



Netfinity 5500 M10

Hardware Information



Netfinity 5500 M10

Hardware Information

Note

Before using this information and the product it supports, be sure to read the general information in “Product Warranties and Notices” in the “Legal and Safety Information” section of this *Server Library*.

Second Edition (January 1999)

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Safety Information Statements

Laser Compliance Statements

Some IBM PC Server and Netfinity models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

3



CAUTION:

When a CD-ROM drive is installed, note the following.

Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

Removing the covers of the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. Do not remove the CD-ROM drive covers.

4

DANGER

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

1



DANGER

To avoid a shock hazard, do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.

To avoid shock hazard:

- **The power cord must be connected to a properly wired and earthed receptacle.**
- **Any equipment to which this product will be attached must also be connected to properly wired receptacles.**

When possible, use one hand to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

Electrical current from power, telephone, and communications cables is hazardous. To avoid shock hazard, connect and disconnect cables as described following when installing, moving, or opening covers of this product or attached devices.

To Connect

1. Turn Everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to receptacles.
4. Attach power cord(s) to outlet.
5. Turn device ON.

To Disconnect

1. Turn Everything OFF.
2. First, remove power cord(s) from outlet.
3. Remove signal cables from receptacles.
4. Remove all cables from devices.

NOTE: In the UK, by law, the telephone cable must be connected after the power cord.

NOTE: In the UK, the power cord must be disconnected after the telephone cable.

Lithium Battery Notice

2



CAUTION:

When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

Laser Compliance Statements

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Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

About This Book

This book provides instructions for installing and removing server options and configuring and troubleshooting your server. It also provides information to help you solve problems if they occur.

How This Book is Organized

Chapter 1, "Introducing the IBM Netfinity 5500 M10," describes the Netfinity 5500 M10 and provides an overview of the server's features.

Chapter 2, "Arranging Your Workspace," provides information on arranging your equipment and workspace.

Chapter 3, "Configuring Your Server," describes how to use the Configuration/Setup Utility program to configure your server. This chapter also provides instructions for using various utility programs.

Chapter 4, "Installing Options," contains instructions for installing and removing options, such as memory, adapters, and internal drives. Instructions for connecting external options are also included in this chapter.

Chapter 5, "Installing a Server in a Rack," contains information about installing your server in a rack.

Chapter 6, "Solving Problems," includes an overview of the diagnostic tools, instructions for testing the server, lists of error messages, and troubleshooting charts. This chapter also contains information about checking the server for damage, and resolving configuration conflicts.

Chapter 7, "Server Records and Specifications," provides a section to record and update important information about your server, including serial numbers, key number, and device records. Whenever you add options to your server, be sure to update the information in these records. In addition to server records, this chapter contains specifications. These specifications include product dimensions, environmental operating requirements, system and processor board layouts, and jumper settings. This chapter also describes jumper locations and contains instructions for changing jumpers.

Appendix A, "Installing Devices in the NetBAY3," contains information about installing devices in the NetBAY3.

Appendix B, "I2O-Ready Statement and S3 Video Modes," contains the I2O-ready statement and information about unsupported S3 video modes.

A glossary and an index follow the appendixes.

Notices Used in This Book

This book contains notices to highlight information or provide safety information:

- **Notes**

These notices provide important tips, guidance, or advice.

- **Attention**

These notices indicate possible damage to programs, devices, or data. An attention notice is placed just *before* the instruction or situation in which damage could occur.

- **Caution**

These notices indicate situations that can be potentially hazardous to you. A caution notice is placed just *before* descriptions of potentially hazardous procedure steps or situations.

Related Publications

The *IBM Hardware Maintenance Manual* is available for purchase. It contains a parts catalog, error codes, and advanced diagnostic procedures. This manual is intended for trained service technicians. (Diagnostic programs are not included.)

The following publications pertain to the server's Ethernet controller. They are available for purchase from IBM.

- *IBM LAN Technical Reference IEEE 802.2 and NETBIOS API*, SC30-3587
- *IBM LAN Server Command and Utilities*, S10H-9686
- *Guide to LAN Server Books*, S10H-9688

Additional publications are available for purchase from IBM. For a list of publications available in your country:

- In the U.S., Canada, and Puerto Rico, call 1-800-879-2755.
- In all other countries, contact the IBM support organization that services your area, your IBM marketing representative, or your IBM reseller.

Chapter 1. Introducing the IBM Netfinity 5500 M10

Your Netfinity 5500 M10 is a high-performance, symmetric multiprocessing (SMP) server. It is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and large amounts of reliable data storage.

Performance, ease of use, reliability, and expansion capabilities were key considerations during the design of your server. These design features make it possible for you to customize the system hardware to meet your needs today, while providing flexible expansion capabilities for the future.

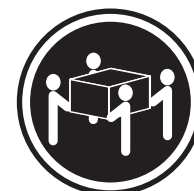
Your server comes with a three-year limited warranty, IBM ServerGuide CDs, and IBM Start Up Support. For more information about the ServerGuide CDs, refer to the "ServerGuide and Netfinity Manager Information" section of this *Server Library*. For more information about IBM Start Up Support, refer to the "Getting Help Information" section of this *Server Library*. Addresses on the World Wide Web where you can obtain information about your server model and other IBM products are also listed in the "Getting Help Information" section of this *Server Library*.

Note: The information label containing the serial number, machine type, model number, and agency marks for your server is located at the front of the server behind the media-bay trim bezel. See "Removing the Server Door and Trim Bezels on the Tower Model" on page 41 for instructions on removing the trim bezel.

5



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:

Use safe lifting practices when lifting your machine.

Note: Most of the illustrations in this publication show the tower model of the Netfinity 5500 M10 with the IBM Netfinity NetBAY3; the rack model does not come with a NetBAY3.

This chapter contains:

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Features at a Glance

The following table summarizes the features of the Netfinity 5500 M10.

<p>Microprocessor</p> <ul style="list-style-type: none"> • Intel® Pentium® II Xeon™ microprocessor with MMX™ technology • 32 KB of level-1 cache • 512 KB of level-2 cache (min.) • Expandable to two microprocessors <p>Memory</p> <ul style="list-style-type: none"> • Standard: 128 MB (min.), expandable to 2 GB • 100 MHz registered, error correcting code (ECC), synchronous dynamic random access memory (SDRAM) • Four dual inline memory-module (DIMM) sockets <p>Diskette Drive</p> <ul style="list-style-type: none"> • Standard: One 3.5-inch, 1.44 MB <p>Hard Disk Drives</p> <ul style="list-style-type: none"> • Up to six hot-swappable hard disk drives supported <p>CD-ROM Drive</p> <ul style="list-style-type: none"> • Standard: 32X IDE <p>Keyboard and Auxiliary Device (standard only on tower models)</p> <ul style="list-style-type: none"> • Keyboard • Mouse <p>Expansion Bays</p> <ul style="list-style-type: none"> • Six slim (1-inch) or three half-high (1.6-inch) hot-swap drive bays • Three 5.25-inch removable-media bays (one used by CD-ROM drive) • The IBM Netfinity NetBAY3 (tower model only) allows installation of options to provide extra expansion bays 	<p>Expansion Slots</p> <p>Up to seven adapters can be installed.</p> <ul style="list-style-type: none"> • Four 32-bit hot-plug PCI slots • Two standard (non-hot-plug) 32-bit PCI slots • One 16-bit ISA slot <p>Upgradable Microcode</p> <ul style="list-style-type: none"> • BIOS, diagnostics, Netfinity Advanced System Management Processor, and ServeRAID upgrades (when available) can update EEPROMs on the system board <p>Security Features</p> <ul style="list-style-type: none"> • Door and top cover lock (tower model only) • NetBAY3 bezel lock • Power-on and administrator passwords • Selectable drive-startup • Keyboard password • Systems management security <ul style="list-style-type: none"> – User log-in password – Read-only or read/write access – Dial back <p>Predictive Failure Analysis (PFA) Alerts</p> <ul style="list-style-type: none"> • Power supplies • Fans • Memory • Hard disk drives • Microprocessors • Voltage regulator modules (VRMs) 	<p>Integrated Functions</p> <ul style="list-style-type: none"> • Two serial ports • Two universal serial bus (USB) ports • One parallel port • Mouse port • Keyboard port • Video port • IBM ServeRAID controller (two channels) on system board • 10BASE-T/100BASE-TX Ethernet port (controller on system board) • Redundant Ethernet capability, through the use of an optional network interface card (NIC) • Netfinity Advanced System Management Processor on system board • Dedicated Advanced System Management I/O port • Video controller (with 1 MB video memory) compatible with: <ul style="list-style-type: none"> – Super video graphics array (SVGA) – Video graphics adapter (VGA) <p>Power Supply</p> <ul style="list-style-type: none"> • 400 W (115–230 V ac) • Automatic voltage range selection • Built-in overload and surge protection • Automatic restart after a loss of power • For redundant power, an optional 400 W power supply is available <p>Redundant Cooling</p> <ul style="list-style-type: none"> • Three hot-swap fans
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What Your IBM Netfinity 5500 M10 Offers

The unique design of your server takes advantage of advancements in symmetric multiprocessing (SMP), data storage, disk-array technologies, and memory management. Your server combines:

- Impressive performance using an innovative approach to SMP

Your server supports up to two Pentium II Xeon microprocessors. You can install a second microprocessor in your server to enhance performance and provide SMP capability.

- Integrated disk-array subsystem

Although many operating systems provide software fault tolerance through mirroring, IBM provides hardware fault tolerance through the redundant array of independent disks (RAID) controller. The IBM ServeRAID controller is a standard feature. It provides two channels and supports RAID levels 0, 1, and 5.

For details about the IBM ServeRAID controller, refer to the “ServeRAID Information” section of this *Server Library*.

- Large data-storage and hot-swap capabilities

All models of the server support up to six hot-swap hard disk drives. This *hot-swap* feature enables you to remove and replace hard disk drives without turning off the server.

- Hot-plug PCI adapter capabilities

Your server has four *hot-plug* slots for PCI adapters. With operating system support, you can replace failing hot-plug PCI adapters without turning off the server. If the *hot-add* feature is supported by your operating system and the PCI adapter, you can also add PCI adapters in these slots without turning off the server.

- IBM Netfinity NetBAY3

The tower model of the Netfinity 5500 M10 comes with a NetBAY3 attached. You can install devices, such as the IBM EXP10 or a power distribution unit, in the NetBAY3. Refer to Appendix A, “Installing Devices in the NetBAY3” for more information.

- Redundant cooling and power capabilities

The redundant cooling and hot-swap capabilities of the fans in your server allow continued operation if one of the fans fails. You can also replace a failing fan without turning off the server.

The addition of a second, optional power supply provides redundant power for the server. You can install the second power supply, or if you already have the second power supply installed, replace a failing power supply, without turning off the server.

- Large system memory

The memory bus in your server supports up to 2 GB of system memory. The memory controller provides error correcting code (ECC) support for up to four industry standard (Intel PC registered SDIMM specification, revision 1.0 or later), 3.3 V, 168-pin, 8-byte, registered, dual inline memory modules.

What Your IBM Netfinity 5500 M10 Offers

- System-management capabilities

Your server comes with a Netfinity Advanced System Management Processor on the system board. This processor, in conjunction with the Netfinity Manager provided on your ServerGuide CDs, allows you to manage the functions of the server locally and remotely. The Netfinity Advanced System Management Processor also provides system monitoring, event recording, and dial-out alert capability.

Note: The Netfinity Advanced System Management Processor is sometimes referred to as the service processor.

Refer to the “Advanced System Management Information” section of this *Server Library* for more information.

- Integrated network environment support

Your server comes with an Ethernet controller on the system board. This Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The server automatically selects between 10BASE-T and 100BASE-TX. The controller provides full-duplex (FDX) capability, which allows simultaneous transmission and reception of data on the Ethernet local area network (LAN).

- Redundant network-interface card

The addition of an optional, redundant network interface card (NIC) provides a failover capability to a redundant Ethernet connection. If a problem occurs with the primary Ethernet connection, all Ethernet traffic associated with this primary connection is automatically switched to the redundant NIC. This switching occurs without data loss and without user intervention.

- IBM ServerGuide CDs

The ServerGuide CDs included with IBM Netfinity servers provide programs to help you set up your server and install the network operating system (NOS). The ServerGuide program detects the hardware options installed, and provides the correct configuration program and device drivers. In addition, the ServerGuide CDs include a variety of application programs such as IBM Update Connector to help keep your server BIOS and microcode updated, and IBM Netfinity Manager for systems management.

For more information about the ServerGuide CDs, see the “ServerGuide and Netfinity Manager Information” section of this *Server Library*.

Your server is designed to be cost-effective, powerful, and flexible. It uses both peripheral component interconnect (PCI) and industry standard architecture (ISA) bus architectures to provide compatibility with a wide range of existing hardware devices and software applications.

As always, your IBM server meets stringent worldwide certifications for power, electromagnetic compatibility (EMC), and safety. Refer to the “Legal and Safety Information” section of this *Server Library* for additional information.

Reliability, Availability, and Serviceability Features

Three of the most important features in server design are reliability, availability, and serviceability (RAS). These factors help to ensure the integrity of the data stored on your server; that your server is available when you want to use it; and that should a failure occur, you can easily diagnose and repair the failure with minimal inconvenience.

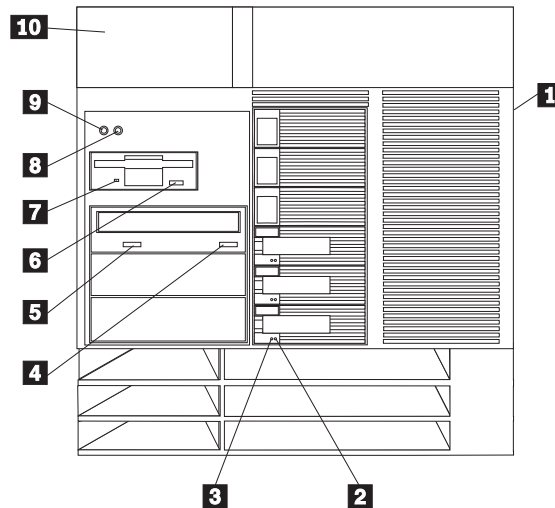
The following is an abbreviated list of the RAS features that your server supports. Many of these features are explained in later chapters of this book.

- Menu-driven setup, system configuration, RAID configuration, and diagnostic programs
- Power-on self-test (POST)
- Integrated Netfinity Advanced System Management Processor
- Predictive failure alerts
- System auto-configuring from configuration menu
- Remote system problem-determination support
- Power and temperature monitoring
- Fault-resilient startup
- Hot-swap drive bays
- RAID level 1 and RAID level 5 disk arrays
- Support for hot-plug PCI adapters
- Error codes and messages
- System error logging
- Upgradable BIOS, diagnostics, Netfinity Advanced System Management Processor, and ServeRAID code
- Automatic restart after a power failure
- Parity checking on the SCSI bus and the PCI bus
- Error checking and correcting (ECC) memory
- Redundant hot-swap power supply option
- Redundant hot-swap cooling
- Redundant Ethernet capabilities (with optional adapter)
- Vital Product Data (VPD) on processor complex, system board, each power supply, power backplane, and hot-swap RAID subsystem
- Information and diagnostic LED panels
- Customer support center 24 hours per day 7 days a week¹
- Update Connector
- Remote Connect

¹ Service availability will vary by country. Response time will vary depending on the number and nature of incoming calls.

Controls and Indicators

The most commonly used controls and indicators on the front of the server appear in the following illustration.



- 1 Door Lock (On Side Cover, Tower Model Only):** You can lock the door on your server to deter tampering with the internal components. This same lock also locks the top cover in place.
- 2 Hard Disk Status Light:** Each of the hot-swap drive bays has a Hard Disk Status light. When this amber light is on continuously, the drive has failed. When the light flashes slowly (one flash per second), the drive is being rebuilt. When the light flashes rapidly (three flashes per second), the controller is identifying the drive.
- 3 Hard Disk Activity Light:** Each of the hot-swap drive bays has a Hard Disk Activity light. When this green light is flashing, the drive is being accessed.
- 4 CD-ROM Eject/Load Button:** Press this button to eject or retract the CD-ROM tray so that you can insert or remove a CD.
- 5 CD-ROM Drive In-Use Light:** When this light is on, the CD-ROM drive is being accessed.
- 6 Diskette-Eject Button:** Press this button to eject a diskette from the drive.
- 7 Diskette Drive In-Use Light:** When this light is on, the diskette drive is being accessed.
- 8 Reset Button:** Press this button to reset the server and run the power-on self-test (POST).

- 9 Power Control Button:** Press this button to manually turn the server on or off.

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**CAUTION:**

The Power Control button on the front of the server does not turn off the electrical current supplied to the server. The server also might have more than one power cord. To remove all electrical current from the server, ensure that all power cords are disconnected from the power source.

The server can be activated in several ways:

- You can turn on the server by pressing the Power Control button on the front of the server.

Note: If you have just plugged the power cord of your server into an electrical outlet, you will have to wait approximately 20 seconds before pressing the Power Control button.

- If the server is activated and a power failure occurs, the server will start automatically when power is restored.
- The server can also be powered on by the Netfinity Advanced System Management Processor.

The server can be deactivated as follows:

- You can turn off the server by pressing the Power Control button on the front of the server. Pressing the Power Control button starts an orderly shutdown of the operating system, if this feature is supported by your operating system, and places the server in standby mode.

Note: After turning off the server, wait at least 5 seconds before pressing the Power Control button to power the server on again.

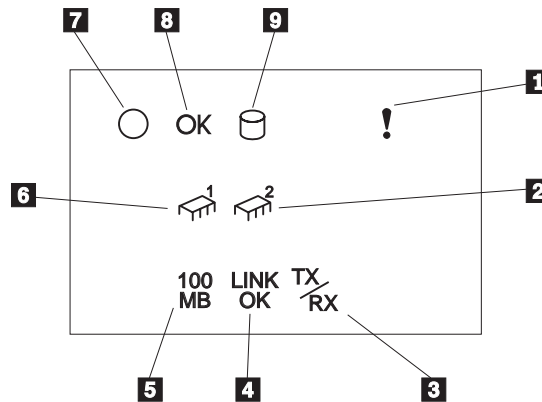
- You can press and hold the Power Control button for more than 4 seconds to cause an immediate shutdown of the server and place the server in standby mode. This feature can be used if the operating system hangs.
- You can disconnect the server power cords from the electrical outlets to shut off all power to the server.

Note: Wait about 15 seconds after disconnecting the power cord for your system to stop running. Watch for the System Power light on the information LED panel to stop blinking.

- 10 Information LED Panel:** The lights on this panel give status information for your server. See “Information LED Panel” on page 8 for more information.

Information LED Panel

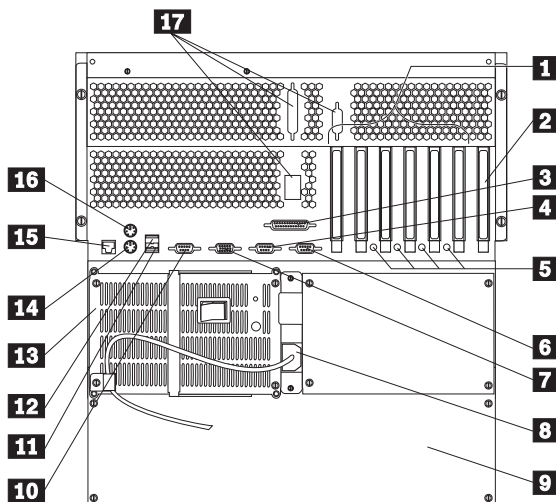
The information LED panel on the front of the server contains status lights.



- 1 System Error Light:** This amber light is on when a system error occurs. A light on the diagnostics LED panel will also be on to further isolate the error. (For more information, see “Identifying Problems Using Status LEDs” on page 141.)
- 2 Processor 2 Activity Light:** This green light is on when there is activity on microprocessor 2 (the secondary microprocessor).
- 3 Ethernet Transmit/Receive Activity Light:** When this green light is on, there is transmit or receive activity to or from the server.
- 4 Ethernet Link Status Light:** When this green light is on, there is an active connection on the Ethernet port.
- 5 Ethernet Speed 100 Mbps:** When this green light is on, the Ethernet speed is 100 Mbps.
- 6 Processor 1 Activity Light:** This green light is on when there is activity on microprocessor 1 (the primary microprocessor).
- 7 System Power Light:** When this green light is on, system power is present in the server. When this light flashes, the server is in standby mode (the system power supply is turned off and AC current is present). When this light is off, either a power supply, AC power, or a light has failed.
Attention: If this light is off, it does not mean there is no electrical current present in the server. The light might be burned out. To remove all electrical current from the server, you must unplug the server power cords from the electrical outlets.
- 8 System POST Complete Light:** This green light is on when the power-on self-test (POST) completes without any errors.
- 9 SCSI Hard Disk Drive Activity Light:** This green light is on when there is activity on a hard disk drive.

Input/Output Connectors and Expansion Slots

The following illustration shows the expansion slots and the input/output connectors (ports) on the rear of the server.



- 1 PCI Expansion Slots:** Your server has six peripheral component interconnect (PCI) expansion slots. Four of the PCI slots support hot-plug PCI adapters.

Many adapters provide bus-master capabilities, which enable the adapters to perform operations without interrupting the system microprocessors.
- 2 ISA Expansion Slot:** Your server has one industry standard architecture (ISA) expansion slot.

Many adapters provide bus-master capabilities, which enable the adapters to perform operations without interrupting the system microprocessors.
- 3 Parallel Connector:** A signal cable for a parallel device, such as a printer, connects here.
- 4 Serial A Connector:** A serial signal cable for a modem or other serial device connects to this 9-pin serial connector. Serial port A can be shared by the Netfinity Advanced System Management Processor and the operating system. See "Devices and I/O Ports" on page 19 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.
- 5 Attention Lights for Hot-Plug PCI Slots:** Each hot-plug PCI slot has an Attention light that is visible from the rear of the server. An Attention light flashes approximately once per second when it is on. The meaning of the Attention lights is defined by your operating system. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters and, if so, what the Attention lights indicate.
- 6 Serial B Connector:** A serial signal cable for a modem or other serial device connects to this 9-pin serial connector. Serial port B is used by the operating system and cannot be shared by the Netfinity Advanced System Management Processor. See "Devices and I/O Ports" on page 19 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.
- 7 Video Connector:** The monitor signal cable connects here.

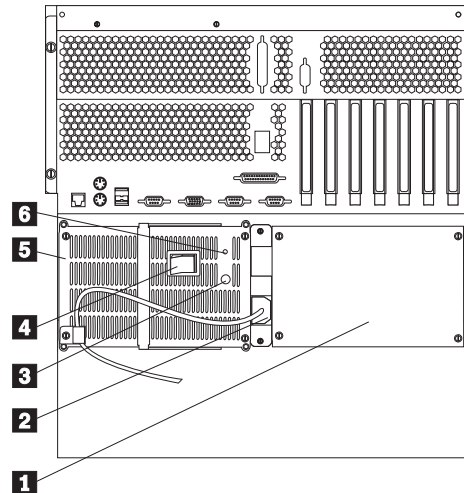
Input/Output Connectors and Expansion Slots

- 8 Power Supply 1 Power Connector:** The power cord for power supply 1 connects here. (The power connector for an additional optional power supply is covered by the filler panel.)
- 9 NetBAY3:** The tower model of the Netfinity 5500 M10 comes with a NetBAY3 attached. You can install devices, such as the IBM EXP10 or a power distribution unit, in the NetBAY3. Refer to Appendix A, “Installing Devices in the NetBAY3” for more information.
- 10 Management C Connector:** This connector is used to attach a modem that is dedicated to communication with the Netfinity Advanced System Management Processor.
- 11 Universal Serial Bus 2 Connector:** You can attach an I/O device to this universal serial bus (USB) connector. You need a 4-pin cable to connect devices to USB 1 or 2.
Note: If a standard (non-USB) keyboard is attached to the keyboard port, the USB ports are disabled while the power-on self-test (POST) is running and no USB devices will work during POST.
- 12 Universal Serial Bus 1 Connector:** You can attach an I/O device to this universal serial bus (USB) connector. You need a 4-pin cable to connect devices to USB 1 or 2.
Note: If a standard (non-USB) keyboard is attached to the keyboard port, the USB ports are disabled while the power-on self-test (POST) is running and no USB devices will work during POST.
- 13 Power Supply 1:** Your server comes with one hot-swap power supply installed. See “Power Supplies” on page 11 for more information about power supplies.
- 14 Keyboard Connector:** The keyboard cable connects here.
- 15 Ethernet Connector:** Your server has one RJ-45 Ethernet connector. This connector is for attaching the network cable to the integrated 10BASE-T or 100BASE-TX, twisted-pair transceiver.
- 16 Mouse Connector:** The mouse cable connects here. This port sometimes is called an auxiliary-device or pointing-device port.
- 17 External Connector Knockouts:** Your server has three external connector knockouts that can be used when you install options, such as the external SCSI cable option.

Note: For pin assignments and other details about these connectors, see “Connecting External Options” on page 80.

Power Supplies

The following illustration shows the power supplies, Power-supply power switch, and power lights on your server.



- 1 Filler Panel:** You can remove this filler panel and install a second hot-swap power supply in power supply bay 2. The second power supply provides redundant power.
- 2 Power Supply 1 Power Connector:** The power cord for power supply 1 connects here. (The power connector for the additional optional power supply is covered by the filler panel.)
- 3 DC Power Light:** This light provides status information about the power supply. For normal operation, both the AC and DC lights should be on. For any other combination of lights, see “Power Supply LEDs” on page 141 for more information.
- 4 Power-Supply Power Switch:** This switch turns the power supply on and off.
- 5 Power Supply 1:** Your server comes with one hot-swap power supply installed. You can install a second hot-swap power supply to provide redundant power. You cannot hot swap a power supply if your server has only one power supply installed. (See “Installing a Hot-Swap Power Supply” on page 71 for instructions.)
- 6 AC Power Light:** This light provides status information about the power supply. For normal operation, both the AC and DC Power lights should be on. For any other combination of lights, see “Power Supply LEDs” on page 141 for more information.

Power Supplies

Chapter 2. Arranging Your Workspace

To get the most from your server, arrange both the equipment you use and your work area to suit your needs and the kind of work you do. Your comfort is of foremost importance, but light sources, air circulation, and the location of electrical outlets also can affect the way you arrange your workspace.

You can also refer to the "Getting Help Information" section of this *Server Library* for information about obtaining ergonomic and environmental information from the World Wide Web.

This chapter contains:

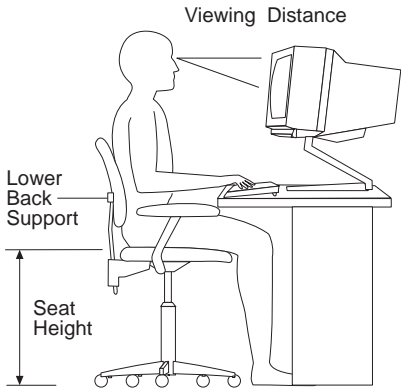
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Glare and Lighting	14
Air Circulation	14
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Comfort

Although no single working position is ideal for everyone, here are a few guidelines to help you find a position that suits you best.

Sitting in the same position for a long time can cause fatigue. A good chair can make a big difference. The backrest and seat should adjust independently and provide good support. The seat should have a curved front to relieve pressure on the thighs. Adjust the seat so that your thighs are parallel to the floor and your feet are either flat on the floor or on a footrest.

When using the keyboard, keep your forearms parallel to the floor and your wrists in a neutral, comfortable position. Try to keep a light touch on the keyboard and your hands and fingers relaxed. You can change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.



Adjust the monitor so the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so you can view it without having to twist your body. Also position other equipment you use regularly, such as the telephone or a mouse, within easy reach.

Glare and Lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Even reflected light from shiny surfaces can cause annoying reflections on your monitor screen. Place the monitor at right angles to windows and other light sources, when possible. Reduce overhead lighting, if necessary, by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight. You might have to adjust the Brightness and Contrast controls on the monitor as the room lighting changes throughout the day.

Where it is impossible to avoid reflections or to adjust the lighting, an antiglare filter placed over the screen might be helpful. However, these filters might affect the clarity of the image on the screen; try them only after you have exhausted other methods of reducing glare.

Dust buildup compounds problems associated with glare. Remember to clean your monitor screen periodically using a soft cloth moistened with a nonabrasive liquid glass cleaner.

Air Circulation

Your server and monitor produce heat. Your server has one or more fans that pull in fresh air and force out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage. Place the server and monitor so that nothing blocks the air vents; usually, 15 cm (6 inches) of air space is sufficient. Also, make sure the vented air is not blowing on someone else.

Electrical Outlets and Cable Lengths

The location of electrical outlets and the length of power cords and cables that connect to the monitor, printer, and other devices might determine the final placement of your server.

When arranging your workspace:

- Avoid the use of extension cords. When possible, plug the server power cords directly into electrical outlets.
- Keep power cords and cables neatly routed away from walkways and other areas where they might get kicked accidentally.

For more information about power cords, refer to the “Legal and Safety Information” section of this *Server Library*.

Chapter 3. Configuring Your Server

This chapter provides information about the Configuration/Setup Utility program that comes with your server.

The Configuration/Setup Utility program is part of the *basic input/output system* (BIOS) that comes with your server. Using this program, you can set the system date and time, define input and output device parameters, and define system security.

The ROM-based diagnostic program that comes with the server provides diagnostic support for the system board, disk drives, and other system components.

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Configuration Overview

You play a key role in how your server allocates resources to organize and interconnect hardware devices and software programs. This allocation process is referred to as *configuration*. The steps required to configure your server depend on the number and types of devices and programs that you install.

Your server supports several types of adapters and SCSI devices. Because of this flexibility, you can choose from among many adapters and devices that comply with any of the following standards:

- Peripheral Component Interconnect (PCI)
- Industry Standard Architecture (ISA)
- Small Computer System Interface (SCSI)

In general, the greater the number and variety of hardware devices and software programs that you install in your server, the more you will have to interact with your server and your devices to correctly configure your system.

Your server comes with the following hardware configuration utility programs:

- Configuration/Setup Utility

With the built-in Configuration/Setup Utility program, you can configure system board functions, such as serial and parallel port assignments; change interrupt request (IRQ) settings; and change the startup sequence for drives that you install. You also can use this utility program to set passwords for starting up the server and accessing the Configuration/Setup Utility program.

- ServeRAID

You can use ServeRAID programs to define and maintain your disk arrays. You can also use these programs to configure SCSI devices (such as hot-swap drives) that are attached to the ServeRAID controller on the system board. Refer to the “ServeRAID Information” section of this *Server Library* for complete instructions.

Before installing a new device or program, read the documentation that comes with it. Reading the instructions helps you to determine the steps required for installation and configuration. The following actions are typically, but not always, required to configure your server.

1. Run the Configuration/Setup Utility program and record the current configuration settings.

2. Set jumpers or switches on the server system board.

See “Changing Jumper Positions” on page 162 and “System Board Jumpers” on page 165.

3. Set jumpers or switches on the device.

See the device installation instructions.

4. Install the device in the server.

See Chapter 4, “Installing Options.”

If you install an ISA adapter that is not a Plug and Play device, select the **Plug and Play** choice on the main menu of the Configuration/Setup Utility program

to assign the ISA legacy resources. See “Plug and Play” on page 25 for more information.

5. Install software programs.

See the installation instructions that come with the software.

6. Resolve configuration conflicts.

See “Resolving Configuration Conflicts” on page 27.

The Configuration/Setup Utility Program

For most configurations, the server will operate using the default system settings. You need to change the settings only to resolve configuration conflicts or to enable or change device functions (for example, defining diskette types, and so on).

When you want or need to change the default settings, the Configuration/Setup Utility program provides a convenient way to display and change the settings.

After you run and exit from the Configuration/Setup Utility program, configuration information is stored in nonvolatile random-access memory (NVRAM). While the server is off, the configuration information remains available for the next system startup.

Always run the Configuration/Setup Utility program if you add, remove, or relocate any hardware option, or if you receive an error message instructing you to do so. Review this chapter and the information that comes with the option before making changes. Also, record the current settings (see Chapter 7, “Server Records and Specifications”) before making any changes.

To start the Configuration/Setup Utility program:

1. Turn on the server and watch the screen.
2. When the message Press F1 for Configuration/Setup appears, press **F1**.

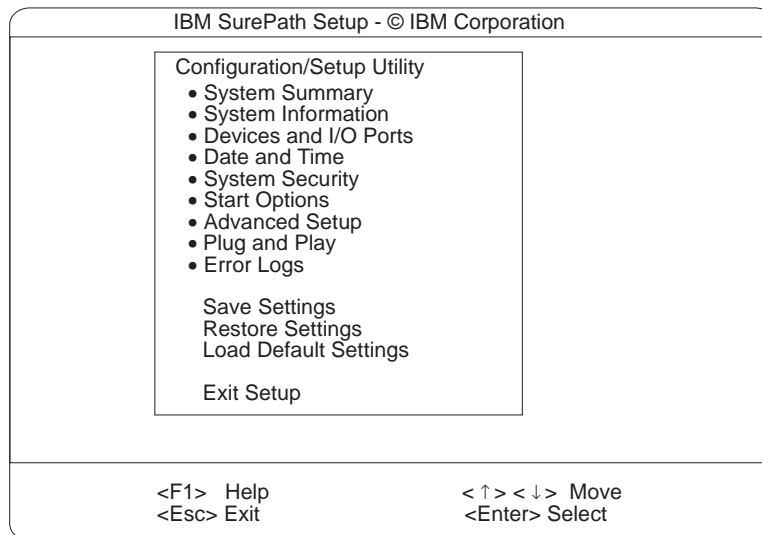
Note: If you enter the power-on password and an administrator (supervisor-level) password is also set, a limited version of the menu appears. To see the full menu, you must restart the server and enter the administrator password when you are prompted to enter a password. See “System Security” on page 20 for additional information.

The Configuration/Setup Utility program main menu appears. For information about the menu, see “Using the Configuration/Setup Utility Program Main Menu.”

Using the Configuration/Setup Utility Program Main Menu

From the Configuration/Setup Utility program main menu, you can select settings that you want to change. The Configuration/Setup Utility program main menu is similar to the following screen:

Using the Configuration/Setup Utility Program Main Menu



Pressing **F1** displays Help information for a selected menu item.

Note: The choices on some menus might differ slightly, depending on the BIOS version that comes with your server.

To change configuration settings:

1. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the menu item for the configuration setting that you want to change; then, press **Enter**.
2. Use the Left Arrow (←) or Right Arrow (→) key to choose the appropriate setting for the selected menu item; then, press **Enter**.
3. Repeat step 1 through step 2 for each setting that you want to change. Press **Esc** to return to the Configuration/Setup Utility program main menu.
4. After making changes, you can select:
 - **Save Settings** to save the selected changes.
 - **Restore Settings** to delete the changes and restore the previous settings.
 - **Load Default Settings** to cancel the changes and restore the factory settings.
5. To exit from the Configuration/Setup Utility program main menu, select **Exit Setup**. If you made any changes and did not save them with the **Save Settings** choice, the system prompts you to save or discard the changes when you attempt to exit from the Configuration/Setup Utility program main menu.

System Summary

Select this choice to display configuration information, including the type and speed of the microprocessor and amount of memory.

Changes that you make to configuration settings appear on this summary screen. You cannot edit the fields.

The **System Summary** choice appears on the full Configuration/Setup Utility program menu and on the limited Configuration/Setup Utility program menu.

System Information

Select this choice to display information about your Netfinity 5500 M10, and to view the IRQ settings for the RAID and Ethernet controllers on the system board, and other PCI adapters that you purchase and install.

Changes that you make on other menus might appear on this summary screen. You cannot edit any fields.

The System Information choice appears only on the full Configuration/Setup Utility program menu.

Product Data

Select this choice to view system information, such as the machine type and model, the system serial number, the system board identifier, and the revision level or issue date of the flash electronically erasable programmable ROM (EEPROM) for the Netfinity Advanced System Management Processor, diagnostics, and BIOS.

System Card Data

Select this choice to view information for the system board and processor board.

PCI Routing

Select this choice to view the IRQ settings for PCI adapters and for the Ethernet, SCSI, and other controllers on the system board. See "PCI Bus Control" on page 24 for information about changing the PCI IRQ settings.

Devices and I/O Ports

Software recognizes ports through their port assignments. Each port must have a unique port assignment. The Configuration/Setup Utility program normally handles this, but you might have special hardware or software that requires you to change these assignments.

Note: Serial port A can be shared by the Netfinity Advanced System Management Processor and operating system. Serial port B is used by the operating system only. Management port C is controlled exclusively by the Netfinity Advanced System Management Processor, cannot be used by the operating system, and cannot be configured using the Configuration/Setup Utility program.

Select the **Devices and I/O Ports** choice to view or change the assignments for devices and input/output ports.

You can add serial ports by installing a serial adapter in an expansion slot. See the documentation that comes with the serial adapter for information about port assignments.

You can configure the parallel port as *bidirectional*; that is, so that data can be both read from and written to a device. In bidirectional mode, the server supports Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP).

To display or change the assignments for devices, serial ports, or the parallel port:

1. Select **Devices and I/O Ports**.

Using the Configuration/Setup Utility Program Main Menu

2. Select a device or port; use the Left Arrow (←) or Right Arrow (→) key to advance through the settings available.

The Devices and I/O Ports choice appears only on the full Configuration/Setup Utility program menu.

Notes:

1. When you configure the parallel port as bidirectional, use an IEEE 1284-compliant cable. The maximum length of the cable must not exceed 3 meters (9.8 feet).
2. The universal serial bus (USB) is configured automatically. For further details about Plug and Play devices, see “Plug and Play” on page 25.
3. If you install a USB keyboard that has a mouse port, the USB keyboard emulates a mouse and you will not be able to disable the mouse setting in the Configuration/Setup Utility program.

Date and Time

Select this choice to set the system date and time.

The system time is in a 24-hour format: hour:minute:second.

The system date is in standard format for your country. For example, in the United States, the format is **MM/DD/YYYY** (Month/Day/Year).

Select **Date and Time**; then, use the Left Arrow (←) or Right Arrow (→) key to advance through each data field. Type the new information; the system saves the information as you type it.

The **Date and Time** choice appears only on the full Configuration/Setup Utility program menu.

System Security

To control access to the information in your server databases, you can implement two levels of password protection. Implementing these security measures helps you to ensure the integrity of the data and programs that are stored in your server.

Note: The default values for all security-related data fields are given in Table 10 on page 155.

After you set a power-on password, you can enable the unattended-start mode. This locks the keyboard and mouse, but allows the system to start the operating system. The keyboard and mouse remain locked until you enter the correct password.

The **System Security** choice appears only on the full Configuration/Setup menu.

To set, change, or delete a password:

1. Select **System Security**.
2. Select the password that you want to change.
3. Follow the instructions on the screen.

Using the Configuration/Setup Utility Program Main Menu

After you set a power-on or administrator password, you must enter the password when you turn on the server. (The passwords do not appear on the screen as you type them.)

Type of Password	Results
No password set	<ul style="list-style-type: none">No password required to start system.You can access all choices on the Configuration/Setup Utility program main menu.
Power-on password only	<ul style="list-style-type: none">You must enter the password to complete the system startup.You can access all the choices on the Configuration/Setup Utility program main menu.
Administrator password only	<ul style="list-style-type: none">You must enter the password to complete the system startup.Administrator password provides access to all choices on the Configuration/Setup Utility program main menu.
Administrator <i>and</i> power-on password	<ul style="list-style-type: none">You can enter either password to complete the system startup.<ul style="list-style-type: none">Administrator password provides access to all choices on the Configuration/Setup Utility program main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user.Power-on password provides access to a limited set of choices on the Configuration/Setup Utility program main menu. This might include changing or deleting the power-on password.If you forget the power-on password, and the administrator password has been set, use the administrator password at the power-on password prompt; then, start the Configuration/Setup Utility program and change the power-on password.

Using the Power-On Password Menu

When a power-on password is set, you must enter a password each time that you start the system.

To set a power-on password:

1. Select **Power-on Password** from the System Security menu; then, press **Enter**.

The Power-on Password menu appears.

2. Type the password in the **Enter Power-on Password** data field.

You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for your power-on password. Keep a record of your password in a secure place.

3. Move the cursor to the **Enter Power-on Password Again** data field and type the password again.

Note: A message appears if the two passwords do not match. If this happens, press **Esc** to cancel the request and return to the System Security menu.

4. Select **Change Power-on Password** to save the new password; then, press **Enter**.

When a power-on password is set, POST does not complete until you enter the password. If you forget the power-on password, you can regain access to the server through one of the following methods:

Using the Configuration/Setup Utility Program Main Menu

- If an administrator password has been set, enter the administrator password at the power-on prompt. (See “Using the Administrator Password Menu” on page 22 for details.) Start the Configuration/Setup Utility program and change the power-on password as previously described in this section (see steps 1 through 4).
- You can change the position of the Power-On Password Override jumper, as described in “Bypassing an Unknown Power-on Password” on page 166.
- You can remove the battery as described in “Replacing the Battery” on page 149 and then reinstall the battery.

To delete a power-on password:

1. Select **Power-on Password** from the System Security menu; then, press **Enter**.
The Power-on Password menu appears.
2. Select **Delete Power-on Password**; then, press **Enter**.
3. A confirmation window appears. Press **Enter** to delete the power-on password. Press **Esc** to cancel the request and return to the System Security menu.

To allow the system to start in unattended mode when a power-on password is set:

1. Select **Power-on Password** from the System Security menu; then, press **Enter**.
The Power-on Password screen appears.
2. Select **Allow for unattended boot with password**. Press the Left Arrow (←) key or Right Arrow (→) key to toggle the entry to **On**.

Note: The **Allow for unattended boot with password** data field must be set to **On** for the system to support locally or remotely scheduled system shutdowns or restarts in unattended-start mode.

Using the Administrator Password Menu

The administrator password (sometimes called a supervisor-level password) controls access to some features of the server, including the Configuration/Setup Utility program.

Important

If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the system board.

To set an administrator password:

1. Select **Administrator Password** from the System Security menu: then, press **Enter**.
The Administrator Password menu appears.
2. Type the password in the **Enter Administrator Password** data field.
A password can contain any combination of up to seven alphanumeric characters (A–Z, a–z, and 0–9). Keep a record of your password in a secure place.

3. Move the cursor to the **Enter Administrator Password Again** data field and type the password again.

Note: A message appears if the two passwords do not match. If this happens, press **Esc** to cancel the request and return to the System Security menu.

4. Select **Change Administrator Password** to save the new password; then, press **Enter**. The password becomes effective immediately.

To delete an administrator password:

1. Select **Administrator Password** from the System Security menu; then, press **Enter**.

The Administrator Password menu appears.

2. Select **Delete Administrator Password**; then, press **Enter**.
3. A confirmation window appears. Press **Enter** to delete the administrator password. Press **Esc** to return to the System Security menu.

To enable a user to change the power-on password:

1. Select **Administrator Password** from the System Security menu; then, press **Enter**.

The Administrator Password screen appears.

2. Select **Power-on password changeable by user**. Press the Left Arrow (←) or Right Arrow (→) key to toggle the entry to **Yes**.

When this choice is enabled, **System Security** appears on the limited Configuration/Setup Utility program menu. The System Security menu contains the **Power-on Password** choice.

Start Options

Start options take effect when you start your server.

You can select keyboard operating characteristics, such as the keyboard speed. You also can specify whether the keyboard number lock starts on or off. You also can enable the server to run in disketteless and monitorless operation.

The server uses a startup sequence to determine the device from which the operating system loads. For example, you can define a startup sequence that checks for a startable diskette in the diskette drive, then checks the hard disk drive in bay 1, and then checks a network adapter.

You can enable a virus-detection test that checks for changes in the master boot record at startup. You also can choose to run POST in the enhanced mode or the quick mode.

Select **Start Options**; then, use the Left Arrow (←) or Right Arrow (→) key to advance through each data field.

The **Start Options** choice appears only on the full Configuration/Setup Utility program menu.

Advanced Setup

Select **Advanced Setup** to change values for advanced hardware features, such as cache control, ROM shadowing, and PCI bus control.

A warning message displays above the choices on this menu, to alert you that the system might malfunction if these options are configured incorrectly. Follow the instructions on the screen carefully.

Use the Left Arrow (←) or Right Arrow (→) key to scroll through each data field after you select one of the setup options.

The **Advanced Setup** choice appears only on the full Configuration/Setup Utility program menu.

ACPI Control

Select this choice to enable or disable the advanced configuration and power management interface (ACPI) in the BIOS. You can choose to change the ACPI hardware signature or select an IRQ for ACPI.

Cache Control

Select this choice to enable or disable the microprocessor cache. In addition, you can define the microprocessor cache mode as write-back (WB) or write-through (WT).

Selecting write-back mode will provide the maximum system performance.

Note: If the system does not start (boot) successfully after three attempts, the default configuration is loaded, disabling the cache.

PCI Bus Control

Select **PCI Bus Control** to get the following choices:

- PCI-PCI Bridge Pre-fetching: Set **PCI-PCI bridge pre-fetching** to **Enabled** for maximum performance. If you experience problems running peer-to-peer adapters, disable this function.
- PCI Primary Bus MLT: This setting is for the primary master latency timer (MLT). It can be used to help tune performance of the server.
- PCI Secondary BUS MLT: This setting is for the secondary master latency timer (MLT). It can be used to help tune performance of the server.
- PCI Interrupt Routing: This choice can be used to manually override the interrupts for PCI devices. Any changes that you make in PCI Interrupt Routing will not be reflected in the IRQ settings displayed in the PCI Routing selection of the System Information menu until you restart the server.

Memory Settings

Select this choice to manually disable or enable a row of memory.

If a memory error is detected during POST or memory configuration, the server can automatically disable the failing row of memory and continue operating with reduced memory capacity. If this occurs, you must manually enable the row of memory after the problem is corrected. Choose **Memory Settings** from the Advanced Setup menu; then use the the Up Arrow (↑) or Down Arrow (↓) key to

highlight the row that you want to enable. Use the Left Arrow (←) or Right Arrow (→) key to select **Enable**.

Advanced ISA Settings

Select this choice to select the I/O recovery timer settings.

System Service Processor Settings

Select this choice to change the Netfinity Advanced System Management Processor IRQ.

Plug and Play

Before you can install Plug and Play adapters, you must configure ISA legacy adapters (if applicable) and assign the resources that are used by these adapters. When you install an ISA legacy adapter, you must allocate the system resources that the adapter will use. Select **Plug and Play** to view and identify these resources, which include:

- Memory
- I/O ports
- Direct memory access (DMA)
- Interrupt

Note: These menus do not display the resources that are required for the system or by Plug and Play devices.

Select **Plug and Play**; then, use the Up Arrow (↑) or Down Arrow (↓) key to highlight the assignment that you want to change. Use the Left Arrow (←) or Right Arrow (→) key to select from the list of available choices.

Enter the appropriate values in the **Interrupt Resources** data fields. These values range from 0 through 15.

The **Plug and Play** choice appears only on the full Configuration/Setup Utility program main menu.

Note: For further details about Plug and Play devices, see “Plug and Play Technology” on page 44.

Error Logs

Select **Error Logs** to choose to view either the POST error log or the system error log.

POST Error Log

Select **POST Error Log** to view the three most recent errors detected and logged during POST. You can clear the Post error log from this screen by selecting **Clear error logs**.

System Error Log

Select **System Error Log** to view the system error log. The system error log contains all error and warning messages generated during POST and all system status messages from the Netfinity Advanced System Management Processor. The most recent error is displayed first. Use the Up Arrow (↑) and Down Arrow (↓) keys to move through the system error log. You can clear the system error log by selecting **Clear error logs**.

Configuring Options

Save Settings

After you make configuration changes, review them to be sure that they contain the correct information. If the information is correct, select **Save Settings** to save the selected changes.

Restore Settings

After you make configuration changes, review them to be sure that they contain the correct information. If the information is incorrect, or if you do not want to save these changes, select **Restore Settings** to delete the changes and restore the previous settings.

Load Default Settings

If you make configuration changes and then decide that you want to use default values instead, select **Load Default Settings** to cancel the changes and restore the factory settings.

Exit Setup

Select **Exit Setup** to exit from the Configuration/Setup Utility program. If you have made any changes, you will be asked if you want to make the changes or exit without making the changes.

Configuring Options

Before installing a new device or program, read the documentation that comes with it. Reading the instructions helps you to determine the steps that are required for installation and configuration. The following list provides a preview of the actions that might be required to configure your server.

1. Run the Configuration/Setup Utility program and record the current configuration settings.
See "The Configuration/Setup Utility Program" on page 17.
2. Set jumpers or switches on the server system board.
See "Changing Jumper Positions" on page 162 and "System Board Jumpers" on page 165.
3. Set jumpers or switches on the device.
See the instructions that came with the adapter.
4. Install the adapter in the server.
See "Working with Adapters" on page 42.
5. Install software programs.
See the installation instructions that came with the software.
6. Resolve configuration conflicts.
See "Resolving Configuration Conflicts" on page 27.

Configuring ISA and PCI Adapters

You cannot assign an ISA adapter to the same interrupt that you have assigned to a PCI adapter. This is because the Netfinity 5500 M10 does not support interrupt sharing among PCI and ISA adapters.

If a situation occurs where you need an additional interrupt, you can use an interrupt from another function that you might not need, such as COM2 (Interrupt 3).

To configure ISA adapters, select **Plug and Play** and follow the instructions on the screen. See “Plug and Play” on page 25 and “Plug and Play Technology” on page 44 for additional information.

PCI devices automatically communicate with the server configuration information. This usually results in automatic configuration of a PCI device. If a conflict does occur, see “Resolving Configuration Conflicts.”

Multiple-function PCI adapters use more than one interrupt. When you install one of these adapters, review the IRQ assignments in the Configuration/Setup Utility programs (see “PCI Routing” on page 19). Verify that the IRQ assignments are correct.

Your Netfinity 5500 M10 uses a rotational interrupt technique to configure PCI adapters. This technique enables you to install a variety of PCI adapters that currently do not support sharing of PCI interrupts.

Resolving Configuration Conflicts

The resources used by your server consist of IRQs, DMA, I/O ports addresses, and memory. This information is useful when a resource configuration conflict occurs.

Conflicts in the configuration occur if:

- A device is installed that requires the same resource as another device. (For example, a conflict occurs when two adapters try to write to the same address space.)
- A device resource is changed (for example, changing jumper settings).
- A device function is changed (for example, assigning *COM1* to two serial ports).
- A software program is installed that requires the same resource as a hardware device.

The steps required to resolve a configuration error are determined by the number and variety of hardware devices and software programs that you install. If a hardware configuration error is detected, a *configuration error* message appears after the server completes POST and before the operating system is loaded. You can bypass the error by pressing **Esc** while the error message is displayed.

The Configuration/Setup Utility program configures the system hardware and PCI IRQs. The program does not consider the requirements of the operating system or the application programs. See “Resolving Software Configuration Conflicts” on page 28 for additional information.

Resolving Hardware Configuration Conflicts

Use the following information to help resolve hardware configuration conflicts:

1. Run the Configuration/Setup Utility program to view and change resources used by the system board functions and the installed options. Record the current settings before making any changes. (See “The Configuration/Setup Utility Program” on page 17 for instructions.)
2. Determine which adapter or device is causing the conflict. (See Chapter 6, “Solving Problems” for instructions.)
3. Change adapter jumpers or switches. Some devices use jumpers and switches to define the system resources that the devices need. If the settings are incorrect or set to use a resource that cannot be shared, a conflict occurs and the device will remain deactivated by the configuration program.
4. Remove the device or adapter. Some configurations are not supported. If you must remove an adapter, see “Working with Adapters” on page 42.

Resolving Software Configuration Conflicts

The memory-address space and IRQs used by some hardware options might conflict with addresses defined for use through application programs or the expanded memory specification (EMS). (EMS is used only with DOS.)

If a conflict exists, one or more of the following conditions might exist:

- The system cannot load the operating system.
- The system does not work.
- An application program does not operate, or it returns an error.
- Screen messages indicate a conflict exists.

To resolve conflicts, you can change the software or hardware configuration.

Note: Start the Configuration/Setup Utility program to view the addresses used by your system board functions. (See “The Configuration/Setup Utility Program” on page 17 for instructions.)

The best way to resolve memory-address conflicts is to change the addresses used by the application program or the device driver. You can use the Configuration/Setup Utility program to change addresses.

If a device driver is causing a memory-address conflict, refer to your operating-system documentation or the documentation that comes with the device drivers.

Configuring the Ethernet Controller

Your Netfinity 5500 M10 comes with an Ethernet controller on the system board. The Ethernet controller provides 10BASE-T and 100BASE-TX support through the RJ-45 connector on the back of your server. When you connect your server to the network, the Ethernet controller automatically detects the data-transfer rate (10 Mbps or 100 Mbps) on the network and then sets the controller to operate at the appropriate rate. That is, the Ethernet controller will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX), half duplex (HDX), or full duplex (FDX). This process is also known as *auto-negotiating*. This auto-negotiation occurs without requiring software intervention. The controller supports half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

Note: The 100BASE-TX Fast Ethernet standard requires that the cabling in the network be Category 5 or higher.

Fast Ethernet operates at a data rate of 100 Mbps; that is, ten times faster than standard Ethernet. However, except for the different operating speeds, Fast Ethernet and standard Ethernet are structurally identical. Applications and protocols that are currently hosted on a standard Ethernet system can be seamlessly migrated to a Fast Ethernet system. (In a very small number of cases, minor tuning might be required to adjust the application to the higher performance of a Fast Ethernet system). Because of the equivalence of the two types of Ethernet, mixed Ethernet and Fast Ethernet systems also can be designed and implemented.

The bandwidth required at each workstation connected to a server is generally far less than the bandwidth required at the server. This is because the server might have to handle the bandwidth of multiple workstations at the same time. A cost-effective solution to the bandwidth requirements of this type of system is a mixed Ethernet and Fast Ethernet network. This mixed network consists of standard Ethernet connections at the workstations and Fast Ethernet connections at the servers.

The Ethernet controller is a PCI device, and is therefore, a Plug and Play device. You do not have to set any jumpers or configure the controller for your operating system before you use the Ethernet controller. However, you must install a device driver to enable your operating system to address the Ethernet controller (refer to the “ServerGuide and Netfinity Manager Information” section of this *Server Library* or to your operating-system documentation).

For troubleshooting information, see “Troubleshooting the Ethernet Controller” on page 138.

If you need additional Ethernet connections, you can install an Ethernet adapter, such as the IBM 10/100 PCI Ethernet adapter. Review your network-adapter documentation for any additional configuration requirements and for troubleshooting information.

Failover for Redundant Ethernet

Your Netfinity 5500 M10 has an integrated Ethernet controller. The IBM Netfinity 10/100 Fault Tolerant Adapter is an optional redundant network interface card (NIC adapter) that you can install in your server. If you install this NIC adapter and connect it to the same logical segment as the primary Ethernet controller, you can configure the server to support a *failover* function. You can configure either the integrated Ethernet controller or the NIC adapter as the primary Ethernet controller. In failover mode, if the primary Ethernet controller detects a link failure, all Ethernet traffic associated with it is switched to the redundant (secondary) controller. This switching occurs without any user intervention. Applications with active sessions do not experience any data loss. When the primary link is restored to an operational state, the Ethernet traffic automatically switches back to the primary Ethernet controller.

Note that only one controller in the redundant pair is active at any given time. For example, if the primary Ethernet controller is active, then the secondary Ethernet controller cannot be used for any other network operation.

Note: Your operating system determines the maximum number of IBM Netfinity 10/100 Fault Tolerant Adapters that you can install in your server. See the documentation that comes with the adapter for more information.

Special Considerations When Combining Failover and Hot-Plug Functions

If your operating system supports hot-plug PCI adapters and the optional redundant NIC adapter is installed in a hot-plug PCI slot, you can replace the NIC adapter without powering off the server — even if it is the primary Ethernet controller. Disconnecting the Ethernet cable from the primary Ethernet controller will cause the Ethernet traffic to be automatically switched to the secondary Ethernet controller. This can be very useful when a network problem is caused by faulty adapter hardware or when you want to upgrade the primary adapter hardware.

Configuring for Failover

The failover feature currently is supported by OS/2, Windows NT, and IntraNetWare. The setup required for each operating system follows.

OS/2

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in “Working with Adapters” on page 42.
2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver. (Refer to the “ServerGuide and Netfinity Manager Information” section of this *Server Library*.)
3. Using the MPTS Utility program, select the driver from the list and select the **Edit** button.

Note: Only one driver instance needs to be loaded for each redundant pair of Ethernet controllers.

4. Change the PermaNet Server Feature keyword to **TRUE** and specify the Primary and Standby slots that contain the redundant pair. Refer to “System Board Component Locations” on page 164 for the locations and slot numbers of the PCI slots. The integrated controller is located in slot E.

5. To enable the writing of messages to the IBMCOM\LANTRAN.LOG file when a failover occurs:
 - a. Copy the file PCNETOS2.EXE from the root directory of the diskette created using the ServerGuide CDs to your hard disk drive.
 - b. Add the following statement to the CONFIG.SYS file:

```
Run=d:\path\PCNETOS2.EXE
```

where *d* and *path* are the drive and path to which you copied PCNETOS2.EXE.
6. Restart the server.

The failover function is now enabled.

Windows NT

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in “Working with Adapters” on page 42.
2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver. (Refer to the “ServerGuide and Netfinity Manager Information” section of this *Server Library*.)
3. From the NT desktop, select **Control Panel**, then select the **Network** icon, then the **Adapters** tab.
4. Highlight one of the adapters that will be in the redundant pair and then select the **Properties...** button.
5. Check the **Grouping** box. This will show the possible combinations for redundant pairs.
6. Select the adapter pair you want and then select **OK**. Note that the integrated Ethernet controller is located at PCI bus 0, slot 14.
7. Select **Close** to exit from the Network setup.

When you restart the server, the failover function will be in effect.

If a failover occurs, a message is written to the NT Event Viewer log. If the DMI instrumentation code for the integrated Ethernet controller is active (PCNET.EXE was run), a popup message is generated also.

IntraNetWare

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in “Working with Adapters” on page 42.
2. Load the device driver by using the following command:

```
LOAD d:\path\PCNTNW.LAN PRIMARY=x SECONDARY=y
```

where *d* and *path* are the drive and path where the driver is located, and *x* and *y* are the PCI slot numbers where the redundant pair is located.

The slot number associated with the integrated Ethernet controller can vary depending upon the configuration of the server. To determine the slot number, load the driver with no parameters. The driver will display the available slot numbers. The slot number that is greater than 10000 will be the slot number of integrated Ethernet controller. When the slot number of the integrated Ethernet controller is determined, reload the driver with the appropriate parameters.

Failover for Redundant Ethernet

3. When the driver is loaded, bind it to a protocol stack.

The failover function is now enabled. If a failover occurs:

- A message is generated to the operating system console.
- The custom counters for the device driver contains variables that define the state of the failover function and the location of the redundant pair. You can use the NetWare Monitor to view the custom counters.

Note: If the primary adapter was hot-replaced while the Ethernet traffic was being handled by the secondary Ethernet controller, the traffic does not automatically switch back to the primary adapter when the primary adapter comes back online. In this case, issue the command:

```
LOAD d:\path\PCNTNW SCAN
```

where *d* and *path* are the drive and path where the driver is located. This command causes the device driver to locate the primary adapter and switch the Ethernet traffic to it.

Chapter 4. Installing Options

This chapter provides instructions to help you add options to your server. Some option-removal instructions are provided, in case you need to remove one option to install another.

Notes:

1. Most of the illustrations in this publication show the tower model of the Netfinity 5500 M10 with the IBM Netfinity NetBAY3; the rack model does not come with a NetBAY3.
2. The illustrations in this book are similar to your server; details might vary.

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Before You Begin

Before you begin to install options in your server, read the following information:

Notes:

1. You do not need to turn off the server to install or replace hot-swap power supplies, hot-swap drives, hot-swap fans, or hot-plug PCI adapters.
 2. The color orange on components or labels in your Netfinity 5500 M10 indicates hot-plug components.
- Become familiar with the safety and handling guidelines specified under “Safety Information Statements” on page vii, “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36. These guidelines will help you work safely while working with your server or options.
 - Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and any other options that you intend to install.
 - Place your server in a location that is dry. Rain or spilled liquids might damage your server.
 - Leave about 50 mm (2 inches) of ventilated space on the right and left sides of the server to allow the server cooling system to work properly. Leave 100 mm (4 inches) of clearance at the rear of the server for cables.
 - Have a supply of 1 MB and 2 MB, 3.5-inch diskette available.
 - Back up all important data before you make changes to disk drives.
 - Have a small, flat-blade screwdriver available.
 - For a list of supported options for the Netfinity 5500 M10, refer to <http://www.pc.ibm.com/us/compat> on the World Wide Web.

Electrical Safety

For your safety, do the following *before* removing the top cover:

Note: You do *not* need to turn off the server and attached devices before you remove the top cover to install or remove a hot-plug PCI adapter (see “Installing a Hot-Plug PCI Adapter” on page 46), to replace a hot-swap fan (see “Replacing a Hot-Swap Fan Assembly” on page 76), or to check the diagnostics LED panel.

1. Turn off the server and any attached devices, such as printers, monitors, and external drives.
2. If you are in the United Kingdom and have a modem or fax machine attached to your server, you must disconnect the telephone line from the server *before* unplugging any power cords (also known as power cables). When reassembling your server, you must reconnect the telephone line *after* you plug in the power cords.
3. Unplug all the power cords from electrical outlets.
4. Disconnect all communication cables from external receptacles.
5. Disconnect all cables and power cords from the back of the server.

Note: Reconnect the cables or power cords only after you reassemble the server and put the covers back on.

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CAUTION:

Never remove the cover on a power supply or any part (power backplane and AC box) that has the following label attached.



Hazardous voltage, current, and energy levels are present inside the power supplies, power backplane, and AC box. There are no serviceable parts inside the power supplies, power backplane, or AC box. If you suspect a problem with one of these parts, contact an IBM service technician.

Handling Static-Sensitive Devices

Static electricity, though harmless to you, can seriously damage server components or options.

Note: When you are adding an internal option, do not open the static-protective package containing the option until you are instructed to do so.

When you handle options and other server components, take these precautions to avoid damage from static electricity:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters, the processor board, and memory-module kits by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new option, touch the static-protective package containing the option to a metal expansion-slot screw or other unpainted metal surface on the server for at least two seconds. (This reduces static electricity from the package and from your body.)
- When possible, remove the option and install it directly into the server without setting the option down. When this is not possible, place the static-protective package that the option comes in on a smooth, level surface and place the option on it.
- Do not place the option on the server's covers or any metal surface.

System Reliability Considerations

To help ensure proper cooling and system reliability, make sure:

- Each of the drive bays has either a drive or a filler panel installed.
- Each of the power supply bays has either a power supply or a filler panel installed.
- The top cover is in place during normal operation.
Note: The front door and side covers (tower model) can be permanently removed without affecting system reliability.
- There is at least 50 mm (2 inches) of ventilated space at the sides of the server and 100 mm (4 inches) at the rear of the server.
- The top cover is removed for no longer than 30 minutes while the server is operating.
- The Power switch on the power supply is off before you remove a functional power supply.
- A removed hot-swap drive is replaced within two minutes of removal.
- Cables for optional adapters are routed according to the instructions provided with the adapters.
- A failed fan is replaced within 48 hours.

Working Inside a Netfinity 5500 M10 with Power On

Your Netfinity 5500 M10 is designed with special features that make it highly available. These features include hot-plug PCI expansion slots and hot-swap fans. You can add or replace PCI adapters (if supported by your operating system) or replace a fan which no longer functions. In the past you would need to power off the server and disconnect power to perform these operations. With the hot-plug features you remove the top cover of your server with the power on — something most people have not done before.

Your Netfinity 5500 M10 is designed to operate safely while powered on with the top cover removed. The server is designed to protect you and the server. Here are some simple guidelines to follow when you work inside a Netfinity 5500 M10 that is powered on:

- Avoid loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cufflinks while you are working inside the server.
- Do not allow your necktie to hang inside the server.
- Remove jewelry, such as bracelets and loose-fitting wrist watches.
- Remove items from your shirt pocket (such as pens or pencils) that could fall into the server as you lean over it.
- Take care to avoid dropping any metallic objects, such as paper clips, hair pins, or screws, into the server.

Preparing to Install Options

Before you begin:

Read “Electrical Safety” on page 35, “Handling Static-Sensitive Devices” on page 36, and “Working Inside a Netfinity 5500 M10 with Power On” on page 37.

Note: You do not need to turn off the server to work with hot-plug or hot-swap devices, such as hot-plug PCI adapters, and hot-swap hard disk drives.

If you are:

- Installing or removing a hot-plug PCI adapter, go to “Working with Adapters” on page 42.
 - Installing or replacing a hot-swap hard disk drive, go to “Installing Internal Drives” on page 59.
 - Installing or replacing a hot-swap power supply, go to “Installing a Hot-Swap Power Supply” on page 71.
 - Removing a hot-swap power supply, go to “Removing a Hot-Swap Power Supply” on page 74.
 - Replacing a hot-swap fan, go to “Replacing a Hot-Swap Fan Assembly” on page 76.
 - Installing or removing an option not listed in the preceding list, continue with the following steps.
1. Unlock and open the server door.

8



CAUTION:

When unlocked, the server door will not support the weight of the server. To avoid personal injury, be sure to remove or lock the server door before moving or lifting the server.

2. Remove all media (diskettes, CDs, optical discs, or tapes) from the drives; then, turn off the server and all attached options.

6



CAUTION:

The Power Control button on the front of the server does not turn off the electrical current supplied to the server. The server also might have more than one power cord. To remove all electrical current from the server, ensure that all power cords are disconnected from the power source.

3. If you have a modem or fax machine attached to the server, disconnect the telephone line from the electrical outlet.
4. Unplug all power cords (cables) from electrical outlets.
5. Note the location of the remaining cables and cords; then disconnect them from the back of the server.

10



CAUTION:

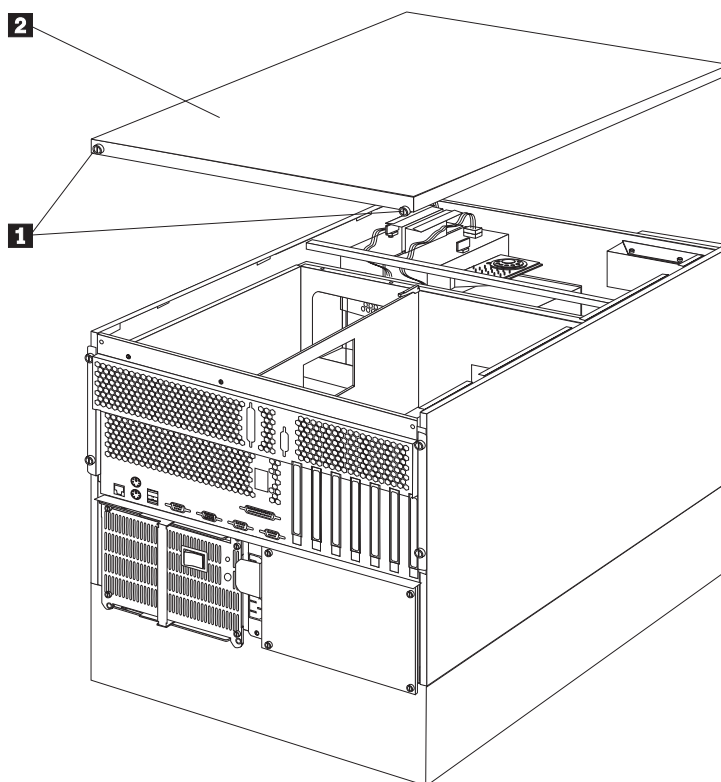
Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunications systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.

Removing the Top Cover

Before you begin:

Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.

Note: The illustrations in this book are similar to your server; details might vary. For example, the processor housing cover is not shown in the following illustration.



- 1** Thumbscrews
- 2** Top cover

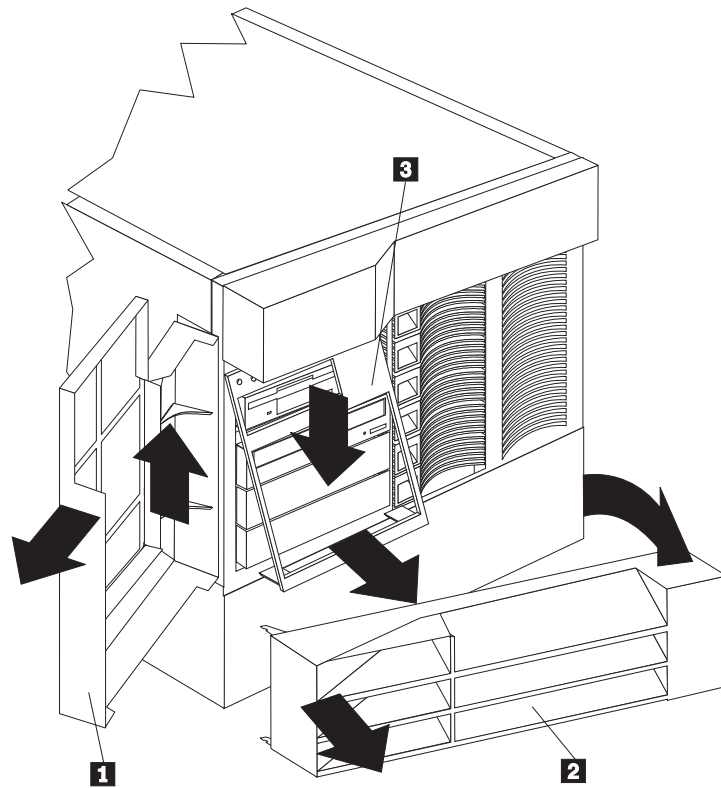
To remove the server top cover:

1. Turn off the server and all attached devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 38).
2. Loosen the two thumbscrews **1** on the back edge of the top cover.
3. Slide the top cover **2** slightly toward the rear of the server; the cover will stop after about 25 mm (1 inch). Lift the cover off the server and set the cover aside.

Attention: For proper cooling and airflow, replace the top cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the top cover removed might damage server components.

Removing the Server Door and Trim Bezels on the Tower Model

Refer to the following illustration while you perform the steps in this procedure.



- 1** Server door
- 2** NetBAY3 bezel
- 3** Media-bay trim bezel

To remove the server door:

1. Unlock and open the server door **1**.
2. Lift the server door up and off its hinges. Store the door in a safe place.

To remove the NetBAY3 bezel (tower model only):

1. Unlock the NetBAY3 bezel **2**.
2. With your fingers on the ribbed area on the right side of the NetBAY3 bezel **2**, grasp the right side of the NetBAY3 bezel and pull it away from the pedestal.
3. Unhook the left side of the bezel from the server. Store the bezel in a safe place.

To remove the media-bay trim bezel:

1. Release the two tabs at the bottom edge of the bezel **3** and pull the bottom of the bezel slightly away from the server.
2. Pull the bezel down to release the two tabs at the top edge of the bezel. Store the bezel in a safe place.

Working with Adapters

You can add adapters to extend the capabilities and power of your server. Many adapters provide bus-master capabilities, which enable the adapters to perform operations without interrupting the server's microprocessor.

You can install up to seven adapters in the expansion connectors, called slots, on the system board of your server. Six of the slots are peripheral component interconnect (PCI) expansion slots and one is an industry standard architecture (ISA) expansion slot.

In four of the PCI slots, you can install a new PCI adapter or replace an existing PCI adapter with the same type of adapter without turning off the server power and restarting the system, if these features are supported by your operating system. These slots are called *hot-pluggable* PCI slots. They are also referred to as hot-plug PCI slots.

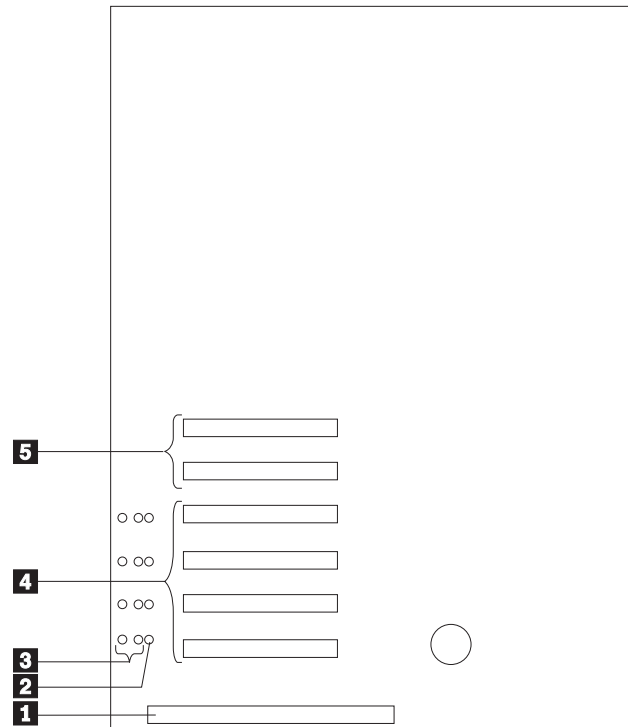
The expansion slots have Plug and Play capabilities. See "Plug and Play Technology" on page 44 for additional information.

Your server comes with a video controller. This video controller is an integrated component on the system board. It is *not* in an expansion slot. The integrated video controller has super video graphics array (SVGA) technology.

The integrated video controller is not removable. If you want to disable this controller and use a video adapter instead, you can install a video adapter in an expansion slot. When you install a PCI video adapter, the server BIOS automatically disables the integrated video controller. When you install an ISA video adapter, you must move a jumper to disable the integrated video controller. See "System Board Jumpers" on page 165 for more information.

Note: Video adapters are not supported in PCI slots on the secondary PCI bus (PCI slots 1–4).

The following illustration shows the location of the PCI and ISA expansion slots on the system board.



- 1** 16-bit ISA slot
- 2** Power LEDs for hot-swap slots
- 3** Attention LEDs for hot-swap slots
- 4** Hot-plug 32-bit PCI slots 1–4 (on secondary PCI bus)
- 5** Non-hot-plug 32-bit PCI slots 5 and 6 (on primary PCI bus)

LEDs for Hot-Plug PCI Slots

Each hot-plug PCI slot has three LEDs associated with it — two Attention LEDs and one Power LED.

- **Power LED:** This LED is on when the hot-plug PCI slot is active and has power. An adapter **must not** be added to or removed from the PCI slot when the Power LED is on. When this LED is off, the PCI slot is inactive and has no power applied. An adapter can be installed when the Power LED for the PCI slot is off. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters, and, if so, how to disable the hot-plug PCI slot.
- **Attention LEDs:** Each hot-plug PCI slot has an Attention LED that is visible from the rear of the server and one that can be seen from inside the server. (The LEDs have the same meaning; they are duplicated to be visible from outside or inside the server.) An Attention LED flashes approximately once per second when it is on. The meaning of the Attention LEDs is defined by your operating system. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters and, if so, what the Attention LEDs indicate.

The following table describes the LEDs:

Power LED	Attention LED	Description
On	Flashing	The adapter requires attention. Slot still has power applied. Do not remove or install an adapter in the slot. Refer to your operating system documentation for instructions.
On	Off	Normal operation; no intervention is required.
Off	Flashing	The adapter requires intervention. Power is removed from the slot. An adapter can be removed or installed in the slot.
Off	Off	Power is removed from the slot. An adapter can be removed or installed in the slot.

Adapter Considerations

Before you continue with the adapter-installation procedure:

- Review the documentation that comes with the adapter and follow those instructions in addition to the instructions given in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that come with the adapter documentation.
- You can install a full-length ISA adapter in the ISA expansion slot.
- You can install full-length adapters in all PCI expansion slots.
- You can install hot-plug PCI adapters in PCI slots 1–4, if your operating system supports this feature. Non-hot-plug PCI adapters can also be installed in these slots.
- Your server supports 5.0V and universal PCI adapters; it does not support 3.3V adapters.
Note: A universal PCI adapter supports both 3.3V and 5.0V operation.
- Your server uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support sharing of PCI interrupts.
- PCI slots 5 and 6 are on the primary PCI bus and PCI slots 1–4 are on the secondary PCI bus. The system scans PCI slots 1 through 6 to assign system resources; then, the system starts (boots) the PCI devices in the following order: system board devices, slot 5, slot 6, slot 1, slot 2, slot 3, and finally slot 4. The performance of the PCI adapters depends on the configuration of adapters in your system.

Plug and Play Technology

Plug and Play is an ISA technology designed to make expanding your server easier. Plug and Play adapter support is built into the system board in your server. If your operating system supports Plug and Play technology, your server will automatically configure itself when you install an ISA Plug and Play device.

Note: PCI adapters are also often referred to as plug and play because they configure automatically.

Plug and Play Adapters

Plug and Play adapters are easier to install and set up because they are auto-configuring. This means that there are no jumpers or switches to set.

A Plug and Play adapter comes with built-in identification and configuration specifications (set in memory on the adapter) that provide installation information to the server during startup. This information is read by the input/output (I/O) bus and interpreted by the server BIOS. The BIOS routines automatically configure the adapter around the resources already in use by other devices.

Legacy Adapters

If an adapter that you install is not Plug and Play compatible, the Configuration/Setup utility program can help you to manually configure the adapter. Adapters that are not Plug and Play compatible are known as *legacy devices*.

Configuration/Setup Utility Program

Within the Configuration/Setup Utility program, the Plug and Play screen displays server resources that are typically required by adapters:

- I/O port address
- Memory address
- IRQ line
- DMA channel

From the Configuration/Setup Utility program screens, you can select available resources for the adapter that you are installing. Resources that are not currently being used by adapters that are already installed in your server are listed as **[ISA Legacy]**. The system resources that are in use by other devices are listed as **[Not Applicable]**.

Notes:

1. Refer to the documentation that comes with the adapter for information about required system resources. Then, make the appropriate jumper or switch settings on the adapter.
2. If you have a resource conflict, set the resources that are used by the ISA legacy adapter to **[ISA Legacy]**. This will manually configure the ISA legacy adapter to that specific server resource. Once Plug and Play detects that a resource is not available, it will skip that resource, and reconfigure to other available system resources. (See “Plug and Play” on page 25.)

Enabling Hot-Plug PCI Support

Your Netfinity 5500 has hot-plug PCI capability. In order to enable this feature, you must install the operating system services for hot-plug PCI support code. To obtain the operating system hot-plug PCI support code, access the IBM Web site at:

<http://www.pc.ibm.com/support>

Click on **IBM Server Support**. Click on **Netfinity 5500** from the **select family** field. Click on **Downloadable files**.

Attention: All hot-plug operations must be done through the operating system console (or supported user interface). Failure to do this can result in a system hang or serious damage to the adapter card or system unit.

Installing a Hot-Plug PCI Adapter

This section gives the procedure for installing a hot-plug PCI adapter. If you want to remove a hot-plug adapter, reverse the steps. If your operating system supports hot-replace PCI adapters, you can replace a failing hot-plug PCI adapter with a new adapter of the same type without turning off power to the server. If your operating system and adapter also support the hot-add feature, you can install a new adapter without turning off the power to the server.

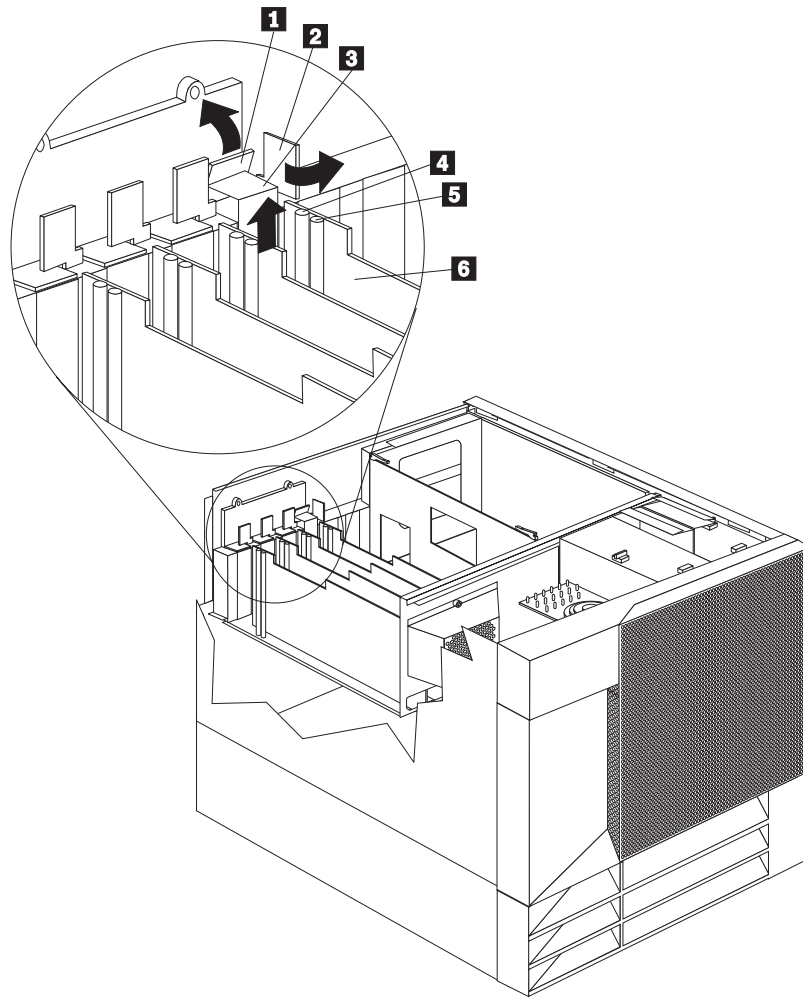
Note: You do not need to turn the server off to install or remove a hot-plug PCI adapter.

Before you begin:

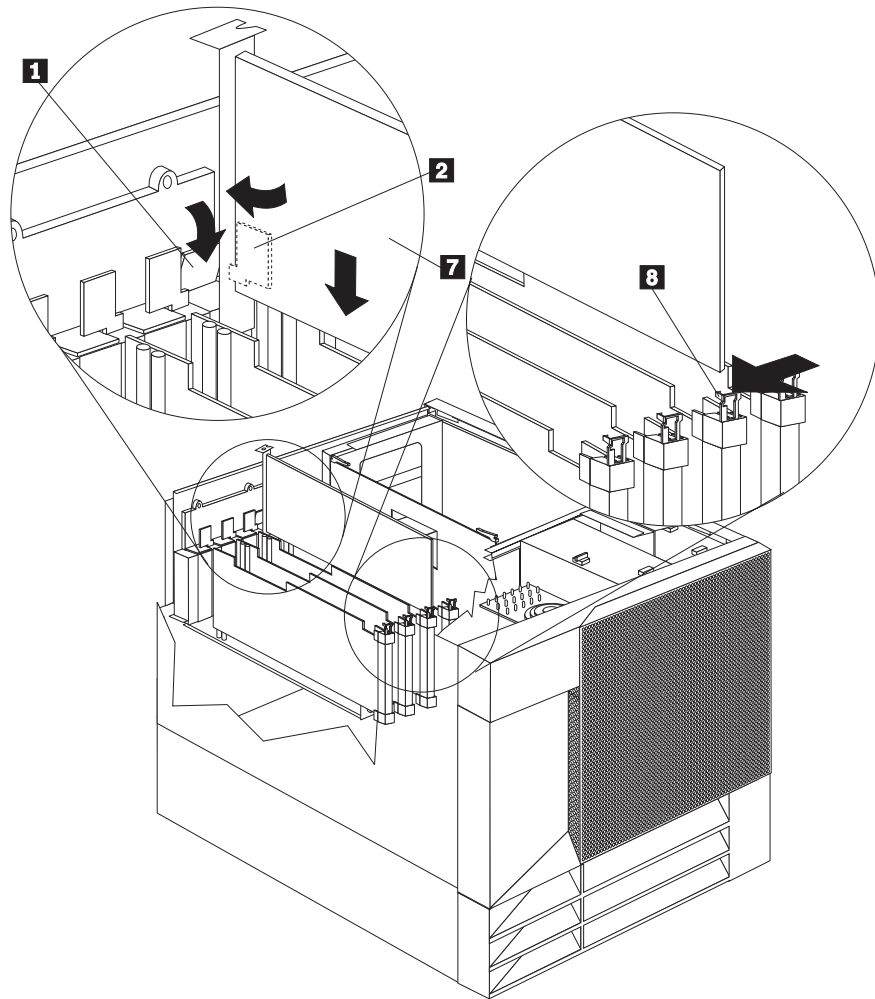
- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Read the documentation that comes with your adapter for any special requirements or restrictions.
- Read the documentation that comes with your operating system.

Attention: Do not remove a hot-plug adapter before performing the operating-system-defined procedure for disabling the hot-plug PCI slot that contains the adapter. Failure to do so might cause your system to lock up. Refer to your operating system documentation.

Refer to the following illustrations while you perform the steps in this procedure.



- 1** Tab
- 2** Adapter retention latch
- 3** Expansion-slot cover
- 4** Attention light
- 5** Power light
- 6** Plastic divider



- 1** Tab
- 2** Adapter retention latch
- 7** Adapter
- 8** Adapter retention latch

To install a hot-plug PCI adapter:

1. Remove the top cover (see “Removing the Top Cover” on page 40).
2. Determine which expansion slot you will use for the adapter.

Note: Only PCI slots 1–4 can be used for hot-plug PCI adapters.

3. Disable the selected PCI slot from your operating system. (Refer to the documentation that comes with your operating system for information about disabling a hot-plug PCI slot.) Disabling the PCI slot turns off the Power light for that PCI slot.

Attention: Make sure the Power light **5** for the hot-plug PCI slot is off before you continue to the next step.

4. Remove the expansion-slot cover **3** :
 - a. Rotate the adapter retention latch **2** counterclockwise.

- b. Lift the tab **1** covering the top of the expansion-slot cover **3** and then remove the expansion-slot cover from the server. Store it in a safe place for future use.

Attention: Expansion-slot covers must be installed on all vacant slots. This maintains the electromagnetic emissions characteristics of the system and ensures proper cooling of system components.

5. Refer to the documentation that comes with your adapter for any cabling instructions. It might be easier for you to route any cables before you install the adapter.

6. Remove the adapter from the static-protective package.

Attention: Avoid touching the components and gold-edge connectors on the adapter.

7. Place the adapter, component-side up, on a flat, static-protective surface.

8. Install the adapter **7**:

- a. Carefully grasp the adapter **7** by its top edge or upper corners, and align it with the expansion slot on the system board.
- b. Press the adapter *firmly* into the expansion slot.

Attention: When you install an adapter in the server, be sure that it is completely and correctly seated in the system-board connector. Incomplete insertion might cause damage to the system board or the adapter.

- c. Lower the tab **1** over the tab on the top corner of adapter. Rotate the adapter retention latch **2** clockwise until it snaps into place.

Note: The expansion slot also has an adapter retention latch **8** at the end of the slot toward the middle of the server. To remove the adapter, you need to push this adapter retention latch **8** away from the adapter until the top edge of the adapter is past the latch.

9. Connect any needed cables to the adapter.

10. Enable the PCI slot from your operating system. (Refer to the documentation that comes with your operating system for information about enabling a hot-plug PCI slot.) Make sure that the Power light **5** for the hot-plug PCI slot is on.

11. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 78.

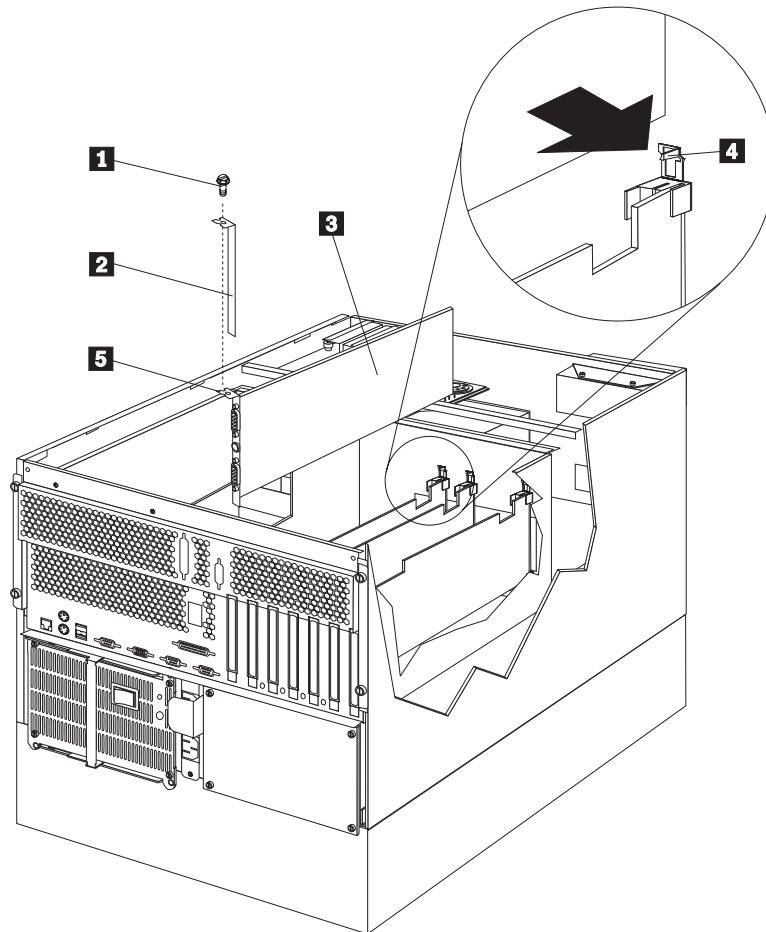
Installing a Non-Hot-Plug Adapter

This section gives the procedure for installing a non-hot-plug adapter. If you want to remove a non-hot-plug adapter, reverse the steps.

Before you begin:

- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Read the documentation that comes with your option.

Refer to the following illustration while you perform the steps in this procedure.



- 1** Expansion-slot cover screw
- 2** Expansion-slot cover
- 3** Adapter
- 4** Adapter retention latch
- 5** Retaining bracket on adapter

To install a non-hot-plug adapter:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 38); then remove the top cover (see “Removing the Top Cover” on page 40).
2. Determine which expansion slot you will use for the adapter.

Note: Check the instructions that come with the adapter for any requirements or restrictions.

3. Remove the expansion-slot cover **2**:
 - If you are installing an adapter in PCI slot 1, 2, 3, or 4:
 - a. See the illustration in “Installing a Hot-Plug PCI Adapter” on page 46 for operation of the adapter retention latch on the end of the slot near the rear of the server.
 - b. Rotate the adapter retention latch counterclockwise.
 - c. Lift the tab covering the top of the expansion-slot cover and remove the expansion-slot cover from the server. Store it in a safe place for future use.
 - If you are installing an adapter in PCI slot 5 or 6 or in the ISA slot:
 - a. Remove the screw **1** on the top of the expansion-slot cover **2**.
 - b. Slide the expansion-slot cover out of the server.
 - c. Store these items in a safe place for future use.

Attention: Expansion-slot covers must be installed on all vacant slots. This maintains the electromagnetic emissions characteristics of the system and ensures proper cooling of system components.

4. Refer to the documentation that comes with your adapter for any cabling instructions. It might be easier for you to route any cables before you install the adapter.
5. Remove the adapter from the static-protective package.

Attention: Avoid touching the components and gold-edge connectors on the adapter.

6. Place the adapter, component-side up, on a flat, static-protective surface.
7. Set any jumpers or switches as described by the adapter manufacturer.
8. Install the adapter:

- a. Carefully grasp the adapter **3** by its top edge or upper corners, and align it with the expansion slot on the system board.
- b. Press the adapter *firmly* into the expansion slot.

Attention: When you install an adapter in the server, be sure that it is completely and correctly seated in the system-board connector before you apply power. Incomplete insertion might cause damage to the system board or the adapter.

9. If you are installing an adapter in PCI slots 1, 2, 3, or 4:
 - a. Refer to the illustration in “Installing a Hot-Plug PCI Adapter” on page 46 for operation of the adapter retention latch on the end of the slot near the rear of the server.

Working with Adapters

- b. Lower the tab on the adapter guide over the tab on the top corner of the adapter. Rotate the adapter retention latch clockwise until it snaps into place.

If you are installing an adapter in PCI slots 5 or 6 or in the ISA slot:

- a. Align the rounded notch in the retaining bracket on the adapter **5** with the threaded hole in the expansion-slot frame. The retaining bracket on the adapter fits into the space that was occupied by the expansion-slot cover.
- b. Insert the expansion-slot screw **3** that you removed earlier into the threaded hole, and push the rounded notch up against the screw.
- c. Tighten the expansion-slot screw firmly.

Note: The expansion slot also has an adapter retention latch **4** at the end of the slot toward the middle of the server. To remove the adapter, you need to push this adapter retention latch **4** away from the adapter until the top edge of the adapter is past the latch.

10. Connect any needed cables to the adapter.
11. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 78.

Verifying Compatibility between Network Adapters and Device Drivers

Your server supports several types of network adapters. If you are having trouble with the installation or operation of a network adapter or network operating system, ensure that the network-adapter device driver supports dual processors. Refer to your network-adapter documentation for additional information about adapter compatibility requirements.

Installing a Microprocessor Kit

Your server comes with one microprocessor installed on the processor board. When you install an additional microprocessor kit, your server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load between the microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.

Before you begin:

- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Thoroughly review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server basic input/output system (BIOS). The latest level of BIOS for your server is available through the World Wide Web and the IBM Bulletin Board System (BBS). Refer to the “Getting Help Information” section of this *Server Library* for the appropriate World Wide Web addresses and bulletin-board telephone numbers.
- Obtain an SMP-capable operating system (optional). For a list of supported operating systems, see <http://www.pc.ibm.com/us/compat/> on the World Wide Web.

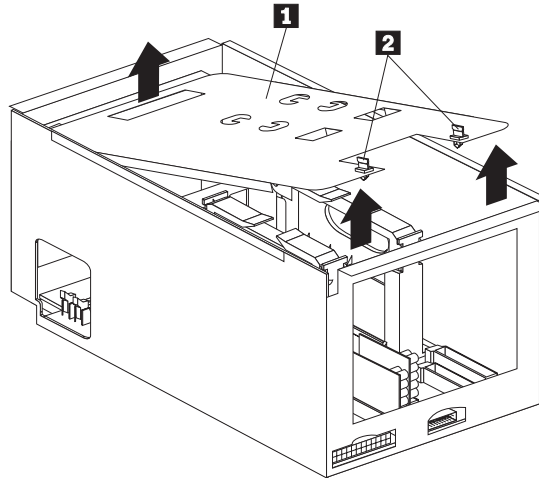
Notes:

1. The illustrations in this section might differ slightly from your hardware.
2. To order additional microprocessor options, contact your IBM reseller or IBM marketing representative.
3. To avoid damage and ensure proper server operation when you install a new or an additional microprocessor, use microprocessors that have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical.
4. If you replace the microprocessor in your server with a microprocessor with a different speed, be sure to set the Microprocessor Core Frequency Selection switch correctly. See “Processor Board Jumpers” on page 168 for more information.
5. The microprocessor that is installed in the primary microprocessor connector is CPU or processor 1. If a microprocessor is installed in the secondary microprocessor connector, it is CPU or processor 2. If the server has only one microprocessor installed, that microprocessor is installed in the primary microprocessor connector and is the boot processor. If the server has two microprocessors installed, the microprocessor in the secondary microprocessor connector is the boot processor and the microprocessor in the primary microprocessor connector is the application processor.

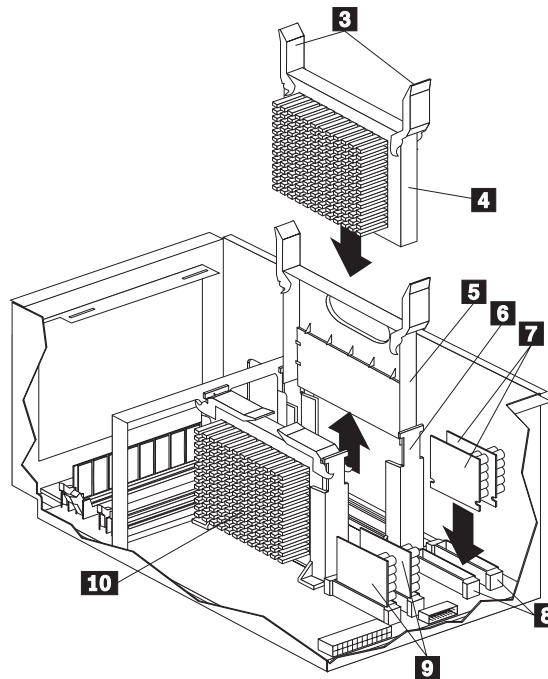
Installing a Microprocessor Kit

Refer to the following illustrations of the processor housing and processor board while you perform the steps in this section.

Note: The illustrations show only the processor housing and processor board for simplicity; you do not need to remove the processor housing and processor board to install a microprocessor kit.



- 1** Processor housing cover
- 2** Quarter-turn fastener



- 3** Latches
- 4** Secondary microprocessor (CPU or processor 2)
- 5** Terminator card
- 6** Secondary microprocessor connector
- 7** Voltage regulator modules (VRMs) for secondary microprocessor
- 8** VRM connectors for secondary microprocessor
- 9** VRMs for primary microprocessor
- 10** Primary microprocessor (CPU or processor 1)

To install an additional microprocessor kit:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 38); then remove the top cover (see “Removing the Top Cover” on page 40).
2. Turn the two quarter-turn fasteners **2** on the processor housing cover **1** one quarter turn and remove the cover from the processor housing.
3. Remove the terminator card **5** from the secondary microprocessor connector **6**. You do not need the terminator card when you have a second microprocessor installed. You can store it in a safe place in the static-protective package that your new microprocessor is shipped in.
4. Install the microprocessor:
 - a. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.
 - b. Hold the microprocessor **4** by the open latches **3**, and center the microprocessor over the secondary processor connector **6**.
Attention: Make sure the microprocessor is oriented and aligned correctly before you try to close the latches.
 - c. Carefully close the latches **3** to seat the microprocessor in the connector.
5. Install the two voltage regulator modules (VRMs) **7** included in the microprocessor kit.
 - a. Center the first VRM over the connector **8**. Make sure that the VRM is oriented and aligned correctly; then, press the VRM into the connector. The latches should snap into the locked positions.
 - b. Repeat the preceding step for the second VRM.**Note:** If you remove the secondary microprocessor at some time in the future, remember to install the terminator card in the secondary microprocessor connector and to remove the VRMs for the secondary microprocessor.
6. Install the processor housing cover **1** and turn the two quarter-turn fasteners **2** one quarter turn to secure the cover.
7. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 78.

Installing Memory-Module Kits

Adding memory to your server is an easy way to make programs run faster. You can increase the amount of memory in your server by installing options called *memory-module kits*. Each kit contains one industry-standard, dual-inline memory module (DIMM). Your server uses a noninterleaved memory configuration.

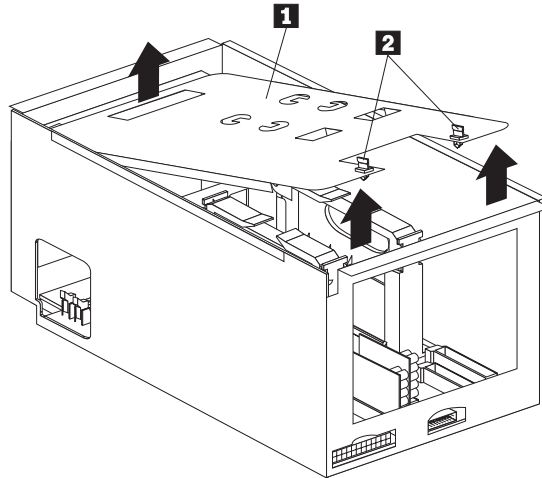
Your server comes with a memory-module installed on the processor board in connector J1, the connector nearest the rear of the server. Install additional memory modules in connectors J2, J3, and J4, in that order. (See the illustration on the next page for memory connector locations.) If you mix DIMM sizes, install the largest sized DIMM in connector J1, the next largest sized DIMM in connector J2, and so forth.

Notes:

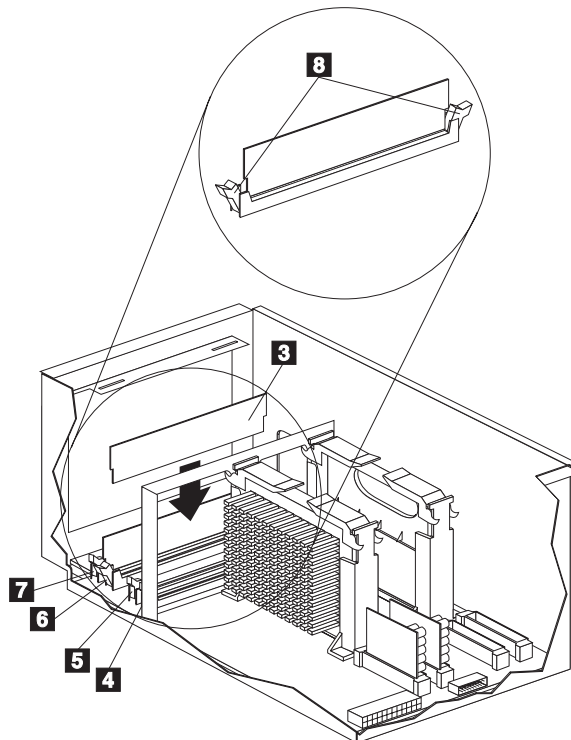
1. The memory-module kit sizes available for your server are 128 MB, 256 MB, and 512 MB. Your server supports a minimum of 128 MB and a maximum of 2 GB of system memory.
2. Install only 3.3 V, 168-pin, 8-byte, registered DIMMs. Only 100 MHz, 72-bit, registered, synchronous, error correcting code (ECC), x4 configuration DIMM memory is supported for the 128 MB, 256 MB, and 512 MB DIMMs.
3. Installing or removing memory modules changes the configuration information in the server. Therefore, after installing or removing a DIMM, you must save the new configuration information in the Configuration/Setup program. When you restart the server, the system displays a message indicating that the memory configuration has changed. Start the Configuration/Setup program and select **Save Settings**. See "Using the Configuration/Setup Utility Program Main Menu" on page 17 for more information.

Refer to the following illustrations of the processor housing and the processor board while you perform the steps in this procedure.

Note: The illustrations show only the processor housing and processor board for simplicity; you do not need to remove the processor housing and processor board to install a memory module.



- 1** Processor housing cover
- 2** Quarter-turn fastener



- 3** DIMM
- 4** Memory socket 1 (J4)
- 5** Memory socket 2 (J3)
- 6** Memory socket 3 (J2)
- 7** Memory socket 4 (J1)
- 8** Retaining clips

Installing Memory-Module Kits

Before you begin:

- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Read the documentation that comes with your option.

To install a memory module:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 38); then remove the top cover (see “Removing the Top Cover” on page 40).
2. Turn the two quarter-turn fasteners **2** on the processor housing cover **1** one quarter turn and remove the cover from the processor housing.
3. Locate the memory-module connectors on the processor board. Determine the memory-module connector into which you will install the memory module. (See the notes at the beginning of this procedure.)
4. Touch the static-protective package containing the memory-module kit to any unpainted metal surface on the server. Then, remove the memory module from the package.

Note: To avoid breaking the retaining clips or damaging the memory-module connectors, handle the clips gently.

5. Install the memory module:
 - a. Turn the memory module (DIMM) **3** so that the pins align correctly with the connector **6**.
 - b. Insert the DIMM into the connector by pressing on one edge of the DIMM and then on the other edge of the DIMM. Be sure to press straight into the connector. The retaining clips **8** should snap into the closed positions.
 - c. Make sure the retaining clips **8** are in the closed position. If a gap exists between the DIMM and the retaining clips, the DIMM has not been properly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.
 - d. Repeat these steps for each memory module that you install.
6. Install the processor housing cover **1** and turn the two quarter-turn fasteners **2** one quarter turn to secure the cover.
7. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 78.

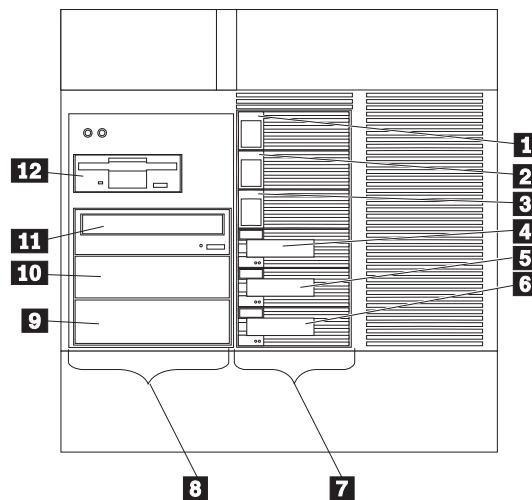
Installing Internal Drives

Different types of drives allow your system to read multiple types of media and store more data. Several types of drives are available, such as:

- Diskette
- Hard disk
- CD-ROM
- Tape

Internal Drive Bays

Internal drives are installed in *bays*. Your server comes with one 3.5-inch, 1.44 MB diskette drive and one CD-ROM drive.



- 1** Bay 1
- 2** Bay 2
- 3** Bay 3
- 4** Bay 4
- 5** Bay 5
- 6** Bay 6
- 7** Hot-swap bays
- 8** Removable-media bays
- 9** Bay B
- 10** Bay A
- 11** CD-ROM drive bay
- 12** Diskette drive bay

Your server contains hardware that lets you replace a failed hard disk drive without turning off the server. Therefore, you have the advantage of continuing to operate your system while a hard disk drive is removed or installed. These drives are known as *hot-swappable* drives. They are also referred to as hot-swap drives.

Each hot-swap drive bay has two indicator lights on the front of the server (see "Information LED Panel" on page 8). If the amber Hard Disk Status light for a drive is lit continuously, that individual drive is faulty and needs to be replaced. When the Hard Disk Status light indicates a drive fault, you can replace a hot-swap drive without turning off the server.

Installing Internal Drives

Each hot-swap drive that you plan to install must have a hot-swap-drive tray attached. The drive must have a single connector attachment (SCA) connector. Hot-swap-drive trays come with the hot-swap drives.

- Your server comes with a preinstalled 3.5-inch, 1.44 MB diskette drive and a preinstalled IDE CD-ROM drive.
- Bays A and B come without a device installed. These bays are for 5.25-inch, half-high, removable-media drives, such as tape backup drives. Bays A and B can be combined into a single full-high bay.
- The Netfinity 5500 M10 supports only one diskette drive.
- Your server does not support hard disk drives in bays A and B because of cooling considerations.

Note: The server's EMI integrity and cooling are both protected by having the left front bays (removable-media bays) covered or occupied. When you install a drive, save the filler panel from the bay, in case you later remove the drive and do not replace it with another.

- If you are installing a device with a 50-pin connector in one of the removable-media bays (bays A–B), you need a 68-pin to 50-pin converter. To order the converter, contact your IBM reseller or IBM marketing representative.
- Your server supports six slim (1-inch) or three half-high (1.6-inch), 3.5-inch hot-swap hard disk drives in the hot-swap bays.
- The hot-swap bays connect to a SCSI *backplane*. This backplane is the printed circuit board behind the bay. The backplane supports up to six hard disk drives.
- The diskette drive uses 1 MB and 2 MB diskettes. For optimum use, format 1 MB diskettes to 720 KB and format 2 MB diskettes to 1.44 MB.

SCSI Drives

Some drives have a special design called *small computer system interface*, or SCSI. This design allows you to attach multiple drives to a single SCSI channel.

Notes:

1. Any information about SCSI drives also applies to other SCSI devices, such as tape drives.
2. If you plan to install both internal and external SCSI devices, you must follow the instructions in "Connecting External Options" on page 80, in addition to the instructions in this section.

A 16-bit (wide) SCSI cable connects the hot-swap backplane to one channel of the integrated RAID SCSI controller on the system board. An additional 16-bit SCSI cable with connectors for optional devices in bays A and B connects to the second channel of the RAID controller. This cable has a terminator at the other end and is folded and restrained with a cable clamp to the bottom of your server between the open bays and the power supply area.

SCSI IDs

Each SCSI device that is connected to an individual channel of the RAID controller needs a unique identification (ID) so that the controller can identify the devices and ensure that different devices do not attempt to transfer data at the same time. (The two channels of the integrated RAID controller operate independently.) If you need to set IDs for SCSI devices, refer to the instructions that come with those devices.

Your server automatically sets SCSI IDs for hot-swap hard disk drives, according to the jumper settings on the SCSI backplanes. The server uses the hard disk drive SCSI IDs to send status information to the indicator lights above each hot-swap bay.

The SCSI backplane in the server supports up to six hot-swap bays. Table 1 shows the default SCSI IDs that the backplane assigns for hot-swap hard disk drives.

Bay	1	2	3	4	5	6
ID	0	1	2	3	4	5

Note: The default SCSI ID for the SCSI backplane is 15. The default SCSI ID for each channel of the RAID controller is 7.

You can change the default ID addresses of the drives by changing the jumper settings on the SCSI backplane. See “SCSI Backplane Option Jumpers” on page 169. A simplified layout of the SCSI backplane is shown in “SCSI Backplane Component Locations” on page 169.

The processing sequence for SCSI devices is set through the ServeRAID Configuration Utility program. The sequence proceeds from the lowest SCSI ID to the highest (0 to 6, then 8 to 15).

Termination (Internal SCSI Devices)

SCSI buses must be terminated at each end. The ends of the SCSI buses in your server are already terminated.

All the hot-swap drives in your server have automatic termination and the RAID controller provides termination at the other end of the SCSI bus.

If you install SCSI devices in the removable-media bays (bays A and B), you must disable the termination on the devices; the RAID controller is already terminated and the SCSI cable for devices in the removable-media drive bays has a terminator at the other end. For example, when you install a SCSI device in a removable-media drive bay (bay A or B), set its termination to Disable, because the SCSI cable is already terminated at the end.

Refer to the information that come with the SCSI device for instructions about setting device jumpers or switches that control termination.

Preinstallation Steps (All Bays)

Before you install drives in your server, verify that you have all the cables and any other equipment specified in the documentation that comes with the internal drive. You might also need to perform certain preinstallation activities. Some of the steps are required only during the initial installation of an option.

Before you begin:

- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Read the documentation that comes with the internal drive.

1. Choose the bay in which you want to install the drive.
2. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive.
3. To install the drive, go to “Installing a 5.25-inch Removable-Media Drive” or “Installing a Drive in a Hot-Swap Bay” on page 65.

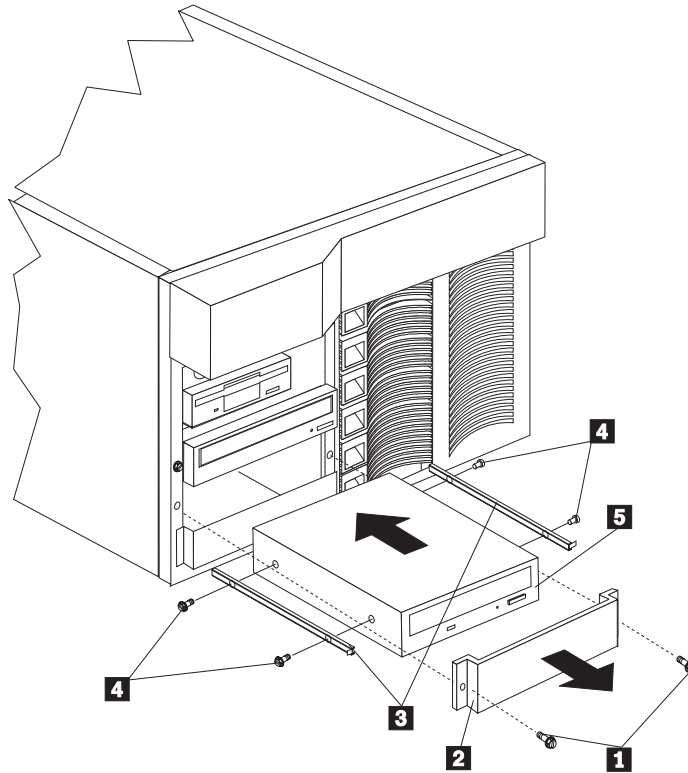
Installing a 5.25-inch Removable-Media Drive

Before you begin:

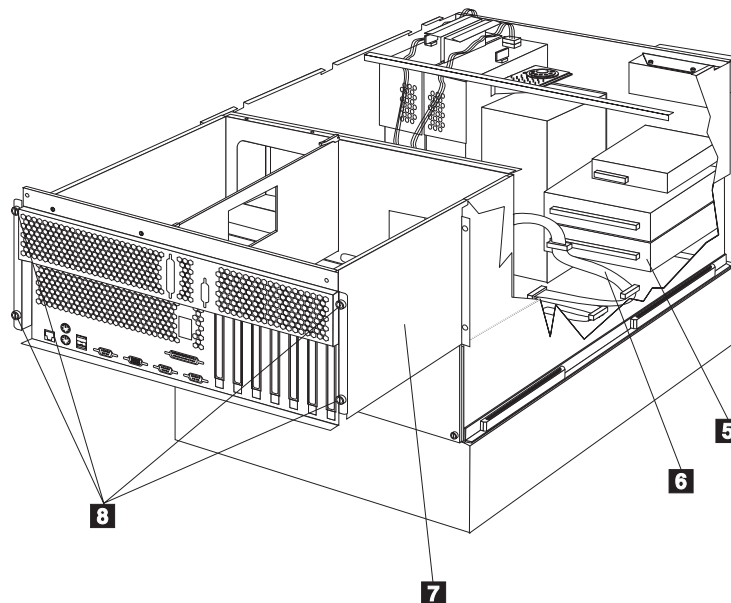
- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Read the documentation that comes with your drive.
- Prepare the drive for installation (see “Preinstallation Steps (All Bays)”).

Note: The server's EMI integrity and cooling are both protected by having the left front bays covered or occupied. When you install a drive, save the filler panel from the bay, in case you later remove the drive and do not replace it with another.

Refer to the following illustrations while you perform the steps in this procedure.



- 1** Screws for filler panel
- 2** Filler panel with EMI shield
- 3** Slide rails
- 4** Screws for slide rails
- 5** Drive



- 5** Drive
- 6** SCSI cable for the removable-media drive bays
- 7** Shuttle
- 8** Thumbscrews

To install a removable-media drive in one of the left front bays:

1. Turn off the server and peripheral devices (see “Preparing to Install Options” on page 38) and remove the top cover (see “Removing the Top Cover” on page 40).
 2. Remove the NetBAY3 bezel and the media-bay trim bezel. (See “Removing the Server Door and Trim Bezels on the Tower Model” on page 41.)
 3. Remove the screws **1** and filler panel **2** from the bay opening. Save screws for later use in this procedure. You do not need the filler panel when you have a drive installed in the bay.
 4. Touch the static-protective bag containing the drive to any unpainted metal surface on the server; then, remove the drive from the bag and place it on a static-protective surface.
 5. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
 6. Use screws **4** of the appropriate size and length to attach a slide rail **3** to each side of the drive **5**.
- Note:** The slide rails and screws are included in the drive accessory kit that comes with your server.
7. Place the drive so that the slide rails engage in the bay guide rails. Push the drive into the bay and attach it with the two screws **1** from the filler panel.
 8. Loosen the four thumbscrews **8** on the shuttle at the back of the server.
 9. Pull the shuttle **7** toward the back of the server.
 10. Connect one of the connectors on the SCSI cable for the removable-media drive bays **6** to the back of the drive **5**.
 11. Connect a power cable to the back of the drive. Power cables for removable-media drives come installed in your server. The connectors are keyed and can be inserted only one way.
 12. If you are installing another 5.25-inch drive, do so at this time. Otherwise, continue with the next step.
 13. Push the shuttle **7** toward the front of the server and tighten the four thumbscrews **8** at the back of the shuttle.
 14. Install the media-bay trim bezel and the NetBAY3 bezel that you removed earlier. (See “Installing the Trim Bezels and Server Door” on page 79.)
 15. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 78.

Installing a Drive in a Hot-Swap Bay

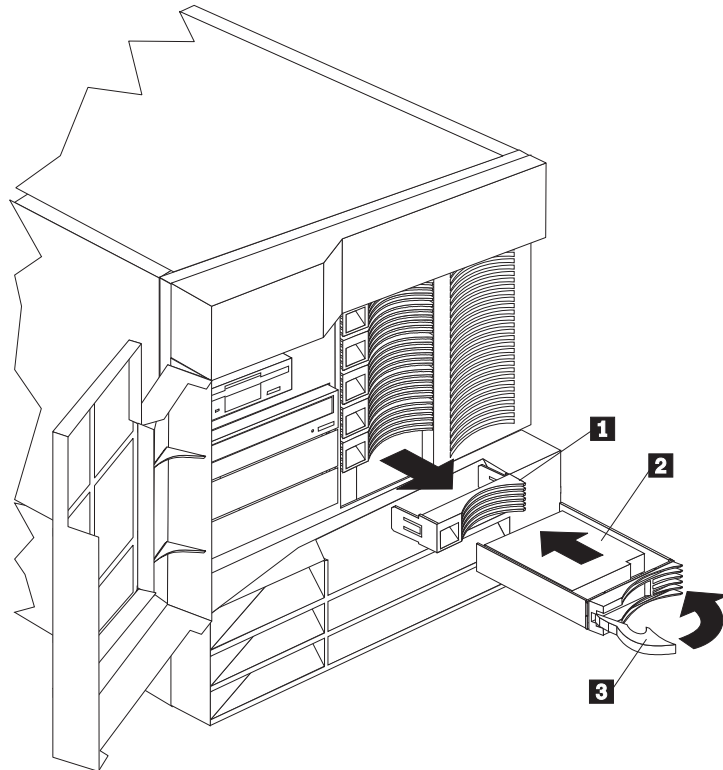
The bays on the right front of the server support hot-swap drives only.

Note: You do not have to turn off the server to install hot-swap drives in these bays. However, you must turn off the server when performing any steps that involve installing or removing cables.

Before you begin:

- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Read the documentation that comes with your drive.
- Reviewed the “ServeRAID Information” section of this *Server Library* for information about the RAID controller and disk-array configuration.
- Prepare the drive for installation (see “Preinstallation Steps (All Bays)” on page 62).

Refer to the following illustration while you perform the steps in this procedure.



- 1** Filler panel
- 2** Hot-swap hard disk drive
- 3** Drive tray handle (open position)

To install a drive in a hot-swap bay:

1. Unlock and open the server door (see “Preparing to Install Options” on page 38).

Attention: To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed for each bay.

2. Remove the filler panel **1** from one of the empty hot-swap bays by inserting your finger into the depression at the left side of the filler panel and pulling it away from the server.
3. Install the hard disk drive **2** in the hot-swap bay:
 - a. Ensure the tray handle **3** is open (that is, perpendicular to the drive).
 - b. Align the drive/tray assembly so that it engages the guide rails in the bay.
 - c. Gently push the drive assembly into the bay until the drive connects to the backplane.
 - d. Push the tray handle to the right until it locks.
4. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly. See “Identifying Problems Using Status LEDs” on page 141 for details.
5. Close and lock the server door.

Note: Because your server has a RAID controller, you must reconfigure your disk arrays after installing hard disk drives. Record the configuration information in the appropriate tables in “Installed Device Records” on page 154.

Replacing a Drive in a Hot-Swap Bay

You do not have to turn off the server to remove a drive from the hot-swap bays.

Attention:

1. Before you remove from a hot-swap bay a hard disk drive that is not defective, back up all important data.
2. To avoid damage to a hard disk drive, DO NOT remove the drive from the hot-swap bay until it has had time to spin down (approximately 30 seconds). Handle the drive carefully.

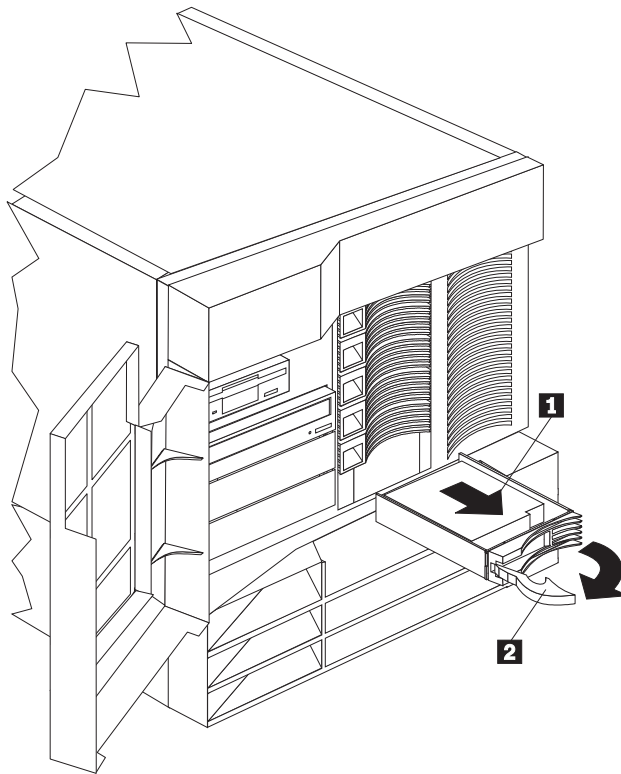
Before you attempt to remove a defective drive, thoroughly review the information that appears on your server screen to determine the location of the failed drive. The “ServeRAID Information” section of this *Server Library* explains the status codes that your server uses to indicate a defective drive. Also, if the amber Hard Disk Status light for a drive is lit continuously, that individual drive is faulty and needs to be replaced. If you remove a hard disk drive that is not defective from an array that already has a defective hard disk drive, all data in the array will be lost. This situation is especially relevant if you assigned RAID level 1 or 5 to the logical drives in your disk array. However, the RAID controller can rebuild the data that you need, provided that certain conditions are met. Refer to the “ServeRAID Information” section of this *Server Library* for further details.

Before you begin:

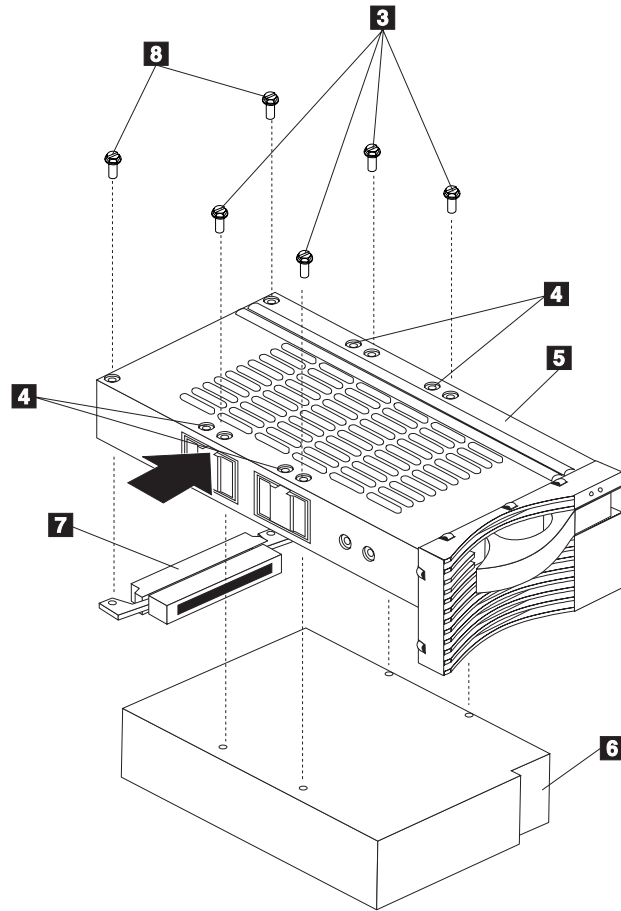
- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Read the documentation that comes with your drive.
- Review the “ServeRAID Information” section of this *Server Library* for information about the ServeRAID controller and disk-array configuration.
- Prepare the drive for installation (see “Preinstallation Steps (All Bays)” on page 62).

Installing Internal Drives

Refer to the following illustrations while you perform the steps in this procedure.



- 1** Hard disk drive
- 2** Drive tray handle (open position)



- 3** Screws for half-high drive
- 4** Screw holes for slim-high drive
- 5** Drive tray
- 6** Drive
- 7** Connector for half-high drive
- 8** Screws for half-high drive connector

To replace a drive in a hot-swap bay:

1. Unlock and open the server door (see “Preparing to Install Options” on page 38).

Attention: To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed for each bay.

2. Remove the defective hard disk drive **1** by placing the handle **2** on the drive to the open position (perpendicular to the drive) and pulling the hot-swap tray from the bay.
3. Remove the hard disk drive from the tray:
 - a. If the drive is a half-high drive, remove the two screws **8** that hold the connector **7** to the hot-swap tray **5**; then, remove the connector from the back of the drive.
 - b. Remove the four screws **3** (for a half-high drive) or **4** (for a slim-high drive) that attach the drive **6** to the hot-swap tray, and remove the drive from the tray.
4. Place the new hard disk drive on the hot-swap tray and attach the drive to the tray using four screws, as follows:
 - a. If the drive is a half-high drive, use screws **3** to attach the drive to the tray. If the drive is a slim-high drive, use screws in holes **4** to attach the drive to the tray.
 - b. As you tighten each screw, press on the metal spring nearest the screw at the point indicated by the arrow on the illustration of the drive tray.
 - c. If the drive is a half-high drive, plug the connector **7** to the back of the drive and secure the connector to the drive with screws **8**. (Slim-high drives do not need the connector.)
5. Install the hard disk drive in the hot-swap bay:
 - a. Ensure the tray handle is open (that is, perpendicular to the drive).
 - b. Align the drive/tray assembly so that it engages the guide rails in the bay.
 - c. Push the drive assembly into the bay until the drive connects to the backplane.
 - d. Push the tray handle to the right until it locks.
6. Check the hard disk drive status indicators to verify that the hard disk drive is installed properly. See “Identifying Problems Using Status LEDs” on page 141 for details.
7. Close and lock the server door.

Installing a Hot-Swap Power Supply

Your server comes with one power supply. You can add a second power supply to provide redundant power. After you install a power supply, check the power-supply status indicators to verify that the power supply is operating properly. See “Power Supplies” on page 11 for details.

9



CAUTION:

Never remove the cover on a power supply or any part (power backplane and AC box) that has the following label attached.

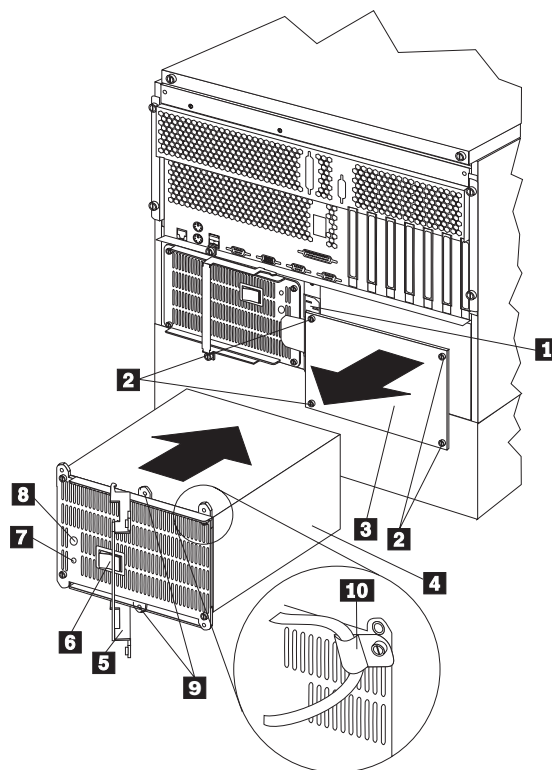


Hazardous voltage, current, and energy levels are present inside the power supplies, power backplane, and AC box. There are no serviceable parts inside the power supplies, power backplane, or AC box. If you suspect a problem with one of these parts, contact an IBM service technician.

Installing a Hot-Swap Power Supply

Refer to the following illustration while performing the steps in this procedure.

Note: You do not need to turn off the power to the server to install hot-swap power supplies.



- 1** Power cord connector for power supply 2
- 2** Screws
- 3** Filler panel
- 4** Power supply
- 5** Handle
- 6** Power switch on power supply
- 7** AC Power light
- 8** DC Power light
- 9** Holes for shipping screws
- 10** Power-cord strain-relief bracket

To add a power supply:

9



CAUTION:

Never remove the cover on a power supply or any part (power backplane and AC box) that has the following label attached.



Hazardous voltage, current, and energy levels are present inside the power supplies, power backplane, and AC box. There are no serviceable parts inside the power supplies, power backplane, or AC box. If you suspect a problem with one of these parts, contact an IBM service technician.

Note: It is not necessary to turn the Power switch on the power supply off when you are installing a power supply.

1. Remove the filler panel **3** :
 - a. Remove the four screws **2** from the filler panel.
 - b. Remove the filler panel **3** from the power-supply bay and save it and the four screws you removed for future use.

Note: During normal operation, each power-supply bay should have either a power supply or filler panel installed for proper cooling.
2. Place the handle **5** on the power supply in the open position, and slide the power supply into the chassis.
3. Gently close the handle **5** on the power supply to seat the power supply in the bay.
4. Plug the power cord for the added power supply into power cord connector **1**.

7



CAUTION:

When the power-cord strain-relief bracket option is installed on the power cord, the server must be plugged to a power source that is easily accessible.

5. Install a power-cord strain-relief bracket **10** , if desired.
6. Plug the power cord into a properly grounded electrical outlet.
7. Make sure the Power switch **6** on the power supply is in the On position.
8. Verify that the DC Power light **8** and AC Power light **7** on the power supply are lit, indicating that the power supply is operating correctly.

Removing a Hot-Swap Power Supply

Your server comes with one power supply. You can add a second power supply to provide redundant power. Each power supply has two status indicators; see “Power Supplies” on page 11 for information about the status indicators.

Attention: You cannot hot swap a power supply if your server has only one power supply installed.

Refer to the illustration in “Installing a Hot-Swap Power Supply” on page 71 while you perform the steps in this procedure.

To remove a hot-swap power supply:

9



CAUTION:

Never remove the cover on a power supply or any part (power backplane and AC box) that has the following label attached.



Hazardous voltage, current, and energy levels are present inside the power supplies, power backplane, and AC box. There are no serviceable parts inside the power supplies, power backplane, or AC box. If you suspect a problem with one of these parts, contact an IBM service technician.

1. If your server has only one power supply installed, turn off the server and peripheral devices (see “Preparing to Install Options” on page 38); otherwise, go to the next step.

Attention: Before removing a functional power supply, set the Power switch on the power supply to the Off position.

2. Set the Power switch on the power supply that you are removing to the Off position.
3. Remove the power supply **4** :
 - a. Remove the shipping screws **9** from the power supply, if they have not already been removed.

Notes:

- 1) You do not need to replace the shipping screws.
 - 2) Your server might use a different handle and a blue thumbscrew instead of the handle and shipping screws shown in the illustration.
- b. Remove the power-cord strain-relief bracket **10** , if one is installed.
 - c. Grasp the handle **5** on the power supply and pull the handle toward the center of the server; then, slide the power supply out of the chassis.

Note: During normal operation, each power-supply bay should have either a power supply or filler panel installed for proper cooling.

4. If you are not installing a replacement power supply:

- a. Disconnect the power cord for the power supply that you replaced.
- b. Install a power-supply filler panel; then go to step 5.

If you are replacing the power supply:

- a. Place the handle **5** on the power supply in the open position, and slide the power supply into the chassis.
- b. Gently close the handle **5** on the power supply to seat the power supply in the bay.
- c. Make sure the Power switch **6** on the power supply is in the On position.
- d. Verify that the AC Power light **7** and DC Power light **8** are lit, indicating that the power supply is operating correctly.

7



CAUTION:

When the power-cord strain-relief bracket option is installed on the power cord, the server must be plugged to a power source that is easily accessible.

- e. Install a power-cord strain-relief bracket **10**, if desired.
5. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 78.

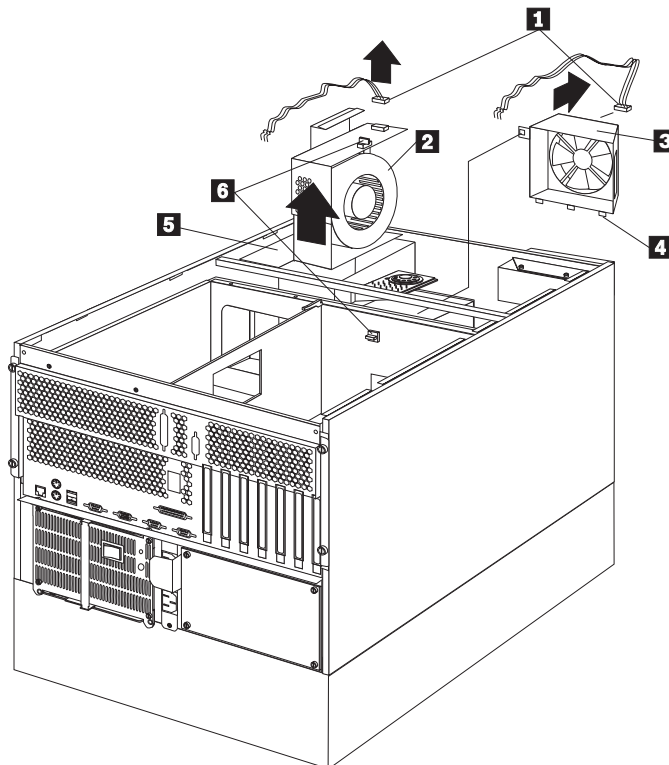
Replacing a Hot-Swap Fan Assembly

Your server comes with three hot-swap fan assemblies.

Attention: Replace a fan that has failed within 48 hours to help ensure proper cooling.

Note: You do not need to turn off the power to the server to replace a hot-swap fan assembly.

The following illustration shows the replacement of a hot-swap fan assembly. Refer to this illustration while performing the steps in this procedure.



- 1** Fan power cables
- 2** Hot-swap fan assembly 2
- 3** Hot-swap fan assembly 1
- 4** Tabs
- 5** Hot-swap fan assembly 3
- 6** Quarter-turn fasteners

To replace a hot-swap fan assembly:

11



CAUTION:

The power cable to the fan should be disconnected whenever the fan assembly is not installed in the server; otherwise, the fan might start turning while you are holding it and the fan blades could injure your fingers.

1. Remove the top cover (see “Removing the Top Cover” on page 40).
Attention: To ensure proper system cooling, do not remove the top cover for more than 30 minutes during this procedure.
2. Determine which fan assembly (**2** , **3** , or **5**) needs to be replaced by checking the fan LEDs on the diagnostic panel (see “Diagnostics Panel LEDs” on page 143).
3. Disconnect the fan power cable **1** from the fan assembly that you are replacing.
4. Turn the quarter-turn fastener **6** for the fan assembly one quarter turn and remove the fan assembly from the server.
5. Slide the replacement fan assembly into the server. (If you are replacing fan assembly 1 **3** , make sure the tabs **4** fit into the slots at the bottom of the fan opening in the server.)
6. When you have the fan assembly correctly seated, turn the quarter-turn fastener **6** one quarter turn to secure the fan in the server.
7. Connect the fan power cable **1** to the power connector.
8. Replace the top cover (see “Installing the Top Cover” on page 78).

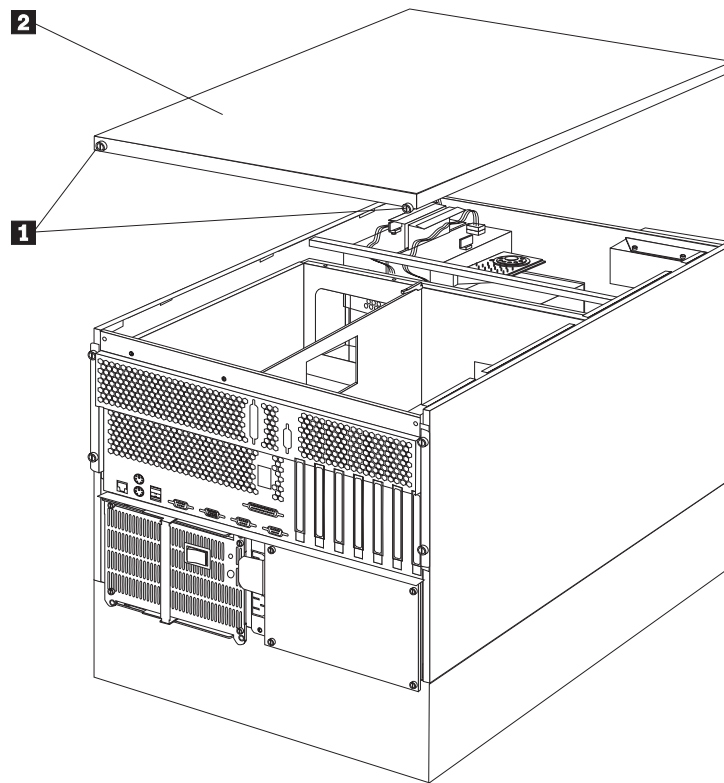
Completing the Installation

To complete your installation, you must reinstall the side and top covers, reconnect all the cables that you disconnected in “Preparing to Install Options” on page 38, and, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

Attention: For correct cooling and airflow, install the top cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the top cover removed might damage server components.

Installing the Top Cover

Refer to the following illustration while you perform the steps in this procedure.



- 1** Thumbscrews
- 2** Top cover

To install the server top cover:

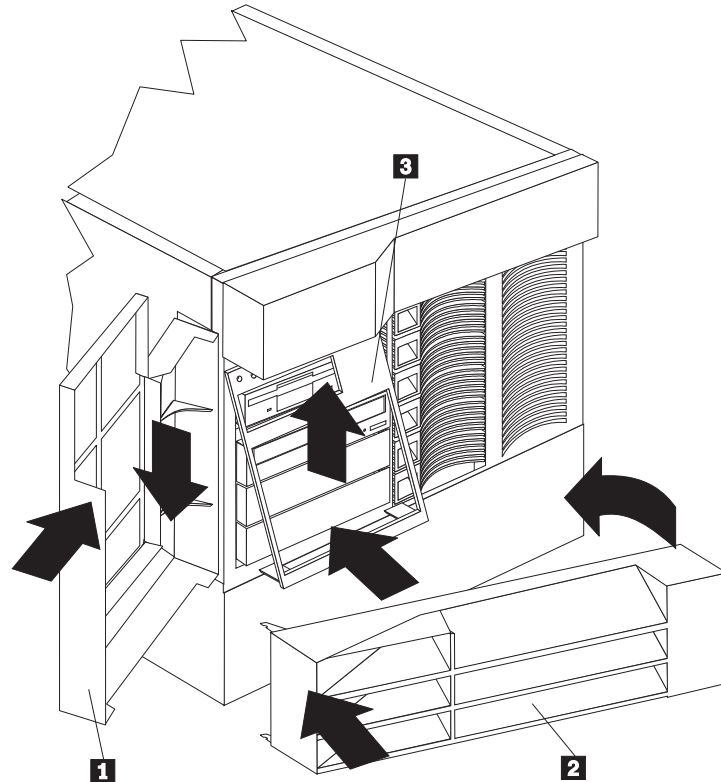
1. Before installing a cover, check that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Lower the cover **2** with the rear edge of the cover about 25 mm (1 inch) back from the rear edge of the server.
3. Slide the cover forward.
4. Tighten the two thumbscrews **1** on the back edge of the cover.
5. If you disconnected any cables from the back of the server, reconnect the cables; then, plug the power cords into properly grounded electrical outlets.

Notes:

- a. If you are in the United Kingdom and have a modem or fax machine attached to your server, reconnect the telephone line *after* you plug in the power cords.
- b. If necessary, see “Input/Output Connectors and Expansion Slots” on page 9 for connector locations.

Installing the Trim Bezels and Server Door

Refer to the following illustration while you perform the steps in this procedure.



- 1** Server door
- 2** NetBAY3 bezel
- 3** Media-bay trim bezel

To install the media-bay trim bezel:

1. Insert the two tabs on the top of the media-bay trim bezel **3** in the matching holes on the server chassis.
2. Push the bottom of the bezel toward the server until the two tabs at the bottom of the bezel snap into place.

To install the NetBAY3 bezel:

1. Hook the tabs on the left side of the NetBAY3 bezel **2** around the posts on the NetBAY3.
2. Gently push the right side of the bezel toward the server until the bezel snaps into place.
3. Lock the NetBAY3 bezel.

Connecting External Options

To install the server front door:

1. Align the pins on the server door **1** with the hinges on the server and slide the door down.
2. Close and lock the door.

Updating Device Records and Reconfiguring the Server

When you start your server for the first time after you add or remove an internal option or an external SCSI device, you might see a message telling you that the configuration has changed.

Some options have device drivers that you need to install. Refer to the documentation that comes with your option for information about installing any required device drivers.

If you have installed a new microprocessor, you might want to upgrade your operating system. Refer to “ServerGuide and Netfinity Manager Information” section of this *Server Library*. If you have installed or removed hard disk drives, refer to the “ServeRAID Information” section of this *Server Library* for information about reconfiguring your disk arrays.

Run the Configuration/Setup Utility program to save the new configuration information. See Chapter 3, “Configuring Your Server.”

Record your updated device and configuration information in the appropriate tables in “Installed Device Records” on page 154.

Connecting External Options

Before you begin:

- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Read the documentation that comes with your options.

Connecting External SCSI Devices

You can attach a SCSI storage expansion enclosure to your server.

Cabling Requirements

The ServeRAID controller in your server has one channel that can be used to attach external devices.

If you plan to install external SCSI devices, you must order additional SCSI cables. The cables must have the proper connectors for the ServeRAID controller and the external devices. To select and order the correct cables for use with external devices, contact your IBM reseller or IBM marketing representative.

Refer to the information provided with your adapter to determine the number of internal and external connectors, channels, and SCSI devices that the adapter supports.

For information about the maximum length of SCSI cable between the terminated ends of the cable, see ANSI SCSI Standards:

- X3.131-1986 (SCSI)
- X3.131-1994 (SCSI-2)
- X3T10/1071D

Adhering to these standards ensures that your server operates properly.

Setting SCSI IDs for External Devices

Each SCSI device that is connected to a SCSI controller must have a unique SCSI ID, so that the SCSI controller can identify the devices and ensure that different devices do not attempt to transfer data at the same time. SCSI devices that are connected to different SCSI controllers can have duplicate SCSI IDs. See “SCSI IDs” on page 61 and refer to the instructions that come with the SCSI devices for more information about setting a SCSI ID.

Installation Procedure

To attach an external device:

1. Turn off the server and all attached devices.
2. Follow the instructions that come with the option to prepare it for installation and to connect it to the server.

Input/Output Ports and Connectors

The input/output (I/O) connectors are for attaching external devices, such as printers, keyboards, and displays, to your server. The I/O connectors on your server include:

- Two serial-port connectors
- One systems management connector
- One parallel-port connector
- One video-port connector
- One keyboard-port connector
- One auxiliary-device-port connector
- One Ethernet-port connector
- Two USB-port connectors

See the illustration in “Input/Output Connectors and Expansion Slots” on page 9 for the locations of the connectors.

Serial Ports

Your server comes with two serial ports. (See “Input/Output Connectors and Expansion Slots” on page 9 for the locations of the connectors.) These ports are used to communicate with printers, plotters, external modems, scanners, and auxiliary terminals. These ports also enable you to transfer data between computers.

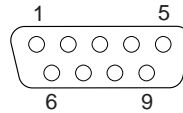
Serial ports can transfer data *asynchronously*, which means that they can transmit any number of characters at any time, with no restriction on the duration of the pauses between characters.

The serial ports can transmit and receive data and commands at rates of from 300 bits per second up to 115 000 bits per second.

Connecting External Options

Serial port A is shared by the operating system and the integrated Netfinity Advanced System Management Processor. Serial port B can be used only by the operating system.

Each serial port has a 9-pin, male D-shell connector on the back of the server. The pin-number assignments of this connector conform to the industry standard.



The following table shows the pin-number assignments for the serial-port connectors.

Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

When you turn on your server, the POST routine assigns the serial ports to specific communication port addresses.

Some application programs use only certain ports, and some modems are designed for use only at certain communication port addresses. You might need to use the Configuration/Setup Utility program to change communication port address assignments to resolve conflicts.

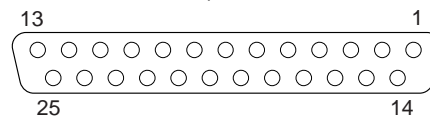
Management Port C

Your server has a dedicated system-management I/O port. This port can be used to attach a modem that is dedicated to communication with the Netfinity Advanced System Management Processor.

The connector on the back of the server and the pin-number assignments are the same as for the serial ports.

Parallel Port

The parallel port usually is used to communicate with printers, and transfers data one byte at a time. The parallel port has a 25-pin, female D-shell connector on the back of your server. It support three standard IEEE 1284 modes of operation: Standard Parallel Port (SPP), Enhanced Parallel Port (EPP), and Extended Capability Port (ECP). (See "Input/Output Connectors and Expansion Slots" on page 9 for the location of the connector.)



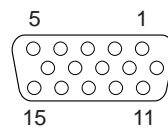
The following table shows the pin-number assignments for the parallel-port connector.

<i>Table 3. Parallel Port Pin-Number Assignments</i>			
Pin	I/O	SPP/ECP Signal	EPP Signal
1	O	-STROBE	-WRITE
2	I/O	Data 0	Data 0
3	I/O	Data 1	Data 1
4	I/O	Data 2	Data 2
5	I/O	Data 3	Data 3
6	I/O	Data 4	Data 4
7	I/O	Data 5	Data 5
8	I/O	Data 6	Data 6
9	I/O	Data 7	Data 7
10	I	-ACK	-ACK
11	I	BUSY	-WAIT
12	I	PE (paper end)	PE (paper end)
13	I	SLCT (select)	SLCT (select)
14	O	-AUTO FD (feed)	-DSTRB
15	I	-ERROR	-ERROR
16	O	-INIT	-INIT
17	O	-SLCT IN	-ASTRB
18	-	Ground	Ground
19	-	Ground	Ground
20	-	Ground	Ground
21	-	Ground	Ground
22	-	Ground	Ground
23	-	Ground	Ground
24	-	Ground	Ground
25	-	Ground	Ground

When you turn on your server, the POST routine assigns the parallel port a specific port address. You can change the parallel-port assignment by using the Configuration/Setup Utility program.

Video Port

The system board in your server has one SVGA video port. This port is used to attach a video monitor. The video port has a 15-pin analog connector on the back of the server. (See "Input/Output Connectors and Expansion Slots" on page 9 for the location of the connector.)



The following table shows the pin-number assignments for the video connector.

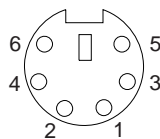
Connecting External Options

Table 4. Video Port Pin-Number Assignments

Pin	Signal
1	Red
2	Green or monochrome
3	Blue
4	Monitor ID bit 2
5	Ground
6	Ground
7	Ground
8	Ground
9	+5 V
10	Ground
11	Monitor ID bit 0
12	DDC SDA
13	Horizontal synchronization (Hsync)
14	Vertical synchronization (Vsync)
15	DDC SDL

Keyboard and Auxiliary-Device Ports

The system board has one keyboard port and one auxiliary-device port that supports a mouse or other pointing device. (See “Input/Output Connectors and Expansion Slots” on page 9 for the locations of the connectors.)



The following table shows the pin-number assignments for the connectors used by the keyboard and auxiliary-device ports.

Table 5. Keyboard and Auxiliary-Device Port Pin-Number Assignments

Pin	Signal
1	Data
2	Not connected
3	Ground
4	+5 V dc
5	Clock
6	Not connected

Ethernet Port

The system board in your Netfinity 5500 M10 contains an Ethernet *controller*. The controller has an external RJ-45 connector on the rear of the server that is used with a category 3, 4, or 5 unshielded twisted-pair (UTP) cable. The connector enables an Ethernet network to attach to the internal transceiver in your server.

Note: The 100BASE-TX Fast Ethernet standard requires that the cabling in the network be Category 5 or higher.

See “Configuring the Ethernet Controller” on page 29 for additional information about the Ethernet controller.

Table 6 shows the pin-number assignments for the RJ-45 connector. These assignments apply to both 10BASE-T and 100BASE-TX devices.

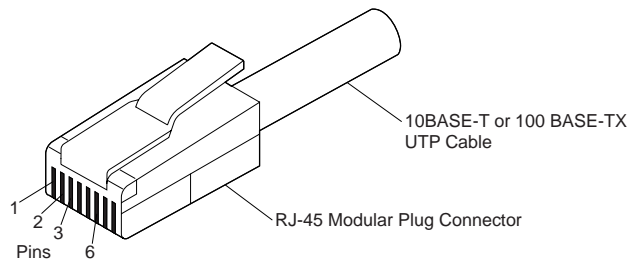


Table 6. Ethernet Connector Pin-Number Assignments

Pin	Signal	Pin	Signal
1	Transmit data+	5	Reserved
2	Transmit data-	6	Receive data-
3	Receive data+	7	Reserved
4	Reserved	8	Reserved

Universal Serial Bus Ports

The system board in your Netfinity 5500 M10 contains two universal serial bus (USB) ports. Each USB port has an external connector on the rear on the server for attaching devices that previously used serial, parallel, keyboard, mouse, and game ports.

USB is an emerging serial interface standard for telephony and multimedia devices. USB technology uses Plug and Play to determine what device is attached to the connector. Each USB device is accessed by a unique *USB address*. A device called a hub is used to convert the USB port into multiple attachment points. A hub has multiple ports where peripherals can be attached. USB provides 12 megabits-per-second (Mbps) bandwidth with a maximum of 63 peripherals and a maximum signal distance of five meters (16 ft.) per segment.

Note: If more than one USB device is to be attached, then the device must be connected to a hub.

Table 7 on page 86 shows the pin-number assignments for the USB connectors.

Connecting External Options

<i>Table 7. USB Connector Pin-Number Assignments</i>	
Pin	Signal
1	VCC
2	-Data
3	+Data
4	Ground

Chapter 5. Installing a Server in a Rack

This chapter provides instructions for installing a server in a rack and for removing a server from a rack.

This chapter contains:

Before You Begin	87
Installing and Removing the Server	88
Preparing the Rack	88
Installing the Server in the Rack	92
Removing the Server from a Rack	96

Your server comes with all the rack installation hardware (rack model only). Review the preinstallation information in “Before You Begin”; then, continue with “Installing and Removing the Server” on page 88.

12



>50 kg (110 lbs)

CAUTION:

Do not place any object weighing more than 50 kg (110 lbs) on top of the rack model of the server.

Before You Begin

- You will need the following items:
 - An assortment of small screwdrivers
 - 8-inch adjustable wrench or pliers

Some of the installation procedures require three people.

- Before you begin to install your server in the rack, review the safety and handling guidelines specified under “Safety Information Statements” on page vii, and “Electrical Safety” on page 35. These guidelines will help you work safely while working with your server and options.
- To ensure rack stability, plan the installation of servers in the rack starting from the bottom. For more information, refer to the IBM Netfinity Rack Configurator program provided with the ServerGuide CDs. Refer to “ServerGuide and Netfinity Manager Information” section of this *Server Library*.
- Review the documentation that comes with your rack enclosure for safety or cabling considerations. Ensure that your planned installation is within the rack’s guidelines for heat generation, electrical requirements, air flow, and mechanical loading.
- Verify that the rack can meet the operating parameters, as detailed in “Specifications” on page 160.

Installing and Removing the Server

During the installation procedure, you must install parts on the rack and the server. This process can be divided into two parts:

- Preparing the rack
- Installing the server in the rack

Preparing the Rack

5



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:

Use safe lifting practices when lifting your machine.

In this section, you will use the following parts:

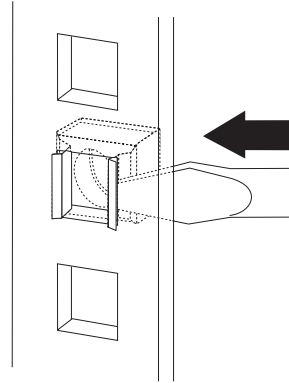
- IBM installation template
- Two slide-bracket assemblies
- One cable-management arm
- Two bezel brackets
- Six screws (for attaching the bezel brackets)
- Sixteen long screws (M6 by 16 mm)
- Eight short screws (M4 by 8 mm)
- Six cage nuts
- Two hex nuts (M6)
- Four nut bars
- Four lift handles (shipped with some servers)
- Cable ties
- One server bracket (for attaching the cable management arm to the server)

Attention: To ensure rack stability, plan the installation of servers in the rack starting from the bottom.

To attach the mounting hardware to the rack:

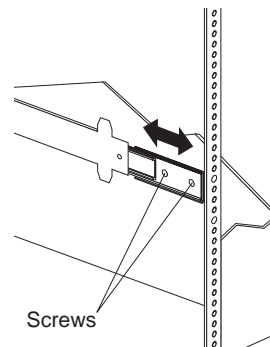
1. Remove the rack front door. Refer to the rack documentation for instructions.

2. Mark the positions of the slide-bracket assemblies, bezel brackets, and the cable-management arm on the rack:
 - a. Position the installation template on the front mounting rails on the rack, aligning the holes.
 - b. Mark the holes for the slide-bracket assemblies and bezel brackets.
 - c. Move the template to the same U level at the rear of the server and mark the locations for the slide-bracket assemblies and cable-management arm.
 - d. Install the six cage nuts at the locations marked on the mounting rails.



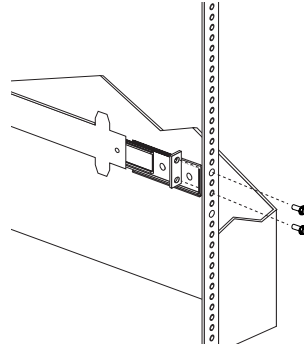
Notes:

- a. Get another person to help you attach the slide-bracket assemblies to the rack.
 - b. The slide-bracket assemblies can be installed on either the left or right side of the rack.
 - c. Refer to the illustrations for examples of the proper alignment of the slide-bracket assemblies.
3. Attach a slide-bracket assembly to the front of the rack:
 - a. Position the slide-bracket assembly behind the mounting rail so that the slides will extend out from the front of the rack.
 - b. If necessary, loosen the screws at the rear of the slide-bracket assembly and adjust the length of the slide-bracket to fit the mounting rail. Tighten the screws.

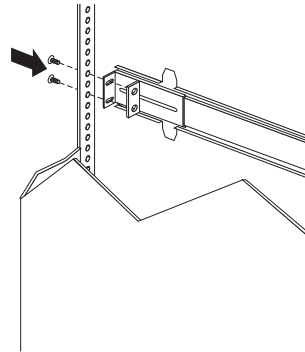


Installing and Removing the Server

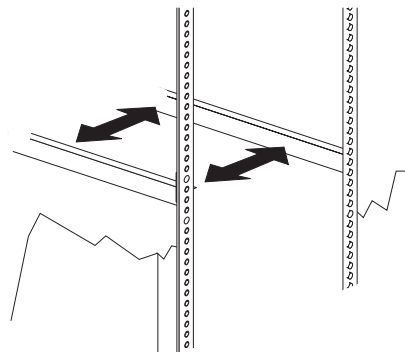
- c. Position a nut bar behind the slide-bracket assembly.
- d. Insert screws (6M by 16 mm) through the mounting rail, the slide-bracket assembly, and the nut bar. Do not tighten the screws.



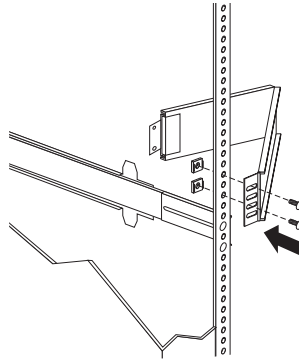
4. Attach the slide-bracket assembly to the rear of the rack:
 - a. Position the slide-bracket assembly inside the mounting rail.
 - b. Position a nut bar behind the slide-bracket assembly.
 - c. Insert screws (6M by 16 mm) through the mounting rail, the slide-bracket assembly, and the nut bar. Do not tighten the screws.



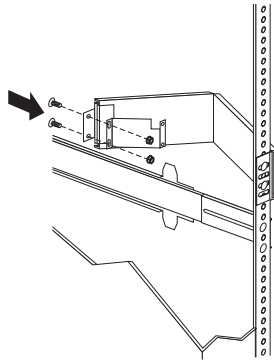
5. Attach the other slide-bracket assembly to the front and rear of the rack.
6. Push the slide-bracket assemblies to the outermost positions on the rack.



7. Tighten all screws to secure both slide-bracket assemblies. If you are using a torque screwdriver, use the following torque setting: 8–11 Nm (70.8–97.0 in/lbs).
8. Attach the cable-management arm to the rear of the rack:
 - a. Position the cable-management arm bracket on the outside of the mounting rail.
 - b. Insert screws (M6 by 16 mm) through the cable-management arm bracket, mounting rail, and cage nuts. Tighten the screws.



- c. Position the server bracket on the cable-management arm.
- d. Insert screws through the cable-management arm and the server bracket. Attach M6 hex nuts to the screws and tighten the hex nuts.

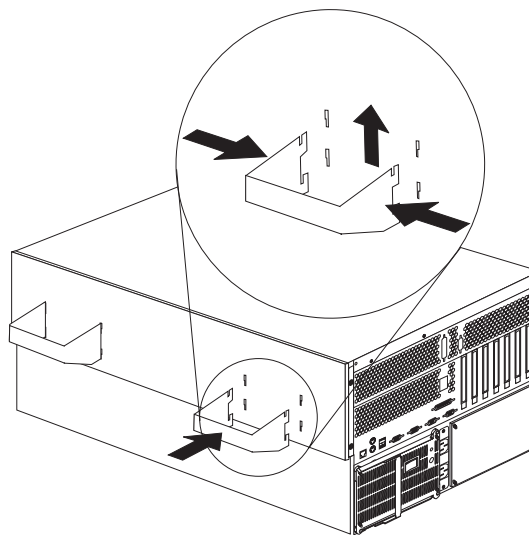


Installing the Server in the Rack

In this section, you will use eight screws (M4 by 8).

To install the server in the rack:

1. Fully extend the slide-bracket assemblies until they lock.
2. Install the four lift handles on the sides of the server:
 - a. Press in on the sides of the lift handle near the tabs and insert the handle tabs into the slots on the side of the server.
 - b. Move the handle up in the slots so that the hooked part of each tab is inside the server. Release the pressure on the sides of the handle.
 - c. Install the remaining three lift handles.



5



≥32 kg (70.5 lbs)



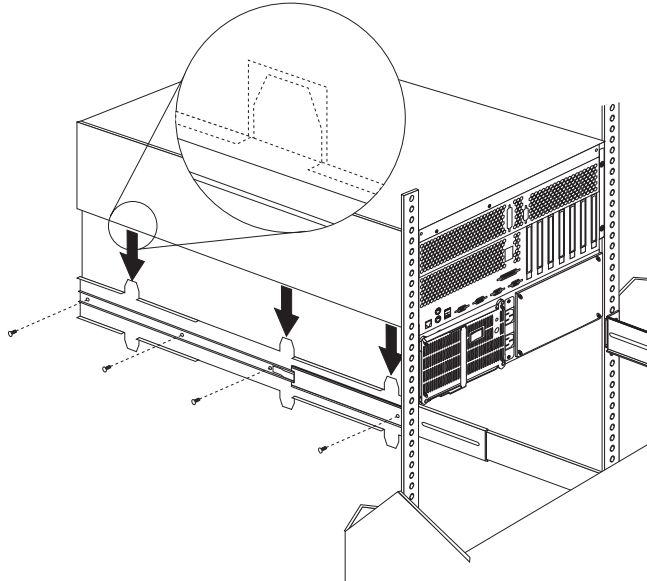
≥55 kg (121.2 lbs)

CAUTION:

Use safe lifting practices when lifting your machine.

3. Lift and position the server so that the bayonet slots on the server are above the bayonets on the slide-bracket assemblies.
4. Lower the server and slip the bayonets into the bayonet slots.

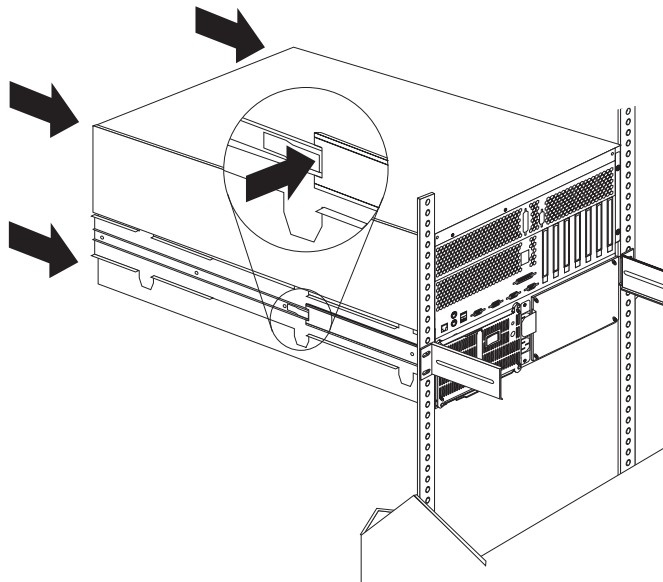
5. Insert screws through one slide-bracket assembly and server side. Tighten the screws. Repeat this step for the other slide-bracket assembly on the opposite side of the server. This secures the server.



6. Remove the four lift handles from the sides of the server:
 - a. Grasp the lift handle and press in on the sides of the lift handle near the tabs until the tabs touch the inside edges of the slots.
 - b. Move the handle down in the slots so that the hooked parts of the tabs clear the top edges of the slots; then, pull the handle away from the server.
 - c. Remove the remaining three handles. Store the handles in a safe place.

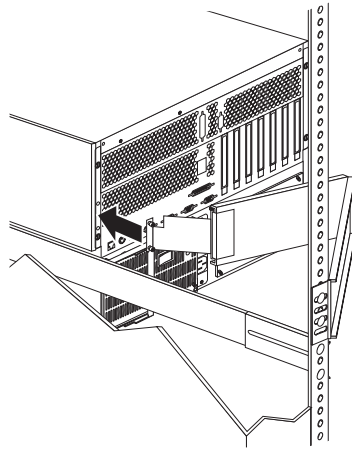
Note: When the drawer is fully extended, safety latches on the slide-brackets lock into place. To release the safety latch, press the latch on each side of the rack.

7. Press the safety latches and slide the drawer about halfway into the rack.

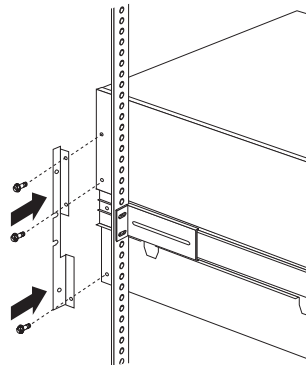


Installing and Removing the Server

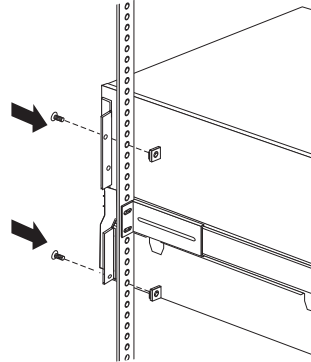
8. Attach the cable-management arm to the server using the captive screws.



9. Attach the monitor, keyboard, and power cables to the corresponding connectors on the server. Refer to the rack documentation for instructions.
10. Attach the cables to the cable-management arm using cable ties.
11. Attach the two bezel brackets (one for each side) to the front sides of the server with the six screws provided.



12. Secure the server in the rack:
 - a. Slide the server into the rack.
 - b. Secure the server to both sides of the rack by inserting screws (M6 by 16 mm) through the bezel brackets, mounting rails, and cage nuts.



13. Install the rack front door.
14. To complete the installation, refer to the documentation that came with the rack.

Removing the Server from a Rack

Before you begin

- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Turn off the server.
- Follow any additional installation and safety instructions that come with the rack.

To remove the server from a rack:

1. If you have a modem or fax machine attached to the server, disconnect the telephone line from the electrical outlet and the server.

Note: If you are in the United Kingdom, you must perform this step before disconnecting the power cords.

2. Disconnect all cables and power cords from the rear of the server.
3. Disconnect all power cords from the rack.
4. Remove the screws from the bezel brackets on each side of the front bezel. Set them aside for later use.
5. Slide the server about halfway out of the rack.
6. Loosen the captive screws that secure the cable-management arm.
7. Fully extend the slide-bracket assemblies until they lock.
8. Remove the screws that attach the server to each slide-bracket assembly.

5



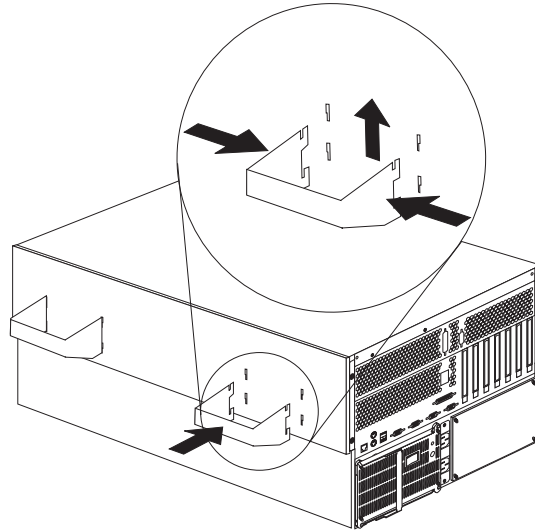
≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:
Use safe lifting practices when lifting your machine.

9. Install the four lift handles on the sides of the server:
 - a. Press in on the sides of the lift handle near the tabs and insert the handle tabs into the slots on the side of the server.
 - b. Move the handle up in the slots so that the hooked part of each tab is inside the server. Release the pressure on the sides of the handle.
 - c. Install the remaining three lift handles.



10. Lift the server from the slide bracket assemblies and place the server on a flat, nonconductive surface.

Removing the Server from a Rack

Chapter 6. Solving Problems

Server problems can be caused by hardware, software, or a user error. An example of a user error is pressing the wrong key on the keyboard. You can check server hardware by using the diagnostic programs and other information in this chapter.

This chapter contains:

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Diagnostic Tools Overview

The following tools are available to help identify and resolve hardware-related problems:

- Diagnostic programs
- Power-on self-test (POST)
- POST beep codes
- Error messages
- Troubleshooting charts
- Option diskettes

Diagnostic Programs

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of your server, such as the the system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), diskette drive, serial port, and parallel port. You can also use them to test some external devices.

Also, if you cannot determine whether a problem is caused by the hardware or by the software, you can run the diagnostic programs to confirm that the hardware is working properly.

Note: When you run the diagnostic programs, a single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages might not occur the next time you run the test.

Power-On Self-Test (POST)

When you turn on the server, it performs a series of tests to check the operation of server components and some of the options installed in the server. This series of tests is called the power-on self-test or POST.

POST does the following:

- Checks the operation of some basic system-board operations
- Checks the memory
- Compares the current server configuration with the stored server configuration information
- Configures PCI adapters
- Starts the video operation
- Verifies that drives (such as the diskette, CD-ROM, and hard disk drives) are connected properly

If you have a power-on password or administrator password set, you must type the password and press **Enter**, when prompted, before POST will continue.

While the memory is being tested, the amount of available memory appears on the screen. These numbers advance as the server progresses through POST and the final number that appears on the screen represents the total amount of memory available. If POST finishes without detecting any problems, a single beep sounds, the first screen of your operating system or application program appears, and the System POST Complete (OK) light is illuminated on the information LED panel.

If POST detects a problem, more than one beep sounds and an error message appears on your screen.

Note: A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages usually will not occur the next time you run the test.

POST Beep Codes

POST generates beep codes to indicate successful completion or the detection of a problem.

- One beep indicates the successful completion of POST.
- More than one beep indicates that POST detected a problem. For more information, see “Power-on Self Test (POST) Beep Codes” on page 112.

Error Messages

Error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing of complex problems indicated by error messages should be performed by trained service personnel.

Hardware error messages that occur can be text, numeric, or both. Messages generated by your software generally are text messages, but they also can be numeric.

POST Error Messages

POST error messages occur during startup when POST finds a problem with the hardware or detects a change in the hardware configuration. For more information, see “Power-On Self-Test (POST) Messages” on page 104.

Diagnostic Error Messages

Diagnostic error messages occur when a test finds a problem with the server hardware. These error messages are alphanumeric and they are saved in the Test Log. For more information, see “Diagnostic Error Message Tables” on page 115.

Software-Generated Error Messages

These messages occur if a problem or conflict is found by an application program, the operating system, or both. Messages are generally text messages, but they also can be numeric. For information about these error messages, refer to the documentation that comes with your software.

Troubleshooting Charts

The charts under “Troubleshooting Charts” on page 132 list symptoms of problems (for example, a symptom might be “The mouse or pointing device does not work.”), along with steps to correct the problems.

System Error Log

The system error log contains all error and warning messages issued during POST and all system status messages from the Netfinity Advanced System Management Processor. See “System Error Log” on page 25 for information about how to view the system error log.

Option Diskettes

An optional device or adapter might come with an Option Diskette. Option Diskettes usually contain option-specific diagnostic test programs or configuration files.

If your optional device or adapter comes with an Option Diskette, follow the instructions that come with the option. Different instructions apply depending on whether the Option Diskette is startable or not.

Diagnostic Programs

This section includes useful information about running the diagnostic programs. These programs are designed to test the IBM server. If you want to test a non-IBM product, refer to the information that comes with that product.

Note: When you run the diagnostic programs, a single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages usually will not occur the next time you run the test.

Running Diagnostic Programs

While you are running the diagnostic programs, **F1** displays Help information. Pressing **F1** from within a help screen provides a help index from which you can select different categories. Pressing **Esc** exits Help and returns to where you left off.

Notes:

1. To run the diagnostic programs, you must start the server with the highest level password.

That is, if you enter the power-on password and an administrator password is set, you cannot run the programs. You can only view the error messages in the Test Log.

You must enter the administrator password to run the diagnostic programs.

2. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem persists, have the system serviced.
3. If the diagnostic tests do not find a problem but the problem persists during normal operations, see “Troubleshooting” on page 131 and look for the problem symptom.
4. You might have to install a wrap connector on your active parallel, serial, or Ethernet port to obtain accurate test results for these ports. If you do not have a wrap connector, contact your IBM reseller or IBM marketing representative.

5. You might need a scratch diskette (that is, a diskette which has no contents that you want to save) to obtain accurate test results when testing the diskette drive.
6. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.

To start the diagnostic programs:

1. Make sure a standard keyboard, and optionally, a standard mouse are attached to your server.
2. Turn on the server and watch the screen.
If the server is turned on already, shut down your operating system and restart the server.
3. When the message F2 for Diagnostics appears, press **F2**.
If a power-on password or administrator password is set, the server prompts you for it. Type in the appropriate password; then, press **Enter**.
4. The Diagnostics Programs screen appears.
5. Select either **Extended** or **Basic** from the top of the screen.
6. Select the test you want to run from the list that appears; then, follow the instructions on the screen.

When the tests have completed, you can view the Test Log by selecting **Utility** from the top of the screen.

Also, you can view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on) by selecting **Hardware Info** from the top of the screen.

If the hardware checks out OK but the problem persists during normal server operations, a software error might be the cause. If you suspect a software problem, refer to the information that comes with the software package.

Viewing the Test Log

If you are already running the diagnostic programs, continue with step 4 in this procedure.

To view the Test Log:

1. Turn on the server and watch the screen.
If the server is turned on already, shut down your operating system and restart the server.
2. When the message F2 for Diagnostics appears, press **F2**.
If a power-on password or administrator password is set, the server prompts you for it. Type in the appropriate password; then, press **Enter**.
3. The Diagnostic Programs screen appears.
4. Select **Utility** from the top of the screen.
5. Select **View Test Log** from the list that appears; then, follow instructions on the screen.

Power-On Self-Test (POST) Messages

The following table shows error messages that can appear on the screen during the power-on self-test (POST).

Notes:

1. The actions for some of the messages require you to run the Configuration/Setup Utility program. For information about using these programs, see “Using the Configuration/Setup Utility Program Main Menu” on page 17.
2. If a password prompt appears with a POST message, type the administrator or power-on password; then, press **Enter**.

POST Message Table

POST Message	Description
062	<p>The server failed to boot on three consecutive attempts.</p> <p>All caches are disabled. This can be caused by repeatedly turning the server on and then off or resetting the server.</p> <p>Action: Start the Configuration/Setup Utility program and verify that all settings are correct. (See Chapter 3, “Configuring Your Server.”) Use the Cache Control selection in the Advanced Setup menu of the Configuration/Setup Utility program to enable the caches. (See “Advanced Setup” on page 24.)</p> <p>If the problem persists, have the system serviced. When the problem is corrected, make sure to enable the caches.</p>
101 102	<p>An error occurred during the system board and microprocessor test.</p> <p>Action: Have the system serviced.</p>
106	<p>An error occurred during the system board and microprocessor test.</p> <p>Action: Have the system serviced.</p>
114	<p>An adapter read-only memory (ROM) error occurred.</p> <p>Action: Remove the options. If you can start the server without the options installed, reinstall each option one at a time and retest after each is reinstalled. When an option fails, replace it.</p> <p>If you cannot isolate and correct the problem, have the system serviced.</p>
129	<p>An error was detected in the L1 cache of one of the microprocessors.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, check to see if the system has isolated the problem to a microprocessor: <ul style="list-style-type: none"> • If the System Error LED on the information LED panel is on, check to see if the CPU LED on the diagnostics panel is on. If it is on, check the Microprocessor Error LEDs next to the microprocessor sockets on the processor board (see “Processor Board Component Locations” on page 167). <ul style="list-style-type: none"> – If a Microprocessor LED is on, run the diagnostic program for the microprocessor indicated by the LED. (If the Secondary Microprocessor Error LED is on, run the “Alt CPU” diagnostic program.) If the tests fail, replace the microprocessor. – If the microprocessor tests do not fail, have the system serviced. • If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the microprocessor error. <p>If the problem persists, have the system serviced.</p>

POST Message	Description
151	<p>A real-time clock (RTC) error occurred.</p> <p>Action: Have the system serviced.</p>
161	<p>The real-time clock battery has failed.</p> <p>Action: Have the system serviced or replace the battery yourself. For additional information, see “Replacing the Battery” on page 149 and “Lithium Battery Notice” on page ix before you attempt to change the battery.</p> <p>You can use the server until you replace the battery. However, you must run the configuration programs and set the time and date and other custom settings each time you turn on the server.</p>
162	<p>A change in device configuration occurred. This error occurs under one or more of the following conditions:</p> <ul style="list-style-type: none"> • A new device has been installed. • A device has been moved to a different location or cable connection. • A device has been removed or disconnected from a cable. • A device is failing and is no longer recognized by the server as being installed. • An external device is not turned on. • An invalid checksum is detected in the battery-backed memory. <p>Action: Verify that all external devices are turned on. You must turn on external devices before turning on the server.</p> <p>If you did not add, remove, or change the location of a device, a device is probably failing. Running the diagnostic test programs might isolate the failing device, but you must have the system serviced.</p>
163	<p>The time of day has not been set.</p> <p>Action: Set the correct date and time. If the date and time are set correctly and saved, but the 163 error message reappears, have the system serviced.</p> <p>The server can be used until the system is serviced, but any application programs that use the date and time will be affected.</p>
164	<p>A change in the memory configuration occurred. This message might appear after you add or remove memory.</p> <p>Note: The server can be used with decreased memory capacity.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If POST error message 289 also occurred, follow the instructions for that error message first. 2. If you have installed or removed memory, run the Configuration/Setup Utility program; then, exit, saving the new configuration settings. For information about using the configuration programs, see “Using the Configuration/Setup Utility Program Main Menu” on page 17. <p>If the message appears again, shutdown the server, reseal the memory modules, and restart the server.</p> <ol style="list-style-type: none"> 3. If the problem persists, check to see if the system has isolated the problem to a memory module: <ul style="list-style-type: none"> • If the System Error LED on the information LED panel is on, check to see if the MEM LED on the diagnostics panel is on. If it is on, check the DIMM Error LEDs next to the memory sockets on the processor board (see “Processor Board Component Locations” on page 167). If a DIMM Error LED is on, run the diagnostic program for the memory. <ul style="list-style-type: none"> – If the tests fail, replace the DIMM. If the problem persists after you replace the DIMM, have the system serviced. – If the memory tests do not fail, have the system serviced. • If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the memory error. <p>If the problem persists, have the system serviced.</p>

POST Messages

POST Message	Description
175	<p>A vital product data (VPD) error occurred.</p> <p>Action: Have the system serviced.</p>
176 177 178	<p>A security hardware error occurred.</p> <p>Action: Check for indications that someone has tampered with the server. If no one has tampered with the server, have the system serviced.</p>
184	<p>The power-on password information stored in your server has been removed.</p> <p>Action: From the Configuration/Setup Utility program main menu, select System Security. Then, follow the instructions on the screen. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 17.</p> <p>If this information cannot be restored, have the system serviced.</p>
185	<p>A power failure damaged the stored information about the drive-startup sequence.</p> <p>Action: From the Configuration/Setup Utility program main menu, select Start Options; then, follow the instructions on the screen. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 17.</p> <p>If this information cannot be restored, have the system serviced.</p>
186	<p>A system board or hardware error occurred.</p> <p>Action: Have the system serviced.</p>
187	<p>The VPD serial number is not set.</p> <p>Action: The system serial number is set in the VPD EEPROM at the time of manufacturing. If the system board has been replaced, the system serial number will be invalid and should be set. From the main menu of the Configuration/Setup Utility program, select System Information, then select Product Data. If the problem persists, have the system serviced.</p>
188	<p>A vital product data (VPD) error occurred.</p> <p>Action: Have the system serviced.</p>
189	<p>An attempt has been made to access the server with invalid passwords. After three incorrect attempts, the server locks up; that is, the logon data fields are no longer available to the user.</p>
201	<p>An error occurred during the memory controller test. This error can be caused by:</p> <ul style="list-style-type: none">• Incorrectly installed memory• A failing memory module• A processor-board problem• A system board problem <p>Action:</p> <ol style="list-style-type: none">1. If you just installed memory, see "Installing Memory-Module Kits" on page 56 to verify that the new memory is correct for your server. Verify that the memory modules are installed and seated correctly.2. If the problem persists, check to see if the system has isolated the problem to a memory module:<ul style="list-style-type: none">• If the System Error LED on the information LED panel is on, check to see if the MEM LED on the diagnostics panel is on. If it is on, check the DIMM Error LEDs next to the memory sockets on the processor board (see "Processor Board Component Locations" on page 167). If a DIMM Error LED is on, run the diagnostic program for the memory.• If the tests fail, replace the DIMM. If the problem persists after you replace the DIMM, have the system serviced.• If the memory tests do not fail, have the system serviced.3. If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the memory error. <p>If the problem persists, have the system serviced.</p>

POST Message	Description
229	<p>An error was detected in the L2 cache of one of the microprocessors.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, check to see if the system has isolated the problem to a microprocessor: <ul style="list-style-type: none"> • If the System Error LED on the information LED panel is on, check to see if the CPU LED on the diagnostics panel is on. If it is on, check the Microprocessor Error LEDs next to the microprocessor sockets on the processor board (see “Processor Board Component Locations” on page 167). <ul style="list-style-type: none"> – If a Microprocessor LED is on, run the diagnostic program for the microprocessor indicated by the LED. (If the Secondary Microprocessor Error LED is on, run the “Alt CPU” diagnostic program.) If the tests fail, replace the microprocessor. – If the microprocessor tests do not fail, have the system serviced. • If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the microprocessor error. <p>If the problem persists, have the system serviced.</p>
289	<p>An error occurred during POST memory tests and a failing DIMM was disabled.</p> <p>Note: The server can be used with decreased memory.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed memory, see “Installing Memory-Module Kits” on page 56 to verify that the new memory is correct for your server. Verify that the memory modules are installed and seated correctly. Start the Configuration/Setup Utility program (see Chapter 3, “Configuring Your Server”). In the Advanced Setup menu, select Memory Settings and enable the DIMM. (See “Advanced Setup” on page 24.) 2. If the problem persists, replace the failing DIMM. <p>If the problem persists, have the system serviced.</p>
301 303	<p>An error occurred during the keyboard and keyboard controller test. These error messages also might be accompanied by continuous beeping.</p> <p>Action: Ensure that:</p> <ol style="list-style-type: none"> 1. Nothing is resting on the keyboard and pressing a key. 2. No key is stuck. 3. The keyboard cable is connected correctly to the keyboard and to the correct connector on the server. <p>Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, have the keyboard, cable, and system serviced.</p> <p>Note: If you have just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds, and then, turn on the server. If the error message goes away, replace the device.</p>
604	<p>An error occurred during a diskette drive test.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that the configuration programs correctly reflect the type of diskette drive that you have installed. 2. Run the diagnostic tests. If the diagnostic tests fail, have the system serviced.

POST Messages

POST Message	Description
662	<p>A diskette drive configuration error occurred.</p> <p>Action: If you removed a diskette drive, make sure that the diskette drive setting is correct in the configuration programs. If the setting is not correct, change it. For information about using the configuration programs, see “Using the Configuration/Setup Utility Program Main Menu” on page 17.</p> <p>If the problem persists, have the system serviced.</p>
962	<p>A parallel port configuration error occurred.</p> <p>Action: If you changed a hardware option, make sure that the parallel port setting is correct in the configuration programs. If the setting is not correct, change it. For information about using the configuration programs, see “Using the Configuration/Setup Utility Program Main Menu” on page 17.</p> <p>If the problem persists, have the system serviced.</p>
11xx	<p>An error occurred during the system-board serial port test.</p> <p>Action: If you have a modem, serial printer, or other serial device attached to your server, verify that the serial cable is connected correctly. If it is, use the following procedure:</p> <ol style="list-style-type: none">1. Turn off the server.2. Disconnect the serial cable from the serial port.3. Wait five seconds; then, turn on the server. <p>If the POST error message does not reappear, either the serial cable or the device is probably failing. See the documentation that comes with the serial device for additional testing information.</p> <p>If the POST error message reappears, have the system serviced.</p>
1162	<p>The serial port configuration conflicts with another device in the system.</p> <p>Action:</p> <ol style="list-style-type: none">1. Make sure the IRQ and I/O port assignments needed by the serial port are available. (See Chapter 3, “Configuring Your Server.”)2. If all interrupts are being used by adapters, you might need to remove an adapter to make an interrupt available to the serial port, or force other adapters to share an interrupt. For information about removing adapters, see “Working with Adapters” on page 42. For information about setting interrupts, see Chapter 3, “Configuring Your Server.”
1600	<p>The Netfinity Advanced System Management Processor is not functioning.</p> <p>Action:</p> <ol style="list-style-type: none">1. If a jumper is installed on jumper block J51 of the system board, remove it.2. If the Advanced System Management Processor Error LED is not on, disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server. (See “System Board Component Locations” on page 164 for the location of the LED.)3. If the Advanced System Management Processor Error LED (CR24) on the system board is on, have your system serviced. <p>If the problem persists, have the system serviced.</p>
1601	<p>The Netfinity Advanced System Management Processor BIOS needs to be updated.</p> <p>Action:</p> <ol style="list-style-type: none">1. Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server.2. If the problem persists, update the Netfinity Advanced System Management Processor BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. <p>If the problem persists, have the system serviced.</p>

POST Message	Description
1800	<p>A PCI adapter has requested a hardware interrupt that is not available.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the PCI adapter and all other adapters are set correctly in the configuration programs. If the interrupt resource settings are not correct, change the settings. For information about using the configuration programs, see "PCI Bus Control" on page 24. 2. If all interrupts are being used by other adapters, you might need to remove an adapter to make an interrupt available to the PCI adapter, or force other adapters to share an interrupt. For information about removing adapters, see "Working with Adapters" on page 42. For information about setting interrupts, see "PCI Bus Control" on page 24.
1801	<p>A PCI adapter has requested memory resources that are not available.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the PCI adapter and all other adapters are set correctly in the configuration programs. If the memory resource settings are not correct, change the settings. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 17. 2. If all memory resources are being used, you might need to remove an adapter to make memory available to the PCI adapter. For information about removing adapters, see "Working with Adapters" on page 42. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation provided with the adapter.
1802	<p>A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the I/O address for the PCI adapter and all other adapters are set correctly in the configuration programs. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 17. 2. If the I/O port resource settings are correct, the PCI adapter might be defective. Have the system serviced.
1803	<p>A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the memory address for all other adapters are set correctly in the configuration programs. If the memory resource settings are not correct, change the settings. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 17. 2. If the memory resource settings are correct, the PCI adapter might be defective. Have the system serviced.
1804	<p>A PCI adapter has requested a memory address that is not available.</p> <p>Action: If all memory addresses are being used, you might need to remove an adapter to make memory address space available to the PCI adapter. For information about removing adapters, see "Working with Adapters" on page 42. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation provided with the adapter.</p>
1805	<p>A PCI adapter ROM error occurred.</p> <p>Action: Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it.</p> <p>If you cannot isolate and correct the problem, have the system serviced.</p>

POST Messages

POST Message	Description
1806	<p>A PCI-to-PCI bridge error occurred. More than one PCI bus tried to access memory below 1 MB.</p> <p>Action: Remove the PCI adapter that has the PCI bridge. If you can start the server without the adapter, reinstall and retest the adapter. If the adapter fails, replace it.</p> <p>If you cannot isolate and correct the problem, have the system serviced.</p>
1808	<p>Unsupported PCI device is installed.</p> <p>The latch on a hot-plug PCI slot might have been opened while the slot was active or the optical switch for the slot might be defective.</p> <p>Action: Shut down the server, ensure the latches on the hot-plug PCI slots are closed and locked; then, restart the server.</p> <p>If the problem persists, have the system serviced.</p>
1962	<p>No valid startup devices were found. The system cannot find the startup drive or operating system.</p> <p>Action: Be sure that the drive you want to start from is in the startup sequence.</p> <ol style="list-style-type: none">1. Select Start Options from the Configuration/Setup Utility program main menu. If you are unable to set the startup sequence, have the system serviced.2. Check the list of startup devices in the Startup device data fields. Is the drive you want to start from in the startup sequence? Yes Exit from this screen; then select Exit Setup to exit the Configuration/Setup menu. Go to step 3. No Follow the instructions on the screen to add the drive; then save the changes and exit the Configuration/Setup menu. Restart the server.3. Is an operating system installed? Yes Turn off the server. Go to step 4. No Install the operating system in your server; follow your operating system instructions to shut down and restart the server.4. During server startup, watch for messages indicating a hardware problem. <p>If the same error message appears, have the system serviced.</p>
2400	<p>An error occurred during the video controller (on the system board) test. This error can be caused by a failing monitor, a failing system board, or, if a video adapter is installed, a failing video adapter.</p> <p>Action: Verify that the monitor is connected correctly to the video connector. If the monitor is connected correctly, have the system serviced.</p>
2462	<p>A video memory configuration error occurred.</p> <p>Action:</p> <ol style="list-style-type: none">1. Make sure that the monitor cables are correctly and securely connected to the server.2. If the problem persists, have the system serviced.
5962	<p>An IDE CD-ROM configuration error occurred.</p> <p>Action: Check the signal and power cable connections to the CD-ROM drive. See "System Board Component Locations" on page 164 for the locations of the cable connectors on the system board.</p> <p>If the problem persists, have the system serviced.</p>

POST Message	Description
8603	<p>An error occurred during the mouse (pointing device) and mouse (pointing device) controller test. This error can be caused by the addition or removal of a mouse, or by a failing system board.</p> <p>Note: This error also can occur if electrical power was lost for a very brief period and then restored. In this case, turn off the server for at least 5 seconds, and then, turn it back on.</p> <p>Action: Ensure that the keyboard and mouse (pointing device) are attached to the correct connectors. If they are connected correctly, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the server. 2. Disconnect the mouse from the server. 3. Turn on the server. <p>If the POST error message does not reappear, the mouse is probably failing. See the documentation that comes with the mouse for additional testing information. If the problem remains, have the mouse (pointing device) serviced.</p> <p>If the POST error message reappears, run the diagnostic tests to isolate the problem. If the diagnostic tests do not find a problem and the POST error message remains, have the system serviced.</p>
00012000	<p>Processor machine check.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the system BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the microprocessor.
00019501	<p>Processor 1 is not functioning.</p> <p>Action: Replace the primary microprocessor. (The Primary Microprocessor Error LED on the processor board will be on. See “Processor Board Component Locations” on page 167 for the location of the LED.)</p> <p>If the problem persists, have the system serviced.</p>
00019502	<p>Processor 2 is not functioning.</p> <p>Action: Replace the secondary microprocessor. (The Secondary Microprocessor Error LED on the processor board will be on. See “Processor Board Component Locations” on page 167 for the location of the LED.)</p> <p>If the problem persists, have the system serviced.</p>
00019701	<p>Processor 1 failed the built-in self-test.</p> <p>Action: Replace the primary microprocessor. (The Primary Microprocessor Error LED on the processor board will be on. See “Processor Board Component Locations” on page 167 for the location of the LED.)</p> <p>If the problem persists, have the system serviced.</p>
00019702	<p>Processor 2 failed the built-in self-test.</p> <p>Action: Replace the secondary microprocessor. (The Secondary Microprocessor Error LED on the processor board will be on. See “Processor Board Component Locations” on page 167 for the location of the LED.)</p> <p>If the problem persists, have the system serviced.</p>
01298001	<p>No update data for the processor 1 (the primary microprocessor).</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates.</p>
01298002	<p>No update data for processor 2 (the secondary microprocessor).</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates.</p>

POST Beep Codes

POST Message	Description
01298101	Bad update data for processor 1 (the primary microprocessor). Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining updates.
01298102	Bad update data for processor 2 (the secondary microprocessor). Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining updates.
I9990301	A hard disk drive error occurred. Action: Have the system serviced.
I9990305	POST could not find an operating system. Action: Install an operating system. If you have already installed the operating system, check the drive startup sequence (see "Start Options" on page 23). If the drive sequence is correct, run the diagnostic tests to verify that the hard disk drive is functioning correctly. If there is a problem with the hard disk drive (such as a bad sector), you might have to reinstall the operating system. If you cannot reinstall the operating system, have the system serviced.
I9990650	AC power has been restored. Action: No action is required. This message appears each time AC power is restored to the server after an AC power loss.
Other Numbers	POST found an error. Action: Follow the instructions on the screen.

Power-on Self Test (POST) Beep Codes

The successful completion of POST is indicated by one beep and the appearance of the first screen of your operating system or application program. More than one beep indicates that POST detected an error.

Beep codes are sounded in a series of beeps. For example, a 1–2–4 beep code sounds like one beep, a pause, two consecutive beeps, another pause, and four more consecutive beeps.

POST Beep Code Descriptions

The following list contains more detailed descriptions of the possible types of beeps that your server might emit.

No beeps

If no beep occurs after your server successfully completes POST (that is, after the System POST Complete (OK) light on the information LED panel is illuminated), have the system serviced.

Continuous beep

This indicates that your boot microprocessor has failed, or your system board or speaker subsystem might contain a failing component. If the system continues through POST with no errors, have the system serviced. If no video appears, the boot processor has failed; replace the boot processor.

Note: If the server has only one microprocessor installed, that microprocessor is the boot processor. If the server has two microprocessors installed, the microprocessor in the secondary microprocessor connector is the boot processor and the

microprocessor in the primary microprocessor connector is the application processor.

One short beep

If one beep occurs after your server successfully completes POST (that is, after the System POST Complete (OK) light on the information LED panel is illuminated), then POST has no configuration or functional errors to report. One beep also occurs after your server completes POST if you enter an incorrect power-on password.

Two short beeps

This beep combination indicates that POST encountered an error. The Configuration/Setup Utility program will display additional information; follow the instructions displayed. See “Power-On Self-Test (POST) Messages” on page 104 for explanations of any POST error messages.

Three short beeps

This beep combination indicates a system memory error. This combination occurs only if the video BIOS cannot display the error message. Replace the failing memory module.

Repeating short beeps

This beep combination indicates that your server system board might contain a failing component, your keyboard might be defective, or a key on the keyboard might be stuck.

Ensure that:

1. Nothing is resting on the keyboard and pressing a key.
2. No key is stuck.
3. The keyboard cable is connected correctly to the keyboard and to the correct connector on the server.

Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, have the keyboard, cable, and system serviced.

Note: If you have just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds, and then, turn on the server. If the error message goes away, replace the device.

One long and one short beep

This beep combination indicates that POST encountered an error on a video adapter. Have the system serviced if the integrated video adapter on the system board is being used. If an optional video adapter is being used, replace the failing video adapter.

One long and two short beeps

This beep combination indicates that a video I/O adapter ROM is not readable, or the video subsystem is defective. If you hear this beep combination twice, both the server system board and an optional video adapter have failed the test. This beep combination might also indicate that your server system board contains a failing component.

One long and three short beeps

This beep combination indicates that the system-board video subsystem has not detected a monitor connection to the server. Ensure that the monitor is connected to the server. If the problem persists, replace the monitor.

POST Beep Codes

Two long and two short beeps

This beep combination indicates that POST does not support the optional video adapter. This beep combination occurs when a video adapter is installed that is incompatible with your server. Replace the optional video adapter with one that is supported by the server or use the integrated video controller on the system board.

POST Beep Code Table

Beep Code	Description
1-1-2	Microprocessor register test has failed.
1-1-3	CMOS write/read test has failed.
1-1-4	BIOS ROM checksum has failed.
1-2-1	Programmable Interval Timer test has failed.
1-2-2	DMA initialization has failed.
1-2-3	DMA page register write/read test has failed.
1-4-3	Interrupt vector loading test has failed.
2-1-1	Secondary DMA register test has failed.
2-1-2	Primary DMA register test has failed.
2-1-3	Primary interrupt mask register test has failed.
2-1-4	Secondary interrupt mask register test has failed.
2-2-1	Interrupt vector loading has failed.
2-2-2	Keyboard controller test has failed.
2-2-3	CMOS power failure and checksum checks have failed.
2-2-4	CMOS configuration information validation has failed.
2-3-2	Screen memory test has failed.
2-3-3	Screen retrace tests have failed.
2-3-4	Search for video ROM has failed.
2-4-1	Screen test indicates the screen is operable.
3-1-1	Timer tick interrupt test has failed.
3-1-2	Interval timer channel 2 test has failed.
3-1-3	RAM test has failed above address hex 0FFFF.
3-1-4	Time-of-Day clock test has failed.
3-2-1	Serial port test has failed.
3-2-2	Parallel port test has failed.
3-2-3	Math Coprocessor test has failed.
3-2-4	Comparison of CMOS memory size against actual has failed.
1-2-4	RAM refresh verification has failed.
1-3-1	First 64 Kb RAM test has failed.
1-3-2	First 64 Kb RAM parity test has failed.
3-3-1	A memory size mismatch has occurred.
	Action: Reseat the memory modules. If the problem persists, have the system serviced.
2-3-1	Screen initialization has failed.
	Action: Make sure that a jumper is installed on pins 1 and 2 of the Reset Video Controller jumper (J14) on the system board. (This is the default position, which enables the video controller on the system board.) If the problem persists, have the system serviced.
3-3-2	I2C bus has failed.
	Action: Turn off the server and then restart the server. If the problem persists, have the system serviced.

Diagnostic Error Message Tables

Error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing of complex problems indicated by error messages should be performed by trained service personnel.

Sometimes the first error to occur causes additional errors. In this case, the server displays more than one error message. Always follow the suggested action instructions for the *first* error message that appears.

The following pages contain the error codes that you might receive in the diagnostic program detailed test log and summary log when running the diagnostic programs for your Netfinity 5500 M10.

The format for the codes is:

fff-ttt-iii-date-cc-text message

where:

- fff** is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.
- ttt** is the three-digit failure code that indicates the exact test failure that was encountered. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)
- iii** is the three-digit device ID. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)
- date** is the date that the diagnostic test was run and the error recorded.
- cc** is the check digit that is used to verify the validity of the information.
- text message** is a message that the diagnostic program generates that indicates the reason for the problem. More information about the text message follows.

Text Messages

The text message format is:

Function Name: Result (test specific string)

where:

Function Name is the name of the function being tested when the error occurred. This corresponds to the function code (fff) given in the previous list.

Result can be one of the following:

- Passed** This result occurs when the diagnostic test completes without any errors.
- Failed** This result occurs when the diagnostic test discovers an error.
- Aborted** This result occurs when the user ends the diagnostic test before it is complete.
- Warning** This result occurs when a possible problem is reported during the diagnostic test, such as when a device that is to be tested is not installed.

Test Specific String This is additional information that the user can use to analyze the diagnostic problem.

Failed Diagnostic Messages

The following tables display the primary hardware failure messages that the diagnostics might display.

Function: Core System Messages (001)

Result	Test Specific String
Failed	System board. Action: Have the system serviced.

Function: Video System Messages (005)

Result	Test Specific String
Failed	Processor and system boards. Action: Have the system serviced.

Function: Serial Port Messages (011)

Result	Test Specific String
Failed	Built-in serial port on system board. Action: Have the system serviced.

Function: Parallel Port Messages (014)

Result	Test Specific String
Failed	Built-in parallel port on system board. Action: Have the system serviced.

Function: USB Port Interface Messages (015)

Result	Test Specific String
Failed	System board. Action: Have the system serviced.

Function: PCI Interface Messages (020)

Result	Test Specific String
Failed	Tab on PCI Hot Swap slot #1 is bad. Action: Make sure the tab and latch on hot-plug PCI slot 1 are closed correctly. Note: For normal operation, the Power LED for the hot-plug PCI slot will be on and the Attention LEDs will be off. If the problem persists, have the system serviced.
Failed	Tab on PCI Hot Swap slot #2 is bad. Action: Make sure the tab and latch on hot-plug PCI slot 2 are closed correctly. Note: For normal operation, the Power LED for the hot-plug PCI slot will be on and the Attention LEDs will be off. If the problem persists, have the system serviced.
Failed	Tab on PCI Hot Swap slot #3 is bad. Action: Make sure the tab and latch on hot-plug PCI slot 3 are closed correctly. Note: For normal operation, the Power LED for the hot-plug PCI slot will be on and the Attention LEDs will be off. If the problem persists, have the system serviced.

Result	Test Specific String
Failed	Tab on PCI Hot Swap slot #4 is bad. Action: Make sure the tab and latch on hot-plug PCI slot 4 are closed correctly. Note: For normal operation, the Power LED for the hot-plug PCI slot will be on and the Attention LEDs will be off. If the problem persists, have the system serviced.
Failed	System board. Action: Have the system serviced.

Function: SCSI Interface Messages (030)

Result	Test Specific String
Failed	Internal SCSI interface. Action: Have the system serviced.

Function: RAID Messages (035)

Result	Test Specific String
Failed	On system board. Action: Have the system serviced.
Failed	On system board adapter; indicates POST error Action: Have the system serviced.
Failed	On system board testing drive in bay #1, SCSI ID 0 Action: Have the system serviced.
Failed	On system board testing drive in bay #2, SCSI ID 1 Action: Have the system serviced.
Failed	On system board testing drive in bay #3, SCSI ID 2 Action: Have the system serviced.
Failed	On system board testing drive in bay #4, SCSI ID 3 Action: Have the system serviced.
Failed	On system board testing drive in bay #5, SCSI ID 4 Action: Have the system serviced.
Failed	On system board testing drive in bay #6, SCSI ID 5 Action: Have the system serviced.

Function: Power Supply Messages (075)

Result	Test Specific String
Failed	Voltage sensed by the system is out of range. Action: Have the system serviced.

Function: Microprocessor Error Messages (089)

Result	Test Specific String
Failed	Secondary microprocessor in socket number U6. Note: The Secondary Microprocessor Error LED will be on. See "Processor Board Component Locations" on page 167 for the location of the LED. Action: 1. Reseat the secondary microprocessor (in connector U6). 2. If the problem persists, replace the secondary microprocessor. If the problem persists, have the system serviced.
Failed	Microprocessor in socket number U5. Note: The Primary Microprocessor Error LED will be on. See "Processor Board Component Locations" on page 167 for the location of the LED. Action: 1. Reseat the primary microprocessor (in connector U5). 2. If the problem persists, replace the primary microprocessor. If the problem persists, have the system serviced.

Function: Netfinity Advanced System Management Processor Messages (165)

Result	Test Specific String
Failed	Netfinity Advanced System Management Processor on system board. Action: Have the system serviced.

Function: Thermal System Messages (175)

Function	Test Specific String
Failed	Fan #1 Note: The FAN1 LED on the diagnostics panel will also be on. Action: Replace fan 1. If the problem persists, have the system serviced.
Failed	Fan #2 Note: The FAN2 LED on the diagnostics panel will also be on. Action: Replace fan 2. If the problem persists, have the system serviced.
Failed	Fan #3 Note: The FAN3 LED on the diagnostics panel will also be on. Action: Replace fan 3. If the problem persists, have the system serviced.
Failed	Temperature sensed on processor board is out of range. Action: If one of the FAN LEDs on the diagnostics panel is on, replace the indicated fan. If the problem persists, have the system serviced.

Function: Status Display Messages (180)

Result	Test Specific String
Failed	Information LED panel. Action: Have the system serviced.
Failed	Diagnostics LED panel. Action: Have the system serviced.
Failed	LED on system board. Action: Have the system serviced.
Failed	LED on processor board. Action: Have the system serviced.
Failed	LED on hot-swap SCSI backplane. Action: Have the system serviced.

Function: System Memory Messages (201)

Result	Test Specific String
Failed	DIMM location J1 Note: The DIMM 4 Error LED will be on. See "Processor Board Component Locations" on page 167 for the locations of the LED and the DIMMs. Action: <ol style="list-style-type: none">1. Reseat the DIMM in DIMM socket J1.2. If the problem persists, replace the DIMM. If the problem persists, have the system serviced.
Failed	DIMM location J2 Note: The DIMM 3 Error LED will be on. See "Processor Board Component Locations" on page 167 for the locations of the LED and the DIMMs. Action: <ol style="list-style-type: none">1. Reseat the DIMM in DIMM socket J2.2. If the problem persists, replace the DIMM. If the problem persists, have the system serviced.
Failed	DIMM location J3 Note: The DIMM 2 Error LED will be on. See "Processor Board Component Locations" on page 167 for the locations of the LED and the DIMMs. Action: <ol style="list-style-type: none">1. Reseat the DIMM in DIMM socket J3.2. If the problem persists, replace the DIMM. If the problem persists, have the system serviced.
Failed	DIMM location J4 Note: The DIMM 1 Error LED will be on. See "Processor Board Component Locations" on page 167 for the locations of the LED and the DIMMs. Action: <ol style="list-style-type: none">1. Reseat the DIMM in DIMM socket J4.2. If the problem persists, replace the DIMM. If the problem persists, have the system serviced.

Function: System Cache Messages (202)

Result	Test Specific String
Failed	Microprocessor in socket number U5. Note: The Primary Microprocessor Error LED will be on. See "Processor Board Component Locations" on page 167 for the location of the LED. Action: 1. Reseat the primary microprocessor (in connector U5). 2. If the problem persists, replace the primary microprocessor. If the problem persists, have the system serviced.
Failed	Microprocessor in socket number U6. Note: The Secondary Microprocessor Error LED will be on. See "Processor Board Component Locations" on page 167 for the location of the LED. Action: 1. Reseat the secondary microprocessor (in connector U6). 2. If the problem persists, replace the secondary microprocessor. If the problem persists, have the system serviced.

Function: Diskette Drive Messages (206)

Result	Test Specific String
Failed	Internal diskette drive bay. Action: Have the system serviced.

Function: CD-ROM Messages (215)

Result	Test Specific String
Failed	On system board. Action: Have the system serviced.

Function: Hard Disk Drive Messages (217)

Result	Test Specific String
Failed	BIOS drive #1. Action: Have the system serviced.
Failed	BIOS drive #2. Action: Have the system serviced.
Failed	BIOS drive #3. Action: Have the system serviced.
Failed	BIOS drive #4. Action: Have the system serviced.
Failed	BIOS drive #5. Action: Have the system serviced.
Failed	BIOS drive #6. Action: Have the system serviced.

Function: Keyboard Messages (301)

Result	Test Specific String
Failed	On system board keyboard test failed. Action: 1. Replace the keyboard. 2. If the problem persists, replace the keyboard cable. If the problem persists, have the system serviced.

Function: Pointing Device (Mouse) Messages (302)

Result	Test Specific String
Failed	On system board pointing device test failed. Action: Replace the pointing device (mouse). If the problem persists, have the system serviced.

Function: Ethernet Messages (405)

Result	Test Specific String
Failed	On system board. Action: Have the system serviced.

Failed Diagnostic Messages That Prevent Proper Testing

The following tables display failures that occur during diagnostics that prevent proper testing of the hardware.

Function: RAID Messages (035)

Result	Test Specific String
Failed	Test setup error: On system board. Cannot find RAID adapter on PCI bus or BIOS setup problem. Action: Have the system serviced.
Failed	Test setup error: On system board. PCI configuration of RAID adapter cannot be determined or BIOS setup problem. Action: Have the system serviced.

Function: Microprocessor Messages (089)

Result	Test Specific String
Failed	Test setup error: Primary microprocessor in socket number U5 is installed but not functioning; check system error log. Action: 1. Update the BIOS. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the primary microprocessor and run the microprocessor diagnostic program again. If the problem persists, have the system serviced.

Result	Test Specific String
Failed	<p>Test setup error: Secondary microprocessor in socket number U6 is installed but not functioning; check system error log.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the secondary microprocessor and run the microprocessor diagnostic program again. <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: Invalid microprocessor in socket number U5 or BIOS setup problem.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the primary microprocessor and run the microprocessor diagnostic program again. <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: Invalid microprocessor in socket number U6 or BIOS setup problem.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the secondary microprocessor and run the microprocessor diagnostic program again. <p>If the problem persists, have the system serviced.</p>
Warning	<p>Test setup error: Secondary microprocessor not installed or BIOS setup problem.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that the secondary microprocessor is installed and seated correctly. 2. If the problem persists, update the BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 3. If the problem persists, replace the secondary microprocessor and run the microprocessor diagnostic program again. <p>If the problem persists, have the system serviced.</p>

Function: System Memory Messages (201)

Result	Test Specific String
Failed	<p>Test setup error: Corrupt DMI BIOS, information in BIOS is not as expected.</p> <p>Action: Update the BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates.</p> <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: Unknown hardware problem associated with microprocessor in socket number U5.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS and run the diagnostic program again. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the primary microprocessor. <p>If the problem persists, have the system serviced.</p>

Result	Test Specific String
Failed	<p>Test setup error: Unknown hardware problem associated with microprocessor in socket number U6.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS and run the diagnostic program again. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the secondary microprocessor. <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: Corrupt BIOS in ROM.</p> <p>Action: Update the BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates.</p> <p>If the problem persists, have the system serviced.</p>

Function: System Cache Messages (202)

Result	Test Specific String
Failed	<p>Test setup error: No L2 cache detected on microprocessor socket U5 or BIOS setup problem.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS and run the diagnostic program again. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the primary microprocessor. <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: No L2 cache detected on microprocessor socket U6 or BIOS setup problem.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS and run the diagnostic program again. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the secondary microprocessor. <p>If the problem persists, have the system serviced.</p>
Warning	<p>Test setup error: Cache is disabled. Use system setup to enable before retrying the test.</p> <p>Action: Use the Cache Control selection in the Advanced Setup menu of the Configuration/Setup Utility program to enable the cache. (See “Advanced Setup” on page 24.)</p> <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: Corrupt DMI BIOS. Information in BIOS is not as expected.</p> <p>Action: Update the BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates.</p> <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: BIOS cannot access VPD information.</p> <p>Action: Update the BIOS. Refer to the “Getting Help Information” section of this <i>Server Library</i> for information about obtaining updates.</p> <p>If the problem persists, have the system serviced.</p>

Result	Test Specific String
Failed	<p>Test setup error: Unknown hardware problem associated with microprocessor in socket number U5.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the primary microprocessor and run the diagnostic program again. <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: Unknown hardware problem associated with microprocessor in socket number U6.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the BIOS. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining updates. 2. If the problem persists, replace the secondary microprocessor and run the diagnostic program again. <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: Cannot allocate memory due to unknown memory problem.</p> <p>Action: Have the system serviced.</p>

Ethernet Controller Messages

The integrated Ethernet controller might display messages from the following device drivers:

- Novell NetWare or IntraNetWare Server ODI
- NDIS Adapter for level 2.01 (OS/2)
- NDIS Adapter for level 4.0 (Windows NT)
- SCO UNIX LLI

Novell NetWare or IntraNetWare Server ODI Driver Messages

This section contains the error messages for the Novell NetWare or IntraNetWare server ODI driver. The explanation and recommended action are included with each message.

PCNTNW-NW-026 The MSM is unable to parse a required custom keyword.

Explanation: The user entered an incorrect parameter keyword.

Action: Reload the driver using the correct keyword.

PCNTNW-NW-054 The adapter did not respond to the initialization command.

Explanation: The adapter did not respond when the driver tried to initialize it.

Action: Verify that the Ethernet controller jumper on the system board is set to the default (enabled) position (see "System Board Jumpers" on page 165). If the jumper is set to the default (enabled) position, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

PCNTNW-NW-058 The adapter did not respond to the initialization command.

Explanation: The interrupt request (IRQ) setting might not be valid or the EEPROM information might be incorrect.

Action: Make sure the IRQ settings are correct in the configuration programs. See "PCI Bus Control" on page 24 for information on setting the interrupt requests. If the IRQ settings are correct, have the system serviced.

PCNTNW-NW-066 The cable might be disconnected from the adapter.

Explanation: The cable might be disconnected from the server Ethernet port.

Action: Verify that a cable is connected to the Ethernet port.

PCNTNW-NW-071 The matching virtual adapter could not be found.

Explanation: You tried to load another instance of the driver with a different I/O address. This new adapter could not be found.

Action: Verify that you installed an IBM Netfinity 10/100 Fault Tolerant Adapter and make sure that the adapter is seated correctly. If the adapter is seated correctly, have the system serviced.

PCNTNW-NW-072 A resource tag is unavailable.

Explanation: The driver tried to allocate some resources that were not available.

Action: Add or free some memory in the server. Then, restart the server.

PCNTNW-NW-073 Unable to allocate memory.

Explanation: The driver failed to allocate the memory needed for normal operation.

Action: Add more memory, or free some memory resources in the server. Then, restart the server.

PCNTNW-NW-074 The hardware interrupt cannot be set.

Explanation: An attempt was made to initialize a given hardware interrupt. The attempt was not successful.

Action: Verify that the Ethernet controller jumper on the system board is set to the default (enabled) position (see "System Board Jumpers" on page 165).

Make sure that the interrupt request numbers are set correctly. If you are using an ISA adapter, make sure resources are reserved as ISA Legacy in the configuration programs (see "Plug and Play" on page 25.)

PCNTNW-NW-075 The Multiple Link Interface Driver (MLID) cannot be registered with the Link Support Layer (LSL).

Explanation: An error occurred while the driver was trying to register with the LSL.

Action: Check the version of the NetWare or IntraNetWare Operating System. Make sure that this driver is correct for the version of NetWare or IntraNetWare that you are using. Restart the server.

PCNTNW-NW-079 The Multiple Link Interface Driver (MLID) did not initialize MSMTx Free Count.

Explanation: The MSMTx Free Count is not initialized correctly.

Action: Restart the server. If the problem persists, have the system serviced.

PCNTNW-NW-086 The driver parameter block is too small.

Explanation: The driver parameter block is too small.

Action: Restart the server. If the problem persists, have the system serviced.

PCNTNW-NW-087 The media parameter block is too small.

Explanation: The driver media parameter block is too small.

Action: Restart the server. If the problem persists, have the system serviced.

PCNTNW-NW-091 The hardware configuration conflicts.

Explanation: You tried to load a new frame type for the existing controller. The hardware assumptions made in doing so are incorrect. This error can also occur if you try to specify a mode (such as, redundancy) that conflicts with another specified mode.

Action: Make sure that your hardware configuration matches the software settings. See "PCI Bus Control" on page 24 for information on viewing and changing interrupt requests.

PCNTNW-NW-126 The group bit in the node address override was cleared.

Explanation: The IEEE address has a group bit indicating that an address belongs to a group of stations. This bit is used only as a destination address; it cannot be used as a source address. You tried to enter a source address with this bit set. The driver cleared the group bit of the source address.

Action: None necessary, message is for information only.

PCNTNW-NW-127 The local bit in the node address override was set.

Explanation: The local bit in the IEEE address format indicates that the addresses are being managed locally. If you use the node address override capabilities of this driver to enter a new address, the local bit must be set. You entered an address without the local bit set. The driver has set the local bit.

Action: None necessary, message is for information only.

PCNTNW-NW-164 The device was not found.

Explanation: The driver cannot find an Ethernet controller in the server.

Action: Verify that the Ethernet controller jumper is set to the default (enabled) position (see "System Board Jumpers" on page 165). If the jumper is set to the default (enabled) position, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

PCNTNW-NW-165 The device was not found at I/OADDRESS.

Explanation: The Ethernet controller cannot be found at the I/O address specified.

Action: The Ethernet controller does not require a parameter for the I/O address. Remove the I/O address parameter.

PCNTNW-NW-167 PCI scan specified, device not found.

Explanation: The driver cannot locate the Ethernet controller on the PCI bus.

Action: Verify that the Ethernet controller jumper on the system board is set to the default (enabled) position (see "System Board Jumpers" on page 165).

If the problem persists, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

PCNTNW-NW-180 The DMA parameter is not necessary for PCI device.

Explanation: The Ethernet controller does not require a DMA setting.

Action: None necessary, message is for information only.

NDIS 2.01 (OS/2) Driver Messages

This section contains the error messages for the NDIS 2.01 (OS/2) drivers. The explanation and recommended action are included with each message.

PCNTND-1 Unable to open the Protocol Manager.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-6 Out of memory while allocating buffers.

Explanation: The driver could not allocate the requested buffers.

Action: Check your system configuration. Edit the PROTOCOL.INI file to reduce the number of Tx buffers and Rx buffers specified for the driver.

PCNTND-7 A Protocol Manager device error occurred.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-8 Bad status for the Protocol Manager.

Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file.

Action: Check and correct your configuration.

PCNTND-9 Cannot find the PROTOCOL.INI entry.

Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file.

Action: Check and correct your configuration.

PCNTND-10 The Protocol Manager Input Output Control (IOCTL) failed.

Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file.

Action: Check and correct your configuration.

PCNTND-11 Protocol Manager registration failed.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-15 Device not found.

Explanation: The driver cannot find an Ethernet controller in the server.

Action: Verify that the Ethernet controller jumper is set to the default (enabled) position (see "System Board Jumpers" on page 165). If the jumper is set to the default (enabled) position, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

PCNTND-16 PCI scan specified, device not found.

Explanation: The driver cannot locate the Ethernet controller on the PCI bus.

Action: Verify that the Ethernet controller jumper is set to the default (enabled) position (see "System Board Jumpers" on page 165). If the jumper is set to the default (enabled) position, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

PCNTND-21 The adapter failed the checksum test.

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller jumper is set to the default (enabled) position (see "System Board Jumpers" on page 165). If the jumper is set to the default (enabled) position, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

PCNTND-23 WARNING: PCNET IRQ found = xx

Explanation: The interrupt request (IRQ) setting (xx) in the PROTOCOL.INI file does not match the hardware IRQ setting.

Action: Remove the IRQ setting from the PROTOCOL.INI file or change the IRQ setting in the PROTOCOL.INI file to match the IRQ setting shown in the **PCI Routing** selection of the System Information menu in the Configuration/Setup Utility program. (See "PCI Routing" on page 19.)

PCNTND-24 WARNING: PCNET IRQ does not match PROTOCOL.INI.

Explanation: The interrupt request (IRQ) setting in the PROTOCOL.INI file does not match the hardware IRQ setting.

Action: Remove the IRQ setting from the PROTOCOL.INI file or change the IRQ setting in the PROTOCOL.INI file to match the IRQ setting shown in the **PCI Routing** selection of the System Information menu in the Configuration/Setup Utility program. (See "PCI Routing" on page 19.)

PCNTND-25 PCI scan specified, PCI bus not found!

Explanation: The driver cannot locate the PCI bus.

Action: Run the diagnostic utility (see "Diagnostic Programs" on page 102).

PCNTND-29 WARNING: DMA number is not necessary for PCI device.

Explanation: The Ethernet controller does not require a DMA setting.

Action: Remove the DMA setting in the PROTOCOL.INI file.

PCNTND-33 PCNET device with specified IOBASE is already in use.

Explanation: The specified I/O address number is already in use by another Ethernet controller or device.

Action: Remove the I/O address setting in the PROTOCOL.INI file.

NDIS 4.0 (Windows NT) Driver Messages

This section contains the error messages for the NDIS 4.0 drivers. The explanation and recommended action are included with each message.

PermaNet(tm) Server: No Secondary Adapter Found. Grouping Mode is disabled.

Explanation: The failover option requires an adapter that is compatible with the device driver of the Ethernet controller on the system board. No such adapter was found.

Action: Make sure the correct adapter is installed.

PermaNet(tm) Server: Problem Occurs on the Primary Adapter. Switching over to the Secondary Adapter.

Explanation: The system detected a problem with the primary Ethernet connection and has transferred all network traffic to the secondary Ethernet controller.

Action: Identify the cause of the failure on the primary Ethernet connection. Restoring the operational state of the primary connection will cause the network traffic to automatically transfer to the primary Ethernet controller.

PermaNet(tm) Server: Switching back to Primary Adapter.

Explanation: The primary Ethernet connection is now operating correctly. Network traffic will automatically transfer to the primary Ethernet controller.

Action: None needed, message is for information only.

UNIX Messages

This section contains the error messages for the SCO UNIX LLI driver.

pnt0-2 PCI search specified, PCI device not found!

Explanation: The driver cannot locate the Ethernet controller on the PCI bus.

Action: Run the NETCONFIG program to search for another Ethernet controller.

Verify that the Ethernet controller jumper is set to the default (enabled) position (see "System Board Jumpers" on page 165).

If the problem persists, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

pnt0-6 Cannot allocate memory for the adapter during an interrupt. Please check your Streams parameters.

Explanation: On a SunSoft Solaris system, this message indicates that the system is out of Streams memory blocks.

Action: Use the CRASH utility to increase the number of Streams memory blocks.

Modify the interrupt request (IRQ) settings in the configuration programs, or run the NETCONFIG program to match the hardware settings.

pnt0-7 Cannot allocate memory for the adapter during reset. Please check your Streams parameters.

Explanation: The system is out of Streams memory blocks.

Action: Use the CRASH utility to increase the number of Streams memory blocks.

pnt0-11 Device not found!

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller jumper is set to the default (enabled) position (see "System Board Jumpers" on page 165). If the jumper is set to the default (enabled) position, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

pnt0-12 Device failed checksum test!

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller jumper is set to the default (enabled) position (see "System Board Jumpers" on page 165). If the jumper is set to the default (enabled) position, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

pnt0-13 add_intr_handler failed! Interrupts already enabled.

Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

Action: Modify your hardware settings.

Run the NETCONFIG program to match the hardware settings.

pnt0-14 Cannot locate hardware.

Explanation: The SunSoft Solaris driver cannot find any Ethernet controller.

Action: Verify that the Ethernet controller jumper is set to the default (enabled) position (see "System Board Jumpers" on page 165). If the jumper is set to the default (enabled) position, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

pnt0-15 No more devices to open.

Explanation: The SunSoft Solaris driver cannot find any more Ethernet controllers.

Action: Verify that additional IBM Netfinity 10/100 Fault Tolerant Adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

pnt0-17 Device fault...Reset initiated!

Explanation: The SunSoft Solaris driver has been reset due to a device fault.

Action: Verify that additional IBM Netfinity 10/100 Fault Tolerant Adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, go to "Diagnostic Programs" on page 102 to run the diagnostic utility.

pnt0-19 IRQ found for PCnet hardware does not match space.c (or pnt.conf)!

Explanation: This is a warning message referring to the interrupt request (IRQ) that the SunSoft Solaris driver found in the system.

Action: Ignore this message if you are sure that this is what you want to do. Otherwise, run the NETCONFIG program to match the hardware settings.

pnt0-20 add_intr_handler failed! Unknown interrupt type.

Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

pnt0-21 add_intr_handler failed! Out of range interrupt number.

Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

pnt0-22 add_intr_handler failed! Out of range IPL.

Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

pnt0-23 add_intr_handler failed! Vector already occupied.

Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

pnt0-24 add_intr_handler failed! Vector already shared at different IPL.

Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

pnt0-26 The DMA number is not necessary for PCI device.

Explanation: The IBM Netfinity 10/100 Fault Tolerant Adapter does not require a DMA setting.

Action: Edit the SPACE.C file to delete the DMA parameter.

pnt0-29 The IRQ number is already in use.

Explanation: The specified I/O address is already in use.

Action: Run the NETCONFIG program to modify your hardware settings.

pnt0-31 I/O address is not necessary for the PCI device.

Explanation: The I/O address specified is not required.

Action: Remove the assigned I/O address specified for the Ethernet controller.

Troubleshooting

You can use the troubleshooting charts in this section to find solutions to problems that have definite symptoms.

Note: Review “Electrical Safety” on page 35 before you start troubleshooting.

Troubleshooting Charts

Look for the symptom in the left column of the chart. Instructions and probable solutions to the problem are in the right column. If you have just added new software or a new option and your server is not working, do the following before using the troubleshooting charts:

- Remove the software or device that you just added.
- Run the diagnostic tests to determine if your server is running correctly.
- Reinstall the new software or new device.

Integrated ServeRAID Controller Problems	
Controller Problems	Action
Drives are not responding or errors are reported when ServeRAID BIOS is loaded during POST.	<p>If the RAID System Error LED (CR32) on the system board is on, have your system serviced.</p> <p>If the RAID System Error LED (CR32) is not on, check the RAID Channel 1 Error LED (CR30) and the RAID Channel 2 Error LED (CR31) on the system board.</p> <ol style="list-style-type: none"> 1. If either CR30 or CR31 is on and not flashing, have your system serviced. 2. If either CR30 or CR31 is flashing in a pattern of 3 or 6 flashes followed by a pause, update the ServeRAID controller microcode. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining updates. <p>If a problem still exists, have the system serviced.</p> <p>Note: See "System Board Component Locations" on page 164 for the locations of the LEDs on the system board.</p>
CD-ROM Drive Problems	
Problems	Action
The CD is not working properly.	<p>Clean the CD by wiping it with a soft, lint-free cloth, from the center of the CD to the outer edge. Do not clean in a circular pattern. This can cause loss of data.</p> <p>If this does not correct the problem, clean the optical-head lens. Discs for cleaning the lens are available from your place of purchase.</p> <p>If a problem still exists, have the system serviced.</p>
The CD-ROM drive tray is not working.	<p>The server must be turned on. If the server is on and the tray does not eject, insert the end of a paper clip into the manual tray-release opening. If the drive still does not work correctly, have the system serviced.</p>
The CD-ROM drive is not recognized.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The primary IDE channel is enabled in the Configuration/Setup Utility program. 2. All cables and jumpers are installed correctly. 3. The correct device driver is installed for the CD-ROM drive.

Diskette Drive Problems	Action
The diskette drive in-use light stays on, or the system bypasses the diskette drive.	<p>If there is a diskette in the drive, verify that:</p> <ol style="list-style-type: none"> 1. The diskette drive is enabled in the configuration programs. 2. The diskette is good and not damaged. (Try another diskette if you have one.) 3. The diskette is inserted correctly in the drive. 4. The diskette contains the necessary files to start the server. 5. Your software program is OK. See "Software Problem" on page 138. <p>If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, have the system serviced.</p>
Monitor Self-Tests	Action
	<p>Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, refer to the information that comes with the monitor for adjusting and testing instructions.</p> <p>If you still cannot find the problem, have the monitor and system serviced.</p>
Monitor Problems	Action
The screen is blank.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The server power cord is plugged into the server and a working electrical outlet. 2. The monitor power cord is plugged into the monitor and a working electrical outlet. 3. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. 4. The monitor signal cable is connected to the correct connector on the server. <p>If the items above are correct and the screen remains blank, have the system serviced.</p>
Only the cursor appears.	Have the system serviced.
The monitor works when you turn on the server, but goes blank when you start some application programs.	<p>Verify that the primary monitor cable is connected to the video port. To find the video port, see "Input/Output Connectors and Expansion Slots" on page 9.</p> <p>Be sure that you installed the necessary device drivers for the applications.</p>
The screen flickers.	<p>Set the monitor for the highest, noninterlaced refresh rate available. To reset the refresh rate, use a utility program, such as AnyView Professional or WinMode.</p>

Monitor Problems	Action
Wavy, unreadable, rolling, distorted screen, or screen jitter.	<p>If the monitor self-tests show the monitor is OK, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor.</p> <p>Note:</p> <ol style="list-style-type: none"> 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, see your IBM reseller or IBM marketing representative. <p>If the problem still exists, have the monitor and system serviced.</p>
Wrong characters appear on the screen.	<p>If the wrong language is displayed, update the BIOS with the correct language. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining updates for the BIOS.</p> <p>If the problem still exists, have the system serviced.</p>
General Problems	Action
Problems such as broken cover locks or indicator lights not working.	Have the system serviced.
Power Problems	Action
The server does not power on.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The power cables are properly connected to the server. 2. The power outlet functions properly. 3. The type of memory installed is correct. 4. If you just installed an option, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports. 5. The LEDs on the power supply are on. See "Power Supply LEDs" on page 141 for more information about the power supply LEDs. <p>If the problem still exists, have the system serviced.</p>
Intermittent Problems	Action
A problem occurs only occasionally and is difficult to detect.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. All cables and cords are connected securely to the rear of the server and attached options. 2. When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no air flow, the fan is not working. This causes the server to overheat and shut down. 3. Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. See "SCSI Drives" on page 60. <p>If the items above are correct, have the system serviced.</p>

Microprocessor Problems	Action
The server emits a continuous tone during POST.	<p>The startup (boot) microprocessor is not working properly. If your server contains two microprocessors the microprocessor in the secondary microprocessor socket is the startup microprocessor.</p> <ol style="list-style-type: none"> 1. Verify that the startup microprocessor is seated properly. 2. If your server contains two microprocessors, remove the startup microprocessor and restart the server. If the server starts properly, replace the old startup microprocessor. 3. Replace the startup microprocessor. Restart the server. <p>If the problem still exists, have the system serviced.</p>
Keyboard, Mouse, or Pointing-Device Problems	Action
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"> 1. Make sure that the keyboard cable is properly connected to the server. 2. Make sure that the server and the monitor are turned on. 3. Try using another keyboard. <p>If the items above are correct, have the system serviced.</p>
The mouse or pointing device does not work.	<ol style="list-style-type: none"> 1. Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly. 2. Try using another mouse or pointing device. <p>If the problem still exists, have the server and the device serviced.</p>
Memory Problems	Action
The amount of memory displayed is less than the amount of memory installed.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The memory modules are seated properly. 2. You have installed the correct type of memory (see "Installing Memory-Module Kits" on page 56). 3. If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 17. 4. All banks of memory on the DIMMs are enabled (see "Memory Settings" on page 24). The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. <p>If the above items are correct, run the memory diagnostic program. The system might have detected a bad memory module and automatically reallocated memory to enable you to continue to operate. If the memory tests fail, have the system serviced or replace the failing DIMM.</p>
Option Problems	Action
An IBM option that used to work does not work now.	<p>Verify that all of the option hardware and cable connections are secure.</p> <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the failing option is a SCSI option, verify that:</p> <ol style="list-style-type: none"> 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. <p>If the problem still exists, have the system serviced.</p>

Option Problems	Action
An IBM option that was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The option is designed for the server. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining ServerProven compatibility information from the World Wide Web. 2. You followed the installation instructions that come with the option. 3. The option is installed correctly. 4. You have not loosened any other installed options or cables. 5. You updated the configuration information in the Configuration/Setup utility program. Whenever memory or an option is changed, you must update the configuration. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 17. <p>If the problem still exists, have the system serviced.</p>
Parallel Port Problems	Action
The number of parallel ports displayed is less than the number of parallel ports installed.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. Each port is assigned a unique address. 2. The parallel-port adapter, if you installed one, is seated properly. <p>If the problem still exists, have the system serviced.</p>
Serial Port Problems	Action
The number of serial ports identified by the operating system is less than the number of serial ports installed.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports are disabled. <ul style="list-style-type: none"> Note: The management C connector is the same as a serial port connector, but it is used only by the integrated Netfinity Advanced System Management Processor, and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured using Netfinity Manager. 2. The serial-port adapter, if you installed one, is seated properly. <p>If the problem still exists, have the system serviced.</p>
A serial device does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The device is compatible with the server. Refer to the "Getting Help Information" section of this <i>Server Library</i> for information about obtaining ServerProven compatibility information from the World Wide Web. 2. The serial port is enabled and is assigned a unique address. 3. Make sure that the device is not connected to the management port C. <ul style="list-style-type: none"> Note: The management C connector is the same as a serial port connector, but it is used only by the integrated Netfinity Advanced System Management Processor and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured using Netfinity Manager. <p>If the problem still exists, have the system serviced.</p>

Universal Serial Bus (USB) Port Problems	Action
A USB device does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. <p>Note: If a standard (non-USB) keyboard is attached to the keyboard port, then the USB is disabled and no USB device will work during POST.</p> 2. The correct USB device driver is installed. 3. Your operating system supports USB devices. <p>If the problem still exists, have the system serviced.</p>
Printer Problems	Action
The printer does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The printer is turned on and is online. 2. The printer signal cable is connected to the correct serial or parallel port on the server. For the location of the serial or parallel port, see "Input/Output Connectors and Expansion Slots" on page 9. <p>Note: Non-IBM printer cables might cause unpredictable problems.</p> 3. You have assigned the printer port correctly in your operating system or application program. 4. You have assigned the printer port correctly using the configuration programs. <p>If the items above are correct and the printer still does not work, run the tests described in the documentation that comes with your printer. If the tests show that the printer is OK, have the system serviced.</p>
Expansion Enclosure Problems	Action
The SCSI expansion enclosure used to work, but does not work now.	<p>Verify that all of the SCSI expansion enclosure hardware and cable connections are secure.</p> <p>Verify that:</p> <ol style="list-style-type: none"> 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. <p>For more information, see your SCSI and expansion enclosure documentation.</p> <p>If the SCSI expansion enclosure comes with its own test instructions, use those instructions to test it. In addition, test the power supply.</p> <p>If the items above are correct and the test programs found no problem, have the server and SCSI expansion enclosure serviced.</p>

Software Problem	Action
Suspected software problem.	<p>To determine if problems are caused by the software, verify that:</p> <ol style="list-style-type: none">1. Your server has the minimum memory requirements needed to use the software. For memory requirements, refer to the information that comes with the software. <p>Note: If you have just installed an adapter or memory, you might have a memory address conflict.</p> <ol style="list-style-type: none">2. The software is designed to operate on your server.3. Other software works on your server.4. The software that you are using works on another system. <p>If you received any error messages when using the software program, refer to the information that comes with the software for a description of the messages and solutions to the problem.</p> <p>If the items above are correct and the problem remains, contact your place of purchase.</p>

Netfinity Service Processor Manager Problems

	Action
Netfinity Service Processor Manager reports a general monitor failure	<p>If the Systems Management Processor Error LED (CR24) on the system board is on, have your system serviced. See "System Board Component Locations" on page 164 for the location of the LED.</p> <p>If the Systems Management Processor Error LED (CR24) is not on, disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server.</p> <p>If a problem still exists, have the system serviced.</p>

Note: If you cannot find the problem in the troubleshooting charts, go to "Running Diagnostic Programs" on page 102 to test the server. If you have run the diagnostic test programs or if running the tests does not reveal the problem, have the system serviced.

Troubleshooting the Ethernet Controller

This section provides troubleshooting information for problems that might occur with the 10/100 Mbps Ethernet controller.

Network Connection Problems

If the Ethernet controller cannot connect to the network, check the following:

- Make sure that the cable is installed correctly.

The network cable must be securely attached at all connections. If the cable is attached but the problem persists, try a different cable.

If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.

If you directly connect two workstations (without a hub), or if you are not using a hub with X ports, use a crossover cable.

Note: To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.

- Determine if the hub supports auto-negotiation. If not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller lights on the information panel.

These lights indicate whether a problem exists with the connector, cable, or hub.

- The Ethernet Link Status light illuminates when the Ethernet controller receives a LINK pulse from the hub. If the light is off, there might be a bad connector or cable, or a problem with the hub.
 - The Ethernet Transmit/Receive Activity light illuminates when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet Transmit/Receive Activity light is off, make sure that the hub and network are operating and that the correct device drivers are loaded.
 - The Ethernet Speed 100 Mbps light illuminates when the Ethernet controller LAN speed is 100 Mbps.
- Make sure that you are using the correct device drivers, supplied with your server.
 - Check for operating system-specific causes for the problem.
 - Make sure that the device drivers on the client and server are using the same protocol.
 - Test the Ethernet controller.

How you test the Ethernet controller depends on which operating system you are using (see “Configuring the Ethernet Controller” on page 29).

Ethernet Controller Troubleshooting Chart

You can use the following troubleshooting chart to find solutions to 10/100 Mbps Ethernet controller problems that have definite symptoms.

Controller Problem	Action
The server stops running when loading device drivers.	<p>The PCI BIOS interrupt settings are incorrect.</p> <p>Check the following:</p> <ul style="list-style-type: none"> • Determine if the interrupt (IRQ) setting assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program. <p>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet controller or the other device. (See “Resolving Configuration Conflicts” on page 140.)</p> <ul style="list-style-type: none"> • For NetWare and IntraNetWare, do not use IRQ 14 or 15 for PCI devices. IRQ 14 is used for IDE devices (CD-ROM drive). If the IDE CD-ROM in your system is disabled, reserve IRQ 14 as ISA Legacy in the Plug and Play menu of the Configuration/Setup Utility program. (See “Plug and Play” on page 25.) IRQ 15 should be reserved for ISA legacy devices. • Make sure that you are using the most recent device driver available from the World Wide Web. (Refer to the “Getting Help Information” section of this <i>Server Library</i> for World Wide Web addresses.) • Run the network diagnostic program. <p>If the problem still exists, have the system serviced.</p>

Resolving Configuration Conflicts

Controller Problem	Action
Ethernet Link Status light does not light.	<p>Check the following:</p> <ul style="list-style-type: none">• Make sure that the hub is turned on.• Check all connections at the Ethernet controller and the hub.• Check the cable. A crossover cable is required unless the hub has an X designation.• Use another port on the hub.• If the hub does not support auto-negotiation, manually configure the Ethernet controller to match the hub.• If you manually configured the duplex mode, make sure that you also manually configure the speed.• Run diagnostics for the LEDs. <p>If the problem still exists, have the system serviced.</p>
The Ethernet Transmit/Receive Activity light does not light.	<p>Check the following:</p> <p>Note: The Ethernet Transmit/Receive Activity LED illuminates only when data is sent to or by this Ethernet controller.</p> <ul style="list-style-type: none">• Make sure that you have loaded the network device drivers.• The network might be idle. Try sending data from this workstation.• Run diagnostics on the LEDs.• The function of this LED can be changed by device driver load parameters. If necessary, remove any LED parameter settings when you load the device drivers.
Data is incorrect or sporadic.	<p>Check the following:</p> <ul style="list-style-type: none">• Make sure that you are using Category 5 cabling when operating the server at 100 Mbps.• Make sure that the cables do not run close to noise-inducing sources like fluorescent lights.
The Ethernet controller stopped working when another adapter was added to the server.	<p>Check the following:</p> <ul style="list-style-type: none">• Make sure that the cable is connected to the Ethernet controller.• Make sure that your PCI system BIOS is current.• Reseat the adapter (see “Working with Adapters” on page 42).• Determine if the interrupt (IRQ) setting assigned to the Ethernet adapter is also assigned to another device in the Configuration/Setup Utility program. <p>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet adapter or the other device. (See “Resolving Configuration Conflicts” on page 140.)</p> <p>If the problem still exists, have the system serviced.</p>
The Ethernet controller stopped working without apparent cause.	<p>Check the following:</p> <ul style="list-style-type: none">• Run diagnostics for the Ethernet controller.• Try a different connector on the hub.• Reinstall the device drivers. Refer to your operating-system documentation and to the “ServerGuide and Netfinity Manager Information” section of this <i>Server Library</i>. <p>If the problem still exists, have the system serviced.</p>

Resolving Configuration Conflicts

The Configuration/Setup Utility program configures only the server hardware. It does not consider the requirements of the operating system or the application programs. For these reasons, memory-address configuration conflicts might occur.

Changing the Software Configuration Setup

The best way to resolve memory-address conflicts is to change the software configuration by changing the addresses that the EMS device driver defined. The SVGA video memory occupies 32 Kb (1 Kb = approximately 1000 bits) of space in the hex C0000 to C7FFF EMS memory area. EMS device drivers must use addresses different from those assigned to video read-only memory (ROM). You can use the Configuration/Setup Utility program to view or change the current setting for video ROM. For information about using the configuration programs, see “Using the Configuration/Setup Utility Program Main Menu” on page 17.

Changing the Hardware Configuration Setup

An alternative way to resolve memory-address conflicts is to change the address of the conflicting hardware option. See “Plug and Play” on page 25 for information about reserving resources for ISA legacy adapters.

Identifying Problems Using Status LEDs

Your server has LEDs to help you identify problems with some server components. These LEDs are part of the light path diagnostics built into the server. By following the *path of lights*, you can quickly identify the type of system error that occurred. See “Light Path Diagnostics” on page 143 for more information.

Status LEDs are located on the following components:

- Information panel
For more information, see “Information LED Panel” on page 8.
- Hard disk drive trays
For more information, see “Controls and Indicators” on page 6.
- Power supply
For more information, see “Power Supply LEDs.”
- Diagnostic panel
For more information, see “Diagnostics Panel LEDs” on page 143.
- Processor board
See “Processor Board Component Locations” on page 167 for locations of the LEDs on the processor board.
- System board
See “System Board Component Locations” on page 164 for locations of the LEDs on the system board.

Power Supply LEDs

The AC and DC Power LEDs on the power supply provide status information about the power supply. See “Power Supplies” on page 11 for the location of these LEDs.

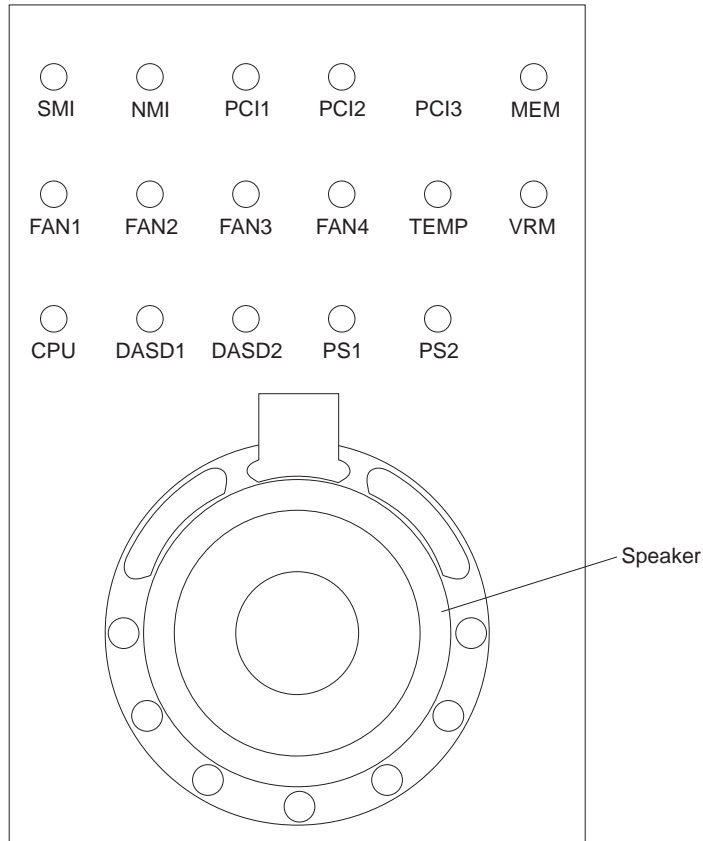
The following table describes the AC and DC Power LEDs.

Identifying Problems Using Status LEDs

AC Power LED	DC Power LED	Description and Action
On	On	The power supply is on and operating correctly.
On	Off	<p>There is a DC power problem.</p> <p>Possible causes:</p> <ol style="list-style-type: none"> 1. The Power Control button on the front of the server is in the Off position. Action: Press the Power Control button to start the server. 2. The Power switch on the power supply is in the Off position. Action: Turn the Power switch to the On position. 3. The power supply has failed. Action: Replace the power supply. <p>If the problem persists, have the system serviced.</p>
Off	Off	<p>There is an AC power problem.</p> <p>Possible causes:</p> <ol style="list-style-type: none"> 1. There is no AC power to the power supply. Actions: Verify that: <ul style="list-style-type: none"> • The power cord is properly connected to the server. • The power outlet functions properly. 2. The power supply has failed. Action: Replace the power supply. <p>If the problem persists, have the system serviced.</p>

Diagnostics Panel LEDs

The following illustration shows the LEDs on the diagnostics panel inside the server. See “Light Path Diagnostics” for information on identifying problems using these LEDs.



Light Path Diagnostics

The light path diagnostics built into your server allow you to quickly identify the type of system error that occurred. Your server is designed so that any LEDs that are illuminated remain illuminated when the server shuts down as long as the AC power source is good and the power supplies can supply +5V current to the server. This feature helps you isolate the problem if an error causes the server to shut down.

The light path diagnostics begins with the System Error LED on the information LED panel. (See the illustration in “Information LED Panel” on page 8.) When this light is illuminated, use the following information to isolate the problem.

- If the System Error LED on the information LED panel on the front of the server is on, a system error was detected. Check to see which of the LEDs on the diagnostics panel inside the server are on.
 - SMI LED on
 - A systems management event occurred.
 - Action:** Restart the server. If the problem persists, have the system serviced.
 - NMI LED on

Identifying Problems Using Status LEDs

A non-maskable interrupt occurred. The PCI 1 or PCI 2 LED will probably also be on.

Actions:

1. If the PCI 1 or PCI 2 LED is on, follow the instructions for those LEDs.
2. If the PCI 1 or PCI 2 LED is not on, restart the server. If the problem persists, have the system serviced.

– PCI 1 LED on

An error occurred on the primary PCI channel. An adapter in PCI slot 5 or 6 or the system board caused the error.

Actions:

1. Check the error log for additional information. If the error log indicates a problem with the integrated ServeRAID controller or the Ethernet controller, have your system serviced.
2. If you cannot isolate the failing adapter from the information in the error log, try to determine the failing adapter by removing one adapter at a time from the primary PCI bus (PCI slots 5 and 6) and restarting the server after each adapter is removed.

If the problem persists, have the system serviced.

– PCI 2 LED on

An error occurred on the secondary PCI channel. An adapter in PCI slot 1, 2, 3, or 4 or the system board caused the error.

Actions:

1. Check the error log for additional information.
2. If you cannot correct the problem from the information in the error log, try to determine the failing adapter by removing one adapter at a time from the secondary PCI bus (PCI slots 1–4) and restarting the server after each adapter is removed.

If the problem persists, have the system serviced.

– MEM LED on

A memory error occurred. Check the DIMM Error LEDs on the processor board.

- DIMM 1 Error LED on

The DIMM in DIMM slot 1 has failed.

Action: Replace the DIMM in DIMM slot 1.

- DIMM 2 Error LED on

The DIMM in DIMM slot 2 has failed.

Action: Replace the DIMM in DIMM slot 2.

- DIMM 3 Error LED on

The DIMM in DIMM slot 3 has failed.

Action: Replace the DIMM in DIMM slot 3.

- DIMM 4 Error LED on

The DIMM in DIMM slot 4 has failed.

Action: Replace the DIMM in DIMM slot 4.

- FAN 1 LED on

Fan 1 has failed or is operating too slowly.

Note: A failing fan can also cause the TEMP and DASD1 LEDs to be on.

Action: Replace fan 1.

- FAN 2 LED on

Fan 2 has failed or is operating too slowly.

Note: A failing fan can also cause the TEMP and DASD1 LEDs to be on.

Action: Replace fan 2.

- FAN 3 LED on

Fan 3 has failed or is operating too slowly.

Note: A failing fan can also cause the TEMP and DASD1 LEDs to be on.

Action: Replace fan 3.

- TEMP LED on

The system temperature has exceeded the maximum rating.

Actions:

1. Check to see if a fan has failed. If it has, replace the fan.
2. Make sure the room temperature is not too hot. (See "Specifications" on page 160)

If the problem persists, have the system serviced.

- VRM LED on

One of the voltage regulator modules on the processor board has failed. Check the VRM Error LEDs on the processor board.

- Primary Processor Cache VRM Error LED on

The cache VRM for the primary microprocessor slot has failed.

Actions:

1. Turn off the server, reseal the VRM, and restart the server.
2. If the problem persists, replace the VRM.

If the problem persists, have the system serviced.

- Primary Processor Core VRM Error LED on

The core VRM for the primary microprocessor slot has failed.

Actions:

1. Turn off the server, reseal the VRM, and restart the server.
2. If the problem persists, replace the VRM.

If the problem persists, have the system serviced.

- Secondary Processor Cache VRM Error LED on

Identifying Problems Using Status LEDs

The cache VRM for the secondary microprocessor slot has failed.

Actions:

1. Turn off the server, reseal the VRM, and restart the server.
2. If the problem persists, replace the VRM.

If the problem persists, have the system serviced.

- Secondary Processor Core VRM Error LED on

The core VRM for the primary microprocessor slot has failed.

Actions:

1. Turn off the server, reseal the VRM, and restart the server.
2. If the problem persists, replace the VRM.

If the problem persists, have the system serviced.

- CPU LED on

One of the microprocessors has failed. Check the Microprocessor Error LEDs on the processor board.

- Primary Microprocessor Error LED on

The microprocessor in the primary microprocessor slot has failed.

Actions:

1. Turn off the server, reseal the microprocessor, and restart the server.
2. If the problem persists, replace the microprocessor.

If the problem persists, have the system serviced.

- Secondary Microprocessor Error LED on

The microprocessor in the secondary microprocessor slot has failed.

Actions:

1. Turn off the server, reseal the microprocessor, and restart the server.
2. If the problem persists, replace the microprocessor.

If the problem persists, have the system serviced.

- PS1 LED on

The primary power supply has failed.

Action: Replace the primary power supply.

- PS2 LED on

The secondary power supply has failed.

Action: Replace the secondary power supply.

- DASD 1 LED on

A hot-swap hard disk drive has failed.

Actions:

Identifying Problems Using Status LEDs

1. Check the error log for additional information. If the error log indicates a temperature problem and the fans are working correctly, have the system serviced.
 2. If the amber Hard Disk Status LED on one of the hot-swap hard disk drives is on, refer to the “ServeRAID Information” section of this *Server Library* for more information.
- System Error LED on the information LED panel on the front of the server is off. The light path diagnostics have not detected a system error.

Checking the System for Damage

This section provides instructions on what to do if your server might be damaged.

After Dropping It

Look for loose cables and obvious damage. If any cables are loose, reconnect them securely. If there is obvious damage to the server, have it serviced.

If you see no damage, turn on the server. If it works correctly, the server probably did not suffer any damage. Observe all electrostatic precautions listed in this book to avoid damage to your server.

If the server does not work correctly, turn it off and check the adapters and memory modules to ensure that they are connected correctly. Go to “Electrical Safety” on page 35 and follow the instructions for opening your server; then, reseal all adapters and memory modules.

If the server still does not work correctly, run the diagnostic tests from diagnostic utility menu. For information about running tests, see “Running Diagnostic Programs” on page 102.

After Spilling Liquid on It

If liquid gets on the keyboard:

1. Turn off the server.
2. Unplug the keyboard from the back of the server.
3. Turn the keyboard upside down to drain excess liquid.
4. Dry off the keyboard with a lint-free cloth.

After the keyboard is completely dry, plug it in and turn on the server. If it does not work correctly, have the keyboard serviced.

If liquid gets inside the monitor:

1. Turn off the monitor.
2. Turn off the server.
3. Unplug the monitor from the server and the electrical outlet.
4. Have the monitor serviced immediately.

If liquid gets inside the server:

1. Turn off the server and all attached devices.
2. Unplug the server from the electrical outlet and all attached devices.
3. Have the server serviced immediately.

Replacing the Battery

IBM has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.

2



CAUTION:

When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

Note: In the U.S., call 1-800-IBM-4333 for information about battery disposal.

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

To order replacement batteries, call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

Before you begin:

- Read “Electrical Safety” on page 35 and “Handling Static-Sensitive Devices” on page 36.
- Follow any special handling and installation instructions supplied with the replacement battery.

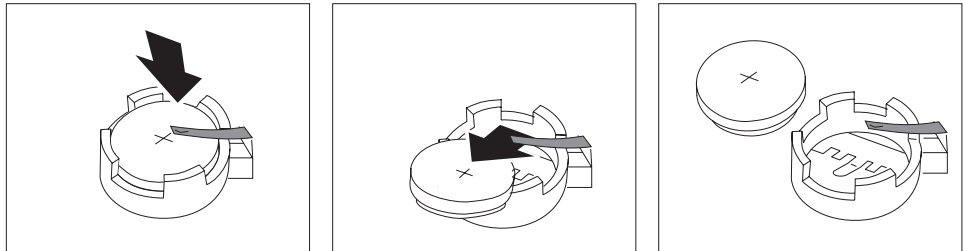
Note: After you replace the battery, you must reconfigure your server and reset the system date and time.

To replace the battery:

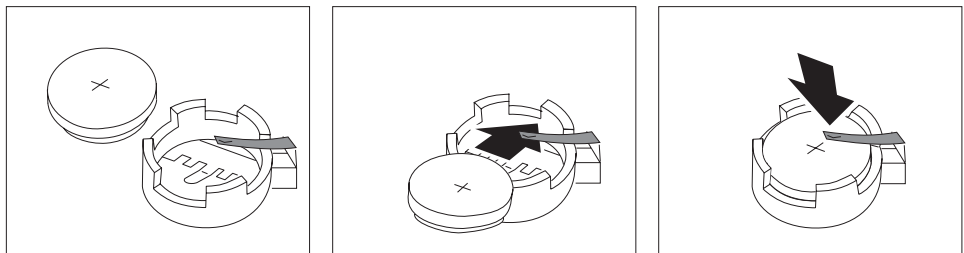
1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 38); then remove the top cover (see “Removing the Top Cover” on page 40).

Replacing the Battery

2. Locate the battery on the system board (see “System Board Component Locations” on page 164).
3. Remove any adapters that are installed in PCI slots 1 and 2, so you can access the battery. (See “Installing a Hot-Plug PCI Adapter” on page 46 for information about installing and removing adapters from the hot-plug PCI slots.)
4. Lift and remove the plastic dividers between PCI slot 1 and the ISA slot and between PCI slot 1 and PCI slot 2 by pressing the latches on the top ends of the dividers toward the dividers and lifting the dividers from the server.
5. Remove the battery:
 - a. Use one finger to lift the battery clip over the battery.
 - b. Use one finger to slightly slide the battery toward the rear of the server. The spring mechanism behind the battery will push it out toward you as you slide it forward.
 - c. Use your thumb and index finger to pull the battery from under the battery clip.
 - d. Ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.



6. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the front of the socket, under the battery clip.
 - b. As you slide it under the battery clip, press the battery down into the socket.



7. Reinstall any adapters you removed. (See “Installing a Hot-Plug PCI Adapter” on page 46 for information about installing and removing adapters from the hot-plug PCI slots.)
8. Insert the plastic dividers into the divider guides beside PCI slots 1 and 2.
9. Reinstall the top cover and complete the installation (see “Completing the Installation” on page 78).

Note: You will have to wait approximately 20 seconds after you plug the power cord of your server into an electrical outlet for the Power Control button to become active.

10. Start the Configuration/Setup Utility program and reset configuration parameters as needed.
 - To reset the system date and time, go to “Date and Time” on page 20.
 - To reset the power-on password, go to “Using the Power-On Password Menu” on page 21.
 - To reconfigure your server, follow the instructions given in “The Configuration/Setup Utility Program” on page 17 (all models).

Replacing the Battery

Chapter 7. Server Records and Specifications

Whenever you add options to your server, be sure to update the information in this chapter. Accurate, up-to-date records make it easier to add other options and, if the need should arise, to report a hardware problem.

In addition to server records, this chapter contains specifications. These specifications include product dimensions, environmental operating requirements, system and processor board layouts, and jumper settings.

This chapter contains:

Record the Identification Numbers	153
Installed Device Records	154
Specifications	160
Changing Jumper Positions	162
Two-Pin Jumper Blocks	162
Three-Pin Jumper Blocks	163
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Bypassing an Unknown Power-on Password	166
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Processor Board Jumpers	168
SCSI Backplane Component Locations	169
SCSI Backplane Option Jumpers	169

Record the Identification Numbers

Record and retain the following information.

<i>Table 8. IBM Netfinity 5500 M10 Identification Numbers</i>	
Product Name	IBM Netfinity 5500 M10
Machine Type	_____
Model	_____
Serial Number	_____
Key Serial Number	_____

The server serial number and other identification numbers are located on a label under the media-bay trim bezel on the front of the server.

Note: Two keys are provided with your server. Store the keys in a safe place. If you lose the keys, you must order a replacement lock mechanism and keys from IBM.

Installed Device Records

Use the following tables to keep a record of the options installed in, or attached to, your system. You can also record your system's default configuration settings. This information can be helpful when you install additional options in your server or if you ever need to have your server serviced. Copy these tables before recording information in them, in case you need extra space to write new values later, when you update your system's configuration.

Note: If necessary, you can also refer to the system-board layout in “System Board Component Locations” on page 164 for connector locations.

In the following table record the types and SCSI IDs for drives or devices attached to your server. If you attach a drive or other device to an adapter, be sure to record the descriptive information properly.

<i>Table 9. Internal and External Drives and Devices</i>	
Location	Drive or Device Description
Internal Devices	
Diskette Drive Bay	_____
CD-ROM Drive Bay	_____
Bay A	_____
Bay B	_____
Bay 1	_____
Bay 2	_____
Bay 3	_____
Bay 4	_____
Bay 5	_____
Bay 6	_____
External Devices	
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____

Table 10 shows the Configuration/Setup Utility program defaults. In the table, record any configuration changes you make.

<i>Table 10 (Page 1 of 4). Configuration/Setup Utility Program Defaults and Changes</i>			
Option	Default Value	New Value	Additional Information
System Summary			
Processor 1 ¹	Pentium II Xeon	_____	_____
Processor 2 ¹	_____	_____	_____
Processor Speed	_____	_____	_____
Math Coprocessor	Internal	_____	_____
System Memory	640 KB	_____	_____
Extended Memory	127 MB	_____	_____
Processor 1 Cache Size	_____	_____	_____
Processor 2 Cache Size	_____	_____	_____
Shadow RAM	384 KB	_____	_____
System ROM	F000h — FFFFh	_____	_____
Diskette Drive A	1.44 MB 3.5"	_____	_____
Primary Master Device	CD-ROM	_____	_____
Mouse	Installed	_____	_____
¹ Both microprocessors must have the same cache size and type, and the same clock speed.			
System Information			
Product Data			
Machine Type/Model	_____	_____	_____
Flash EEPROM Revision Level	_____	_____	_____
System Board Identifier	_____	_____	_____
System Serial Number	_____	_____	_____
BIOS Date	_____	_____	_____
BIOS Revision Number	_____	_____	_____
SP ROM Date	_____	_____	_____
SP ROM Revision Level	_____	_____	_____
Diagnostics Revision Level	_____	_____	_____
Diagnostics Date	_____	_____	_____
Diagnostics Version	_____	_____	_____
ServeRAID BIOS Version	_____	_____	_____
System Card Data			
Model	_____	_____	_____
Submodel	_____	_____	_____
Planar	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
Processor	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
DASD Backplane	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
Power Backplane	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____

Device Records

Table 10 (Page 2 of 4). Configuration/Setup Utility Program Defaults and Changes

Option	Default Value	New Value	Additional Information
System Information (cont.)			
Power Supply 1	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
Power Supply 2	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
PCI Routing			
Planar SCSI RAID	IRQ 11	_____	_____
Planar Ethernet	IRQ 15	_____	_____
Planar Video ²	IRQ 9	_____	_____
Planar USB	IRQ 9	_____	_____
² The screen also displays Int_A, Int_B, Int_C, and Int_D for each PCI slot. You can list the values for the PCI and ISA slots in Table 12 on page 159.			
Devices and I/O Ports			
Serial Port A	[Port 3F8, IRQ 4]	_____	_____
Serial Port B	[Port 2F8, IRQ 3]	_____	_____
Parallel Port	[Port 378]	_____	_____
Parallel Port Mode	[Standard]	_____	_____
Parallel Port IRQ	[IRQ 7]	_____	_____
Parallel Port DMA	None	_____	_____
Mouse	[Installed]	_____	_____
Diskette Controller	[Enabled]	_____	_____
Diskette Drive A	1.44 MB 3.5"	_____	_____
Video			
Video Controller	S3 Incorporated	_____	_____
Video Memory	1024 KB	_____	_____
IDE Configuration Menu			
Primary IDE Channel	[Enabled]	_____	_____
Master Device		_____	_____
Device Type	CD-ROM	_____	_____
Size	650 MB	_____	_____
Transfer Selection:	Autoconfigure	_____	_____
Transfer Mode	PIO Mode 3	_____	_____
LBA Mode	Supported	_____	_____
System Security			
Power-On Password		_____	_____
Allow for Unattended		_____	_____
Boot with Password	[On]	_____	_____
Administrator Password		_____	_____
Power-on Password		_____	_____
Changeable by User	[No]	_____	_____

Table 10 (Page 3 of 4). Configuration/Setup Utility Program Defaults and Changes

Option	Default Value	New Value	Additional Information
Start Options			
Keyboard NumLock State	[On]	_____	_____
Keyboard Speed	[Fast]	_____	_____
Disketteless Operation Mode	[Disabled]	_____	_____
Displayless Operation Mode	[Disabled]	_____	_____
Keyboardless Operation Mode	[Disabled]	_____	_____
First Startup Device	[CD-ROM]	_____	_____
Second Startup Device	[Diskette Drive 0]	_____	_____
Third Startup Device	[Hard Drive 0]	_____	_____
Fourth Startup Device	[Network]	_____	_____
Power-On Self-Test	[Quick]	_____	_____
Virus Detection ³	[Enabled]	_____	_____
³ The Virus Detection test checks for changes to the boot sector.			
Advanced Setup			
ACPI Control			
ACPI BIOS	[Disabled/Not Present]	_____	_____
ACPI Hardware Signature	[Auto]	_____	_____
ACPI Hardware Interrupt (IRQ)	None	_____	_____
Cache Control			
Processor Cache Type	[Write-Back]	_____	_____
Processor 1 Cache State	[Enabled]	_____	_____
Processor 1 Cache Size	_____	_____	_____
Processor 2 Cache State	[Enabled]	_____	_____
Processor 2 Cache Size	0 KB	_____	_____
PCI Bus Control			
PCI-PCI Bridge Pre-fetching	[Enabled]	_____	_____
PCI Primary Bus MLT	[30h]	_____	_____
PCI Secondary Bus MLT	[90h]	_____	_____
PCI Interrupt Routing			
Planar RAID IRQ	[Autoconfigure]	_____	_____
Planar Enet IRQ	[Autoconfigure]	_____	_____
Planar Video IRQ	[Autoconfigure]	_____	_____
Planar USB IRQ	[Autoconfigure]	_____	_____
Slot 1 ⁴	_____	_____	_____
Slot 2	_____	_____	_____
Slot 3	_____	_____	_____
Slot 4	_____	_____	_____
Slot 5	_____	_____	_____
Slot 6	_____	_____	_____
⁴ The screen displays IntA, IntB, IntC, and IntD for each slot. The default value for each is Enabled , if an adapter is installed in the slot. If no adapter is installed, the screen displays No Irq Requested .			
Memory Settings			
Bank1: Row0	[Row Is Enabled]	_____	_____
Bank1: Row1	[Row Is Enabled]	_____	_____
Bank2: Row0	[Row Is Enabled]	_____	_____
Bank2: Row1	[Row Is Enabled]	_____	_____
Bank3: Row0	[Row Is Enabled]	_____	_____
Bank3: Row1	[Row Is Enabled]	_____	_____
Bank4: Row0	[Row Is Enabled]	_____	_____
Bank4: Row1	[Row Is Enabled]	_____	_____
Advanced ISA Setup			
16 Bit I/O Recovery Timer Delay	[1 SysClk]	_____	_____
8 Bit I/O Recovery Timer Delay	[1 SysClk]	_____	_____

Device Records

Table 10 (Page 4 of 4). Configuration/Setup Utility Program Defaults and Changes

Option	Default Value	New Value	Additional Information
Advanced Setup (cont.)			
Sys. Service Proc. Hw. Int. (IRQ)	[Autoconfigure]	_____	_____
Plug and Play			
Memory Resources			
A0000h - A3FFFh ⁵	[Plug and Play]	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
⁵ The screen displays multiple address ranges. The default value for each is Plug and Play , except for E0000h - FFFFFh which is Not applicable .			
I/O Port Resources			
108h - 10Bh ⁶	[Plug and Play]	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
⁶ The screen displays multiple address ranges. The default value for each is Plug and Play .			
DMA Resources			
Channel 0	[Plug and Play]	_____	_____
Channel 1	[Plug and Play]	_____	_____
Channel 2	[Plug and Play]	_____	_____
Channel 3	[Plug and Play]	_____	_____
Channel 4	[Plug and Play]	_____	_____
Channel 5	[Plug and Play]	_____	_____
Channel 6	[Plug and Play]	_____	_____
Channel 7	[Plug and Play]	_____	_____
Interrupt Requests			
0:	Not applicable	_____	_____
1:	Not applicable	_____	_____
2:	Not applicable	_____	_____
3:	[Plug and Play]	_____	_____
4:	[Plug and Play]	_____	_____
5:	[Plug and Play]	_____	_____
6:	[Plug and Play]	_____	_____
7:	[Plug and Play]	_____	_____
8:	Not applicable	_____	_____
9:	[Plug and Play]	_____	_____
10:	[Plug and Play]	_____	_____
11:	[Plug and Play]	_____	_____
12:	[Plug and Play]	_____	_____
13:	Not applicable	_____	_____
14:	[Plug and Play]	_____	_____
15:	[Plug and Play]	_____	_____

Record the system memory (DIMMs) installed in your server in the following table.

<i>Table 11. System Memory</i>				
Memory Connector	DIMM Size			Additional Information
Connector J1	128 MB Kit <input type="checkbox"/>	256 MB Kit <input type="checkbox"/>	512 MB Kit <input type="checkbox"/>	_____
Connector J2	128 MB Kit <input type="checkbox"/>	256 MB Kit <input type="checkbox"/>	512 MB Kit <input type="checkbox"/>	_____
Connector J3	128 MB Kit <input type="checkbox"/>	256 MB Kit <input type="checkbox"/>	512 MB Kit <input type="checkbox"/>	_____
Connector J4	128 MB Kit <input type="checkbox"/>	256 MB Kit <input type="checkbox"/>	512 MB Kit <input type="checkbox"/>	_____
Total Memory (MB)	_____			

Record expansion slot configuration information for your server in the following table.

<i>Table 12. Expansion Slot Configuration Information</i>					
Expansion Slot	IRQ	DMA	I/O Port	Memory Resources	Option Description and Additional Information
ISA slot	_____	_____	_____	_____	_____
PCI slot 1	_____	_____	_____	_____	_____
PCI slot 2	_____	_____	_____	_____	_____
PCI slot 3	_____	_____	_____	_____	_____
PCI slot 4	_____	_____	_____	_____	_____
PCI slot 5	_____	_____	_____	_____	_____
PCI slot 6	_____	_____	_____	_____	_____
Notes:					
1. PCI slots 1–4 are hot-plug slots.					
2. Before setting values, review “Resolving Configuration Conflicts” on page 27 and follow the instructions for avoiding configuration conflicts.					

Specifications

The following list contains the specifications for the Netfinity 5500 M10.

Size (Tower Model)

- Depth: 700 mm (27.6 in.)
- Height with NetBAY3: 530 mm (20.9 in.)
- Height without NetBAY3: 356 mm (14 in.)
- Width: 483 mm (19 in.)
- Front clearance: 305 mm (12 in.)
- Rear clearance: 100 mm (4 in.)
- Side clearance: 50 mm (2 in.)

Size (Rack Model)

- Depth: 650 mm (25.6 in.)
- Height: 356 mm (14 in.) (8 U)
- Width: 440 mm (17.3 in.)

Weight (Tower Model)

- Unpacked, minimum configuration (with empty NetBAY3): 40.1 kg (88.4 lb.)
- Unpacked, maximum configuration: 56 kg (123.4 lb.)

Weight (Rack Model)

- Unpacked, minimum configuration: 33.8 kg (74.4 lb.)
- Unpacked, maximum configuration: 51.5 kg (113.4 lb.)

Heat Output

- Approximate heat output in British thermal units (Btu) per hour:
 - Minimum configuration: 1023.9 Btu
 - Maximum configuration: 2764.6 Btu

Environment

- Air temperature
 - System on: 10° to 35° C (50° to 95° F)
Altitude: 0 to 914 m (3000 ft.)
 - System on: 10° to 32° C (50° to 89.6° F)
Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)
 - System off: 10° to 43° C (50° to 110° F)
Maximum altitude: 2133 m (7000 ft.)
- Humidity
 - System on: 8% to 80%; maximum wetbulb, 23° C (73.4° F)
 - System off: 8% to 80%; maximum wetbulb, 27° C (80.6° F)
- Altitude: 0 to 2133 m (0 to 7000 ft.)

Acoustical Noise Emissions Values

- Sound power, idling
 - 6.2 bel for open bay system (no hard disk drives installed)
 - 6.3 bel for typical system configuration (1 hard disk drive installed)
- Sound power, operating
 - 6.2 bel for open bay system (no hard disk drives installed)
 - 6.3 bel for typical system configuration (1 hard disk drive installed)
- Sound pressure, idling
 - 47 dBA for open bay system (no hard disk drives installed)
 - 48 dBA for typical system configuration (1 hard disk drive installed)
- Sound pressure, operating
 - 47 dBA for open bay system (no hard disk drives installed)
 - 48 dBA for typical system configuration (1 hard disk drive installed)

These levels are measured in controlled acoustical environments according to ISO 7779 (EMCA-74), and are reported in accordance with ISO 9296 (EMCA-109). The declared sound power levels indicate an upper limit, below which a large portion of machines operate. Sound pressure levels in your location might exceed the average 1-meter values stated because of room reflections and other nearby noise.

Electrical Input

- Sine-wave input (50±3 or 60±3 Hz) is required
- Input voltage
 - Low range
 - Minimum: 90 V ac
 - Maximum: 137 V ac
 - High range
 - Minimum: 180 V ac
 - Maximum: 265 V ac
 - Input kilovolt-amperes (KVA) approximately
 - Minimum configuration as shipped: 0.2 KVA
 - Maximum configuration: 0.78 KVA

Electrostatic Discharge

- Tested to 8 KV

Immunity

- Verified to comply with EN 50082-1

Safety Standards

- UL 1950
- CSA C22.2 No. 950-M93
- EN 60950 and countries deviations
- IEC 950
- NOM-019

Changing Jumper Positions

Jumpers located on the system board and the processor board help you to customize the way your server operates.

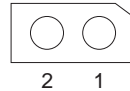
Your system board, processor board, and SCSI backplane contain two-pin and three-pin jumper blocks.

In some cases, groups of jumpers might combine to define a function.

Two-Pin Jumper Blocks

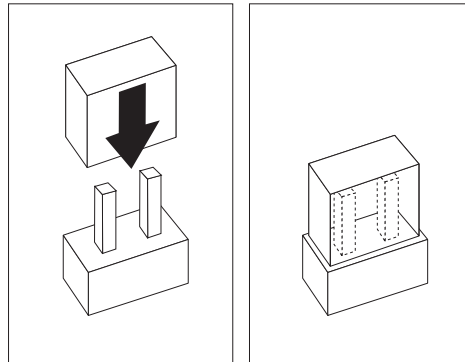
Covering both pins with a jumper defines one function of the jumper block. To change the function of the jumper block, cover one pin only or remove the jumper entirely.

The following illustration identifies pins 1 and 2 on a two-pin jumper block.

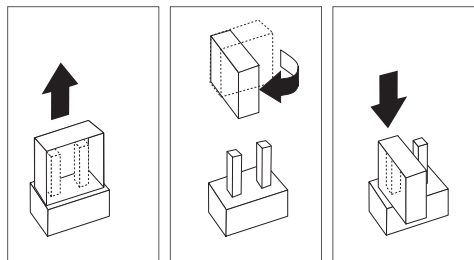


To change a jumper's position for a two-pin jumper block:

1. Turn off the server; then, disconnect the server power cords.
2. Remove the server cover (see "Preparing to Install Options" on page 38).
3. Do one of the following:
 - Lift the jumper straight off the pin block.
 - Align the holes in the bottom of the jumper with the two pins on the pin block, and then slide the jumper onto these pins.



- Align one of the holes in the bottom of the jumper with one of the pins on the pin block, and then slide the jumper onto that pin only.

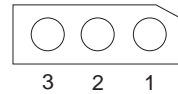


- Reinstall the server cover and connect the cables (see “Completing the Installation” on page 78).

Three-Pin Jumper Blocks

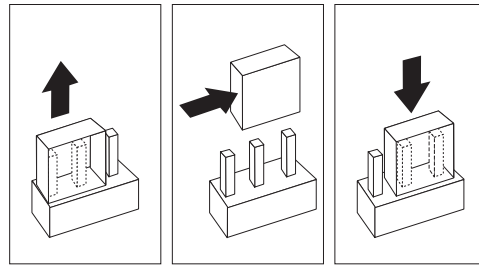
With the three-pin jumper blocks, each jumper covers two of the three pins on a pin block. You can position the jumper to fit over the center pin and either of the other two pins.

The following illustration identifies pins 1, 2, and 3 on a three-pin jumper block.



To change a jumper's position for a three-pin jumper block:

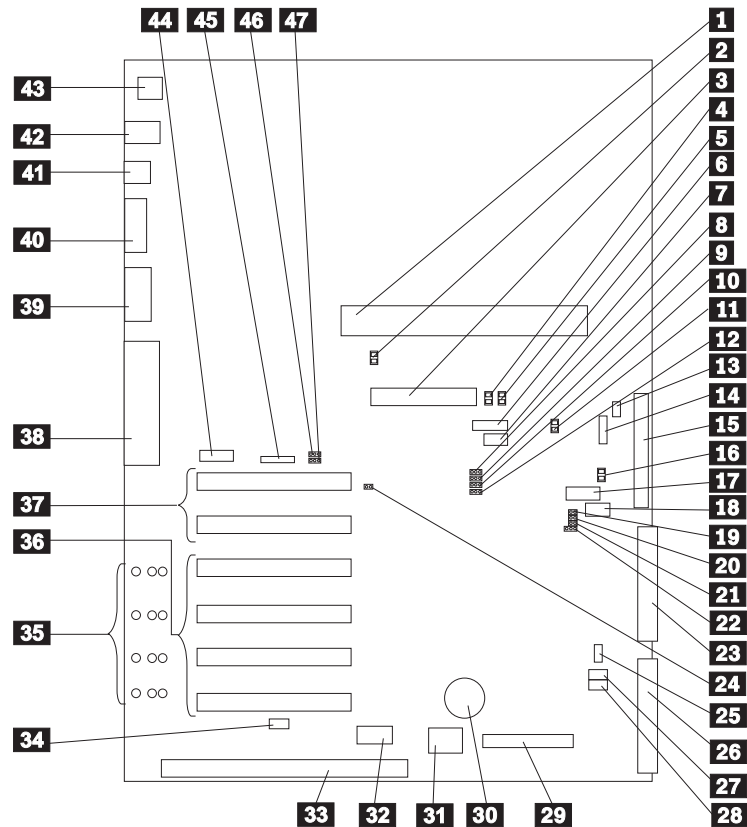
- Turn off the server; then, disconnect the server power cords.
- Remove the server cover (see “Preparing to Install Options” on page 38).
- Lift the jumper straight off the pin block.
- Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.



- Slide the jumper fully onto these pins.
- Reinstall the server cover and connect the cables (see “Completing the Installation” on page 78).

System Board Component Locations

The following illustration shows a layout of the system board and identifies system-board components. You might need to refer to this figure before you install hardware in your server, or when you record information in the tables in this chapter. You might also need to refer to this figure when you set configuration jumpers on the system board.



- 1** Processor board connector (J19)
- 2** Advanced System Management Processor error LED (CR24)
- 3** RAID channel 1 connector (J7)
- 4** RAID channel 1 error LED (CR30)
- 5** RAID channel 2 error LED (CR31)
- 6** Reserved (J54)
- 7** Reserved (J64)
- 8** Disable RAID controller jumper block (J11)
- 9** Reserved (J45)
- 10** Power on control jumper block (J32)
- 11** RAID download jumper block (J15)
- 12** Reserved (J25)
- 13** Reserved (J9)
- 14** Power backplane cable connector (J8)
- 15** RAID channel 2 connector (to backplane) (J3)
- 16** RAID system error LED (CR32)
- 17** Reserved (J27)
- 18** Reserved (J35)
- 19** SCSI activity LED connector (J52)
- 20** Reserved (J34)

- 21** Reserved (J29)
- 22** Reserved (J26)
- 23** IDE connector (J33)
- 24** Disable Advanced System Management Processor jumper block (J51)
- 25** Fan connector (J36)
- 26** Diskette drive connector (J22)
- 27** Power on password override jumper block (J24)
- 28** Flash ROM page swap jumper block (J30)
- 29** Control panel connector (J20)
- 30** Battery
- 31** Reserved (J46)
- 32** Hot-plug PCI controller programmer interface connector (J53)
- 33** ISA expansion slot
- 34** Hot-plug switch connector (J16)
- 35** PCI slot LEDs (four are on the side of the board)
- 36** PCI (hot-plug) slots 1–4 (on secondary PCI bus)
- 37** PCI slots 5 and 6 (on primary PCI bus)
- 38** Parallel port connector (J56) (Serial port A and B connectors are below the parallel port connector.)
- 39** Video port connector (J2)
- 40** Management port C connector (J42)
- 41** USB 1 and USB 2 port connectors (USB 2 is below USB 1.) (J31)
- 42** Mouse and keyboard connectors (J1) (The mouse connector is above the keyboard connector.)
- 43** Ethernet port connector (J4)
- 44** Reserved (J17)
- 45** Reserved (J18)
- 46** Disable Ethernet controller jumper block (J5)
- 47** Disable video controller jumper block (J14)

System Board Jumpers

Table 13 describes the jumpers on the system board. The numbers in the table correspond to the highlighted numbers on the illustration in “System Board Component Locations” on page 164.

Note: Turn off the server, and disconnect the power cords before moving any jumpers.

<i>Table 13 (Page 1 of 2). System Board Jumpers</i>	
Jumper Name	Description
8 J11 Disable RAID controller	The default position is Enabled (jumper on pins 1 and 2). Move the jumper to pins 2 and 3 to disable the RAID controller.
9 J45 Reserved	The default position is a jumper on pins 2 and 3.
10 J32 Power on control	The default position is normal operation (jumper on pins 1 and 2). Moving the jumper to pins 2 and 3 allows the power supply to be turned on without a control panel or Netfinity Advanced System Management Processor.
11 J15 RAID download	The default is no jumper on the pins. This jumper block is used when the RAID controller EEPROM is being updated.
12 J25 Reserved	The default position is a jumper on pins 1 and 2.
13 J9 Reserved	The default position is a jumper on pins 1 and 2.
20 J34 Reserved	The default position is a jumper installed on pins 1 and 2.

Bypassing an Unknown Power-on Password

Jumper Name	Description
21 J29 Reserved	The default position is a jumper installed on pins 1 and 2.
22 J26 Reserved	The default is no jumper installed on J26.
24 J51 Disable Advanced System Management Processor	In normal operation, there is no jumper on J51. Installing a jumper on J51 disables the Netfinity Advanced System Management Processor.
27 J24 Power on password override	Changing the position of this jumper bypasses the power-on password check if the jumper has been moved since the server was last powered on. You do not need to move the jumper back to the default position after the password is overridden. Changing the position of this jumper does not affect the administrator password check if an administrator password is set.
28 J30 Flash ROM page swap	The default position is a jumper installed on pins 2 and 3. Changing the position of this jumper will change which of the two pages of Flash ROM is used when the system is started.
46 J5 Disable Ethernet controller	The default position is Enabled (jumper on pins 1 and 2). Move the jumper to pins 2 and 3 to disable the Ethernet controller.
47 J14 Disable video controller	The default position is Enabled (jumper on pins 1 and 2). Move the jumper to pins 2 and 3 to disable the video controller.

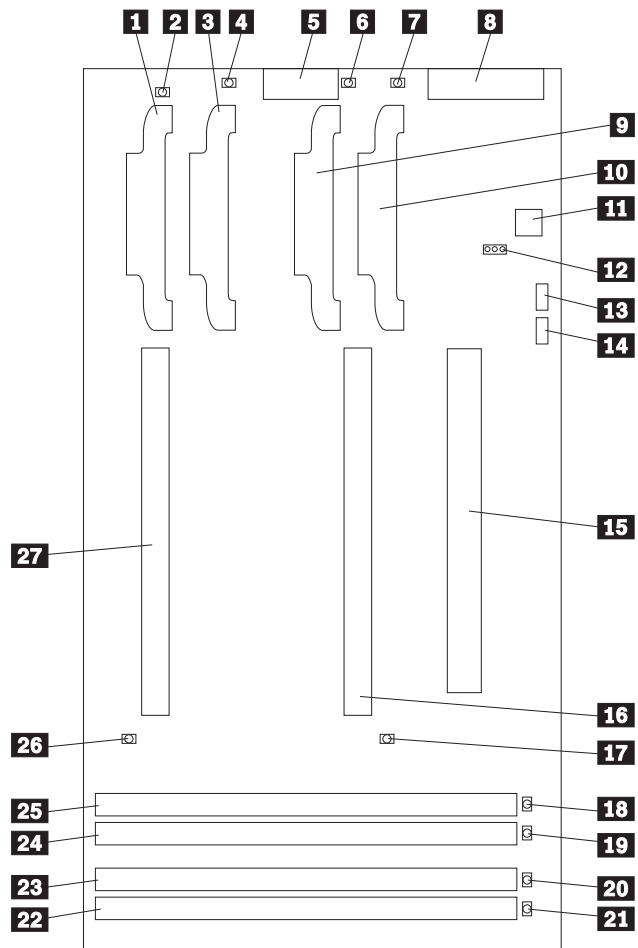
Bypassing an Unknown Power-on Password

When a power-on password is set, POST does not complete until you enter the password. If you forget the power-on password, you can regain access to the server through either of the following methods:

- Enter the administrator password at the power-on prompt, if an administrator password has been set. (If necessary, see “Using the Administrator Password Menu” on page 22 for details.) Start the Configuration/Setup Utility program and change the power-on password. See “Using the Power-On Password Menu” on page 21.
- Change the position of the jumper on J24 as described in Table 13 on page 165 to bypass the power-on password check. You can then start the Configuration/Setup Utility program and change the power-on password. See “Using the Power-On Password Menu” on page 21.

Processor Board Component Locations

A layout of the processor board is shown in the following illustration.



- 1** Secondary microprocessor cache VRM connector (U15)
- 2** Secondary microprocessor cache VRM error LED (CR36)
- 3** Secondary microprocessor core VRM connector (U7)
- 4** Secondary microprocessor core VRM error LED (CR37)
- 5** Power control connector (J17)
- 6** Primary microprocessor cache VRM error LED (CR19)
- 7** Primary microprocessor core VRM error LED (CR17)
- 8** Power supply connector (J10)
- 9** Primary microprocessor cache VRM connector (U17)
- 10** Primary microprocessor core VRM connector (U22)
- 11** Microprocessor core-frequency-selection switch block (SW1)
- 12** Reserved (J22)
- 13** Reserved (J20)
- 14** Reserved (J18)
- 15** System board connector (J9) (on reverse side of processor board)
- 16** Primary microprocessor connector (U5)
- 17** Primary microprocessor error LED (CR12)
- 18** DIMM 1 error LED (CR8)
- 19** DIMM 2 error LED (CR9)
- 20** DIMM 3 error LED (CR10)
- 21**
- 22**
- 23**
- 24**
- 25**
- 26**
- 27**

Processor Board Jumpers

- 21** DIMM 4 error LED (CR11)
- 22** DIMM socket 4 (J1)
- 23** DIMM socket 3 (J2)
- 24** DIMM socket 2 (J3)
- 25** DIMM socket 1 (J4)
- 26** Secondary microprocessor error LED (CR13)
- 27** Secondary microprocessor connector (U6)

Processor Board Jumpers

Table 14 contains the names and descriptions of the jumper blocks located on the processor board. Table 15 gives the microprocessor core-frequency-selection switch settings. The highlighted numbers in the table refer to the highlighted numbers in the illustration in “Processor Board Component Locations” on page 167.

Notes:

1. Turn off the server, and disconnect the power cords before moving any jumpers.
2. Be sure the microprocessor bus-to-core ratio is set correctly. For example, if you have a 400 MHz² microprocessor installed and the system bus speed is 100 MHz (the default), be sure that the microprocessor core frequency selection switch block is set to a bus-to-core ratio of 4 (400/100). See Table 15.

Attention: If the microprocessor bus-to-core ratio is incorrect, system-board components will overheat and component damage might occur. Be sure that the microprocessor core-frequency selection is properly set.

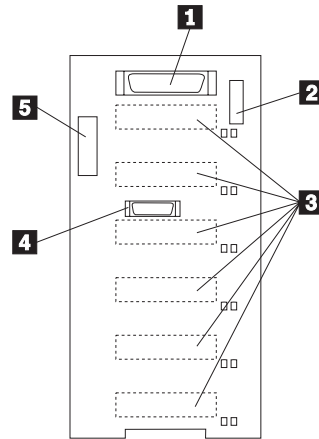
<i>Table 14. Processor Board Jumpers</i>	
Jumper Name	Description
12 J22 Reserved	The default position is no jumper on J22.

<i>Table 15. Microprocessor Core Frequency Selection Switch (SW1) Settings</i>					
Microprocessor Speed (MHz)	Core/Bus Ratio	Position 1	Position 2	Position 3	Position 4
400	4	On	On	On	Off
450	4.5	On	Off	On	Off
Note: All other setting combinations are reserved.					

² 400 MHz denotes internal clock speed of the microprocessor only; other factors also affect application performance.

SCSI Backplane Component Locations

The following simplified layout of the SCSI backplane identifies the components. Refer to this figure when you set the jumpers on the backplane.



- 1** Wide (16-bit) SCSI connector
- 2** Option jumper block (J10)
- 3** SCSI hot-swap drive connectors (on reverse side of backplane)
- 4** Repeater card connector
- 5** Power connector

SCSI Backplane Option Jumpers

The option jumper block on the SCSI backplane defines the SCSI IDs for hot-swap drives. See the illustration in “SCSI Backplane Component Locations” for the location of the option jumper block.

Table 16 summarizes the settings for the SCSI backplane option jumper block (J10).

<i>Table 16. Backplane Option Jumper Block</i>	
Pins	Description
1–2	Reserved.
3–4	Reserved
5–6	Placing a jumper on these two pins enables SCSI IDs 8–13
7–8	Reserved.
9–10	Reserved.
11–12	Placing a jumper on these two pins reverses the SCSI IDs on the backplane.
Note: The default is no jumpers installed on the J10 jumper block.	

Table 17 on page 170 shows the SCSI IDs that you can use for hot-swap drives.

Table 17. SCSI IDs for Hot-Swap Drives

J10 Pins 5-6	J10 Pins 11-12	Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6
No jumper	No jumper	0	1	2	3	4	5
No jumper	Jumper	5	4	3	2	1	0
Jumper	No jumper	13	12	11	10	9	8

Notes:

1. No jumper on pins 5-6 and 11-12 is the default.
2. Jumpers on pins 5-6 and 11-12 is not supported.

Appendix A. Installing Devices in the NetBAY3

This appendix contains information about installing devices in the NetBAY3.

Note: The illustrations in this appendix do not show the server on top of the NetBAY3; however, you do not need to remove the NetBAY3 to install devices.

This appendix contains:

General Considerations	172
Removing the Rear Panel	173
Installing Devices on Side Rails	174
Removing Cage Nuts	175
Installing Cage Nuts	175
Installing Cantilevered Devices	176
Installing Devices on the NetBAY3 Base Plate	176

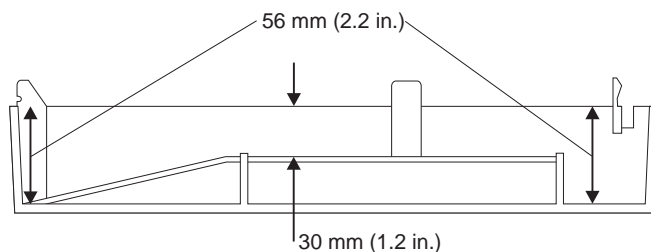
General Considerations

You can install three types of devices in the NetBAY3:

- Devices, such as the IBM EXP10, that sit on side rails
- Cantilevered devices, such as a power distribution unit (PDU), that are screwed to the front or rear of the NetBAY3
- Devices that sit on the NetBAY3 base plate

Notes:

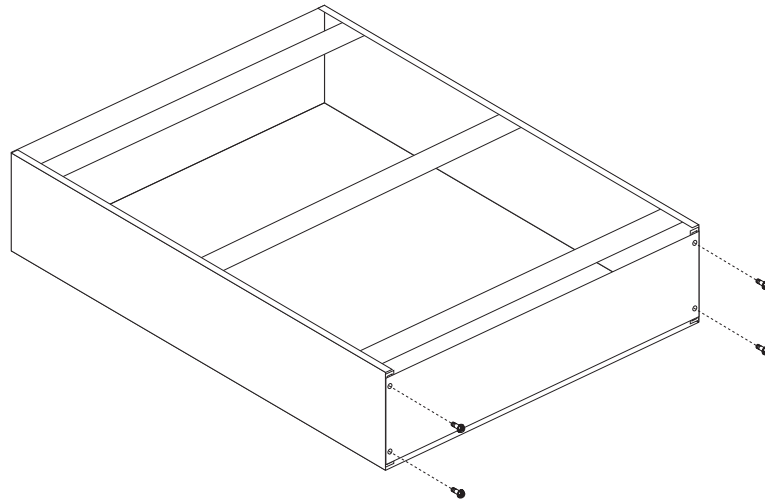
1. To allow the NetBAY3 front bezel to close, devices with handles must not protrude out more than 56 mm (2.2 in.). The following illustration of the front bezel top-view cross section shows the clearances.
2. All device cables must exit from the rear of the NetBAY3.



Removing the Rear Panel

Note: Do not remove the rear panel if you are not installing a device in the NetBAY3.

1. Remove the NetBAY3 rear panel.
 - a. Remove the four screws.
 - b. Lift the rear panel off.

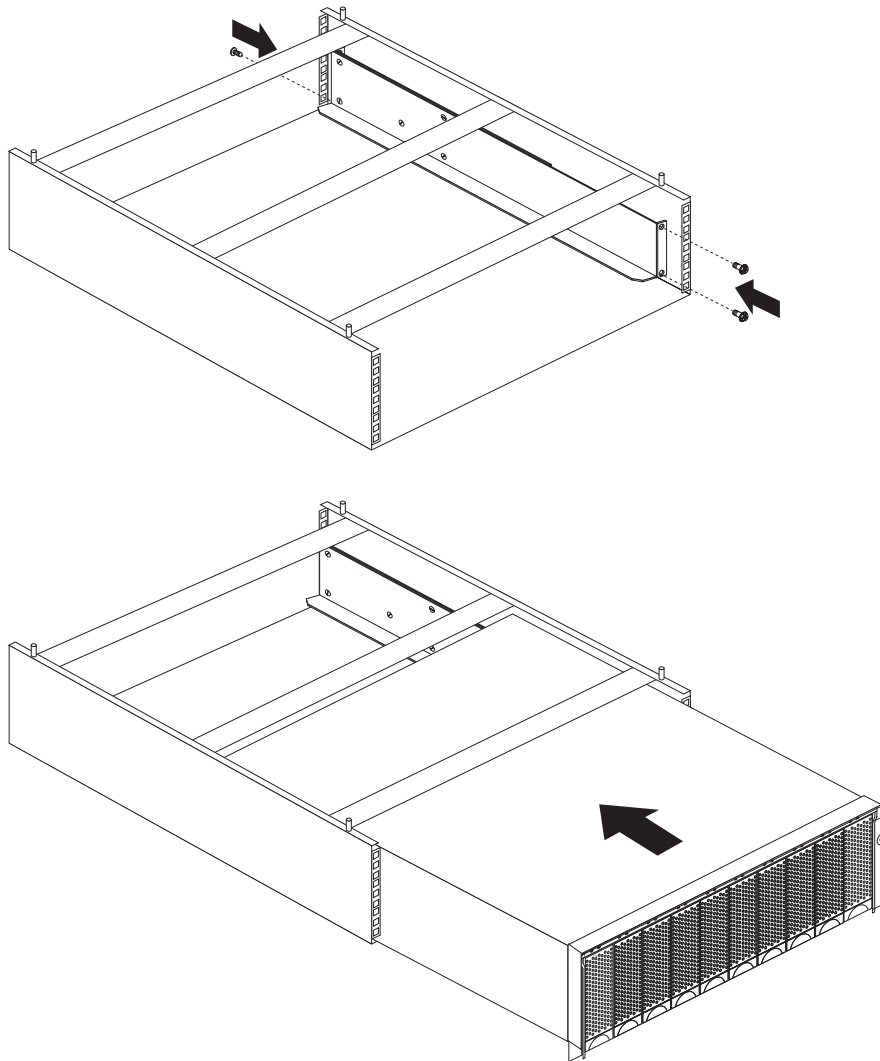


2. After you remove the rear panel, do one of the following:
 - Install a device on rails in the NetBAY3. (Go to “Installing Devices on Side Rails” on page 174.)
 - Install a cantilevered device in the NetBAY3. (Go to “Installing Cantilevered Devices” on page 176.)
 - Install a device on the NetBAY3 base plate. (Go to “Installing Devices on the NetBAY3 Base Plate” on page 176.)

Installing Devices on Side Rails

Installing devices that sit on side rails in a NetBAY3 is similar to installing these devices in a rack enclosure. The device side rails must be screwed to the NetBAY3 vertical mounting rails. Follow the instructions in the documentation that comes with the device and use the following illustrations as a guide.

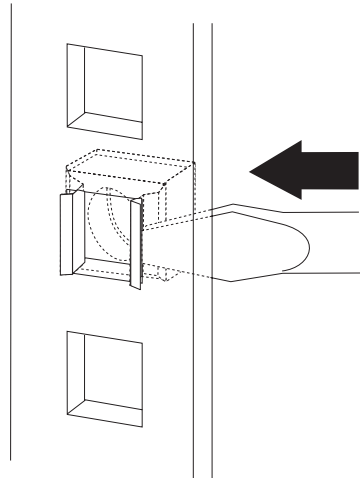
If you need to remove or move the cage nuts at the rear of the NetBAY3 to hold the rails, go to “Removing Cage Nuts” on page 175.



Removing Cage Nuts

Device installation might require the removal or moving of the rear-pane cage nuts. If you need to move the cage nuts, follow this procedure to move them and then go to “Installing Cage Nuts” to install them in the correct position.

1. Hold the cage nut in place and compress the cage-nut clip with a flat screwdriver blade.



2. With the cage nut-clip compressed, push the cage nut-clip out of the square hole.
3. Release the screwdriver pressure on the clip. The cage nut is now loose and can be removed from the square hole.

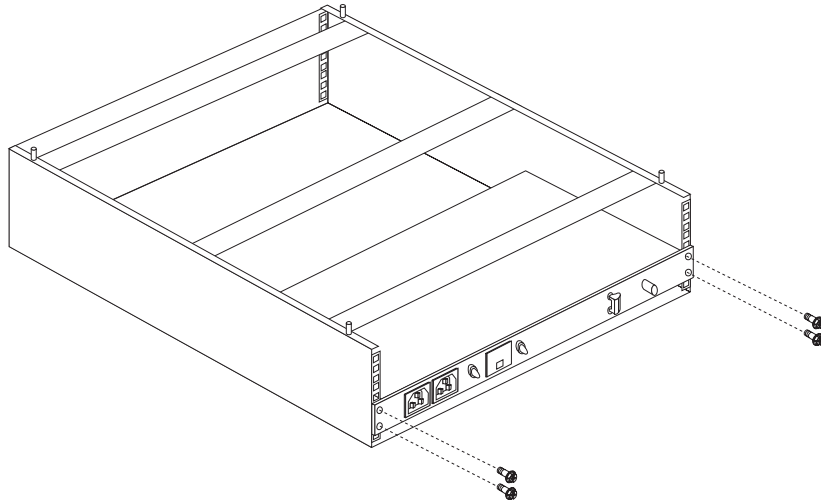
Installing Cage Nuts

The nuts go toward the inside of the NetBAY3. Make sure you install all the cage nuts at the same level on the mounting rails.

1. Hook one side of the cage-nut clip into the rack-mounting-rail square hole.
2. Hold the cage nut in place and compress the cage-nut clip with a flat screwdriver blade.
3. With the cage-nut clip compressed, push the cage-nut clip into the square hole.
4. Release the screwdriver pressure on the clip. The cage nut is now locked in the square hole.

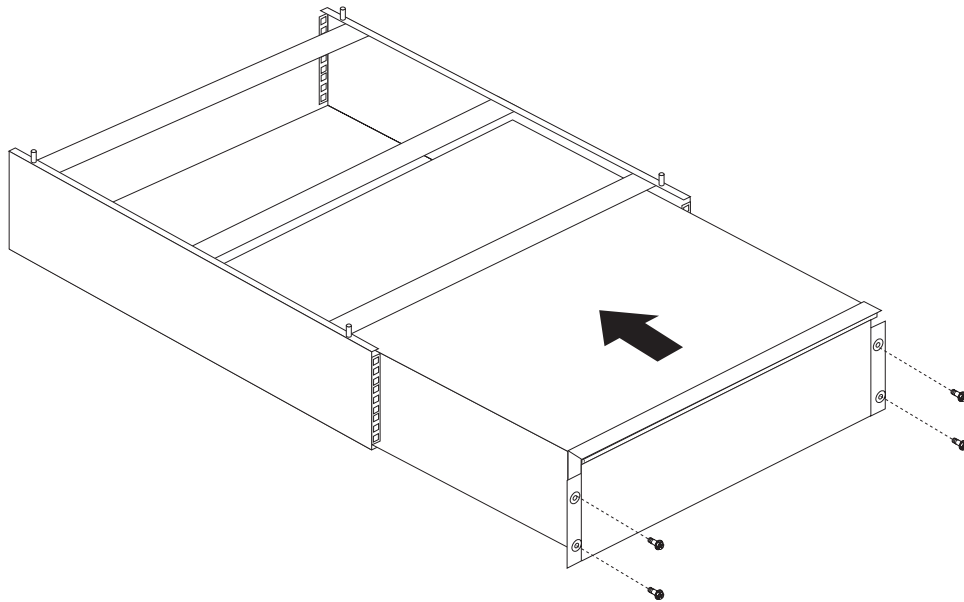
Installing Cantilevered Devices

Installing cantilevered devices in a NetBAY3 is similar to installing these devices in a rack enclosure. Cantilevered devices can be installed in the front or rear of the NetBAY3. The devices must be screwed to the NetBAY3 vertical mounting rails. Follow the instructions in the documentation that comes with the device and use the following figure as a guide.



Installing Devices on the NetBAY3 Base Plate

Some devices rest on the NetBAY3 base plate. These devices must be screwed to the NetBAY3 vertical mounting rails.



Appendix B. I2O-Ready Statement and S3 Video Modes

This appendix contains I2O-readiness information and information about unsupported S3 video modes.

I2O-Ready Statement

The Netfinity 5500 M10 is intended to support I2O deep adapters as listed in the ServerProven program. A deep adapter is a PCI card that has an embedded IOP (input/output processor). For the deep adapter to function correctly, the following items are needed:

- An operating system vendor-provided OSM (operating system service module) that supports the class of adapter (such as, storage) that is being installed in the server.
- A PCI card vendor-provided HDM (hardware device module).

Unsupported S3 Video Modes

The S3 VGA BIOS does not directly support display modes hex 1F and hex 10 (15 and 16). When using DOS or an OS/2 DOS session in the modes, the last two lines of text will be unviewable. The 8X14TSR.EXE program is available on the Netfinity World Wide Web site (<http://www.pc.ibm.com/us/netfinity>) to restore full visibility for DOS applications requiring these modes.

Glossary

This glossary includes terms and definitions from the following publications.

The American National Dictionary for Information Systems, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies may be purchased from the American National Standards Institute, 11 West 42 Street, New York, NY 10036. Definitions are identified by the symbol (A).

The ANSI/EIA Standard 440-A: *Fiber Optic Terminology*. Copies may be purchased from the Electronic Industries Association, 2001 Pennsylvania Avenue, N.W., Washington DC 20006. Definitions are identified by the symbol (E).

The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). These definitions are identified by the symbol (I). Definitions from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1 are identified by the symbol (T), indicating that final agreement has not yet been reached among the participating National Bodies of SC1.

A

ACPI. Advanced configuration and power management interface.

adapter. A printed circuit board that modifies the system unit to allow it to operate in a particular way.

address. (1) A value that identifies a register or a particular part of storage. The value is represented by one or more characters. (2) The location in the storage of a computer where data is stored. (3) To refer to a specific storage location by specifying the value that identifies the location.

analog. (1) Pertaining to data consisting of continuously variable physical quantities. (T)
(2) Contrast with digital, discrete.

ANSI. American National Standards Institute. An organization consisting of producers, consumers, and general interest groups, that establishes the procedures by which accredited organizations create and maintain voluntary industry standards in the United States.

application. The use to which an information processing system is put; for example, a payroll

application, an airline reservation application, a network application.

application program. (1) A program that is specific to the solution of an application problem. Synonymous with application software. (T) (2) A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll. (3) A program used to connect and communicate with stations on a network, enabling users to perform application-oriented activities.

architecture. See computer architecture.

ASCII. American National Standard Code for Information Interchange.

AWG. American Wire Gauge.

B

backplane. In personal computers, a printed circuit board that sets the SCSI ID and termination for hot-swap hard disk drives.

back up. To copy information, usually to diskette or tape, for safekeeping.

backup. Pertaining to a system, device, file, or facility that can be used in the event of a malfunction or loss of data.

bank. An aggregation of similar devices, such as single inline memory modules, connected to each other and used cooperatively.

baud rate. In remote communications, the transmission rate that is synonymous with signal events. The baud rate is usually expressed in bits per second.

BBS. Bulletin board system.

BIOS (Basic Input/Output System). Code that controls basic hardware operations such as interactions with diskette drives, hard disk drives, and the keyboard.

bit. Either of the digits 0 or 1 when used in the binary numeration system. Synonymous with binary digit. (T)

buffer. (1) A routine or storage used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transferring data from one device to another. (A) (2) A portion of storage used to hold input or output data temporarily.

bus. One or more conductors used for transmitting signals, data, or power. See also address bus and data bus.

bus master. A device or subsystem that controls data transfers between itself and a subordinate.

byte. A string that consists of a number of bits, usually 8, that are treated as a unit and represent a character.

C

cable. The physical medium for transmitting signals; it includes copper conductors and optical fibers.

cache. A buffer storage that contains frequently accessed instructions and data; it is used to reduce access time.

CD-ROM. Compact disc read only memory. High-capacity read-only memory in the form of an optically read compact disc. See also CD.

client. A functional unit that receives shared services from a server. (T)

clock. A device that generates periodic, accurately spaced signals used for purposes such as timing, regulation of the operations of a processor, or generation of interrupts. (T)

code. A collection of instructions that is in a form that can be read and processed by a computer.

compatibility. The capability of a hardware or software component to conform to the interface requirements of a given computer without adversely affecting its functions.

configuration. The manner in which the hardware and software of an information processing system are organized and interconnected. (T)

configure. To set up a computer for operation by describing to the system the devices, optional features, and programs installed in the computer.

connector. An electrical part used to join two or more other electrical parts. (Contrast with port.)

control. The determination of the time and order in which the parts of a computer and the devices that contain those parts perform the input, processing, storage, and output functions.

controller. A device that coordinates and controls the operation of one or more input/output devices, such as workstations, and synchronizes the operation of such devices with the operation of the system as a whole.

cycle. (1) An interval of space or time in which one set of events or phenomena is completed. (A) (2) A complete vibration, electric oscillation, or alternation of current.

D

DASD. Direct access storage device.

data. (1) A re-interpretable representation of information in a formalized manner suitable for communication, interpretation, or processing. Operations can be performed upon data by humans or by automatic means. (T) (2) Any representations such as characters or analog quantities to which meaning is or might be assigned. (A)

device. A mechanical, electrical, or electronic piece of equipment designed to serve a special purpose or perform a special function.

device driver. A file that contains the code needed to use an attached device.

diagnostic. Pertaining to the detection and isolation of errors in programs and faults in equipment.

digital. (1) Pertaining to data in the form of digits. (A) (2) Contrast with analog.

DIMM. Dual inline memory module.

direct access storage device (DASD). A nonvolatile-storage device, such as a diskette drive, hard disk drive, or CD-ROM drive, in which access time is effectively independent of the location of the data on the storage medium.

direct memory access (DMA). The transfer of data between memory and input/output devices without microprocessor intervention.

disk array. Two or more hard disks interconnected to increase security, performance, or reliability.

diskette. A small magnetic disk enclosed in a jacket. (T)

diskette drive. The mechanism used to seek, read, and write data on diskettes. It can be installed in, or attached to, a computer.

display. A component capable of displaying information on a viewing surface; for example, a cathode ray tube or a gas panel.

DMA. Direct memory access.

E

ECC. Error correcting code.

ECP. Extended Capability Port.

EEPROM. Electrically erasable programmable read-only memory.

EISA. Extended industry standard architecture.

electrically erasable programmable read-only memory (EEPROM). EPROM that can be reprogrammed while it is in the computer.

EPP. Enhanced Parallel Port

extended industry standard architecture (EISA). An expansion bus architecture used in a network server that provides compatibility among hardware components.

F

file. A named set of records stored or processed as a unit. (T)

flash memory. See electrically erasable programmable read-only memory (EEPROM).

frame. (1) A data structure that consists of fields, predetermined by a protocol, for the transmission of user data and control data. The composition of a frame, especially the number and types of fields, may vary according to the type of protocol. (T)

G

GB. Gigabyte.

gigabyte. (1) For processor storage and real and virtual memory, 2^{30} or 1 073 741 824 bytes. (2) For disk storage capacity, 1 000 000 KB. (3) For transmission rates, 1 000 000 000 bytes.

H

hard disk. A rigid magnetic disk such as the internal disks used in the system units of personal-computer systems and in external hard disk drives.

hard disk drive. A disk drive that reads and writes data on rigid disks and can be installed in or connected to a computer.

hardware. (1) All or part of the physical components of an information processing system, such as

computers or peripheral devices. (T) (2) The equipment, as opposed to the programming, of a computer. (3) Contrast with software.

hot add. Refers to a hardware component that can be installed without disturbing the operation of any other resource which is not connected to, or dependant upon, this component.

hot plug. Refers to a hardware component that can be installed or removed without disturbing the operation of any other resource which is not connected to, or dependant on, this component.

hot swap. Refers to a hardware component that can be removed and replaced without disturbing the operation of any other resource which is not connected to, or dependant upon, this component.

I

input/output. Pertaining to a device, process, or channel involved in data input, data output, or both.

instruction. A statement that specifies an operation to be performed by a microprocessor, and that identifies data involved in the operation.

I/O. Input/output.

IRQ. Interrupt request.

ISA. Industry standard architecture

J

jumper. A connector between two pins on an adapter or board that enables or disables an adapter or board option, feature, or parameter value.

L

LED. Light-emitting diode.

load. To bring all or part of a computer program into memory from auxiliary storage so that the computer can run the program.

logical. (1) Pertaining to content or meaning as opposed to location or actual implementation. (A) (2) Pertaining to a view or description of data that does not depend on the characteristics of the computer system or the physical storage. (A) (3) Contrast with physical. (A)

LUN. Logical unit number.

M

math coprocessor. In personal-computer systems, a microprocessor that supplements the operations of the system microprocessor, enabling the computer to perform complex mathematical operations in parallel with other operations.

MB. Megabyte

Mb. Megabit

megabyte. (1) For processor storage and real and virtual memory, 2^{20} or 1 048 576 bytes. (2) For disk storage capacity and transmission rates, 1 000 000 bytes.

memory. Addressable storage space in the computer that is used for temporary storage of instructions and data while a program is running, or for permanent storage of microcode. Contrast with auxiliary storage.

menu. A list of options displayed to the user by a data processing system, from which the user can select an action to be initiated. (T)

microprocessor. A processor whose elements have been miniaturized into one or a few integrated circuits. (T)

modem (modulator/demodulator). (1) A functional unit that modulates and demodulates signals. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (T) (A) (2) A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication line, and converts the analog signal received to data for the computer.

N

nanosecond (ns). One thousand millionth (10^{-9}) of a second.

network. (1) An arrangement of nodes and connecting branches. (T) (2) A configuration of data processing devices and software connected for information interchange.

nonvolatile. (1) Pertaining to a storage device whose contents are not lost when power is cut off. (T) (2) Contrast with volatile.

ns. Nanosecond.

O

OBI. Options by IBM.

operating system. Software that controls the execution of programs and that may provide services such as resource allocation, scheduling, input/output control, and data management. Although operating systems are predominantly software, partial hardware implementations are possible. (T)

P

pack. Two or more hard disks interconnected to increase security, performance, or reliability. Commonly referred to as a disk array.

packet. In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. The data, control signals, and possibly error control information are arranged in a specific format. (I)

parallel port. An access point through which a computer transmits or receives data that consists of several bits sent simultaneously on separate wires. Contrast with serial port.

PCI. Peripheral component interconnect.

performance. One of the two major factors, together with facility, on which the total productivity of a system depends. Performance is largely determined by a combination of throughput, response time, and availability.

PFA. Predictive Failure Analysis

physical. (1) Pertaining to actual implementation or location as opposed to conceptual content or meaning. (A) (2) Contrast with logical. (A)

pin. One of the conducting contacts of an electrical connector.

port. An access point for data entry or exit. (Contrast with connector.)

POST. Power-on self-test.

power-on self-test (POST). A series of diagnostic tests that are run automatically by a device when the power is turned on.

processing. The performance of logical operations and calculations on data, including temporary retention of data in microprocessor storage while the data is being operated on.

processor. A functional unit that interprets and executes instructions. A processor consists of at least an instruction control unit and an arithmetic and logic unit. (T) See microprocessor and central processing unit.

program. (1) A sequence of instructions that a computer can interpret and execute. (2) To design, write, modify, and test computer programs. (I) (A)

prompt. A visual or audible message sent by a program to request the user's response. (T)

R

RAID. Redundant array of independent disks.

RAM. Random access memory.

random access memory (RAM). (1) A storage device in which data can be written and read. (2) A storage device into which data is written and from which data is read in a nonsequential manner.

RAS. Reliability, availability, and serviceability.

read. To acquire or interpret data from a storage device, from a data medium, or from another source.

read-only memory (ROM). Memory in which stored data cannot be modified by the user except under special conditions. See also EEPROM, EPROM, and PROM.

record. (1) A set of data treated as a unit. (2) A set of one or more related data items grouped for processing.

refresh. (1) To recharge a memory location in volatile memory with an electric current so that it retains a state or binary value. (2) In computer graphics, the process of repeatedly producing a display image on a display surface so that the image remains visible.

register. (1) An integrated circuit that contains 8, 16, or 32 storage locations, each of which can store 1 bit of binary data. See also binary. (2) An area that stores binary data while it is being processed by the computer.

repeater. A device used to amplify or reshape signals.

resolution. In video monitors, a measure of the sharpness of an image, expressed as the number of lines and columns on the monitor screen or the number of pels per unit of area.

ROM. Read-only memory.

S

SCSI. Small computer system interface.

segment. A section of cable between components or devices. A segment may consist of a single patch cable, several patch cables that are connected, or a combination of building cable and patch cables that are connected.

serial port. An access point through which a computer transmits or receives data, one bit at a time. Contrast with parallel port.

server. (1) A functional unit that provides shared services to workstations over a network. (2) In a network, a data station that provides facilities to other stations.

slot. (1) A position in a device used for removable storage media. (2) One of several receptacles in the rear panel of the system unit into which a user can install an adapter.

small computer system interface (SCSI). A standard input/output interface used by personal computers.

SMI. Systems management interrupt.

SMP. symmetric multiprocessing.

socket. A receptacle for a microchip.

software. (1) All or part of the programs, procedures, rules, and associated documentation of a computer. Software is an intellectual creation that is independent of the medium on which it is recorded. (2) Contrast with hardware.

SPP. Standard Parallel Port

startup sequence. In personal computers, the order that the computer uses to search the direct access storage devices for an operating system.

storage. A functional unit into which data can be placed, in which it can be retained, and from which it can be retrieved.

striping. In a disk array, the process of storing data across all the disks assigned to an array.

subsystem. In computers, a secondary or subordinate system, usually capable of operating independently of a controlling system, and usually having a single purpose, such as displaying video or reading from and writing to hard disks. A subsystem can be integrated into the system board or on an adapter.

SVGA. Super video graphics array.

symmetric multiprocessing. In personal-computer systems, a multiprocessing design that enables two or more microprocessors to run concurrently and work independently, with each microprocessor capable of performing any task.

system board. In a system unit, the main circuit board that supports a variety of basic system devices, such as a keyboard or a mouse, and provides other basic system functions.

system unit. In personal-computer systems, the part of the computer that contains the processor circuitry, read-only memory (ROM), random access memory (RAM), and the I/O channel.

T

transaction. An exchange between a workstation and another device that accomplishes a particular action or result.

transmit. To send information from one place for reception elsewhere. (A)

U

universal serial bus (USB). A serial interface standard for telephony and multimedia connections to personal computers.

USB. Universal serial bus.

utility program. (1) A computer program in general support of computer processes; for example, a diagnostic program, a trace program, a sort program. (2) A program designed to perform an everyday task such as copying data from one storage device to another.

V

VFD. Vacuum fluorescent display.

VPD. Vital product data.

VRM. Voltage regulator module.

W

workstation. (1) A functional unit at which a user works. A workstation often has some processing capability. (2) A terminal or microcomputer, usually one that is connected to a mainframe or to a network, at which a user can perform applications.

write. To make a permanent or transient recording of data in a storage device or on a data medium.

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