressure can damage the socket slot. Apply only enough pressure on the plastic ejector levers to release the DIMM

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system's cabinet.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 1). The power-on LED goes out.
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.



CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

8. Remove the processor air duct. See *Processor Air Duct Removal* earlier in this chapter.
9. Locate the appropriate DIMM sockets on the system board (see Figure 4-15).
10. Gently push the plastic ejector levers out and down to eject a DIMM from its socket. See Figure 4-18.
11. Hold the DIMM only by its edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket, and store it in an antistatic package.

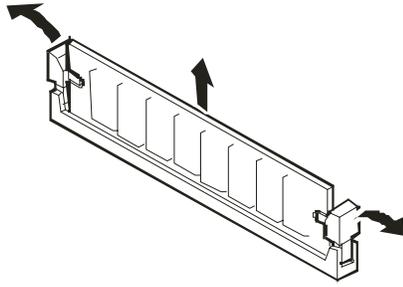


Figure 4-18. Removing a DIMM

- 12.** Repeat the above steps to remove the remaining DIMMs.
- 13.** Reinstall the processor air duct.
- 14.** Reinstall the left-hand side access panel on the system chassis.
- 15.** Plug in the system power cord(s) and power up the system.

Hard Disk Drives

Your system supports a variety of SCSI hard disk drives installed in the system's hard disk drive bay. Contact your sales representative or dealer for a list of approved devices.

The 3.5-inch hard disk drive bay on the front of the server contains six slots on which hard disks can be installed. A hard disk having the thickness of 1 inch can be installed in each of the slots. The SCSI IDs of the slots are fixed to ID0 to ID5 from bottom to top.

In the configuration at the shipment, the cable on the 3.5-inch hard disk drive bay is connected to the Ultra320/160 SCSI (A) connector on the system board.

To provide the disk array configuration, connect the cable on the 3.5-inch hard disk drive bay to the disk array controller. The SCSI standard of the hard disk to be added should be the same as that of the existing disks.

A dummy tray is installed in an empty slot of the 3.5-inch hard disk drive bay. This is intended to improve the cooling effect within the server. Always install a dummy tray in any slot in which a hard disk is not installed.

IMPORTANT: A specified dummy tray must be used.

Installation

If installing new drives, follow an installation scheme starting with the bottom-most drive. Fill the bays bottom-to-top.

NOTE: Hard disks can be installed or removed from the server only by opening the front bezel. In the disk array configuration, hard disks may be installed or removed with the power of the server on.

IMPORTANT: In the disk array configuration, hard disks configuring a specific pack should have the same specification including the capacity.

1. See the section *Preparing Your System for Disassembly and Reassembly* described earlier to prepare (in other than the disk array configuration).
2. Release the lock of the front bezel by using the security key to open the front bezel.
3. Check the slot in which the hard disk is installed.
4. Remove the dummy tray. See Figure 4-19.

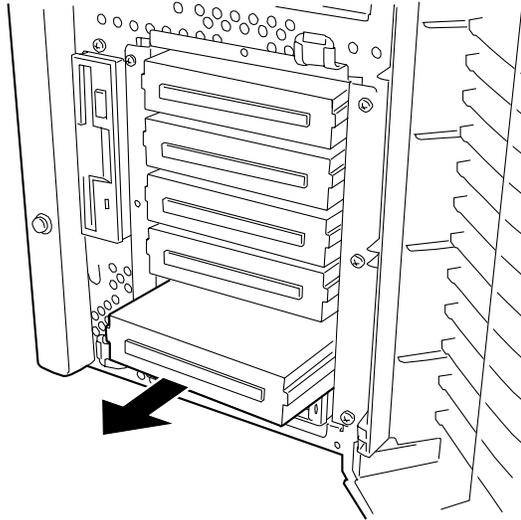


Figure 4-19. Removing the Dummy Tray

5. Unlock the lever of the hard disk drive carrier and open the handle. See Figure 4-20.

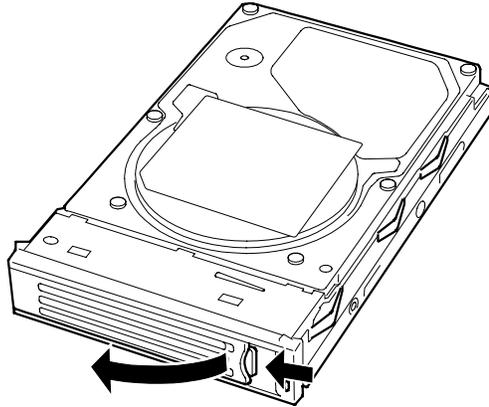


Figure 4-20. Unlocking the Drive Carrier

6. Align the drive carrier with the bay guide rail.
7. Slide the drive carrier into the bay until it docks with the SCSI backplane connector. See Figure 4-21.

IMPORTANT:

- Push the hard disk drive carrier until the hook of the handle hits the frame.
 - Hold the hard disk drive carrier with both hands securely and carefully.
-

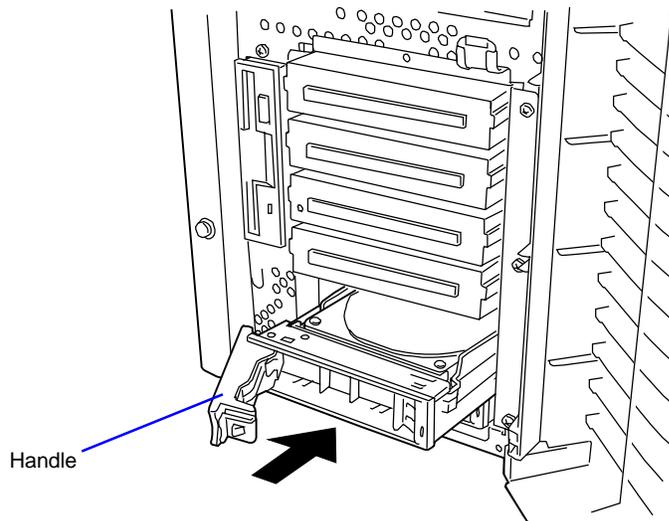


Figure 4-21. Installing the Hard Disk Drive

8. Close the lever ensuring the drive is secured. The handle is locked when a distinct click is heard.. See Figure 4-22.

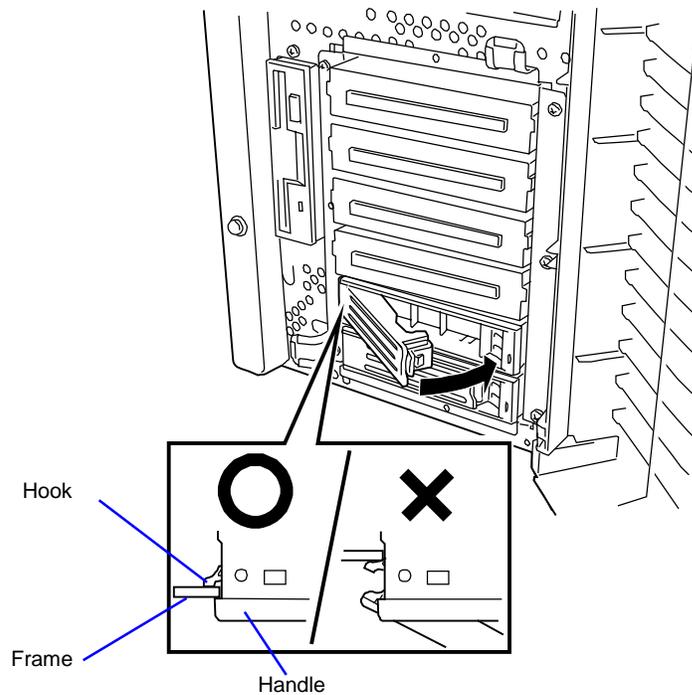


Figure 4-22. Locking the Hard Disk Drive Carrier

9. Close the bezel opened in step 2.

Removal

NOTE: The disk LED of a defective hard disk drive is amber.

1. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* described earlier in this chapter.
2. Release the lock of the front bezel by using the security key to open the front bezel. See Figure 4-23.

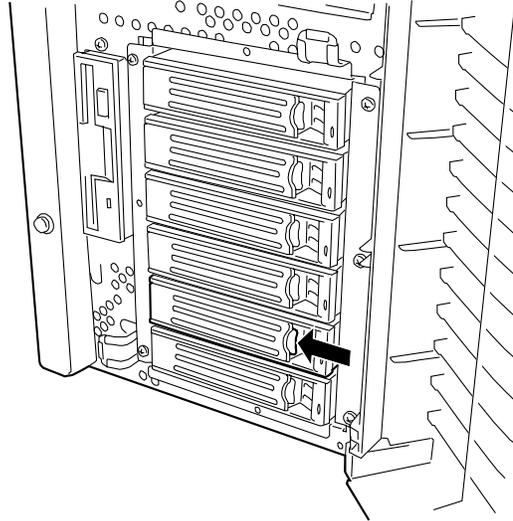


Figure 4-23. Releasing the Hard Disk Drive Carrier

3. Press the locking tab to release the lock.
4. Grasp the drive carrier handle and pull the handle toward you to disengage the drive connector from the backplane. See Figure 4-24.

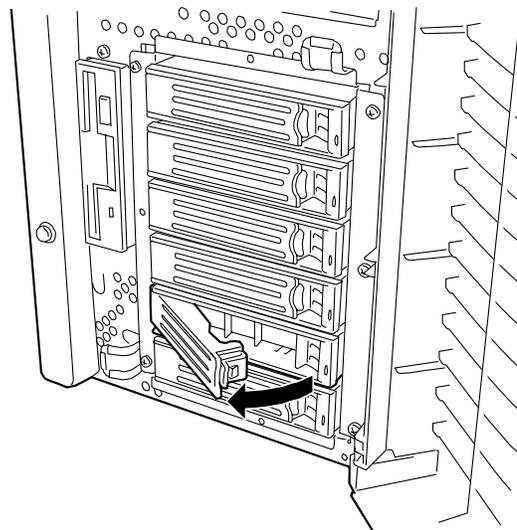


Figure 4-24. Opening the Hard Disk Drive Carrier

5. Hold the drive carrier handle and hard disk securely and remove the hard disk from the drive bay. See Figure 4-25.

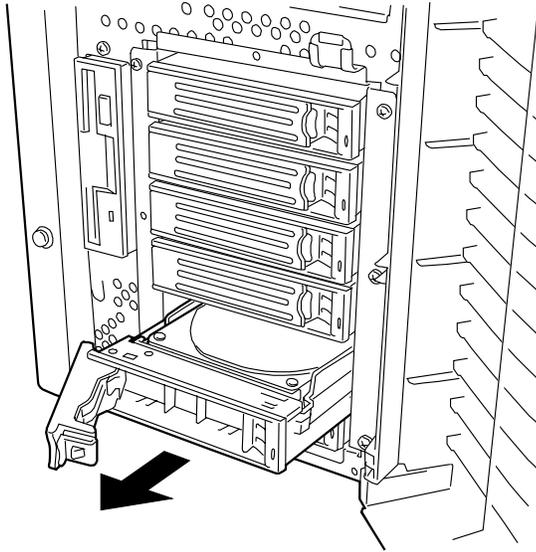


Figure 4-25. Removing a Hard Disk Drive

6. If not replacing the hard disk removed, insert a dummy carrier tray into the empty slot.

IMPORTANT: To maintain the cooling effect in the server, install the dummy tray in the vacant slot of the disk bay.

7. Close the bezel opened in step 2 securely.

Auto Rebuild Functionality

If your server includes a disk array controller, the auto rebuild function can be used to restore data from the defective hard disk drive. The auto rebuild function can write the data saved from a defective hard disk to the replacement disk drive thereby recovering the server to the state before the occurrence of the fault.

The auto rebuild function is valid for disk arrays set to RAID1 or RAID5.

The auto rebuild is automatically started only by the hot-swap of a defective hard disk (or disk replacement in the power-on state). During the auto rebuild, the disk lamp on the hard disk is lit green or amber alternatively.

IMPORTANT: Do not turn off the power of the server in the interval between a fault of a hard disk to the end of the auto rebuild process.

Wait at least 90 seconds from the time you remove a defective disk drive to the time you install the replacement disk drive.

If a hard disk is rebuilding, do not replace another disk. (The disk lamp on the hard disk being rebuilt is lit green or amber alternatively.)

Hot-Swap Power Supply

Your server may contain a modular hot-swap power supply like the one shown in Figure 4-26. The addition of a second hot-swap power supply makes your system so that it has redundant power and can be operated continuously without interruption if either of the power supplies malfunction.

Installation

1. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* describes earlier in this chapter.
2. Loosen a screw securing the blank cover to remove the cover from the chassis. Remove the cover and save it for future use. See Figure 4-26.

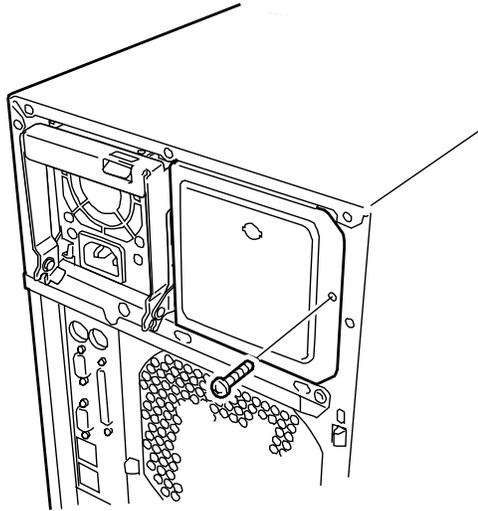


Figure 4-26. Loosening the Blank Cover Retaining Screw

3. Press down the locking tab of the power supply handle and open the handle. See Figure 4-27.

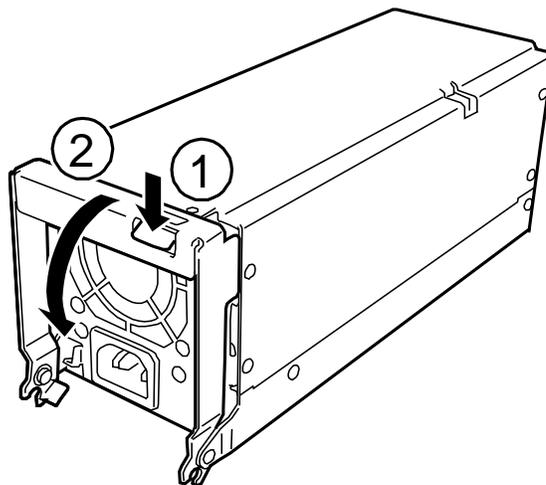


Figure 4-27. Preparing the Power Supply for Installation

-
4. Slide the power supply into the vacant slot until you feel resistance. See Figure 4-28.

IMPORTANT:

- Make sure that the handle is in full-open position.
 - To avoid damaging the power supply unit, do not tilt or twist the unit as you push it into the connector.
-

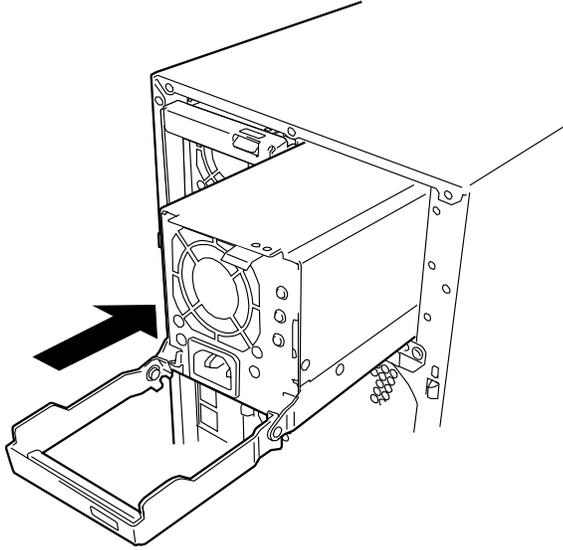


Figure 4-28. Installing the Power Supply

5. Push the power supply handle up. See Figure 4-29.

NOTE: Confirm that the handle is securely hooked.

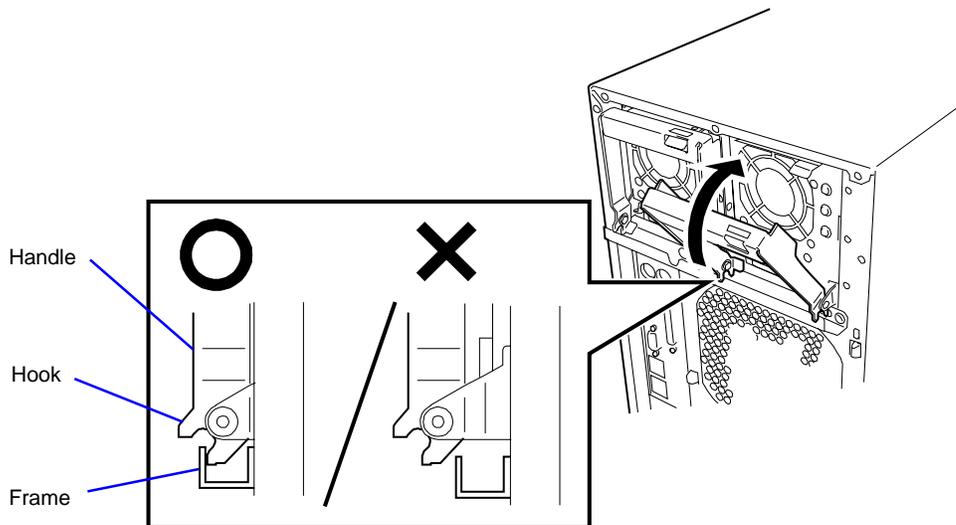


Figure 4-29. Pushing up the Power Supply Handle

-
6. Push the power supply handle toward the power supply until the locking tab snaps into place. See Figure 4-30.

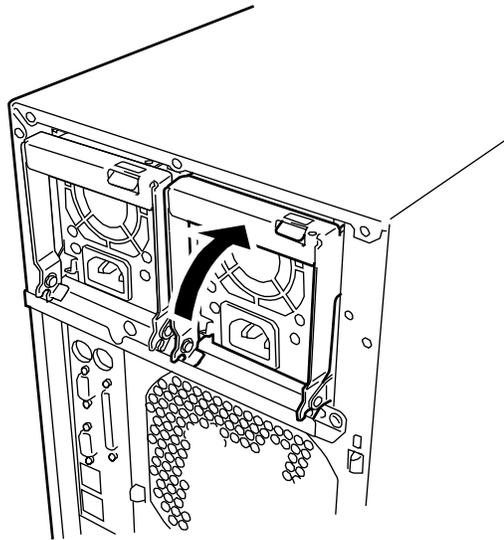


Figure 4-30. Securing the Power Supply

7. Connect two power cords to the AC inlets. The AC Power lamps go on and DC Power lamps blink when the power cords are connected. See Figure 4-31.

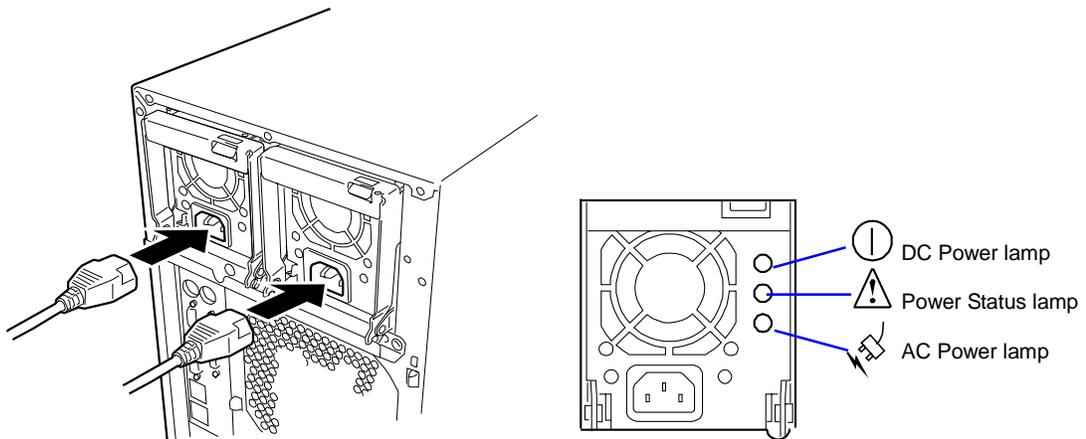


Figure 4-31. Connecting the Power Cords

8. Turn on the power of the server. The DC Power lamps on the power supplies are lit.

Removal

1. Check the Power Status lamps of the power supplies on the rear face and determine which module needs to be replaced. (If a power supply is defective, the Power Status lamp is lit amber.)

NOTE: When the server is equipped with two power supplies and one of the power supplies operates normally (with the power lamp of the power supply being on), the other defective power supply can be replaced while the system is in operation (or in the power-on status). In this case, skip step 2 in this procedure.

2. Shut down the system and press the POWER switch to turn off the power.
3. Disconnect the power cord from the failed power supply.
4. While pressing down on the locking tab, grasp the handle and carefully pull the power supply out of the power supply bay. See Figure 4-32.

IMPORTANT: To avoid damaging the power supply unit, do not tilt or twist the unit as you pull it from the power supply bay. The module disengaging from its connector causes the initial resistance you will feel. Use even, steady force to remove the unit.

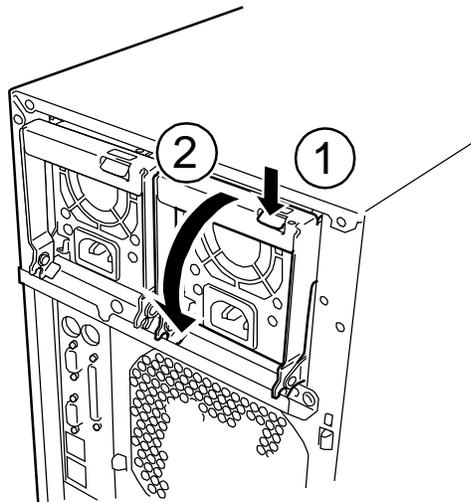


Figure 4-32. Removing a Power Supply

5. If you are not going to install a replacement power supply unit, you must install blank cover in the vacant slot.

IMPORTANT: To maintain the cooling effect in the server, install the blank cover in the vacant slot of the power supply bay.

6. Install the power supply referring to steps 3 to 8 of the power supply installation procedure.

Non-Hot-Swap Power Supply

Your server system may contain a single non-hot-swap power supply that is housed in the rear of the chassis as shown in Figure 4-33.

Removal

1. Prepare your system for disassembly. See *Preparing Your System for Disassembly and Reassembly* earlier in this chapter.
2. Remove the left-hand side access panel of the system chassis. See *Removing the Side Access Panel* earlier in this chapter.

CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

3. Remove all the power cables from the system board, 5.25-inch devices, diskette drive, and SCSI backplane.
4. Remove and save the nine screws that secure the power supply to the rear of the chassis. See Figure 4-33.

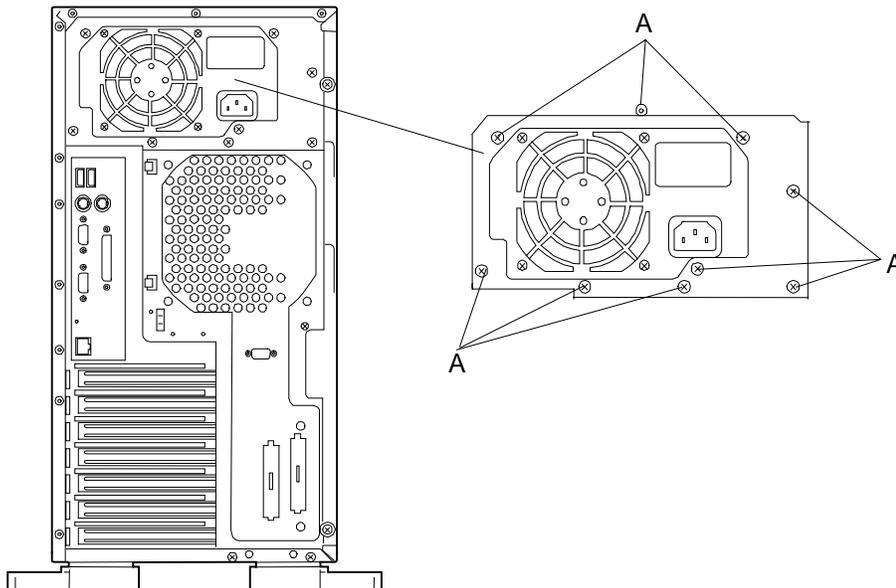


Figure 4-33. Removing the Non-Hot-Swap Power Supply

5. Carefully remove the power supply from the chassis.
6. Follow this removal procedure in reverse order to install the replacement power supply unit.

Front Cooling Fan Unit

The optional front cooling fan unit contains up to two fans for cooling the CPU, memory, and PCI devices built in the server.

Installation

1. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* described earlier in this chapter.
2. Remove the left-hand side cover.
3. Hold the fan unit with its locking tab facing the front of the server and with the hook facing the rear of the server. Insert the fan unit into the server. See Figure 4-34.

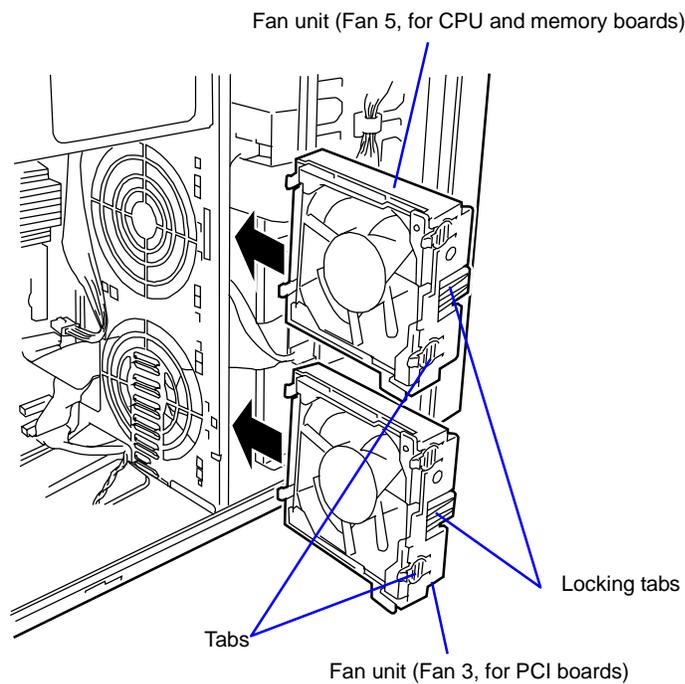


Figure 4-34. Installing a Fan Unit

4. Insert the tabs into holes on the frame of the server, and push the cooling fan unit toward the frame. See Figure 4-35.

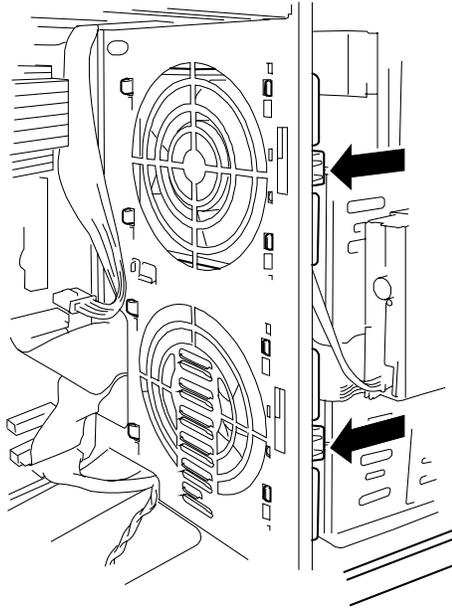


Figure 4-35. Securing the Fan Unit

5. Connect the cooling fan cable to the system board. See Figure 4-36.

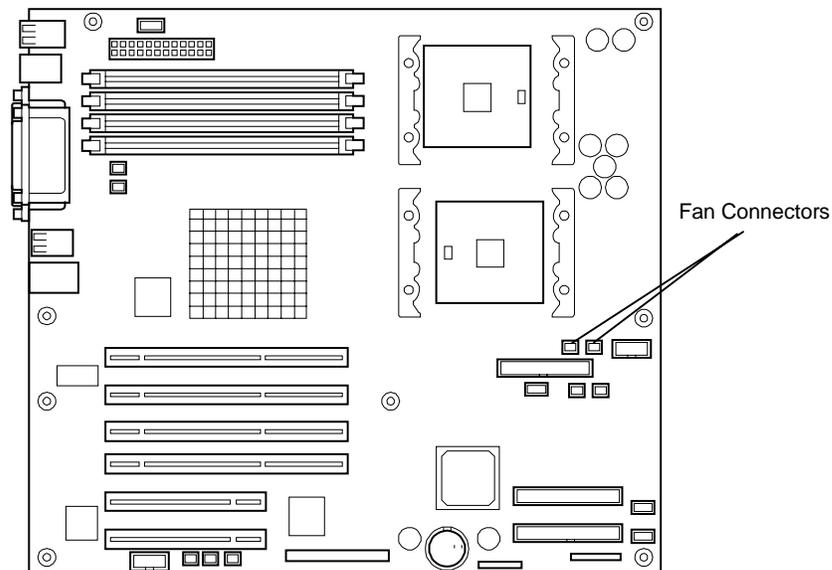


Figure 4-36. Fan cable Connector

6. Reassemble the removed components.
7. Configure the hardware by using the configuration disk supplied with the optional fan unit. Refer to the manual that comes with the optional fan unit for detailed instructions.

Removal

1. Prepare your system for upgrade. See *Preparing Your System for Upgrade* described earlier in this chapter.
2. Remove the left-hand side cover.
3. Remove the fan unit connector from the system board. See Figure 4-37.
4. Push the locking tab to unlock the cooling fan unit, and remove the fan unit from the server. See Figure 4-37.
5. Reassemble the removed components.

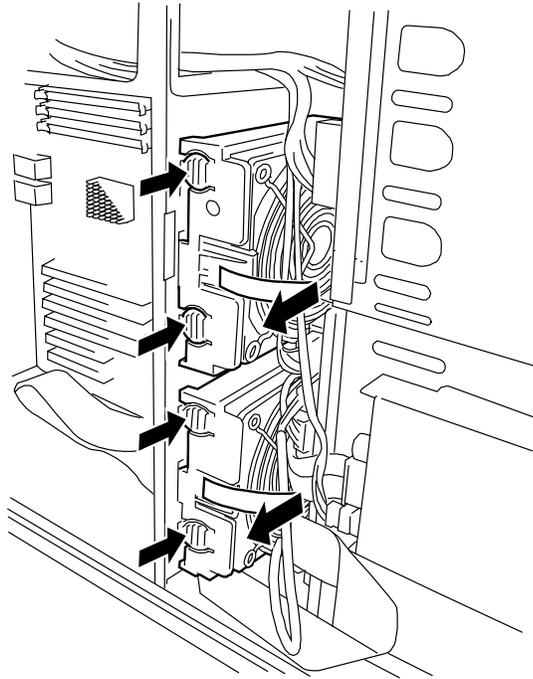


Figure 4-37. Removing a Fan Unit

Removable 5.25-inch Media Devices

A variety of SCSI 5.25-inch removable media devices (i.e., tape backup, etc.) can be installed in the four half-height media bays (Figure 4-38). The media devices should be installed in the first available media bay from the top (slot 1). Contact your sales representative or dealer for a list of approved devices.

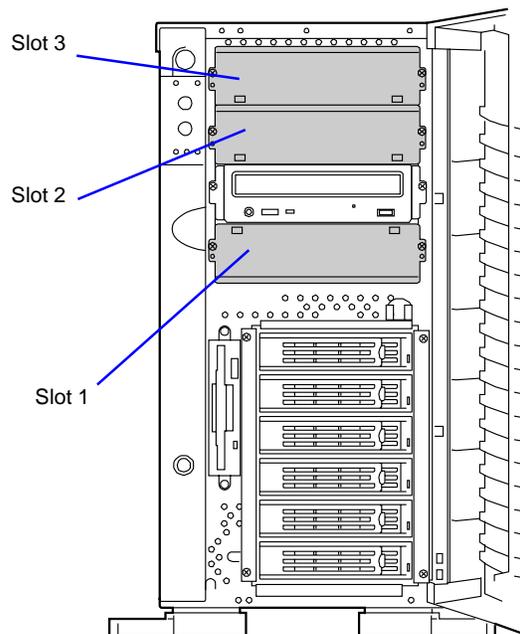


Figure 4-38. Removable Media Devices

IMPORTANT:

- With the standard configuration, the optional SCSI add-in card and SCSI cable are required.
 - The server can include a maximum of two half-height devices and one full-height device.
 - Set the SCSI termination of the 5.25-inch device to be installed to OFF and the SCSI ID to a value which is not duplicated or corrupted with that of any other device. Refer to the documentation coming with each of the devices for how to set the values.
 - For half-height device, first install a device in slot 1. Then install another device in slot 2.
For full-height device, install the device to the slots 2 and 3.
 - This system can include a maximum of two optional file devices.
-

Installation

1. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* described earlier in this chapter.
2. Remove the side cover.
3. Remove the two screws fixing the dummy cover. See Figure 4-39.
4. Pull out the dummy cover toward you carefully.

NOTE: When installing a full-height device, remove two dummy covers.

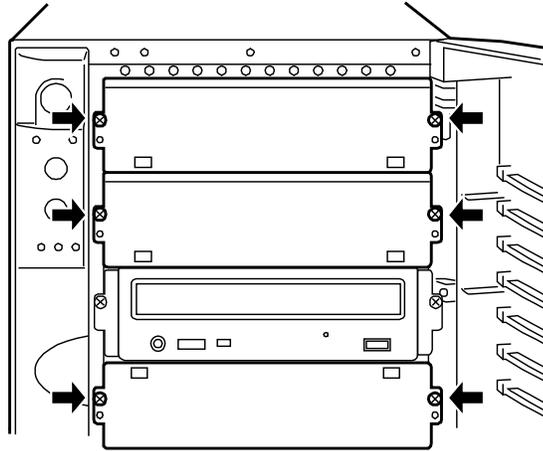


Figure 4-39. Removing Dummy Covers

5. Attach the rails to the 5.25-inch device by using the four screws. See Figure 4-40.

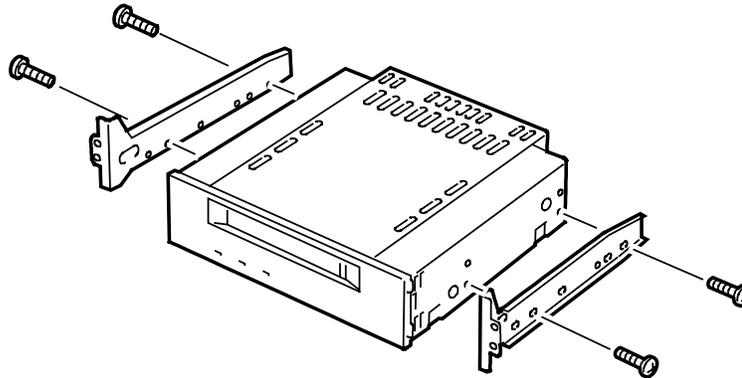


Figure 4-40. Attaching the Rails

IMPORTANT: When installing a double-height device, use the DLT device rails that is included with the server.

-
6. Push the 5.25-inch device to the device bay carefully.

NOTE: Make sure the cables are not caught while the 5.25-inch device is pushed into the slot.

7. Secure the device using the screws removed in step 3. See Figure 4-41.

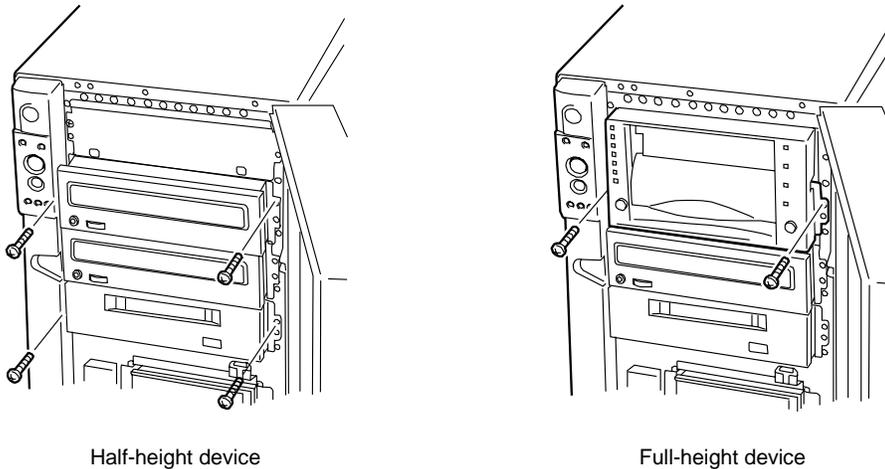


Figure 4-41. Securing the Media Device

8. Ensure the front of the installed 5.25-inch device is aligned with the CDROM drive already installed in the server.
9. Connect the SCSI interface and power cables to the installed 5.25-inch device.
10. Install the removed components.

Removal

Remove the 5.25-inch device in the reverse procedure of the installation.

PCI Boards

The server contains six slots into which PCI boards can be inserted. See Figure 4-42.

IMPORTANT: PCI boards are easily affected by static electricity. Handle a PCI board after making your body contact with a metallic frame section of the server to discharge the static electricity on your body. Do not make bare hands contact with terminals and components on the PCI board. In addition, do not put the PCI board on a desk directly. See "Static Precautions" in this chapter for details of the static electricity.

NOTE: When a PCI board is installed, removed, or removed from the present slot and then installed in another slot, modify the detailed settings including the interrupt lines (IRQ) by using the BIOS setup utility SETUP if necessary. See Chapter 4 for the settings of the interrupt line states and I/O spaces at the shipment of the server.

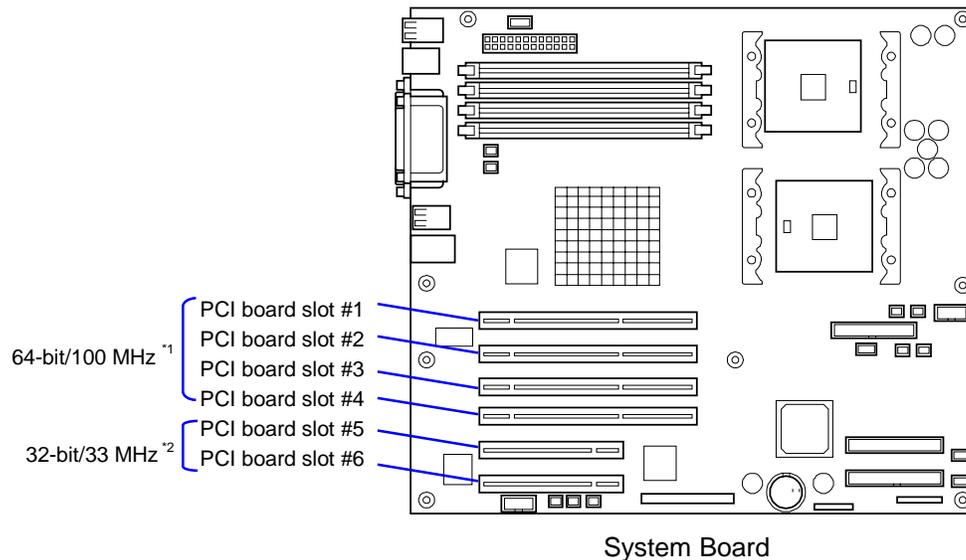


Figure 4-42. PCI Slot Designations

*1 The system operates at the rate of 33 MHz when PCI boards operating only at 33 MHz are installed in these slots.

*2 Do not install a set of PCI boards providing a specific function to extend over both the 64-bit and 32-bit PCI buses.

Installation

IMPORTANT:

- For ease of installation, remove the external SCSI cable when installing the full-length PCI card.
- 3.3V or universal PCI boards can be installed in PCI board slots #1 to #4.
- 5V or universal PCI boards can be installed in PCI board slots #5 and #6.

NOTE: To install a PCI board, make sure that the board connecting section is engaged with the connector of the PCI board slot.

List of optional devices and their available slots

Board Name	Slot						Remarks
	PCI #1	PCI #2	PCI #3	PCI #4	PCI #5	PCI #6	
SCSI Controller	√	√	√	√	√	√	
SCSI Controller	√	√	√	√	√	√	
Disk Array Controller	√	√	√	√	–	–	Only N8103-80F and N8103-81F can coexist.
Disk Array Controller	√	√	√	√	–	–	
Fibre Channel Controller	√	√	√	√	√	√	Up to two Fibre channel controllers can be installed.
100BASE-TX Board	√	√	√	√	√	√	Up to four 100BASE-TX boards can be installed.
100BASE-TX Board	√	√	√	√	–	–	
100BASE-TX Board	√	√	√	√	√	√	Up to two 100BASE-TX boards can be installed.
1000BASE-T Board	√	√	√	√	√	√	Only one 1000BASE-T board can be installed. (With AFT, up to four boards can be installed.)

√: Installation enabled, –: Installation disabled

-
1. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* described earlier in this chapter.
 2. Remove the left-hand side cover.
 3. Define the slot in which a board is installed and remove the connector cap of the slot.

IMPORTANT: Keep the removed connector cap carefully.

4. Remove a screw securing the expansion slot cover.
5. Remove the expansion slot cover. See Figure 4-43.

IMPORTANT: Keep the expansion slot cover being removed carefully.

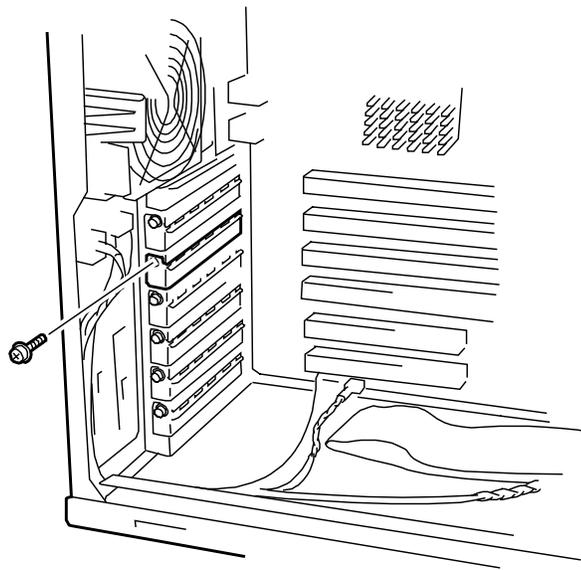


Figure 4-43. Removing the PCI Slot Cover

6. On the edge opposite the connectors, grasp the board by both corners. Orient the board to the vacant slot so that the metal retention bracket is toward the rear of the chassis.
7. Insert the board into the front retention mechanism and rear guide rails. Carefully push the board until it engages and fully seats in the slot connector.

IMPORTANT: If the board cannot be installed easily, remove the board once and then reinstall it. Excess force added to the board may cause the board to be broken.

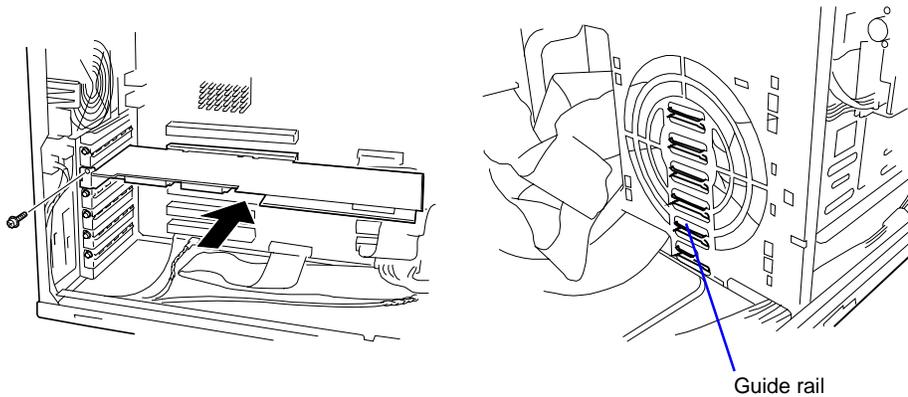


Figure 4-44. Installing a PCI Board

- 8.** Secure the board with a screw removed in Step 4.
- 9.** Reinstall the removed components.
- 10.** Turn on the power of the server
- 11.** Check for any POST error messages.
- 12.** Start the BIOS Setup Utility to set the "Reset Configuration Data" in the "Advanced" menu to "Yes". This is required to update the hardware configuration information.

Removal

Remove the board in the reverse procedure of the installation. Then install the connector cap and additional slot cover.

RAID Controller Board

The functions of a disk array controller are described in the following table.

Functions of a Disk Array Controller

Function	Description
Level	Support RAID levels RAID0, RAID1, RAID5, and RAID0+1.
Hot plug	Allows a hard disk to be replaced while the system is running depending on RAID level and system configuration.
Auto rebuild	After the defected hard disk is replaced with a new one, the data saved in the defected hard disk is automatically recovered from the data saved in the remaining hard disks depending on RAID level.
Expand capacity	The addition of a hard disk without system interruption can automatically expand the area in which disk arrays are available.

Please note the following when installing and configuring a disk array:

- Disk array controller boards are easily affected by static electricity. Handle the disk array controller board only after making body contact with the metallic frame section of the server chassis in order to discharge the static electricity from your body. Also, never make contact with terminals and components on the disk array controller board using your bare hands.
- To change the disk array configuration or the RAID level, the hard disks must be initialized. If important data is saved on the hard disks used to constitute a disk array, first back up the data on the other hard disks and then install the boards and configure the disk array.
- More than one hard disk is required to configure a disk array.
- Hard disks used in the disk array configuration should have the same disk revolution rate and capacity.
- See PCI Board in this chapter for the slots in which a RAID Controller can be installed.
- Up to four disk array controller boards can be installed in your server.
- Several RAID (Redundant Arrays of Independent Disks) levels can be set for the newly installed disk array controller boards. For details of the available RAID types, data transfer rate, and array configurations refer to the online documentation on the *EXPRESSBUILDER* CD-ROM that comes with your system or the vendor documentation that comes with the disk array controller.
- The available capacity of the hard disks in the disk array configuration will be lower than the capacity of the hard disks in a standard configuration, but the disk reliability is much improved.

-
- Set "PCI SLOT n ROM (n: slot number)," a parameter of the slot in which a hard disk is installed, to "Enable" in "PCI Configuration" on the Advanced menu of the BIOS utility SETUP.

- Replacement of disk array controller board

Restore the disk array configuration information in the disk array controller boards. Use the configuration utility for the restoration. Refer to the online document saved in CD-ROM "EXPRESSBUILDER" coming with the server or the documentation coming with the disk array controller for details. If a disk array controller is replaced, create the configuration information newly by using the proper utility.

- When more than one disk array controller board are installed in the server, install the disk array controller board to which the system disk to be booted is connected in the lowest PCI slot number. For example, if four disk array controller boards are installed in PCI slots #1 to #4, the system disk should be connected to the board installed in PCI slot #2.

PCI Slot Boot Priority

PCI Slot Number	Boot Priority
PCI slot #1	6
PCI slot #2	5
PCI slot #3	4
PCI slot #4	3
PCI slot #5	2
PCI slot #6	1

Using Internal Disks in Disk Array Configuration

For the installation of the RAID controller board, see "PCI Board" and the manual that comes with the RAID controller board. The DISK access lamp on the front panel of the server indicates the access status of the hard disk drive connected to the RAID controller board. Before the access status can be indicated, the LED connector on the RAID controller board and the DAC LED connector on the system board must be connected through the LED cable supplied with the server. The DAC LED connector is at the position shown in the Figure 4-45 below. It can be connected in either direction.

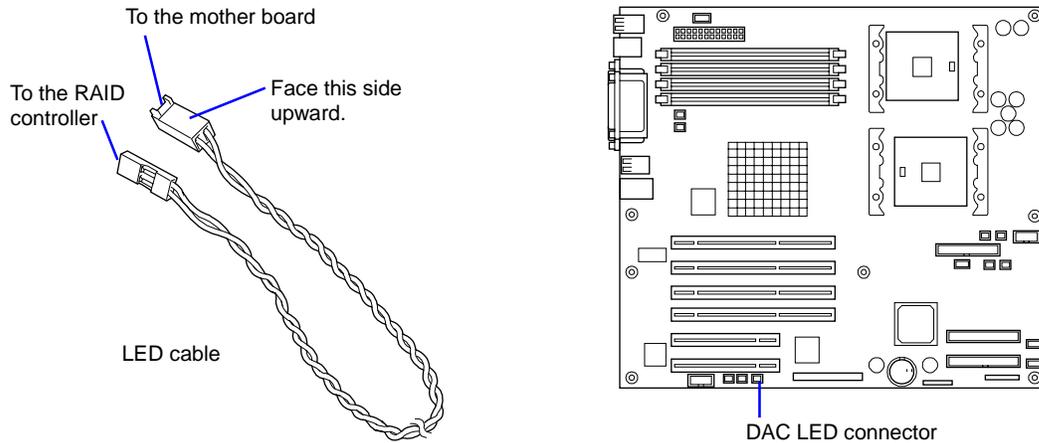


Figure 4-45. DAC LED Cable Connection to the System Board.

Diskette Drive and Carrier Assembly

Your server system contains a 3.5-inch diskette drive housed in a carrier located inside the front of the server chassis.

To remove the diskette drive and carrier assembly, perform the following procedures:

1. Prepare your system for disassembly. See *Preparing Your System for Disassembly and Reassembly* earlier in this chapter.
2. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.

CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

3. Disconnect the data cable connector and power cable connector from their mating connectors on the rear of the diskette drive.
4. Remove and save the two screws (A) that secure the diskette drive carrier to the front of the chassis. See Figure 4-46.
5. Slide the drive carrier towards the rear of the chassis, until it comes free and place it on an antistatic surface.

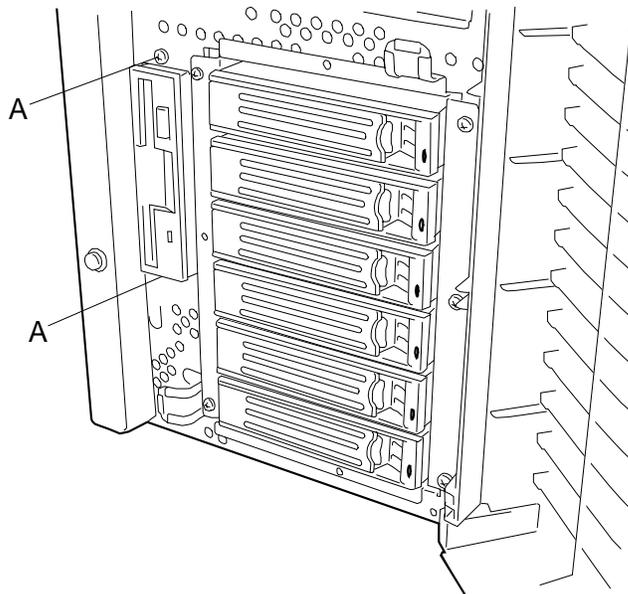
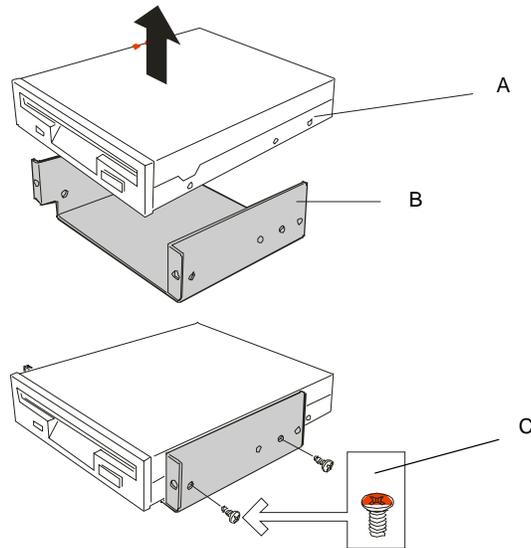


Figure 4-46 . Removing the Diskette Drive and Carrier Assembly

6. Remove the four screws (C) that attach the drive (A) to the carrier (B). See Figure 4-47. Save the screws for reassembly.

7. Remove the drive from the carrier.



- A Diskette drive
- B Carrier
- C Screws (4)

Figure 4-47. Removing the Diskette Drive from the Carrier Assembly

8. Install the replacement diskette drive into the carrier and secure it with the four screws removed in Step 6. See Figure 4-47.
9. Position the diskette drive carrier next to the hard disk drive bay and slide the carrier towards the front of the system until it locks into place. Secure the drive to the front panel using the two screws removed in Step 4. See Figure 4-46.
10. Connect the data cable connector and power cable connector to the rear of the diskette drive.
11. Reassemble all other removed components.

Front Bezel and Front Bezel Hinge (Tower-Based System)

Your server system contains a front bezel that covers the front of the chassis. The bezel is secured to the front of the chassis by metal pins located at the top and bottom of a front bezel hinge. To remove the front bezel, the two metal pins must be removed from the bezel hinge.

To remove the front bezel and front bezel hinge (see Figure 4-48 and Figure 4-48), perform the following procedures:

1. Prepare your system for disassembly. See *Preparing Your System for Disassembly and Reassembly* earlier in this chapter.
2. Remove the metal pin (B) from the top of the bezel hinge (D) by pushing in on the flexible bezel pin tab (C) and pulling the pin down and out of the bezel hinge. See Figure 4-48.
3. Allow the bezel (A) to drop down so that it disengages from the bottom of the bezel hinge and remove the bezel.
4. Remove the metal pin from the bottom of the bezel. Remove the front bezel.

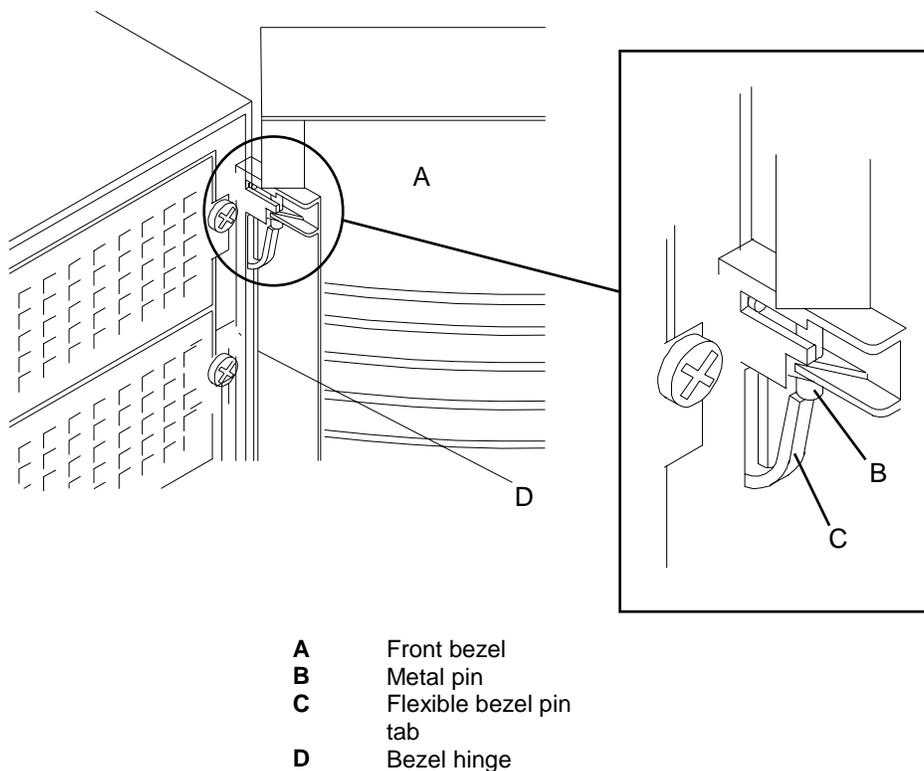


Figure 4-48. Removing the Front Bezel

-
5. Remove the four screws securing the bezel hinge to the chassis and remove the hinge. See Figure 4-49.

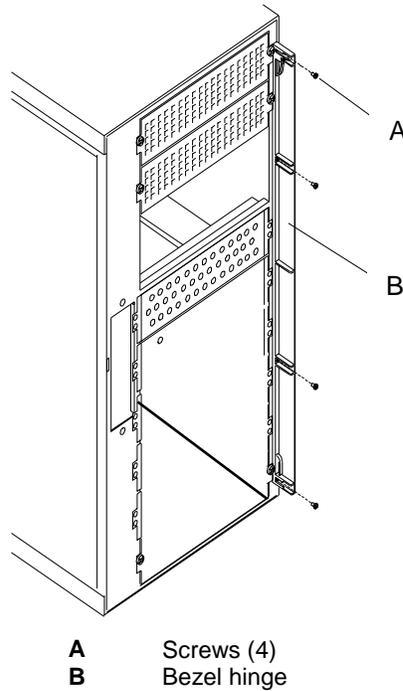


Figure 4-49. Removing the Front Bezel Hinge

6. Install the replacement bezel hinge using the four screws removed in Step 5.
7. Align the front bezel with the bezel hinges and install the metal pins into the top and bottom slots in the bezel hinge.

Front Panel

Your server system contains a front panel that houses the system controls and indicators. You must open the front bezel to access the front panel. The front panel is secured to the front of the chassis by hooks and a locking lever. To remove the front panel its locking lever must be released and the panel moved up slightly to disengage its hooks from the chassis.

To remove the front panel (see Figure 4-50), perform the following procedures:

1. Prepare your system for disassembly. See *Preparing Your System for Disassembly and Reassembly* earlier in this chapter.
2. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.



CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

3. Remove the front panel (A) by releasing its locking lever (B) and then sliding the front panel up to disengage its hooks from the chassis. The locking lever is located at the back of the front panel and is released by pushing the lever towards the right so that it clears the notch in its locking slot.
4. Pull the front panel (A) away from the front of the chassis far enough to remove the five LEDs inserted into the back of the front panel. Note the position of each LED before removing it from the front panel. Set the front panel aside for reattaching it later.

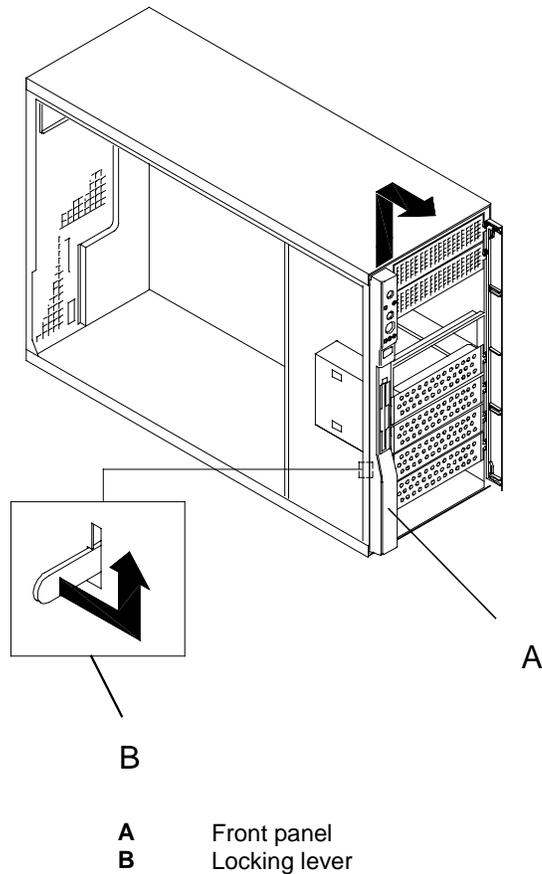


Figure 4-50. Removing the Front Panel

Hot-Swap HDD Bay

This procedure describes how to remove the Hot-Swap SCSI Hard Disk Drive (HDD) Bay that is housed in the front of your system.

WARNING

Before doing these procedures, make sure that your system is powered off and unplug all AC power cords. Failure to disconnect power before opening your system can result in personal injury and equipment damage. All voltage is removed only when the power cords are unplugged.

To remove the hot-swap HDD bay (see Figure 4-51), perform the following procedures:

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Prepare your system for upgrade. See *Preparing Your System for Disassembly and Reassembly* described earlier in this chapter.
3. Remove the left-hand side access panel as described earlier in this chapter.
4. Remove the optional front cooling fan unit if installed following procedures described earlier in this chapter.
5. Remove all the drive carriers from the HDD bay. To remove a drive carrier perform step 3 of *Swapping a Hard Disk Drive* described earlier in this chapter.
6. Remove and save the eight screws securing the HDD bay to the front of the chassis. See Figure 4-51.
7. Tag and disconnect the power cables, HSBP (I²C) cable, and SCSI interface cable from their connectors on the SCSI backplane. The SCSI backplane is located on the rear of the HDD bay.
8. Remove the HDD bay from the chassis.

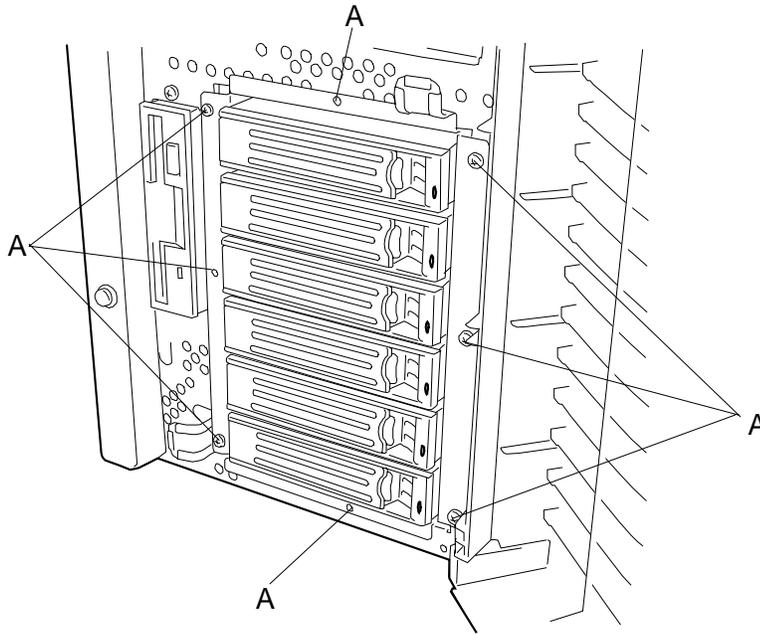


Figure 4-51. Removing the HDD Bay

Hot-Swap SCSI Backplane

This procedure describes how to remove the hot-swap SCSI backplane that is attached to the back of the hot-swap HDD bay.

! WARNING

Before doing these procedures, make sure that your system is powered off and unplug all AC power cords. Failure to disconnect power before opening your system can result in personal injury and equipment damage. All voltage is removed only when the power cords are unplugged.

To remove the hot-swap SCSI backplane, perform the following procedures:

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Remove the hot-swap HDD bay. See *Hot-Swap HDD Bay* described in the previous section.
3. Remove and save the eight screws securing the SCSI backplane to the rear of the hot-swap HDD bay. See Figure 4-52.

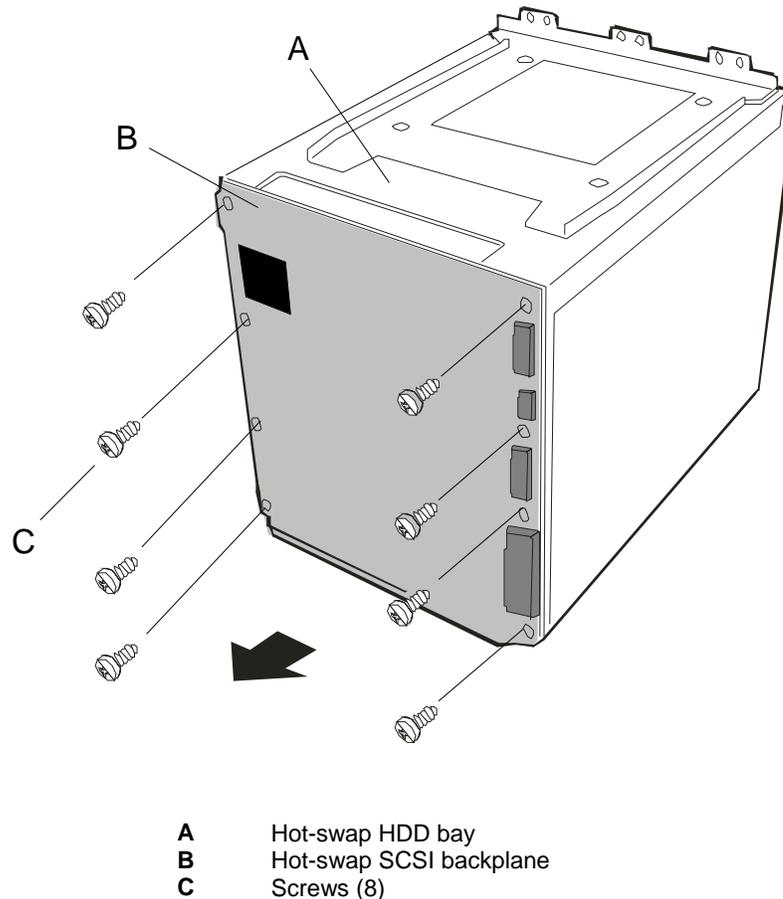


Figure 4-52. Removing the SCSI Backplane Bracket

4. Carefully pull the SCSI backplane straight out from the HDD bay and place the backplane on an antistatic wrapper.
5. Carefully position the replacement SCSI backplane on to the rear of the HDD bay and secure it with the eight screws removed in Step 3. See Figure 4-52.
6. At the front of the server, install the HDD bay into the chassis and secure it with eight screws. See Figure 4-51.
7. Connect the power cables, HSBP (I²C) cable, and SCSI interface cable to their connectors on the SCSI backplane.
8. Install the optional front cooling fan unit following procedures previously described in this chapter, if previously removed.
9. Install the left-hand side access panel as described earlier in this chapter.
10. Install all the drive carriers into the HDD bay.

Replacing the Rear Cooling Fan

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system's cabinet.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 1). The power-on LED goes out.
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Remove the left-hand side access panel of the chassis following procedures previously described in this chapter.

CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

8. Remove the processor air duct. See *Processor Air Duct Removal* earlier in this chapter.
9. Disconnect the rear cooling fan cable to the system board. See Figure 4-53.

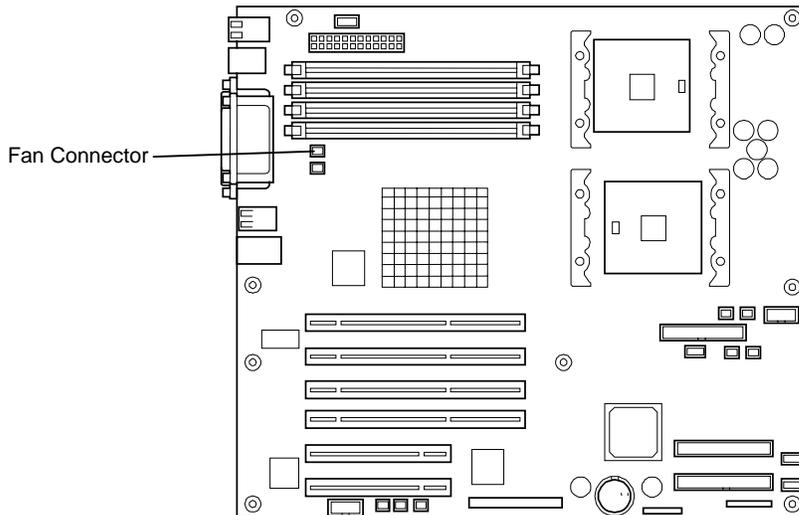


Figure 4-53. Rear Cooling Fan System Board Connector

-
- 10.** To release the fan from the fan housing, pull the fan housing tab (Figure 4-54, A) towards you until the tab clears the edge of the fan. Swivel the fan towards the front of the server and remove it from the fan housing.

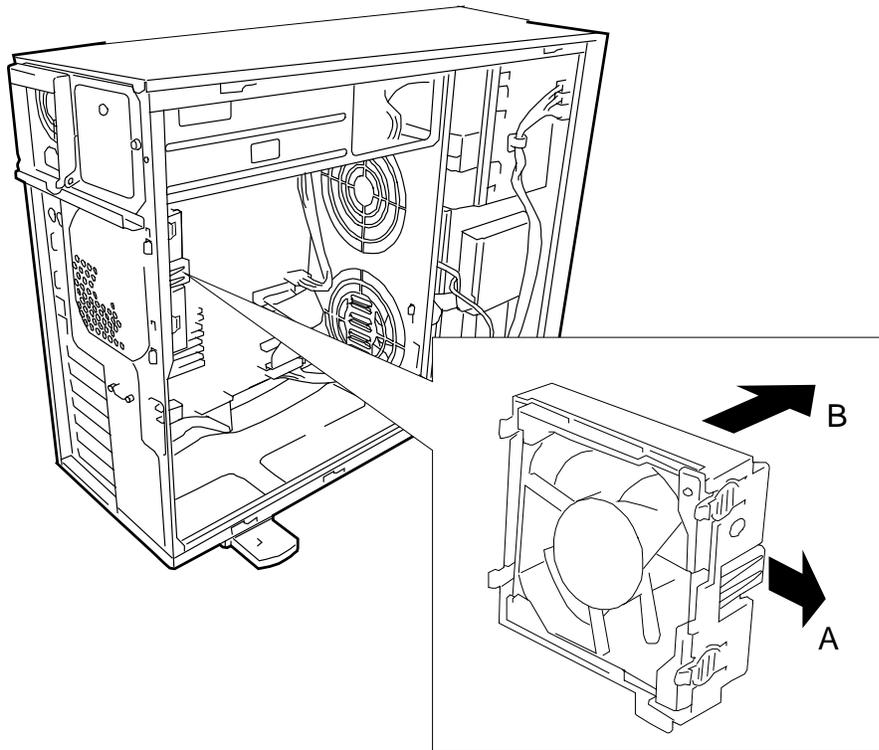


Figure 4-54. Removing the Rear Cooling Fan

- 11.** Position the replacement fan inside the fan housing, ensuring the fan label faces the rear of the system. Install the side of the fan nearest the system board first, then swivel the outside edge of the fan in place inside the fan housing tab.
- 12.** Connect the rear cooling fan cable to the system board.
See Figure 4-53.
- 13.** Reassemble all removed components.

System Board

To remove the system board all the processor(s), DIMMs, and PCI option boards (if installed) on the board must be removed and all system board cable connectors tagged and unplugged.

CAUTION

The system board can be extremely sensitive to ESD and always requires careful handling. After removing it from the system, place it component-side up on a nonconductive, static-free surface to prevent shorting out the battery leads. Do not slide the system board over any surface.

To remove the system board, perform the following procedures:

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 1). The power-on LED goes out.
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.

CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system.

8. Remove the processor air duct. See *Processor Air Duct Removal* earlier in this chapter.
9. Remove the rear cooling fan following procedures described in the previous section.
10. Perform the processor(s) and DIMM(s) removal procedures described earlier in the section *Modifying the System Board*. Save the processor(s) and DIMM(s) for reassembly.

11. Tag and remove any PCI option boards installed on the system board. See *PCI Boards* earlier in this chapter. Save the PCI option boards for reassembly.

 **Note:** The PCI option boards must be reinstalled in the same slots when you reassemble the system.

12. Tag and disconnect all the power, signal, and fan cable connectors from their mating connectors on the system board.
13. Remove the eight screws securing the system board to the chassis. See Figure 4-55, A. Save the screws for reassembly.
14. Carefully move the board sideways slightly towards the front of the cabinet so that it clears all its I/O connectors. Then lift the system board out of the chassis and place it component-side up on a nonconductive, static free surface.
15. Remove the four screws securing each CPU retention module and remove the module for use on the replacement system board. See Figure 4-55, B. Note that the CPU retention module reinforcement brackets are located on the back of the system board and will become loose once the screws are removed.

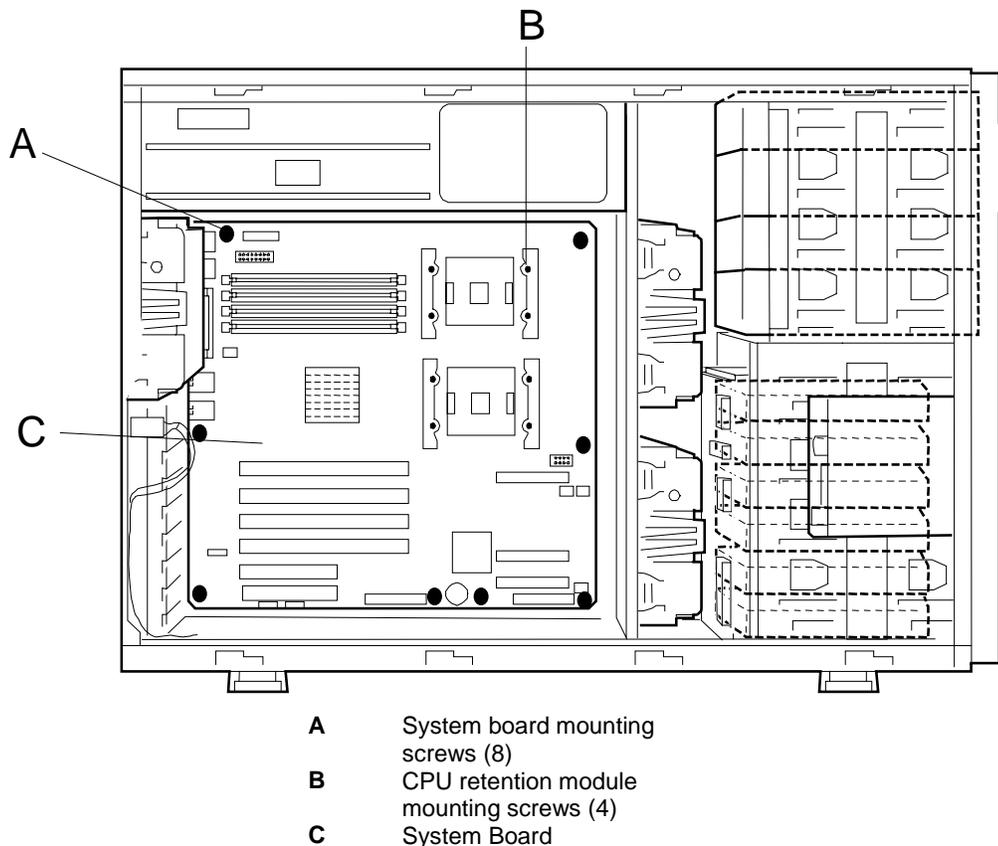


Figure 4-55. Removing the System Board and Retention Modules

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16. Install the two retention modules to the system board using the screws removed in Step 15.
 17. Install the replacement system board into the server securing it with the eight screws removed in Step 13.
 18. Connect all the power, signal, and fan cable connectors to their mating connectors on the system board.
 19. Perform the processor(s) and DIMM(s) installation procedures described earlier in the section *Modifying the System Board*.
 20. Install any PCI option boards removed from the system board. See *PCI Boards* earlier in this chapter.
 21. Install the rear cooling fan following procedures previously described in this chapter.
 22. Install the processor air duct following procedures previously described in this chapter.
 23. Reassemble any other removed components and check system board operation..

Power Supply Back Board

To remove the power supply back board, perform the following procedures:

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 1). The power-on LED goes out.
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Remove the system left-hand side access panel following procedures previously described in this chapter.

CAUTION

For proper cooling and airflow, do not operate the system with the side access panel removed. Always **replace** the panel before powering on the system

8. Remove any power supply installed in the system following procedures described earlier in this chapter.
9. Figure 4-56, A shows the location of the power supply back board. Tag and remove all power supply back board cables connected to the system board, SCSI backplane, and peripheral devices installed in the system.

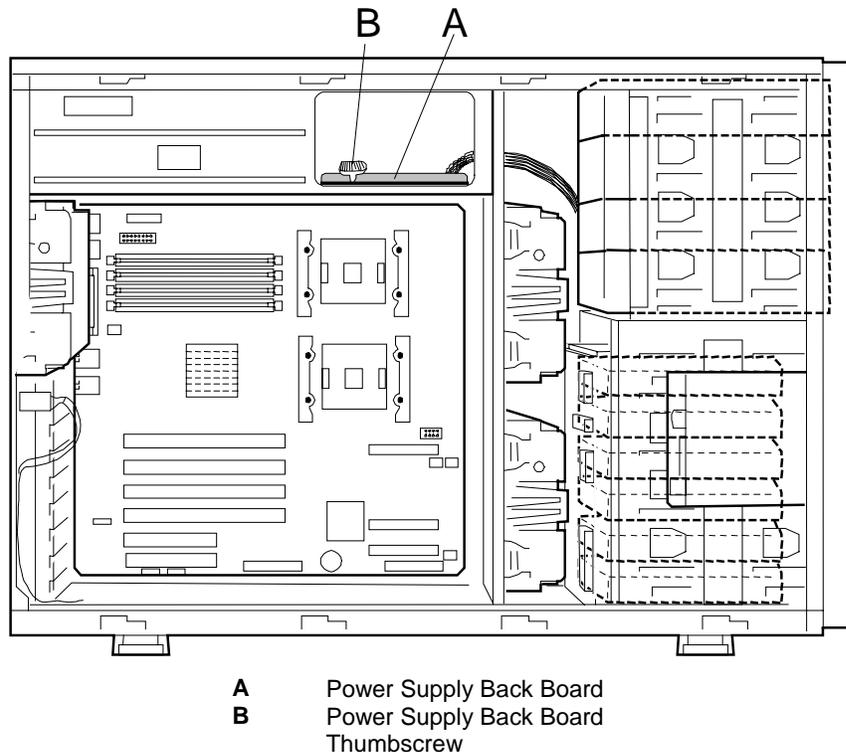


Figure 4-56. Removing the Power Supply Back Board

10. Loosen the single thumbscrew securing the power supply back board to the system chassis. See Figure 4-56, B.
11. The power supply back board mounts on top of four standoffs. Pull the back board towards you to release it from the standoffs.
12. Lift the power supply back board towards the top of the system and remove it and associated cables from the system.
13. Install the replacement power supply back board into the system in the same position as the original being sure to route the power cables to the system board, SCSI backplane and internal peripheral components.
14. Push the back board away from you to secure it to the standoffs.
15. Tighten the single thumbscrew securing the power supply back board to the system chassis. See Figure 4-56, B.
16. Install any power supply removed in Step 8.
17. Install any other components removed in this procedure and power up the system.

Tower Feet

Your tower system has four stabilizer feet located on the bottom of the chassis. To remove the stabilizer feet you must have the chassis positioned on its side with its stabilizer feet overhanging the edge of a table or workbench.

To remove the tower feet (see Figure 4-57), perform the following procedures:

1. Prepare your system for disassembly. See *Preparing Your System for Disassembly and Reassembly* earlier in this chapter.
2. Position the chassis on its side and move it to the edge of a table or workbench so that its stabilizer feet overhang the surface rim.
3. Remove and save the two screws attaching a foot to the bottom of the chassis.
4. Slide the foot towards the rear of the chassis and remove the foot from the chassis.
5. Repeat steps 3 and 4 to remove the other feet from the chassis.

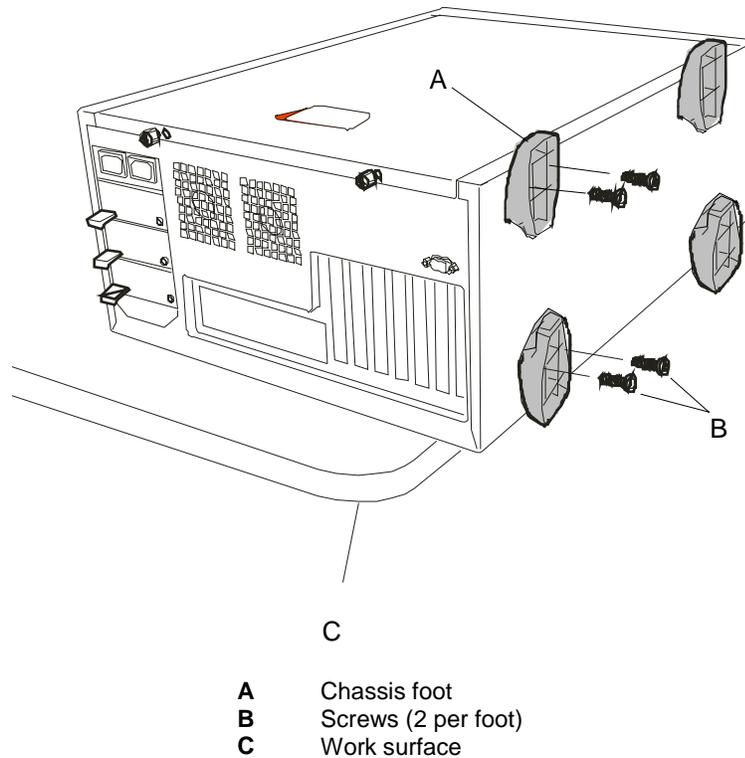


Figure 4-57. Removing the Tower Feet

I/O Shield

To remove the I/O, perform the following procedures:

1. Observe the safety and ESD precautions listed under *General Information* and *Static Precautions* at the beginning of this chapter.
2. Open the front bezel of your system.
3. Shutdown the operating system (OS).
4. Press the power on/off switch on the front panel of the server (see *Front View* in Chapter 1).
5. Power off the peripheral devices.
6. Unplug the system power cord(s) from the AC wall outlet(s).

 **Note:** If the system 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.

7. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.
8. Remove the system board following procedures previously described in this chapter.
9. The I/O shield snaps into the rear panel. To remove the I/O shield, push in on the perimeter of the shield towards the inside of the chassis. See Figure 4-58, A for the location of the I/O shield.

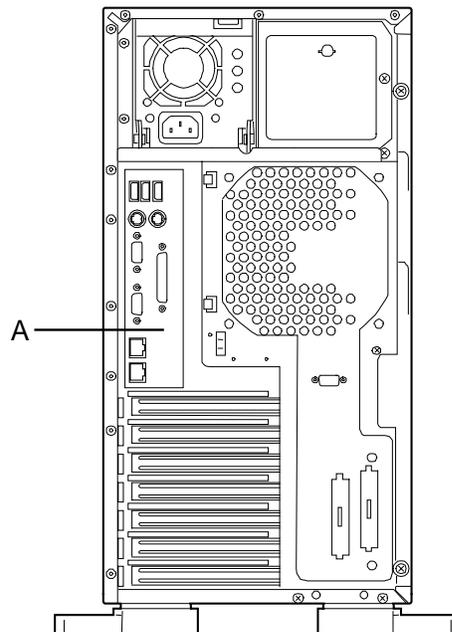


Figure 4-58. Removing the I/O shield

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10. Snap the replacement I/O shield into place in the rear panel.
 11. Install the system board following procedures previously described in this chapter.
 12. Install the left-hand side access panel.

LED/Switch Assembly

Your server system contains a front panel that houses the LED/switch assembly. You must open the front bezel to access the front panel. To remove the front panel LED/switch assembly, perform the following procedures:

1. Prepare your system for disassembly. See *Preparing Your System for Disassembly and Reassembly* earlier in this chapter.
2. Remove the left-hand side access panel of the system chassis following procedures previously described in this chapter.
3. Remove the front panel following procedures previously described in this chapter. See *Front Panel* earlier in this chapter.
4. Remove the power switch, reset switch and dump switch from the front of the chassis. To release these switches, squeeze their two plastic snap tabs together and slide the switch back until it is free of the chassis. See Figure 4-59, A.

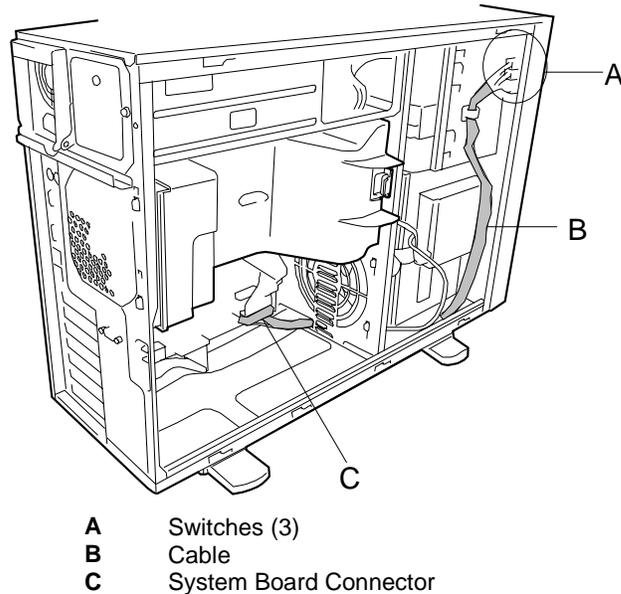


Figure 4-59. Replacing the LED/Switch Assembly

5. Tag and disconnect the LED/Switch Assembly cable (Figure 4-59, B) from its mating connector on the system board. See Figure 4-59, C. Carefully remove the LED/Switch assembly from the system.

Intrusion Switch Assembly

Your server system includes two chassis intrusion switches that are located on the front and rear of the system chassis. The switches monitor the front door being opened and the left-hand side access panel being removed. To access the two intrusion switches you must remove the left-hand side access panel from the system chassis.

 **Note:** The intrusion switch assembly consists of two intrusion switches with cables and a single cable connector.

To remove the intrusion switch assembly (see Figure 4-60), perform the following procedures:

1. Prepare your system for disassembly. See *Preparing Your System for Disassembly and Reassembly* earlier in this chapter.
2. Remove the left-hand side access panel of the system chassis. See *Removing the Side Access Panel* earlier in this chapter.
3. Tag and disconnect the intrusion switch cable from its mating connector on the system board. See Figure 4-60, C.
4. Remove the intrusion switch located on the front and the switch located at the rear of the chassis. See Figure 4-60, A and B. To release an intrusion switch squeeze its two plastic snap tabs together and slide it back until it is free of the chassis.
5. Carefully remove the intrusion switch assembly.

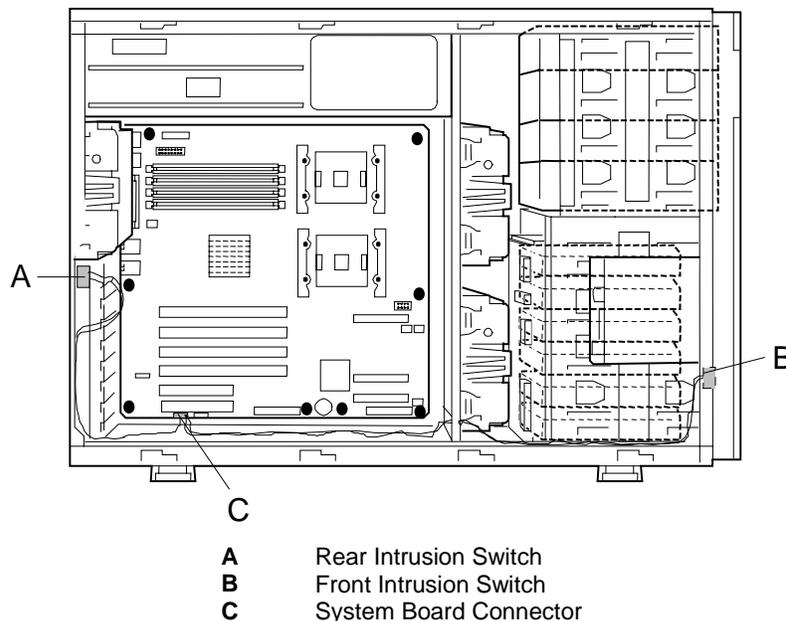


Figure 4-60. Removing the Intrusion Switch Assembly

5

Problem Solving

- Problem Solving
- Static Precautions
- Resetting the Server
- Forced Shutdown
- Troubleshooting Checklists
- Diagnostic Procedures
- Specific Problems and Corrective Actions
- Problems with the Network
- Plug and Play Installation Tips
- Error Messages
- How to Identify BIOS and BMC Revision Levels
- Lamps

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 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 cords 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 cover removed can damage your system components. For proper cooling and airflow, always replace the top panel 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.

IMPORTANT: Resetting the server clears the DIMM memory and the data in process. To reset the server when it is not frozen, make sure that no processing is in progress.

■ Hard reset

Press the RESET switch at the front of the server. See Figure 5-1.

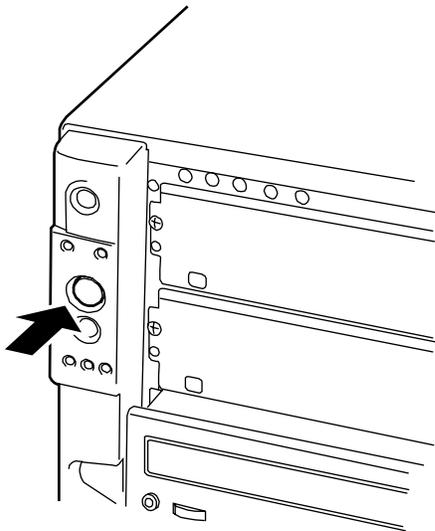


Figure 5-1. Pressing the Reset Button

■ Soft reset

If the server halts before starting the OS, press and hold **Ctrl** and **Alt** and press **Delete**. This restarts the server.

Forced Shutdown

Use this function when an OS command does not shut down the server, the POWER switch does not turn off the server, or resetting does not work.

Press and hold the POWER switch on the server for at least four seconds. The power is forcibly turned off. To turn on the power back again, wait approximately 10 seconds after turning off the power (forced shutdown).

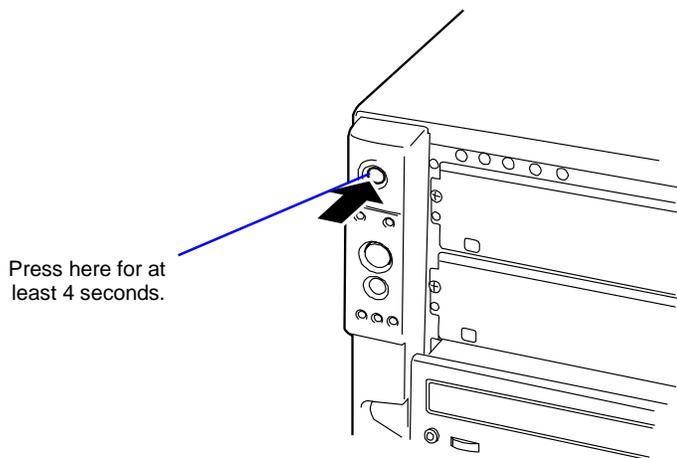


Figure 5-2. Pressing the Power Button

IMPORTANT: 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.

Troubleshooting Checklists

The following subsections provide troubleshooting checklists for problems that occur at initial system startup, when you run new application software, and after the system hardware and software have been running correctly.

Initial System Startup

Incorrect installation or configuration usually causes problems that occur at initial system startup. Hardware failure is a less frequent cause. If you have problems during initial system startup, check the following:

- Are the system power cords properly connected to the system and plugged into a NEMA 5-15R outlet (100-120 VAC), a NEMA 6-15R outlet (200-240 VAC), or an UPS that meets the power specifications of the system?
- Is AC power available at the wall outlet?
- Is the system cover closed properly? A power interlock switch detects if the cover is open. If the cover is not closed properly, power is not supplied to the server system.
- Is the power on/off push-button switch on the front panel in the ON position (power on LED should be lit)?
- Are all cables correctly connected and secured?
- Are all the PCI option boards fully seated in their connector slots in the riser cards?
- Are all jumpers and switch settings on option boards and peripheral devices correct? If applicable, ensure that there are no conflicts; for example, two option boards sharing the same interrupt.
- Are the processors fully seated in their slots on the system board? Refer to the *Processors* subsection of *Upgrading Your System* in Chapter 4 for installation instructions?
- Are all DIMMs fully seated and installed correctly? Refer to the *DIMMs* subsection of *Upgrading Your System* in Chapter 4 for installation instructions.
- Are all option boards and disk drives installed correctly? Refer to the *Options Boards* and *Hard Disk Drives* subsections of *Upgrading Your System* in Chapter 4 for installation instructions.
- Is the system hard disk drive properly formatted or defined?
- Is the operating system properly loaded? Refer to the operating system documentation.
- Are all drivers properly installed?
- Are the configuration settings in BIOS Setup and the SCSISelect Utility correct? For information about running these utilities, refer to the *Configuring Your System* in Chapter 3.

If the above items are all correct, but the problem reoccurs, refer to *Additional Troubleshooting Procedures* in this chapter.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. If you have problems while running new application software, check the following:

- Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.
- Is the software an authorized copy? Unauthorized copies often do not work. Obtain an authorized copy of the software.
- If you are running the software from a diskette, is it a good copy?
- If you are running the software from a hard disk drive, is the software correctly installed? Were all necessary procedures followed and files installed?
- If you are running the software from a CD-ROM disk is the disk scratched or dirty?
- Are the correct device drivers installed?
- Is the software correctly configured for the system?
- Are you using the software correctly?
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problems persist with the software, contact the software vendor's customer service representative.

After System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. However, many situations that are easy to correct can also cause such problems. If you have problems after the system has been running correctly, check the following:

- If you are running the software from a diskette or CD-ROM, try a new copy of the software.
- If you are running the software from a hard disk drive, try running it from a floppy. If the software runs correctly, there may be a problem with the copy on the hard disk. Reinstall the software on the hard disk drive and try running it again. Make sure all the necessary files are installed.
- If the problem recurs, you may need to reformat the hard disk drive. The hard disk drive, the drive controller, or the system board set may be defective.
- If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.

 **Note:** Voltage spikes can corrupt or destroy data files on the drive. If you are experiencing voltage spikes on the power line, install a surge suppresser between the power outlet and the system power cord.

If the problem recurs after you have checked and corrected all of the above items, refer to *Diagnostic Procedures* in this chapter.

Diagnostic Procedures

This section provides a more detailed approach to diagnosing and identifying problems and then locating their sources.

Error Checking

Each time you turn on the system, POST (Power-On-Self-Test) runs automatically and checks the system board, processors, memory board, keyboard, and mouse.

If POST finds an error, it displays an error message. Refer to the *Error Message* section in this chapter for an explanation of each error message.

Troubleshooting Guide

Use the following troubleshooting procedures to help you identify a problem. These general procedures lead you through the following:

- Preparing the system for diagnosing problems
- Monitoring POST while it is running
- Verifying proper operation of key system LEDs
- Confirming loading of the operating system.

Preparing the System for Diagnosing Problems

To prepare the system for diagnosing problems, perform the following:

 **Note:** Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

1. Turn off the system and all external peripheral devices. Disconnect all devices from the system except the keyboard and video monitor.
2. Make sure the system power cords are plugged into a properly grounded AC outlet.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two-thirds of their maximum ranges (refer to the documentation supplied with your video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
5. Turn on the system. If the power indicator LED does not light, refer to *Power Light Does Not Light* found later in this chapter.

Monitoring POST

Each time you turn on the system, the Power-On Self-Test (POST) runs automatically and checks the system board, processors, memory board, keyboard, and mouse.

During the memory test, POST displays the amount of memory that it is able to access and test. Depending on the amount of memory, it may take several minutes to complete the memory test. When the memory test completes, the following is displayed:

Press <F2> to enter SETUP

Press <F2> to enter BIOS SETUP. When the utility appears, follow the instructions on your monitor to configure BIOS. See Chapter 3, "Configuring Your System." If you do not press <F2>, the above message remains for a few seconds and the boot process continues.

When this message appears:

Press <Ctrl> <A> for SCSISelect™ Utility!

Press <Ctrl+A> if you want to configure SCSI devices in your system. When the utility appears, follow the instructions on your monitor to configure the SCSI host adapter settings and run the SCSI disk utilities. See Chapter 3, *Configuring Your System*. If you choose not to run SCSISelect™ Utility, the boot process continues.

If POST finds an error, it displays an error message and, in case there is a problem with the display, it emits a series of long and short beeps. Write down any beep code emitted. This information is useful to your service representative.

Refer to the "Error Messages" section in this chapter for a list of items to check for each error code and for an explanation of the error beep codes.

The POST Tests table at the end of this chapter lists keys active during POST and provides a description of errors that may occur.

The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area, and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

Report any error code to your service representative.

POST Keys and Errors

Action/Message	Description
If POST Beeps Before Video Appears	Initialization failed before video initialized. Most beep code errors are fatal; initialization cannot continue. Refer to the section "Error Messages" in this chapter.
If Monitor Displays Error	Note error; press F1 to continue boot or F2 to enter Setup. Refer to the section "Error Messages" in this chapter.
To Enter Setup	Setup changes specific options, then writes to CMOS, NVRAM. Press F2 during initialization to run Setup. If you do not press F2 , the boot process continues.
Enter BOOT Diskette	If prompted, insert the boot diskette.

Verifying Proper Operation of Key System Indicators

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity indicator should turn on briefly. Check for the following:

- Does the diskette drive activity indicator turn on briefly? If not, refer to “Diskette Drive Activity Indicator Does Not Light” in this chapter.
- If there is a hard disk drive or SCSI devices installed in the system, does the hard disk drive activity indicator turn on briefly? If not, refer to *Hard Disk Drive Activity Indicator Does Not Light* in this chapter.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, refer to *Problems with Application Software* found later in this chapter.

Specific Problems and Corrective Actions

This section provides possible solutions for the following specific problems:

- Power LED does not light
- No beep or incorrect beep pattern
- No characters appear on screen
- Characters on the screen appear distorted or incorrect
- System cooling fan does not rotate
- Diskette drive activity LED does not light
- Hard disk drive activity LED does not light
- CD-ROM drive activity LED does not light
- Problems with application software
- The startup prompt “Press <F2> key if you want to run Setup” does not appear on the screen.
- The bootable CD-ROM is not detected.

Try the solutions in the order given. If you cannot correct the problem, contact your service representative for assistance.

Power LED Does Not Light

Check the following:

- Is the system operating normally? If so, the power LED is probably defective.
- Are there other problems with the system? If so, check the items listed under System Cooling Fans Do Not Rotate.

Incorrect or No Beep Code

Check the following:

- Is the speaker operating?

If the system operates normally, but there was no beep, the speaker may be defective, contact your service representative for assistance.

Record the beep code emitted by POST, and see the “Messages and Beep Codes” section found later in this chapter.

No Characters Appear on Screen

Check the following:

- Is the keyboard working? Check to see if the **Num Lock** light is functioning.
- Is the video display monitor plugged in and turned on?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Are the video monitor switch settings correct?
- Is the video monitor signal cable properly installed?

- Is the onboard video controller enabled?

If you are using a video controller board, verify that the video controller board is fully seated in its connector

If there are still no characters on the screen after you reboot the system, contact your service representative or authorized dealer for assistance.

POST emits one long beep and two short beeps pattern to indicate a possible problem with the video display controller. If you do not receive a beep pattern and characters do not display, the video display or video controller may have failed. Contact your service representative or authorized dealer for assistance.

Characters are Distorted or Incorrect

Check the following:

- Are the brightness and contrast controls properly adjusted on the video display? Refer to the documentation supplied with your video display.
- Are the video monitor's signal and power cables properly installed?
- If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your service representative for assistance.

System Cooling Fans Do Not Rotate

Check the following:

- Is AC power available at the wall outlet?
- Are the system power cords properly connected to the power supplies and the AC wall outlets?
- Is the cooling fan module power connectors seated properly?
- Is the front panel power on indicator lit?

If the switches and connections are correct and the power outlet is functioning, the power supply has probably failed. Contact your service representative for assistance.

Diskette Drive Activity LED Does Not Light

Check the following:

- Is the diskette drive properly configured?
- Is the CDROM/Floppy Disk Drive combo properly installed in the flex bay?

Use BIOS Setup to make sure that the diskette drive controller is set to Enabled. For information about running BIOS Setup, refer to the *Configuring Your System* chapter.

If the problem persists, there may be a problem with the diskette drive, system board, or drive signal cable. Contact your service representative for assistance.

CD-ROM Drive Activity Light Does Not Light

Check the following:

- Is the CDROM/Floppy Disk Drive combo properly installed in the flex bay?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?
- Is the onboard IDE controller enabled?

Problems with Application Software

If you have problems with application software, perform the following:

- Verify that the software is properly configured for the system. Refer to the software installation and operation documentation for instructions on setting up and using the software.
- Verify a different copy of the software to see if the problem is with the copy that you are using.
- Make sure all cables are installed correctly.
- Verify that the system board jumpers are set correctly. Refer to the *Configuring Your System* chapter for jumper settings.
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problem persists, contact the software vendor's customer service representative for assistance.

Bootable CD-ROM Is Not Detected

Check the following:

- Is the BIOS set to allow the CD-ROM to be the first bootable device? Check your BIOS Setup (F2) configuration.

Problems with the Network

Diagnostics pass, but the connection fails:

- Make sure the network cable is securely attached.

The controller stopped working when an add-in adapter was installed:

- Make sure the cable is connected to the port from the onboard network controller.
- Make sure the other adapter supports shared interrupts.
- Try reseating the add-in adapter.

The add-in adapter stopped working without apparent cause.

- Try reseating the adapter first; then try a different slot if necessary.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- Run the diagnostics.

Plug and Play Installation Tips

Certain drivers may require interrupts that are not shared with other PCI drivers. The BIOS Setup Utility can be used to adjust the interrupt numbers for PCI devices. For certain drivers, it may be necessary to alter settings so that interrupts are not shared.

Error Messages

This section describes the POST error codes and messages.

POST Error Codes and Messages

Whenever a recoverable error occurs during POST, BIOS displays a message on the video display screen and causes the speaker to beep as the message appears. BIOS also issues a beep code (one long tone followed by two short tones) during POST if the video configuration fails or if an external ROM module does not have the correct checksum. The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area, and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

Table 5-1 *POST Error Codes and Messages* is a list of the error codes and messages written at the start of each POST test. Table 5-2 *POST Error Beep Codes* is a list of beep codes issued for each POST test. The devices associated with the POST error codes are shown in subsection *POST Error Code Hardware References* that follow.

Table 5-1. POST Error Codes and Messages

On-screen error message	Action
100 Timer Channel 2 Error	Contact your service representative to replace the system board.
101 Master Interrupt Controller	
102 Slave Interrupt Controller	
103 CMOS Battery Failure	
104 CMOS Option not Set	Contact your service representative to replace the system board. (Restart the computer, and then execute SETUP to correct the setting.)
105 CMOS/GPNV Checksum Bad	Execute SETUP to correct the setting.
106 CMOS Display Error	Contact your service representative to replace the system board.
107 Insert Key Pressed	Release the key.
108 Keyboard Locked Message	Reconnect the keyboard.
109 Keyboard Stuck Key	Release the key. Try a different keyboard. If the problem persists, contact your service representative to replace the system board.
10A Keyboard Interface Error	Reconnect the keyboard. Try a different keyboard. If the problem persists, contact your service representative to replace the system board.
10B System Memory Size Error	Install the DIMMs correctly. Check if all the installed DIMMs are the same specification. Contact your service representative to replace the DIMMs.

Table 5-1. POST Error Codes and Messages (continued)

On-screen error message	Action
10E External Cache Failure	Install the CPU (processor) correctly. Contact your service representative to replace the CPU.
110 Floppy Controller Error	Contact your service representative to replace the floppy disk drive or system board. This server does not support floppy disk drive B.
111 Floppy A: Error	
112 Floppy B: Error	
113 Hard disk 0 Error	Contact your service representative to replace the system board, SCSI back-plane, or hard disk.
114 Hard disk 1 Error	
115 Hard disk 2 Error	Contact your service representative to replace the system board, SCSI back-plane, or hard disk.
116 Hard disk 3 Error	
117 CD-ROM disk 0 Error	Contact your service representative to replace the system board or the CD-ROM drive.
118 CD-ROM disk 1 Error	
119 CD-ROM disk 2 Error	
11A CD-ROM disk 3 Error	
11B Date/Time not set	Activate the BIOS SETUP utility to set the date and time.
11E Cache memory bad	Install the CPU (processor) correctly. Contact your service representative to replace the CPU.
120 NVRAM cleared by Jumper	Activate the BIOS SETUP utility to set the CMOS or password.
121 Password clear	
140 PCI Error	Securely install the PCI boards and PCI riser card.
141 PCI Memory Allocation Error	Contact your service representative to replace the PCI board, system board, or PCI riser card.
142 PCI IO Allocation Error	
143 PCI IRQ Allocation Error	Activate the BIOS SETUP utility to set the PCI board.
144 Shadow of PCI ROM Failed	Securely install the PCI boards and PCI riser card. Contact your service representative to replace the PCI board, system board, or PCI riser card.
145 PCI ROM not found	Securely install the PCI boards and PCI riser card. Contact your service representative to replace the PCI board, system board, or PCI riser card.
146 Insufficient Memory to Shadow PCI ROM	For PCI boards which do not need to be bootable, activate the BIOS SETUP utility to disable extension of the expanded ROM on the PCI board. Securely install the PCI boards and PCI riser card. Contact your service representative to replace the PCI board, system board, or PCI riser card.

Table 5-1. POST Error Codes and Messages (continued)

On-screen error message	Action
8110 Processor 1 Internal error (IERR)	Securely install the processor. Contact your service representative to replace the processor or system board.
8111 Processor 2 Internal error (IERR)	
8120 Processor 1 Thermal Trip error	
8121 Processor 2 Thermal Trip error	
8130 Processor 1 disabled	Securely install the processor.
8131 Processor 2 disabled	Contact your service representative to replace the processor or system board.
8140 Processor 1 failed FRB level 3 timer	
8141 Processor 2 failed FRB level 3 timer	
8150 Processor 1 failed initialization on last boot	Securely install the processor.
8151 Processor 2 failed initialization on last boot	If the message is displayed each time the system is booted, contact your service representative to replace the processor or system board.
8160 Processor 01: unable to apply BIOS update	Contact your service representative to replace the processor or system board.
8161 Processor 02: unable to apply BIOS update	
8170 Processor P1 :L2 cache failed	
8171 Processor P2 :L2 cache failed	
8180 BIOS does not support current stepping for Processor P1	
8181 BIOS does not support current stepping for Processor P2	
8190 Watchdog Timer failed on last boot	Securely install the processor.
8191 4:1 Core to bus ratio: Processor Cache disabled	If the message is displayed each time the system is booted, contact your service representative to replace the processor or system board.

Table 5-1. POST Error Codes and Messages (continued)

On-screen error message	Action
8192 L2 Cache size mismatch	Install processors under the same specification.
8193 CPUID, Processor Stepping are different	
8194 CPUID, Processor Family are different	
8195 Front Side Bus Speed mismatch. System Halted	Securely install the processor. Contact your service representative to replace the processor or system board.
8196 Processor Model are different	Install processors under the same specification.
8197 CPU Speed mismatch	
8198 Failed to load processor microcode	Securely install the processor. Contact your service representative to replace the processor or system board.
8300 Baseboard Management Controller failed to Function	Contact your service representative to replace the system board.
8301 Front Panel Controller failed to Function	
8305 Hotswap Controller failed to Function	
8420 Intelligent System Monitoring Chassis Opened	Install the top cover correctly.
84F1 Intelligent System Monitoring Forced Shutdown	Confirm that the system starts normally. If the system is in abnormal state, contact your service representative to replace the system board.
84F2 Server Management Interface Failed	Contact your service representative to replace the system board.
84F3 Baseboard Management Controller in Update Mode	Ask your service representative for maintenance.
84F4 Sensor Data Record Empty	

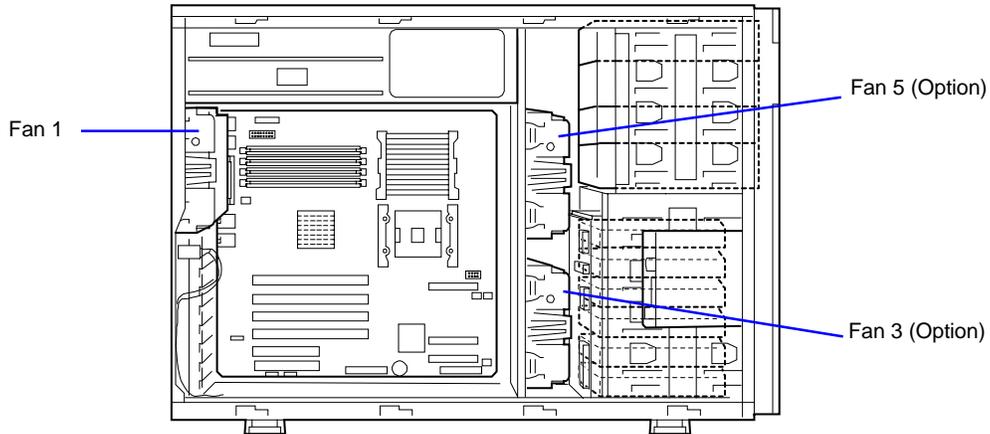
Table 5-1. POST Error Codes and Messages (continued)

On-screen error message	Action
84FF System Event Log Full	Clear the event log by using the BIOS SETUP utility. If the error is not eliminated, contact your service representative to replace the system board. The error message is displayed periodically if ESMPRO is not installed. The event log must be cleared periodically.
8500 Bad or missing memory in Slot 2A	Check to see that the all DIMMs are firmly seated in the slot.
8501 Bad or missing memory in Slot1A	Contact your service representative to replace the memory or system board.
8504 Bad or missing memory in Slot 2B	
8505 Bad or missing memory in Slot 1B	
8601 All memory marked as fail Forcing minimum back online	
8306 OS Boot Watchdog Time failure	Contact your service representative.

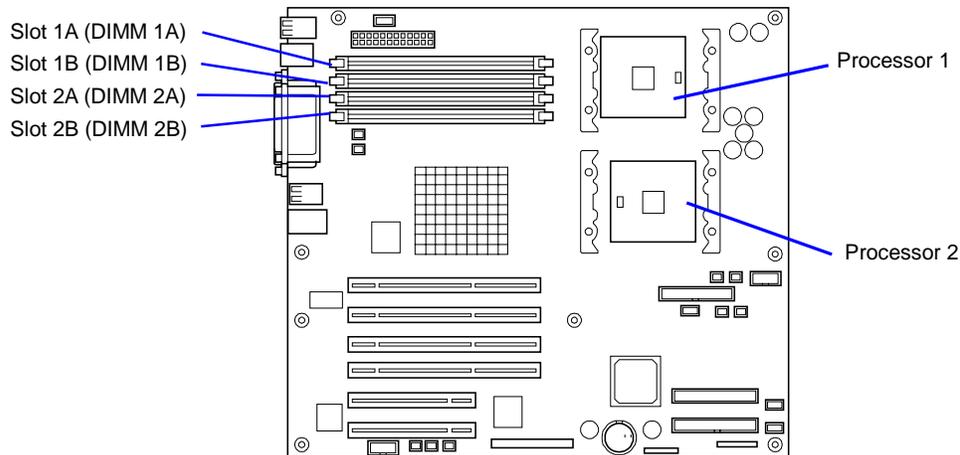
POST Error Code Hardware References

Figure 5-3 shows the location of specific components referenced in the POST Error Codes and Messages table.

■ Fan modules



■ Processor/Memory



NOTE: Failed CPU or memory boards can be also identified with the SETUP utility.

 **Note:** DIMMs are always added in pairs in the ascending order of DIMM socket numbers.

1A	DIMM #1-A	DIMM Group Bank #1
1B	DIMM #1-B	
2A	DIMM #2-A	DIMM Group Bank #2
2B	DIMM #2-B	

Figure 5-3 . Processor and DIMM Locations on the System Board

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 1-5-2-2 indicates 1 beep, pause, 2 beeps, pause, 2 beeps, pause, and 3 beeps notifying that no processor is detected on the system board.

Table 5-2. Post Error Beep Codes

Beeps	Error	Recommended Action
1	Refresh timer error	Contact your service representative to replace the system board
2	Parity error	Check if the DIMM cards are mounted correctly. If the error still occurs when the check result is normal, contact your service representative to replace the DIMM card or system board.
3	Base memory failure	Contact your service representative to replace the system board.
4	System timer error	Contact your service representative to replace the processor or system board.
5	Processor failure	Check if the keyboard is connected correctly. Contact your service representative to replace the keyboard or system board.
6	Keyboard controller error	Contact your service representative to replace the processor or system board.
7	Processor exception interrupt error	Contact your service representative to replace the system board.
8	Display memory read/write error	Contact your service representative to replace the system board.
9	ROM checksum error	Contact your service representative to replace the system board.
10	Shutdown register error	
11	BIOS disabled	
1-5-1-1	FRB failure	Contact your service representative to replace the processor or system board.
1-5-2-1	Processor type error	Check if the type of the mounted processor is correct. If the error still occurs when the check result is normal, contact your service representative to replace the processor or system board.
1-5-2-2	Processor not detected	Check if the processor is mounted correctly. If the error still occurs when the check result is normal, contact your service representative to replace the processor or system board.
1-5-4-2	Power failure	Contact your service representative to replace the power supply unit, power jumper board, or system board.
1-5-4-3	Chip set control error	Contact your service representative to replace the system board.
1-5-4-4	Power control error	Contact your service representative to replace the power supply unit, power jumper board, or system board.

How to Identify BIOS and BMC Revision Levels

To identify your system's current BIOS and BMC revision levels, 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:

Menu	Use
Main	Use this menu for basic system configuration.
Advanced	Use this menu for setting the Advanced Features available on your system.
Security	Use this menu to set User and Supervisor Passwords and the Backup and Virus-Check reminders.
Server	Use this menu for configuring unique Server features.
Boot	Use this menu to configure Boot Device priority.
Exit	Exits the current menu.

3. Use the arrow keys to select the **Server** menu.
4. Select **System Management** and press **ENTER**. The BIOS and BMC revision level are displayed.

Lamps

The following describes lamps on the server and their indications. See Chapter 2 for each location.

LAN ACCESS Lamp (🔌¹)

The LAN ACCESS lamp is lit green when the server is connected to LAN. The lamp blinks while the server is accessed through the LAN (for packet transmission). The value next to the icon indicates the number of the network port on the rear panel.

STATUS Lamp (⚠️)

The STATUS lamp stays lit in green when the server is in successful operation. When the STATUS lamp is unlit or lit/flashing in amber, it indicates that the server has failed.

The following table lists indications of the STATUS lamp, descriptions, and actions to take.

NOTES:

- If the server has the ESM PRO or Off-line Maintenance Utility installed, you can view the error log to identify the cause of a trouble.
 - To cycle power to the server, shut down the server from the OS to and reboot it, if available. If the shutdown from the OS is not available, disconnect and connect the power cord to reboot the server.
-

STATUS lamp indication	Description	Procedure
On (green)	The server is operating normally.	–
Flashing (green)	<ul style="list-style-type: none"> The server is operating with the memory, CPU, or power supply unit in degraded state. A single-bit memory error has often occurred. 	<p>Check the AC POWER lamp indication on the rear panel of the server.</p> <p>Identify the device in degraded state by using the BIOS setup utility "SETUP," and replace it as soon as possible.</p>
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. (Thermal-Trip)	
	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.	<p>Check if the internal fans are clean and if the fan units are firmly connected.</p> <p>If the STATUS lamp indication does not change when the fans are normal, contact your sales representative.</p>
	A voltage alarm was detected.	Contact your sales representative.
	All the power supply units failed.	
Flashing (amber)	<p>Either of the following was detected in the redundant power configuration:</p> <ul style="list-style-type: none"> AC power not supplied to one of the two power supply units Failure of one of the two power supply units 	Connect the power cord to supply power. If the power supply unit is faulty, contact your sales representative.
	A fan alarm was detected.	<p>Check if the fan units are firmly connected.</p> <p>If the STATUS lamp indication does not change when the fans are normal, contact your sales representative.</p>
	A temperature warning was detected.	<p>Check if the internal fans are clean and if the fan units are firmly connected.</p> <p>If the STATUS lamp indication does not change when the fans are normal, contact your sales representative.</p>

POWER/SLEEP Lamp (💡)

The green POWER/SLEEP lamp lights to indicate normal operation while the server is powered. When the server is off-powered, the POWER/SLEEP lamp stays unlit.

The POWER/SLEEP lamp indicates that the server is running in the power-saving mode (sleep mode). If the OS supports the power-saving mode such as Windows 2000, pressing the SLEEP switch blinks the POWER/SLEEP lamp in green and places the server in the power-saving mode. Press the POWER switch to turn out the POWER/SLEEP lamp and place the server back in the normal mode.

The power-saving mode is only available when the 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.

DISK ACCESS Lamp (💡)

The DISK ACCESS lamp indicates the state of hard disks in the 3.5-inch hard disk drive bay.

This lamp lights in green every time any of such hard disks is accessed.

When the DISK ACCESS lamp is lit in amber, it indicates that a hard disk error occurred. To identify a failed hard disk, see the lamps provided for each hard disk.

When the DISK ACCESS lamp lashes in green and amber by turns or in amber only, it indicates that hard disks connected to the internal disk array controller are in auto-rebuilding (reconfiguration).

Access Lamps

The access lamps for the floppy disk drive and the CD-ROM drive light when access is made to a media in the drive.

Hard Disk Drive Lamp

The disk lamp on the 3.5-inch hard disk drive bay has different meanings depending on the display status. See Figure 5-4.

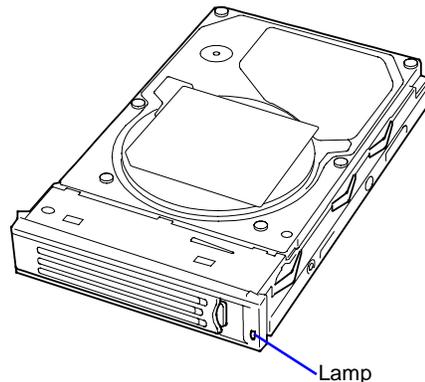


Figure 5-4. Hard Disk Drive Lamp Location

- Lighting green

Indicates that the power is supplied to the hard disk.

- Blinking green

Indicates that the hard disk is accessed.

- Lighting amber

Indicates that the installed hard disk is defected in the disk array configuration.

NOTE: While hard disks are in the disk array configuration (RAID1 or RAID5), a single failed hard disk does not affect the operation of the server. However, it is recommended to replace the failed hard disk and auto-rebuild (reconfigure) the hard disks as soon as possible. (You can hot-swap such a failed hard disk.)

- Alternate lighting green or amber

Indicates that the hard disk is being rebuilt (this status is not a failure). If the defected hard disk is replaced with a new one in the disk array configuration, the data is automatically rebuilt (auto rebuild function). During the rebuild operation, the lamp is lit green or amber alternatively.

The lamp goes off when the rebuild is terminated normally. The lamp goes on amber if the rebuild fails.

IMPORTANT: To abort rebuilding, power off the server. In such a case, restart the server, hot-swap the failed hard disk, and restart rebuilding. Observe the following notes to use the auto-rebuild feature.

- Do not power off the server. (If the server is powered off before rebuilding hard disks, the auto-rebuild feature will not start.)
 - When you removed a hard disk, wait at least 90 seconds before installing the hard disk back again.
 - Do not replace another hard disk while rebuilding is in progress.
-

Power Supply Lamps

The power supply on the rear of the server has three lamps. See Figure 5-5.

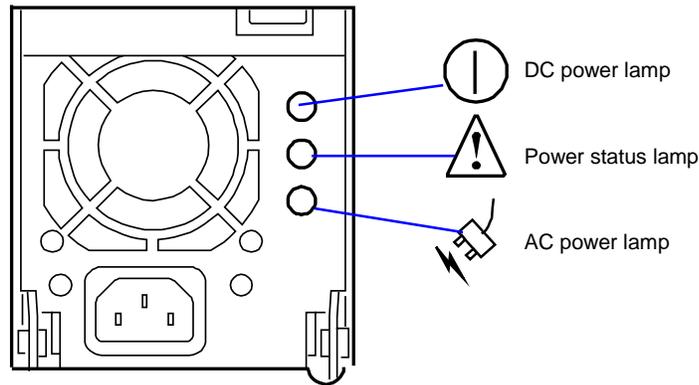


Figure 5-5. Power Supply Lamp Locations

NOTE: The server equipped with an optional power unit can continue the operation with the normal power unit if the other power unit is defected (redundant function). The defected power unit can be replaced with a new one in the hot-swap mode without power interruption.

DC Power Lamp

If the power cord is connected to the AC inlet to supply AC power to the power unit, the lamp blinks green. When the power of the server is turned on, the lamp goes on green. If the lamp is not lit after turning on the power of the server, the power unit may be defected. Contact your service representative to replace the power unit.

Power Status Lamp

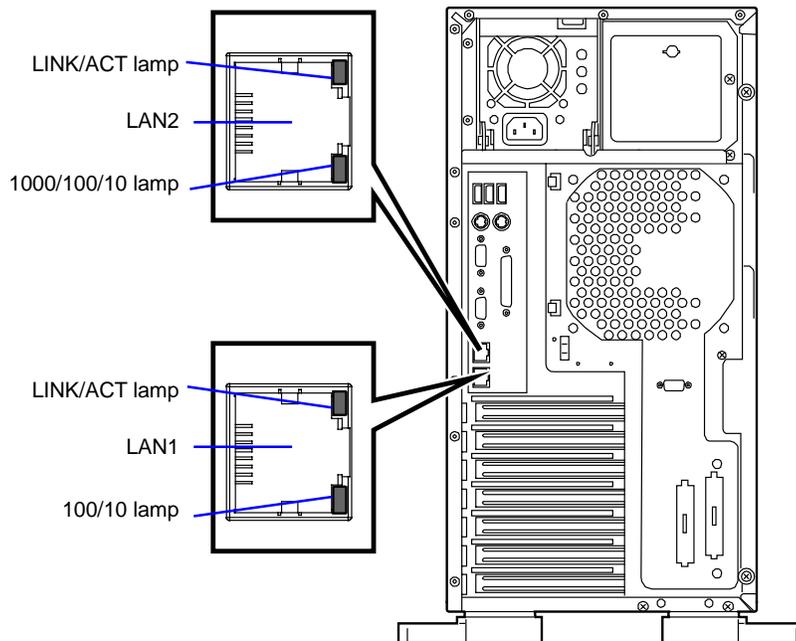
If a power supply failure (such as a fan performance problem, current limit, and overload voltage) is detected, this lamp goes on amber. Contact your service representative to replace the power unit.

AC Power Lamp

If the power cord is connected to the AC inlet to supply AC power to the power unit, the lamp goes on green. If the lamp is not lit after supplying AC power, the power supply bay may be defected. Contact your service representative to replace the power supply bay.

LAN Connector Lamps

Each of the two LAN connectors on the rear panel has two lamps as follows.



■ LINK/ACT lamp

The link/ACT lamp indicates the state of each network port normally equipped with the server. If the power is supplied to the server and the hub and they are correctly connected with each other, the lamp is lit green (LINK state). If information is transmitted through a network port, the lamp blinks green (ACT state).

If the lamp is not lit in the LINK state, check the network cable and the cable connection. If the lamp is not lit still after the checking, the network (LAN) controller may be defected. Contact your service representative.

■ 100/10 lamp (LAN1)

The 100/10 lamp indicates whether each of the network ports normally equipped with the server is operated through the 100BASE-TX or 10BASE-T network interface. If the lamp is lit amber, the network port is operated through 1000BASE-T. If the lamp is off, the network port is operated through 10BASE-T.

■ 1000/100/10 lamp (LAN2)

The 1000/100/10 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 amber, the network port is operated through 1000BASE-T. If the lamp is lit green, the network port is operated through 100BASE-TX. If the lamp is off, the network port is operated through 10BASE-T.

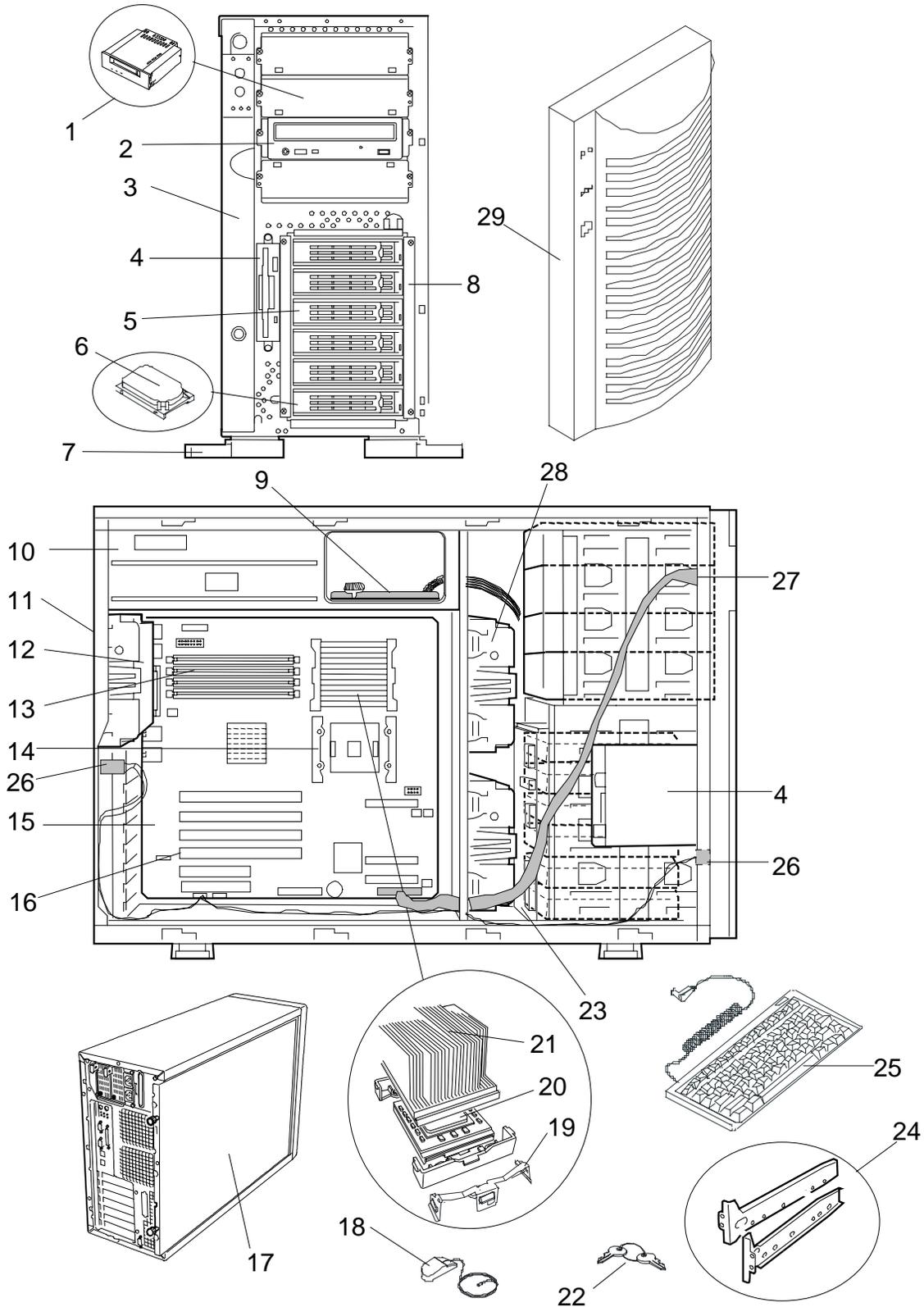
6

Illustrated Parts Breakdown

- Exploded View
- Field Replaceable Units

This chapter provides an exploded view and parts lists for the major assemblies of your server.

Exploded View



Field Replaceable Units

Reference Number	Description	Part Number
1	5.25-inch Peripheral Devices. Refer to subsection "Tape Drives" in this chapter.	
2	CDROM Drive Mitsumi FX-4840W	856-850222-001A
3	Sub Bezel (Front Panel)	6896470000
4	3.5-Inch FDD, Mist White D353M3D	6786020200
5	Hard Disk Drive Carrier	245-01509-000
6	Hard Disk Drives: Refer to subsection "Hard Disk Drives" in this chapter.	
7	Tower Feet	
8	HDD Cage, Hot Swap	
9	Power Supply Backboard	6896460000
10	Power Supply	
	Hot-Swap DPS-450FB D	313-01532-000
	Non Hot-Swap 450W PS/2	856-060342-505A
11	IO Shield	
12	Rear Fan	
13	Memory DIMMs: Refer to subsection "Memory Expansion" in this chapter.	
14	Retention Module	6867350000
15	System Board (Processors, Memory, Retention Module not included)	856-122387-001
16	Raid Controllers and Cache: Refer to subsections "RAID Controllers and Cache" and "SCSI Controllers" in this chapter.	
17	Side Panel	
18	PS/2 Mouse, Mist White	
19	Heat sink Clip P533	6887430000
20	Processor(s): Refer to subsection "Pentium Processors" in this chapter.	
21	CPU Heat Sink	309-01530-000

Reference Number	Description	Part Number
22	Master Key	
23	SCSI Backplane	856-122575-001
24	DLT Bracket Kit	
25	104-Key Keyboard	
26	Intrusion Switch Assembly (included in 6896590000)	6901600000
27	LED/Switch Assembly (included in 6896590000)	
28	Redundant Fan Assembly	856-060342-502A 6884800000
29	Front Bezel (Door)	6896480000

Pentium Processors

Replaceable Parts

Description	Part Number
Intel™ Xeon™ 2.0GHz/533/512 Processor	6884920000
Intel™ Xeon™ 2.4GHz/533/512 Processor	6884940000
Intel™ Xeon™ 2.66GHz/533/512 Processor	6889470000
Intel™ Xeon™ 2.8GHz/533/512 Processor	6884930000

Hard Disk Drives

Replaceable Parts

Description	Part Number
Kit, 18 GB ATLAS320-18SCA FWB411	6893360000
Kit, 36 GB ATLAS320-36SCA FWB411	6893370000
Kit, 73 GB ATLAS320-73SCA FWB411	6893380000
Kit, 18 GB SCSI, 15K RPM, ST318453LC FW0002	6893390000
Kit, 36 GB SCSI, 15K RPM, ST336753LC FW0002	6893400000
Kit, 73 GB SCSI, 15K RPM, ST373453LC FW0002	6893410000

DVD Drives

Replaceable Parts

Description	Part Number
DVDR SR8588 BNN MATSUSH FW7Z16	6892800000

DAT Tape Drives

Replaceable Parts

Description	Part Number
20/40 GB DDS4 DAT ELEPHANT EARS FW 02N9	6872100200
DLT VS80 TANDBERG TAPE DRIVE	6889490000
AIT-1 DRIVE SDX 400C DUST FW 07N6	6856880300
AIT-2 DRIVE SDX 500C DUST FW 01NM	6856890300
AIT-3 DRIVE SDX 700C DUST FW 01NM	6890050100
AIT- 2 AUTO-LOADER TSL A500C FWL1NB	6873450200

RAID Controllers and Cache

Replaceable Parts

Description	Part Number
RAID LSI 518, 2-CH 320-2 1L19	6893990000
RAID LSI 520, 1-CH 320-1 1L19	6894000000
Cache, 128 MB, M374S1723DTS-C7A	6865270000
Battery Backup, FOR LSI RAID Card 320-2	6891630000
RAID LED Cable	320-01688-000
Battery Backup, FOR LSI RAID Card 320-1	6891640000

SCSI Controllers

Replaceable Parts

Description	Part Number
ADAPTEC AHA29160 64-BIT NE LAT	6829240100
ADAPTEC AHA2944UW For Servers	1301630000

Network Controllers

Replaceable Parts

Description	Part Number
INTEL 1000BASE-SX ADAPTER BOARD	154-01504-000
LAN PRO1000XT PWLA8490XT INTEL	6893180000
LP952L-F2 B1.60A7 FW3.90A7	6895780000

Memory Expansion

Replaceable Parts

Description	Part Number
DIMM, 128 MB M383L1713DTS-CBO	6863170000
DIMM, 256 MB M383L3223DTS-CBO	6874140000
DIMM, 512 MB M383L6420DTS-CBO	6874130000
DIMM, 1GB M383L2828DTS-CBO	6874120000

Cable List

Description	Part Number
120Lg Cable Kit (not a FRU, Only for order)	6896590000
LED/SW Cable (included in 6896590000)	6896490000
HDD Activity Cable (included in 6896590000)	6896510000
Port COM Cable (included in 6896590000)	6896420000
IDE CDROM Cable (included in 6896590000)	6896430000
FDD Cable (included in 6896590000)	6896450000
U320 SCSI Cable 2Conn 68P 0.9M (use to link backplane to system board or an additional SCSI controller)	6895050000
RAID LED Cable	320-01688-000
U160 EXT SCSI Cable	320-01676-000
TM1300 6 CONN SCSI Cable with terminator (Use for additional tape drive)	6865960000

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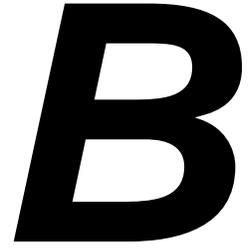
Specifications

- System Specifications

System Specifications

Item		NEC Express5800/120Lg	
CPU	Type	Intel® Xeon™ processor (1.8GHz/512KB)	Intel® Xeon™ processor (2.66GHz/512KB)
	Number of processors	1	
	Maximum	2	
Chipset		E7501	
Memory	Standard	256 MB (128 MB× 2)	512 MB (256 MB× 2)
	Maximum	4GB (The standard DIMM must be replaced.)	
	Expansion unit	2 DIMMs (256/512/1024MB)	
	Expansion times	2 times (The standard DIMM must be replaced.)	
	Memory module	SDRAM DIMM (DDR266, Registered)	
	Error check	ECC	
Graphics (VRAM)		ATI RAGE XL (VRAM 8MB)	
Auxiliary input device	Floppy disk (standard)	3.5-inch drive × 1 (standard)	
	Hard disk (standard)	None (Hot-swap)	
	Hard disk (maximum)	876 GB (146 GB × 6)	
	CD-ROM (standard)	ATAPI interface × 1 (x48 speed)	
5.25-inch file bay		4 slots (Standard ATAPI CD-ROM drive is installed.) *	
3.5-inch device bay		6 slots (Hot-swap)	
Additional slot	PCI (64-bit/100MHz)	4 slots	
	PCI (32-bit/33MHz)	2 slots	
LAN interface		1000BASE-T/100BASE-TX/10BASE-T (1 port), 100BASE-TX/10BASE-T (1 port)	
External interface	Keyboard	MINI DIN 6-pin connector (1 port)	
	Mouse	MINI DIN 6-pin connector (1 port)	
	USB	4-pin (3 ports)	
	Serial	D-sub 9-pin (2 ports)	
	Parallel	D-sub 25-pin (1 port)	
	Network	RJ-45 (2 ports)	
	Display	MINI D-sub 15-pin (1 port)	
	SCSI	Ultra320/160 SCSI (1 port) (An exclusive use with internal SCSI for hard disk drive)	
Cabinet design		Desk-side, mini tower	
External dimensions		292.1* (width) × 453 (height) × 681 (depth) mm * including stabilizers	
Weight		35 kg (Max.)	
Power supply		100 to 120 VAC ±10%, 200 to 240 VAC ±10%, 50/60 Hz ±1 Hz (Hot-swap)	
Power consumption		480 VA, 465 W	
Environmental requirements	Temperature	10 to 35°C	
	Humidity	20 to 80% RH (no condensation)	
Others		NEC EXPRESSBUILDER supported, NEC ESMPRO provided in the standard configuration	

* A maximum of three file devices can be installed in this system (including standard ATAPI CD-ROM drive).



Installing and Configuring Windows[®] 2000

- Overview
- Device Drivers
- Installation Assumption
- Installation Preparation
- Installing Microsoft Windows[®] 2000 Operating System
- Installing LAN Adapters
- Driver Installation for the ATI RAGE XL Display Adapter

Overview

This appendix contains supplemental instructions needed to install and configure hardware and software used with the Microsoft Windows® 2000 Operating System. This information is intended to supplement the more detailed procedural documents available from Microsoft. This information is not intended to be the central source of installation and configuration information for your system. Read this entire chapter along with Microsoft's Windows® 2000 Setup procedures before starting the installation process.

 **Note:** Read the System Release Notes for the latest system information before attempting to install Windows 2000 Operating System on your system.

Device Drivers

The drivers required for the devices listed in Table B-1 below are located on the EXPRESSBUILDER CD that is included with your system. To create the required diskettes, perform “Tools” on the EXPRESSBUILDER CD.

 **CAUTION**

When creating the required diskettes from the EXPRESSBUILDER CD make sure you use the drivers required for the devices on your specific system.

Always read the information in the release notes or inserts, included with any options for they supersede the information in this guide.

Table B-1. Device Drivers

Supported Device	Required Driver Media*
SCSI Controllers HALs	Windows 2000 OEM Diskette* (If applicable)
System Board	Windows 2000 Update Module**

*Diskette generated from the EXPRESSBUILDER CDROM

**Run this application from the EXPRESSBUILDER CDROM; diskette not required

Installation Assumption

The installation and configuration instructions in this chapter assume the following:

- You have properly completed the hardware installation.
- You have run the BIOS Setup Utility to check system configuration.
- You will be installing Windows[®] 2000 Operating System from the CD-ROM media.

 **Note:** If you have an optional disk array controller preinstalled on your system, it was preconfigured at the factory. Refer to your system's *User's Guide* and to the *RAID Installation Guide* and the *Disk Array Controller Installation Guide and User's Manual* for additional information on this option card. If you need to change the RAID level from the factory setting, you must change the setting before installing the operating system.

Installation Preparation

Before starting the installation procedure, you need to obtain certain information for use during the installation. Table B-2 lists the information you need in advance for the installation. It is recommended that you obtain the information from your server administrator and record it in Table B-2 before starting.

After completing the installation, you might want to use the Windows 2000 Control Panel to configure additional devices or Windows 2000 services and facilities.

Table B-2. Advanced Information

Item	Information Required	Enter Your Information Here
1	Name of the Windows 2000 user.	
2	Name of the licensed organization.	
3	Product Key number for Microsoft Windows 2000 Server Software. This number is on the Certificate of Authenticity included with your Windows 2000 Server Software.	
4	Name that you assign to the server.	
5	Obtain your network configuration information. For example, if network settings are to be customized: TCP/IP Configuration values such as IP address values, DNS and WINS address resolution facilities, DHCP Relay and Routing configuration values.	
6	The name of any Administrative Domain or Workgroup that this server is to be a member of.	

Installing Microsoft Windows[®] 2000 Operating System

Use the following procedure to set up and perform a clean Windows 2000 Operating System installation on your server. Before performing the installation, read the “Installation Notes” in the following section.

Installation Notes

Before beginning the Windows 2000 installation, consult your server’s “System Release Notes” to determine whether SCSI controller device drivers and/or Hardware Abstraction Layer (HAL) programming on the “Windows 2000 OEM DISK” are required.

Windows 2000 Installation

1. Insert the Windows 2000 CD into the CD-ROM drive and boot your system by pressing CTRL+ALT+Delete. If a bootable operating system is installed, press **Enter** while the message “Press any key to boot from CD” is displayed at the top of the screen.

 **Note:** Perform Step 2 if a SCSI Disk or RAID controller drivers and/or HAL on the “Windows 2000 OEM DISK” are required; otherwise go to Step 9.

2. While the message “Setup is inspecting your computer’s hardware configuration” or a solid blue background is displayed on the screen, perform one of the following:
 - Press the **F6** key if SCSI Disk or RAID Controller drivers are included on the “Windows 2000 OEM DISK,” are required.
 - Press **F5**, if a HAL included on the “Windows 2000 OEM DISK,” is required.
 - Press **F5** and **F6** simultaneously if both a SCSI Disk or RAID Controller drivers and HAL programming are included on the “Windows 2000 OEM DISK.”

 **Note:** There is no visible indication on the screen when the F5 or F6 key is pressed.

 **Note:** Perform Steps 3 and 4 if you pressed F5; perform Steps 5 through 8 if you pressed F6.

-
3. When the following message is displayed, select **Other**, then press **Enter**.
“Setup could not determine the type of computer you have, or you have chosen to manually specify the computer type.

Select the computer type from the following list or select “Other” if you have the device support disk provided by the computer manufacturer.”

4. Insert the “Windows 2000 OEM-Disk” into the floppy diskette drive, and press **Enter**. Select the computer type which is displayed.
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.

6. When the following message is displayed, select **Other** then press **Enter**.

Select the SCSI Adapter your want from the following list, or select "Other" if you have a device support disk provided by an adapter manufacturer

7. Insert the "Windows 2000 OEM-DISK" diskette into the floppy disk drive, and press **Enter**. A list of mass storage devices is displayed.
8. Select the RAID disk array controller installed in your server from the list of mass storage devices.
9. Follow the messages on the screen to continue to install.

 **Note:** Please consult the Microsoft Windows 2000 Installation Guide for more extensive installation procedures.

For LAN adapter driver installation, see *Installing LAN Adapter Drivers* later in this chapter.

10. After installing Windows 2000, logon to the system using the administrator account or other account, which is a member of the Administrator’s group.
11. Insert the EXPRESSBUILDER CD into the system CDROM drive. The “Master Control” menu displays. Select **Setup** and then select **Update NEC 5800 System** from the displayed menu items.

 **Note:** If you change the configuration of the system (by adding or removing hardware or operating system software components), or repair the system, you must run the Windows 2000 Update Module again.

Installing LAN Adapters

The following section includes special driver installation instructions for the Intel PRO/100+ LAN adapter used in your system.

Driver Installation for the Intel PRO/100+ LAN Adapter

The PRO/100+ driver is initially installed during the installation of Windows 2000 and upgraded when you run the “Windows 2000 Update Module, see “Installing Microsoft Windows® 2000 Operating System” found earlier in this appendix. In order to utilize the PRO/100+ LAN adapter “teaming features,” use the following procedure to install “PROSET II for Windows 2000.”

1. Power on, start Windows 2000, and log on.
2. Insert the EXPRESSBUILDER CD into the system CDROM drive. The “Start” menu displays. Cancel out of the Start menu and run:
 - D:\WINNT\W2k\PC62\HD1\WINDOWS\PROSet2\IA32\PROSet.msi
(where D: is the drive letter for your CDROM drive.) **Note:** PROSet.msi may not be located in the exact location described here.

The Intel PROSetII install wizard displays.

3. Click on the **NEXT** button and select “I accept the terms in the license agreement.”
4. Click on the **NEXT** button and the installation options screen displays. Select “TYPICAL” and click on the **NEXT** button.
5. Click on the **INSTALL** button. The message "Digital signature not found" displays.
6. Click on the **YES** button. “Install Shield Wizard Completed” appears after all files have been copied.
7. Click on **FINISH** button. Once the ProSetII driver installation completes, reboot the system.
8. Proceed to the next section to set transfer speed and duplex mode.

Setting Network Driver Details.

1. Open the Control Panel and double-click the “Intel(R) PROSetII” icon. The 82546EB Based Dual Port Network Connection screen displays.
2. Select “Intel(R) 82546EB Based Dual Port Network Connection #1.”
3. Select the “Link Configuration” tab and set the “Auto Negotiation” value to **DISABLE**. Also set the “Forced Speed and Duplex” value according to the value specified for your HUB.
4. Select “Intel(R) 82546EB Based Dual Port Network Connection #2.”

-
5. Select the "Link Configuration" tab and set the "Auto Negotiation" value to **DISABLE**. Also set the "Forced Speed and Duplex" value according to the value specified for your HUB.

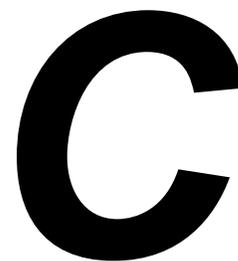
 **Note:** When selecting the "1000/Full" setting, set "Auto Negotiation" to **ENABLE** and select only the "1000/Full" setting at the "Negotiable Speeds and Duplexes" item. Also, add/delete any other protocols and services, as necessary.

Driver Installation for the ATI RAGE XL Display Adapter

To take full advantage of the on-board ATI RAGE XL display adapter, perform the following driver installation procedure:

1. Power on, start Windows 2000, and log on.
2. Insert the EXPRESSBUILDER CD into the system CDROM drive. The "Start" Menu displays. Cancel out of the Start menu and run:

— D:\WINNT\Video\W2k\Setup.exe
(where D: is the drive letter for your CDROM drive.)
3. Follow the screen prompts.
4. When the message "Digital signature not found" displays, select YES to continue the installation.
5. At the conclusion of the ATI Rage XL installation, reboot the system.



IRQ and I/O Port Addresses

- Interrupt Requests
- PIRQ and PCI Device

Interrupt Requests

The factory-set interrupt requests (IRQs) are listed below.

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 (PCI)	15	Secondary IDE
4	COM1 serial port (PCI)	16	USB
5	PCI	17	VGA
6	Floppy disk drive	18	–
7	PCI	19	USB
8	Real-time clock	30	LAN1
9	ACPI compliant system	31	LAN2
10	PCI	49	Adaptec SCSI
11	PCI	50	Adaptec SCSI

PIRQ and PCI Device

The factory-set PCI device interrupts are assigned as follows. Use the BIOS setup utility, BIOS, for interrupt setup.

Menu Option	Interrupt
PCI IRQ 1	On-board SCSI (Channel 0), PCI slot #6 (INT D)
PCI IRQ 2	On-board SCSI (Channel 1), PCI slot #6 (INT C)
PCI IRQ 3	On-board LAN #1
PCI IRQ 4	On-board LAN #2
PCI IRQ 5	On-board GA
PCI IRQ 6	PCI slot #3 (INT A)
PCI IRQ 7	PCI slot #4 (INT A)
PCI IRQ 8	PCI slot #6 (INT A)
PCI IRQ 9	PCI slot #2 (INT A)
PCI IRQ 10	PCI slot #5 (INT A)
PCI IRQ 11	PCI slot #1 (INT A)
PCI IRQ 12	PCI slot #1 (INT D), PCI slot #2 (INT B), PCI slot #3 (INT B), PCI slot #4 (INT C), PCI slot #5 (INT C)
PCI IRQ 13	PCI slot #1 (INT B), PCI slot #2 (INT C), PCI slot #3 (INT C), PCI slot #4 (INT D), PCI slot #5 (INT D), PCI slot #6 (INT B)
PCI IRQ 14	PCI slot #1 (INT C), PCI slot #2 (INT D), PCI slot #3 (INT D), PCI slot #4 (INT B), PCI slot #5 (INT B)

I/O Port Address

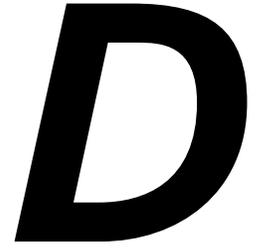
The factory-set I/O port addresses for the server are assigned as follows:

Address	Chip in Use
00 - 1F	8-bit DMA control register
20 - 21	Master 8259 programming interface
2E - 2F	Configuration
40 - 43	8254 programming interface
60	Keyboard & mouse
61	NMI status register
64	Keyboard & mouse
70 - 71	NMI enable register/real-time clock
80 - 8F	16-bit DMA control register
A0 - A1	Slave 8259 programming interface
C0 - DF	DMA controller page register
E0 - E9	Base address register
F0	Register IRQ13
F1 - FF	Logical device configuration
170 - 177 or BAR2	EDMA2-compatible mode primary command block register
1F0 - 1F7 or BAR0	EDMA2-compatible mode secondary command block register
278 - 27F	(Parallel port 3)
2F8 - 2FF	Serial port 2
BAR or 376	EDMA2-compatible mode secondary command block register
370 - 377	(Floppy disk drive 2), IDE 2
378 - 37F	(Parallel port 2)
3B0 - 3BB	VGA
3BC - 3BE	Parallel port 1
3C0 - 3DF	VGA
3F6 or BAR1	EDMA2-compatible mode primary command block register
3F0 - 3F7	Floppy disk drive 1, IDE 1
3F8 - 3FF	Serial port 1
40B	DMA1 expansion write mode register
4D0	Master 8259 ELCR programming
4D1	Slave 8259 ELCR programming
4D6	DMA2 expansion write mode register
580 - 58F	SMBus control

Address	Chip in Use
C00	PCI IRQ mapping index register
C01	PCI IRQ mapping data register
C14	PCI error status register
C49	Address & status control
C4A	Rise time counter control
C52	General register (GPMs)
C6C	ISA wait register
C6F	Other control registers
CA2 - CA3	IPMI (MPI KCS interface)
CA4 - CA5	IPMI (SMI interface)
CA6 - CA7	IPMI (SCI/SW1 interface)
CD6	Power management index register
CD7	Power management data register
CF8, CFC	PCI configuration space
CF9	Reset control
F50 - F58	General chipset
FE00 - FE3F	Chipset
BAR4+00 - 0F	EDMA2 PCI base address register 4

*1 Hexadecimal notation

*2 The I/O port address of a PCI device is set according to its type and number.

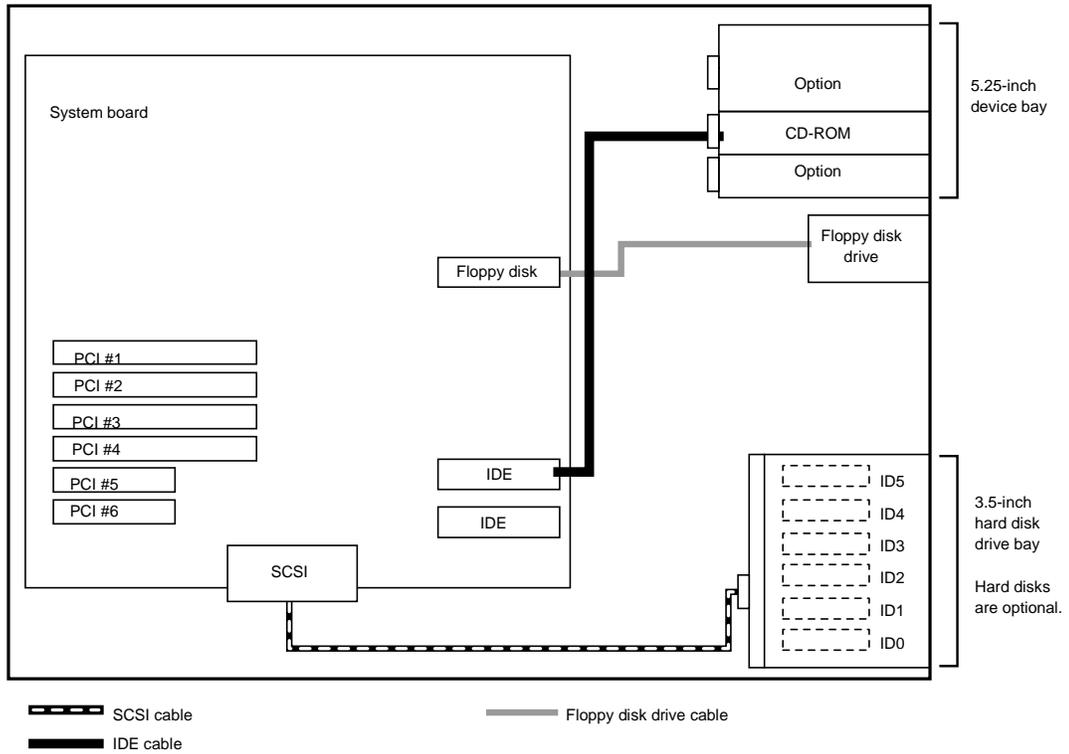


Internal Cabling Diagrams

- Standard Configuration
- Disk Array Configuration of Built-in Hard Disks
- Installing a SCSI File Device

Standard Configuration

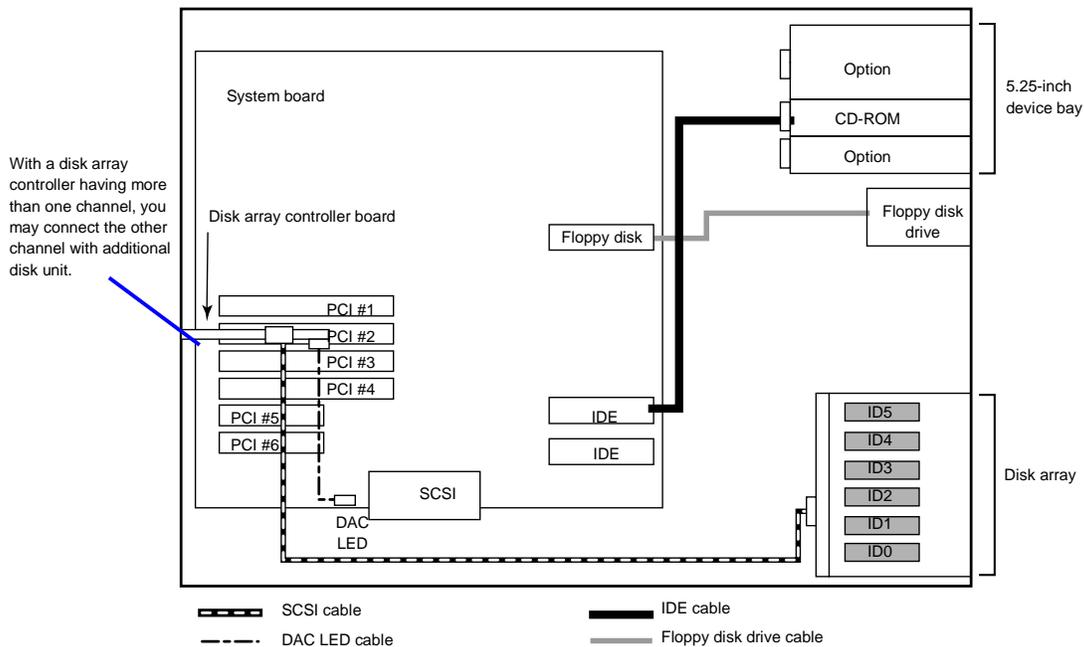
The figure below shows an example of the connections in the standard configuration.



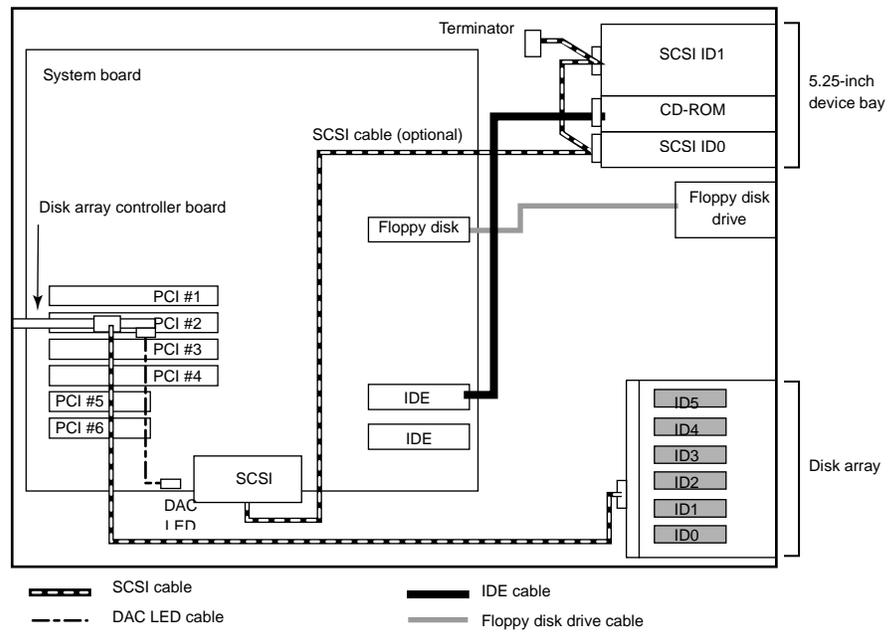
Disk Array Configuration of Built-in Hard Disks

For the disk array configuration of hard disks installed in the built-in 3.5-inch device bays, the disk array controller board of an option is installed in the server and the SCSI cable connected to the Ultra320 connector is disconnected from the connector and then connected to the disk array controller board instead. The server can be equipped with up to four disk array controller boards.

Some disk array controllers contain more than one channel. For such a disk array controller, you may connect one of the two channels to the built-in SCSI backboard joined with the hard disk in a 3.5-in device bay and the remaining channel to a additional disk unit. A disk array controller of another type has two connectors in a channel, or external and built-in connectors. Note that a single channel may not be used for both external and built-in devices.



The following figure shows an example of onboard SCSI connection for SCSI file devices.



In the figure above, the standard hard disk drive bay is connected with an optional RAID controller.

Glossary

A

AC

(Alternating Current) The type of current available in wall outlets. All computers must convert alternating current to direct current to operate. See also DC.

ACPI

(Advanced Configuration and Power Interface) Provides the programming standard for power management features.

address

A label, name, or number that identifies a location in computer memory.

AGP

Accelerated Graphics Port.

ASCII

(American Standard Code for Information Interchange) A standard number assigned to each of the alphanumeric characters and keyboard control code keys to enable the transfer of information between different types of computers and peripherals.

B

backplane slot

A connector on the backplane board in desktop computers and expansion boxes that allows you to install circuit cards.

backup

A copy of data for safe-keeping. The data is copied from computer memory or disk to a floppy disk, magnetic tape, or other media.

backup battery

The battery in your computer that maintains the real-time clock and the configuration information when the computer's power is removed.

base memory

An area of memory between 0 and 640 kilobytes.

baud rate

The speed with which data is transmitted during serial communication. The computer's operating system and software program must be configured for the same baud rate as the communication device, such as a serial printer. See also bps.

BIOS

(Basic Input/Output System) A program stored in flash EPROM or ROM that controls the keyboard, disk drives, video monitor, and other devices. See also flash EPROM, EPROM, and ROM.

bit

Derived from BInary digiT, a bit is the smallest unit of information a computer handles. See also byte.

BMC

(Baseboard Management Controller) Contains all of the server management functions. One major function of the BMC is to monitor system management events and log their occurrence in the System Event Log (SEL).

boot

The process of loading the operating system into memory.

bps

(bits per second) The number of bits transferred in one second during serial communication, such as modem transmission.

byte

A group of eight bits.

C**cache memory**

A very fast, limited portion of RAM set aside for temporary storage of data for direct access by the microprocessor.

CD-ROM drive

(Compact Disk ROM drive) A type of mass storage device that reads information from a compact disk.

Centronics port

An industry standard parallel port. See also parallel port.

CGA

(Color Graphics Adapter) A type of video display system that provides low-resolution text and graphics on TTL monochrome and color monitors.

CMOS

(Complimentary Metal-Oxide Semiconductor) A type of low-power integrated circuit used in computers. See also TTL.

COM1 or COM2

The name you can assign a serial port to set or change its address. See also serial port.

command

An instruction that directs the computer to perform a particular operation.

configuration

The way in which a computer is set up to operate. Some configurable options include CPU speed, serial port designation, and memory allocation.

CPU

(Central Processing Unit) See microprocessor.

CRT

(Cathode-Ray Tube) The type of video display used in monitors for desktop computers.

D**DC**

(Direct Current) The type of current available in the rechargeable battery packs used in portable computers. See also AC.

default

The factory setting your computer uses unless you instruct it otherwise. For example, when powering up, the computer will boot from the default drive.

density

The capacity of information (bytes) that can be packed onto a storage device, such as a floppy disk.

device driver

A software program that a computer must use to recognize and operate certain hardware, such as a mouse or a video monitor.

disk drive

A device that stores data on a hard or floppy disk. A floppy disk drive requires a floppy disk to be inserted; a hard disk drive has a permanently encased hard disk.

DOS

(Disk Operating System) See operating system.

DRAM

(Dynamic RAM) See RAM.

E**ECC**

(Error Checking and Correction) A method of detecting and correcting errors.

EEPROM

(Electrically Erasable Programmable Read-Only Memory) A type of memory device that stores password and configuration information.

EGA

(Enhanced Graphics Adapter) A type of video display system that provides medium-resolution text and graphics on TTL monochrome, color, and enhanced color monitors.

EMP

The Emergency Management Port (EMP) provides an interface to the console manager. This interface allows remote server management via a modem or direct connection.

EMS

(Expanded Memory Specification) A method of accessing memory beyond the 640K limit of DOS by exchanging data in and out of main memory at high speeds. Some software requires EMS to operate.

EPROM

(Erasable Programmable Read-Only Memory) A type of memory device that is usually used to store system BIOS code. This code can be erased with ultraviolet light, but is not lost when the computer is powered off. See also flash EPROM and ROM.

expansion slot

See backplane slot.

extended memory

The protected memory above 1M that is directly accessible by the microprocessor through certain utilities and operating systems.

F**flash EPROM**

A type of memory device that is usually used to store system BIOS code. This code can be replaced with updated code from a floppy disk, but is not lost when the computer is powered off. See also EPROM and ROM.

floppy disk drive

See disk drive.

format

The process used to organize a hard or floppy disk into sectors so it can accept data. Formatting destroys all previous data on the disk.

FRB (Fault Resilient Boot)

A server management feature. FRB attempts to boot the system using the alternate processor or DIMM.

G**(Gigabyte)**

1,073,741,824 bytes. See also byte.

H

hard disk drive

See disk drive.

hardware

The physical parts of your computer, including the keyboard, monitor, disk drives, cables, and circuit cards.

hot swap

A method used to insert or remove SCSI disk drives into or from an operating bus. This method is typically used in RAID subsystems. When used in non-RAID subsystems the operating system must typically be restarted.

I

IC

(Integrated Circuit) An electronic device that contains miniaturized circuitry.

IDE

(Integrated Drive Electronics) A type of hard disk drive with the control circuitry located inside the disk drive rather than on a drive controller card.

interface.

A connection between the computer and a peripheral device that enables them to exchange data. See also parallel port and serial port.

ISA

(Industry Standard Architecture) An industry standard for computers and circuit cards that transfer 16 bits of data at a time.

J

jumper

A small electrical connector used for configuration on some computer hardware.

K

(Kilobyte)

1,024 bytes. See also byte.

L

LAN

(Local Area Network) A group of computers linked together within a limited area to exchange information.

LCD

(Liquid Crystal Display) The type of video display used in portable computers.

LED

(Light-Emitting Diode) A small electronic device that glows when current flows through it.

LPT1 or LPT2

The name you can assign a parallel port to specify its address. See also parallel port.

LVD

Super-fast Ultra 2 SCSI Low Voltage Differential (LVD) Parallel SCSI Interface. A new SCSI interface that provides greater I/O bandwidth, device connectivity, data reliability, and longer cable lengths for Ultra2 SCSI hard disk drives. Note that in order to achieve LVD performance all devices including cable, controller, and drive must support LVD.

M**(Megabyte)**

1,048,576 bytes. See also byte.

memory

The circuitry in your computer that stores data and programs. See also EMS, extended memory, RAM, and ROM.

microprocessor

The integrated circuit that processes data and controls the basic functions of the computer.

modem

A device used to exchange information with other computers over telephone or data lines.

module

A circuit board that plugs into a dedicated connector on the system board in your computer.

mouse

A small input device that you guide on a flat surface to control the cursor movement and operation of the computer when using certain software programs.

N**NVRAM**

(Nonvolatile RAM) A type of RAM that retains its contents even after the computer is powered off. This memory stores EISA configuration information. See also RAM and SRAM.

O**operating system**

A set of programs that provides the interface between other software programs and the computer.

P

parallel port

The connector on the back of your computer that allows the transfer of data between the computer and a parallel device, such as a parallel printer.

partition

The process of dividing the storage space on a hard disk into separate areas so that the operating system treats them as separate disk drives.

password

A security feature that prevents an unauthorized user from operating your computer. See also EEPROM.

PCI

Peripheral Component Interconnect. PCI is a high-performance peripherals I/O bus supporting data transfers of up to 528MB per second.

Pentium

A type of microprocessor, with a built-in math coprocessor, cache memory, and memory and bus controllers, that processes and communicates 32 bits of data at a time. This microprocessor also contains power management capabilities.

peripheral

A device connected to and controlled by the computer, such as an external disk drive or a printer.

pixel

The smallest element that is visible on a video display. The resolution of a video display system is measured in pixels.

PnP

(Plug-n-Play) Plug-and-play is the ability to plug a device into a computer and have the computer recognize that the device is there. The user doesn't have to tell the computer.

POST

Power-On-Self-Test.

R

RAM

(Random-Access Memory) A temporary storage area for data and programs. This type of memory must be periodically refreshed to maintain valid data, and is lost when the computer is powered off. See also NVRAM and SRAM.

real-time clock

The IC in your computer that maintains the time and date.

ROM

(Read-Only Memory) A type of memory device that usually is used to store system BIOS code. This code cannot be altered and is not lost when the computer is powered off. See also BIOS, EPROM, and flash EPROM.

RS-232C port

An industry standard serial port. See also serial port.

S**SAF-TE**

(SCSI Accessed Fault Tolerant Enclosure) A specification for monitoring the state of the drives and enclosure environment (fan, power supply, temperature, etc.) using the SCSI bus to indicate faults.

save

To store information on a floppy disk, hard disk, magnetic tape, or some other permanent storage device.

SCSI

(Small Computer System Interface) An industry standard interface that provides high-speed access to tape drives, hard disk drives, and other peripheral devices.

SEL

(System Event Log) A record of system management events. The information stored includes the name of the event, the date and time the event occurred and data pertinent to the event. Event data may include POST error codes that reflect hardware errors or software conflicts within the system.

serial communication

Information sent sequentially, one bit at a time.

serial port

The connector on the back of your computer that allows the transfer of data between the computer and a serial device, such as a mouse, a modem, or a serial printer.

setup program

The program that you use to change the configuration of some ISA desktop and notebook computers. This program also contains information about the hardware in the computer.

software

Programs with specific functions, such as word processing, data base management, communications, and operating system.

SRAM

(Static RAM) A temporary storage area for data and programs. This type of memory does not need to be refreshed, but it is lost when the computer is powered off. See also NVRAM and RAM.

SVGA

(Super VGA) A type of video display system that provides very high-resolution text and graphics on analog color monitors.

system board

The main circuit board in your computer. It contains most of the connectors and ports.

T**tape drive**

A type of storage device using magnetic tape.

TTL

(Transistor-Transistor Logic) A type of integrated circuit used in computers. See also CMOS.

U**ultra 160/m SCSI**

Ultra 160/m is a parallel SCSI interface based on Ultra3 SCSI technology. This interface features data transfer speeds up to 160MB/second (double-edge clocking), cyclical redundancy checking (CRC) providing higher levels of data reliability, and domain validation that detects the configuration of the SCSI bus and automatically tests and adjusts the SCSI bus transfer rate to optimize interoperability. Note that the Ultra 160/m uses the standard Ultra2 LVD cabling and termination, making it backward compatible for easy implementation.

V**VGA**

(Video Graphics Array) A type of video display system that provides high-resolution text and graphics on analog color monitors.

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.

Component	Manufacturer Name & Model	Serial Number (if available)	Date Installed
Server			
System Board			
Processor 1			
Processor 2			
DIMM Slot 1A			
DIMM Slot 1B			
DIMM Slot 2A			
DIMM Slot 2B			
Modem			
Diskette Drive			
Tape Drive			
CD-ROM Drive			
Hard Disk Drive 1			
Hard Disk Drive 2			
Hard Disk Drive 3			
Hard Disk Drive 4			
Hard Disk Drive 5			
Hard Disk Drive 6			
Network Controller 1			
Network Controller 2			
RAID Controller			
SCSI Controller			
Monitor			
Keyboard			
Mouse			
Power Supply (standard)			
Power Supply (optional)			

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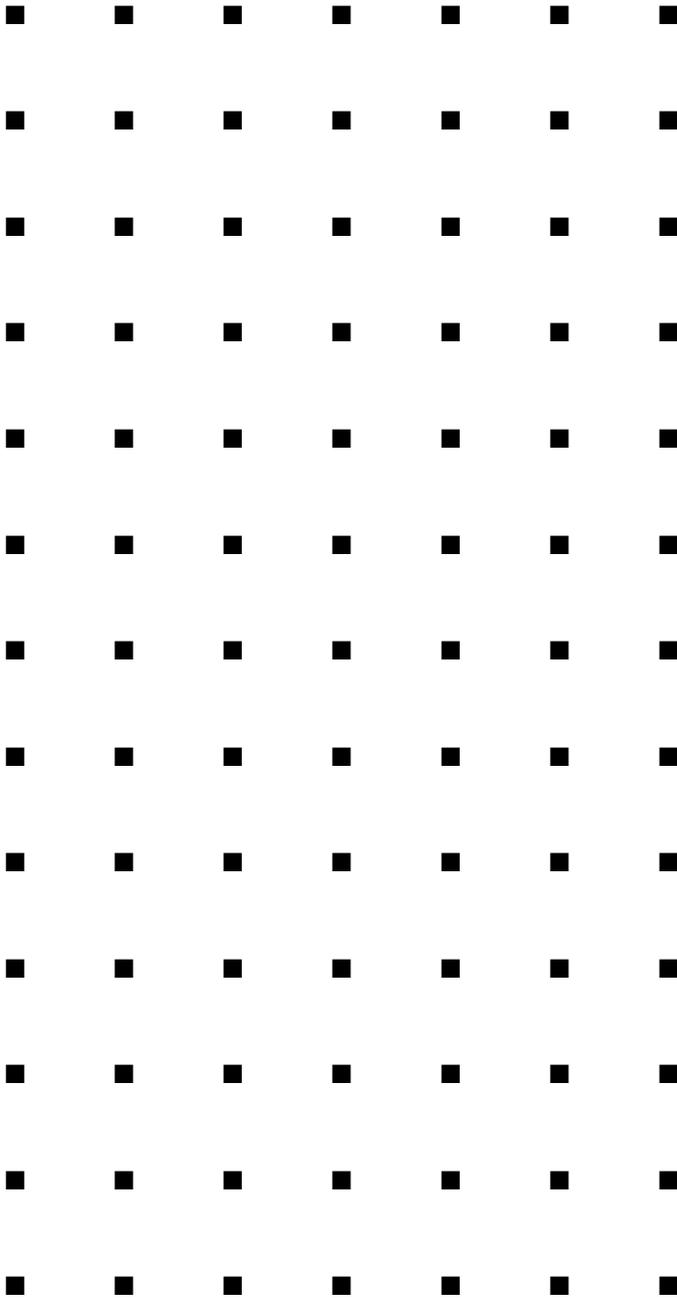
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