



Netfinity 7000 M10

Hardware Information



Netfinity 7000 M10

Hardware Information

Note

Before using this information and the product it supports, be sure to read the information in the "Legal and Safety Information" section of this *Server Library*.

Second Edition (December 1998)

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Safety Information Statements



Before installing this product, read the Safety Information.

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

安裝本產品之前，請先閱讀「安全資訊」。

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

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.

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 simple problems that might occur.

How This Book is Organized

Chapter 1, "Introducing the IBM Netfinity 7000 M10," describes the Netfinity 7000 M10 and provides an overview of the server's features.

Chapter 2, "Arranging Your Workspace," contains information about arranging your 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, "Rack Installation," 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, component layouts, and jumper settings. This chapter also describes jumper locations and contains instructions for changing jumpers.

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

A glossary and an index follow the appendix.

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 Supplement* is available for purchase. It contains a parts catalog, error codes, and advanced diagnostic procedures. This manual is intended for trained service technicians.

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 7000 M10

Thank you for your decision to purchase an IBM Netfinity 7000 M10. Your server is a high-performance, symmetric multiprocessing (SMP) server. Your server is designed to support multiple expansion units. 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 agencies marks is located at the rear of the server.

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 a model of the Netfinity 7000 M10 with two power supplies. Some models come with one power supply only.

This chapter contains:

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Features at a Glance

The following table summarizes the features of the Netfinity 7000 M10.

<p>Microprocessor</p> <ul style="list-style-type: none"> • Intel® Pentium® II Xeon™ or Pentium III Xeon microprocessor with MMX™ technology • 16 KB of level-1 cache • 512 KB of level-2 cache (min.) • Expandable to four microprocessors <p>Memory</p> <ul style="list-style-type: none"> • 128 MB (min.) of system memory, expandable to 8 GB • 50 ns, buffered, extended data output (EDO), error correcting code (ECC) • Maximum of 32 dual inline memory-module (DIMM) sockets on two memory boards <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 four hot-swap hard disk drives supported <p>CD-ROM Drive</p> <ul style="list-style-type: none"> • Standard: Enhanced IDE <p>Redundant Cooling</p> <ul style="list-style-type: none"> • Four hot-swap fans 	<p>Information Panel</p> <ul style="list-style-type: none"> • Two 16-character lines of status information <p>Expansion Slots</p> <ul style="list-style-type: none"> • Five 64-bit hot-plug PCI slots • Seven 32-bit hot-plug PCI slots <p>Expansion Bays</p> <ul style="list-style-type: none"> • Four slim-high (1-inch) or two half-high (1.6-inch) hot-swap drive bays • One 5.25-inch removable-media bay (CD-ROM drive preinstalled) <p>Upgradable Microcode</p> <ul style="list-style-type: none"> • BIOS, diagnostics, and system-management processor upgrades (when available) can update EEPROM <p>Security Features</p> <ul style="list-style-type: none"> • Power-on and administrator passwords • Mountable in an optional secure rack enclosure • Selectable drive-startup • Keyboard password • Netfinity Advanced System Management PCI Adapter security: <ul style="list-style-type: none"> – User log-in password – Read-only or read/write access – Dial back 	<p>Integrated Functions</p> <ul style="list-style-type: none"> • LED usability support • Two serial ports • Two universal serial bus (USB) ports • One parallel port • Mouse and keyboard ports • Netfinity Advanced System Management PCI Adapter • Two UltraSCSI connectors • Video controller port compatible with: <ul style="list-style-type: none"> – Super video graphics array (SVGA) – Video graphics adapter (VGA) – 1 MB video memory <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 • Redundant power available with optional power supply <p>Predictive Failure Analysis (PFA) Alerts</p> <ul style="list-style-type: none"> • Fans • Power Supplies • Memory • Hard disk drives • Microprocessors
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What Your IBM Netfinity 7000 M10 Offers

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

- Impressive performance using an innovative approach to SMP

Your server supports up to four Intel Pentium II Xeon or four Intel Pentium III Xeon microprocessors. You can install multiple microprocessors in your server to enhance performance and provide SMP capability.

- Netfinity Advanced System Management PCI Adapter capabilities

Your server is shipped with a Netfinity Advanced System Management PCI Adapter. With this adapter, in conjunction with the Netfinity Manager Advanced System Management service capabilities of Netfinity Manager, you can locally and remotely configure and monitor many features of your server. You can configure system-management events (such as POST, loader, and operating system timeouts or critical temperature, voltage, and tamper alerts). If any of these events occur, the Netfinity Advanced System Management PCI Adapter can forward an alert to another resource:

- Another Netfinity Manager or other service-processor interface, through an Ethernet network or serial connection
- A standard numeric pager
- An alphanumeric pager

You can dialout and directly access and control a remote Netfinity Advanced System Management PCI Adapter.

In addition, you can remotely monitor, record, and replay all textual data generated during power-on self-test (POST) on a remote server with a Netfinity Advanced System Management PCI Adapter. While monitoring a remote system during POST, you can enter keyboard commands that will be relayed to the remote system.

Note: The Advanced System Management PCI Adapter is sometimes referred to as the *service processor*.

- Large data-storage and hot-swap capabilities

All models of the server support up to four 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 twelve *hot-plug* slots for PCI adapters. With operating system support, you can replace failing hot-plug PCI adapters without turning off the server. In addition, you can add PCI adapters in these slots without turning off the server, if this *hot-add* feature is supported by your operating system and the PCI adapter.

What Your IBM Netfinity 7000 M10 Offers

- Redundant cooling and power capabilities

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

Note: Replace a fan that has failed as soon as convenient to maintain the redundant cooling capability of your server.

You can install an additional power supply to provide redundant power for the server, or if you have an optional redundant 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 8 GB of system memory. The memory controller provides error correcting code (ECC) support for up to 32 industry-standard, 3.3 V, 168-pin, single bank, 8-byte, dual in-line memory modules.

- 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 peripheral component interconnect (PCI) 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 “Getting Help 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.

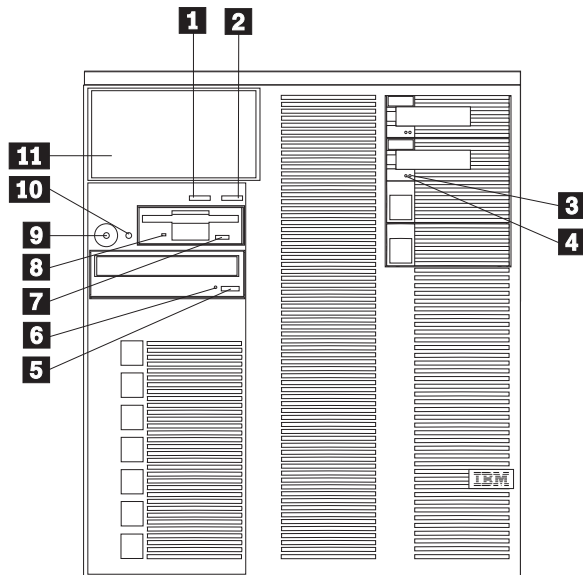
The following is an abbreviated list of the RAS features of your server. Many of these features are explained in later chapters of this book.

- Menu-driven system-configuration, SCSI-configuration, and diagnostic programs
- Power-on self-test (POST)
- Advanced System Management PCI Adapter (service processor)
- Predictive failure analysis alerts
- System auto-configuring from configuration menu
- Remote system problem determination support
- Power and temperature monitoring
- Fault-resilient startup
- Hot-swap drive bays
- Support for hot-plug PCI adapters
- Error codes and messages
- System error logging
- Upgradable BIOS, diagnostics processor code, and Advanced System Management PCI Adapter processor 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
- Vital product data (VPD) on processor board, I/O board, I/O function card, hot-swap SCSI subsystem, and other components
- Information and system status panels
- Worldwide service and support¹

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 Scroll Button:** Press this button to select an action to perform on a system monitoring message; then, press the Enter button to perform the action. You can select:
 - **Keep** to retain the message on the information panel and enable the system error light to continue to flash
 - **Remind** to retain the message on the information panel and enable the system error light to flash slowly
 - **Clear** to clear the message from the information panel and enable the system error light to stop flashing
- 2 Enter Button:** Press this button to perform an action on system monitoring messages that appear on the information panel.
- 3 Hard Disk Status Light:** Each of the hot-swap drives has a Hard Disk Drive Status light. When the amber light for a hard disk drive is lit 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.
- 4 Hard Disk Activity Light:** Each of the hot-swap drives has a Hard Disk Activity light. When the green light for a hard disk drive is flashing, the drive is being accessed.
- 5 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.
- 6 CD-ROM Drive In-Use Light:** When this light is lit, the CD-ROM drive is being accessed.

- 7 Diskette-Eject Button:** Press this button to eject a diskette from the drive.
- 8 Diskette Drive In-Use Light:** When this light is lit, the diskette drive is being accessed.
- 9 Power Control Button:** Press this button to manually turn the server on or off.

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.

The server can be activated in several ways:

- You can turn the server on by pressing the Power Control button on the front of the server.
- If the server is activated and a power failure occurs, the server will start automatically if the automatic-restart-after-power-failure feature is selected in the Configuration/Setup Utility program.
- The server can also be powered on by the Advanced System Management PCI Adapter.

The server can be deactivated as follows:

- You can turn the server off 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 the operating system, and places the server in standby mode.

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

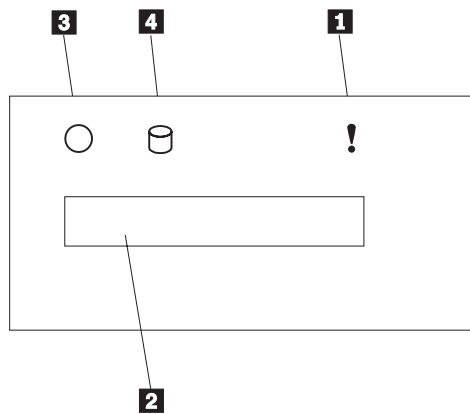
- Pressing and holding the Power Control button causes an immediate shutdown of the server, and places the server in standby mode. This feature can be used if the operating system hangs.
- Disconnecting the server power cord from the electrical outlet will shut off all power to the server.

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 flashing.

- 10 Reset Button:** Press this button to reset the system and run the power-on self-test (POST).
- 11 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 lit when a system error occurs. Information about the condition will display on the Information Panel.
- 2 Information Panel:** System monitor information appears on this vacuum fluorescent display (VFD). The Advanced System Management PCI Adapter monitors system functions and generates the messages. See “System Monitoring Messages” on page 111 for more information.

When the server is in standby mode (the system power supply is turned off and AC current is present) the information panel can display system monitor information.

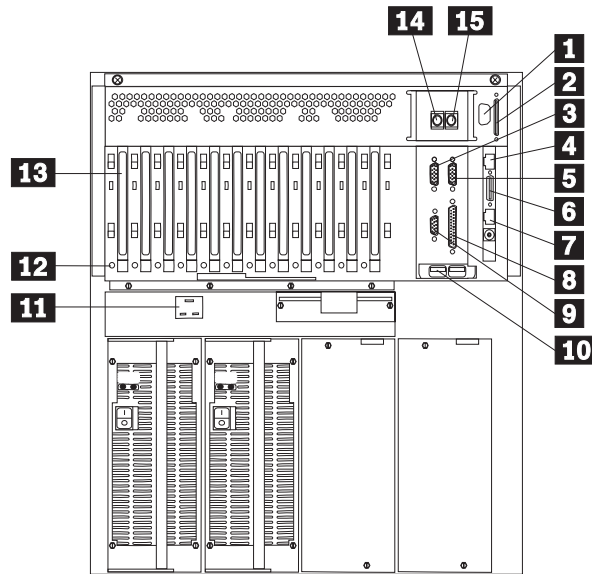
- 3 System Power Light:** When this light is lit, system power is present in the server. When this light flashes, the server is in standby mode (the system power supply is turned off and AC current is present). When this light is off, it indicates either power supply failure or an AC power failure.

Attention: If this light is off, it does not mean there is no electrical current present in the server. To remove all electrical current from the server, you must unplug the server power cord from the electrical outlet.

- 4 SCSI Hard Disk Drive Activity Light:** This green light is lit 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 External Connector Knockout:** Your server has an external connector knockout that can be used when you install the token-ring service processor option.
- 2 SCSI Connector:** External SCSI devices attach here.
- 3 Serial A Connector:** Serial signal cables for modems and other serial devices connect here to the 9-pin serial port A connector. 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.
- 4 10/100 Ethernet Connector:** This connector is to attach the Advanced System Management PCI Adapter to a network hub for remote communication.

Note: The 10/100 Ethernet connector cannot be accessed from the network operating system. The connector is dedicated to connecting your Advanced System Management PCI Adapter to an Ethernet network through a service-processor interface, such as Netfinity Manager.
- 5 Serial B Connector:** Serial signal cables for modems and other serial devices connect here to the 9-pin serial port B connector. 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.
- 6 Dual Serial Connector:** This connector can be used to attach to a *Y-cable* that is shipped with your server. This Y-cable can be used to attach to a modem that is dedicated to communication with the Advanced System Management PCI Adapter.
- 7 RS 485 Bus Connector:** This connector is used to attach other compatible service processors for remote access.

Input/Output Connectors and Expansion Slots

- 8 Parallel Connector:** A signal cable for a parallel device, such as a printer connects here.
- 9 Video Connector:** The monitor signal cable connects here.
- 10 Universal Serial Bus Connectors:** You can attach I/O devices to these two universal serial bus (USB) connectors. You need a 4-pin cable to connect devices to USB 1 or 2. A hot-plug keyboard-and-mouse option can be cabled or uncabled from the USB connectors without error or loss of service.

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.

- 11 Power Supply Connector:** The system power cord connects here.
- 12 Attention Lights for PCI Slots:** Each 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 the operating system supports hot-plug PCI adapters and, if so, what the Attention lights indicate.
- 13 PCI Expansion Slots:** Your server has seven 32-bit and five 64-bit peripheral component interconnect (PCI) expansion slots. All PCI slots support hot-plug PCI adapters.

You can install PCI adapters to provide communication, specialized graphics, and sound. Many adapters provide bus-master capabilities, which enable the adapters to perform operations without interrupting the system microprocessors.

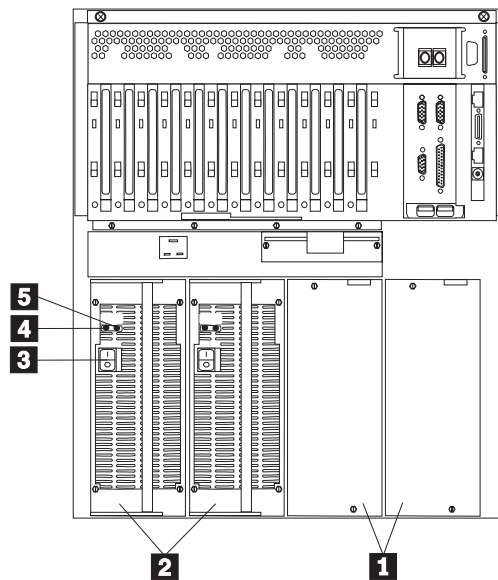
- 14 Keyboard Connector:** The keyboard cable connects here.
- 15 Mouse Connector:** The mouse cable connects here. This port sometimes is called an auxiliary-device or pointing-device port.

Note: For pin assignments and other details about these connectors, see “Connecting External Options” on page 72.

Power Supplies

The following illustration shows the power supplies in your server.

Note: Your server may differ slightly from the following illustration, depending on your model.



- 1 Filler Panels:** You can remove these filler panels to install additional power supplies.
- 2 Hot-Swap Power Supplies:** See “Installing a Hot-Swap Power Supply” on page 63 for information on power supply requirements and for instructions on installing additional power supplies.
- 3 Power-Supply Power Switch:** This switch turns the power supply on and off.
- 4 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 127.
- 5 DC 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 127.

Power Supplies

Chapter 2. Arranging Your Workspace

This chapter contains information about 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.

This chapter contains:

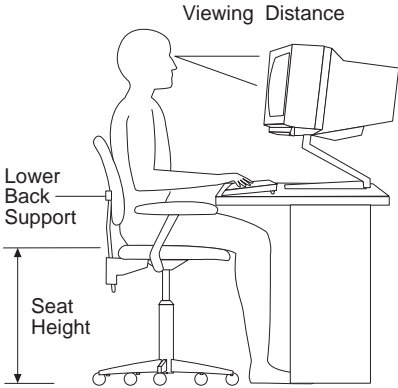
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Comfort

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. Leave at least 305 mm (12 inches) of space at the front and rear of your server to allow the server's cooling system to work properly.

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 “Getting Help 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 these programs, 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 memory, 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 PCI adapters and SCSI devices. Because of this flexibility, you can choose from among many adapters and devices.

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 programs:

- Configuration/Setup Utility

With the built-in Configuration/Setup Utility program, you can configure I/O 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 program to set passwords for starting up the server and accessing the Configuration/Setup Utility program.

- SCSISelect Utility

With the built-in SCSISelect Utility, you can configure the SCSI devices that you attach to the SCSI controller. You can use SCSISelect to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive.

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 server components.
See “Changing Jumper Positions” on page 144 and “I/O Function Card Jumpers” on page 152.
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” on page 31.
5. Install software programs.
See the installation instructions that come with the software.
6. Resolve configuration conflicts.
See “Resolving Configuration Conflicts” on page 26.

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 electrically erasable programmable read-only memory (EEPROM). 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**.

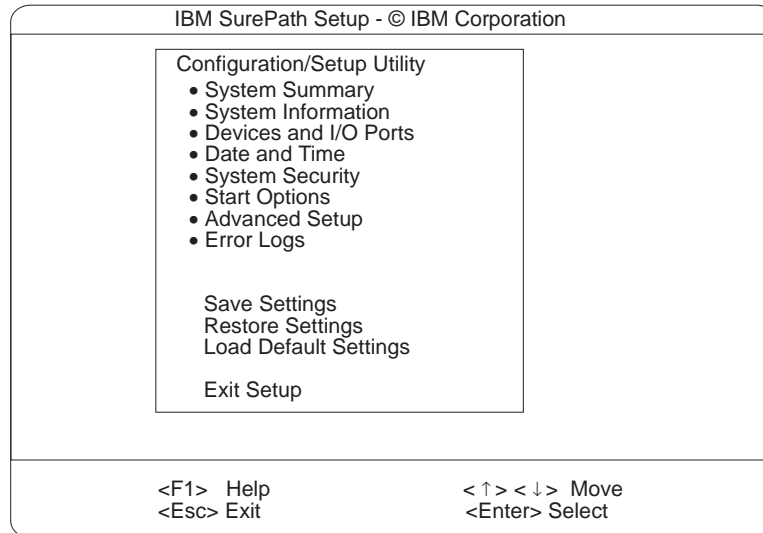
Note: If you enter the power-on password and an administrator (supervisor-level) password is also set, a limited version of the menu appears. To see the full menu, you must restart the server and enter the administrator password when you are prompted to enter a password. See “System Security” on page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

The Configuration/Setup Utility main menu appears. For information about the menu, see “Using the Configuration/Setup Utility Main Menu” on page 18.

Note: When the message Press F2 for Diagnostics appears, press **F2** to run the diagnostics programs. For information about running the diagnostics programs, see “Diagnostic Programs” on page 97.

Using the Configuration/Setup Utility Main Menu

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



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 Up Arrow (↑) or Down 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 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.

Note: The Configuration/Setup Utility main menu selections do not save settings, restore settings, or load default settings for the PCI Slot/Device Information choice. To save settings, or restore settings for the PCI Slot/Device Information choice, you *must* use the menu selections available from the PCI Slot/Device Information choice.

5. To exit from the Configuration/Setup Utility 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 main menu.

System Summary

Select this choice to display configuration information, including the type and speed of the microprocessors 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 main menu and on the limited Configuration/Setup Utility main menu.

System Information

Select this choice to display information about your Netfinity 7000 M10. 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 main menu.

Product Data

Select this choice to view system information, such as the machine type and model, the system serial number, and the revision level or issue date of the BIOS stored on the flash electronically erasable programmable ROM (EEPROM).

System Card Data

Select this choice to view vital product data (VPD) for some server components.

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.

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, the serial ports, or parallel port:

1. Select **Devices and I/O Ports**.
2. Select a device or port; use the Left Arrow (←) or Right Arrow (→) key to advance through the settings.

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

Using the Configuration/Setup Utility Main 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.
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 settings 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 main 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 15 on page 138.

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 Utility 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 the system. You can access all choices on the Configuration/Setup Utility 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 choices on the Configuration/Setup Utility main menu.
Administrator password only	<ul style="list-style-type: none"> You must enter the password to complete the system startup. The Administrator password provides access to all choices on the Configuration/Setup Utility main menu.
Administrator <i>and</i> power-on password	<p>You can enter either password to complete the system startup.</p> <ul style="list-style-type: none"> The administrator password provides access to all choices on the Configuration/Setup Utility 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. The power-on password provides access to a limited set of choices on the Configuration/Setup Utility main menu. This limited access 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.

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:

- If an administrator password has been set, enter the administrator password at the power-on prompt. (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 as previously described in this section (see steps 1 through 4 on page 22).
- You can change the position of the Password override jumper, as described in “Changing Jumper Positions” on page 144.
- You can remove the battery as described in “Replacing the Battery” on page 130 and then install the battery.

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.

Using the Configuration/Setup Utility Main Menu

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**.

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-start 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.

Attention:

If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the *I/O function card*. See "Understanding the Netfinity 7000 M10 Design" on page 36 for information on the I/O function card.

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 main 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 without a diskette drive or a monitor.

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.

Attention: If the CD-ROM drive contains a startable CD, you must remove the CD if you want to use a startup sequence that begins with a startable diskette.

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.

Using the Configuration/Setup Utility Main Menu

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

Advanced Setup

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

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 main 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. ACPI allows the operating system to place some server components into a reduced-power state during periods of low activity.

Cache Control

Select this choice to enable or disable the microprocessor cache. In addition, you can define the microprocessor cache type as write-back (WB) or write-through (WT). Selecting write-back mode will provide the maximum system performance.

You can also enable or disable video BIOS caching, and define buffers for video and option ROM caching.

PCI Slot/Device Information

Select this choice to view and identify system resources used by PCI devices. 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” on page 26.

Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the assignment that you want to change and press **Enter**. Use the Left Arrow (←) or Right Arrow (→) key to select from the list of available choices. An asterisk (*) indicates that more than one device shares a slot. After making changes, you can select:

- **Save Settings** to save the selected changes.
- **Restore Settings** to delete the changes and restore the previous settings.

Note: You can use the menu selections to save settings or restore settings for the PCI Slot/Device Information choice only. The Configuration/Setup Utility main menu selections save settings, restore settings, or load default settings for all other choices, but not the PCI Slot/Device Information choice.

Your server uses a rotational interrupt technique to configure PCI devices. Because of this technique, you can install a variety of PCI devices that currently do

not support sharing of PCI interrupts (IRQs). Multiple-function PCI devices use more than one interrupt.

Memory Settings

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

If a memory error is detected during POST or memory configuration, the server can automatically disable the failing memory bank and continue operating with reduced memory capacity. If this occurs, you must manually enable the memory bank after the problem is corrected. Select **Memory Settings** from the Advanced Setup menu; then use the Up Arrow (↑) or Down Arrow (↓) key to highlight the bank that you want to enable. Use the Left Arrow (←) or Right Arrow (→) key to select **Enable**.

MPS Version Control

Select this choice to view and identify the multiprocessor specification (MPS) level. Some versions of the IBM OS/2 operating system use 1.1 as the MPS level. The default value is 1.4. Refer to the documentation that comes with your operating system for more information.

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 error codes and messages that the system generated during POST. You can clear the error log by selecting **Clear error logs**.

System Error Log

Select **System Error Log** to view the system error log. The system error log contains all the system, error, and warning messages that the system has generated. You can use the Up Arrow (↑) or Down Arrow (↓) keys to move between pages in the system error log.

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. See “Installed Device Records” on page 136 for a listing of the default configuration values.

Exit Setup

If you have made any changes, you will be asked if you want to save the changes or exit without saving 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 components.
See “Changing Jumper Positions” on page 144 and “I/O Function Card Jumpers” on page 152.
3. Set jumpers or switches on the device.
See the instructions that come with the adapter.
4. Install the adapter in the server.
See “Working with Adapters” on page 49.
5. Install software programs.
See the installation instructions that come with the software.
6. Resolve configuration conflicts.
See “Resolving Configuration Conflicts.”

Resolving Configuration Conflicts

The resources used by your server consist of interrupt requests, direct memory access, 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” 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 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. Change system jumpers or switches. See “Changing Jumper Positions” on page 144.
5. Remove the device or adapter. Some configurations are not supported. If you must remove an adapter, see “Working with Adapters” on page 49.

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 server 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.

Using the SCSISelect Utility

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.

Using the SCSISelect Utility

Note: If your server has a RAID adapter installed, use the configuration method supplied with the RAID adapter to view or change SCSI settings for attached devices.

Your server comes with a menu-driven configuration utility, called SCSISelect, that allows you to view and change SCSI settings.

You can use the SCSISelect Utility to:

- View and change the default SCSI IDs
- Verify and change configuration conflicts
- Perform a low-level format on a SCSI hard disk

Starting the SCSISelect Utility

You can access this program when you start the server. The SCSISelect prompt appears after the IBM logo appears. Press **Ctrl+A** immediately after the SCSISelect prompt appears:

```
<<< Press <CTRL><A> for SCSISelect™ Utility! >>>
```

Use the Up Arrow (↑) or Down Arrow (↓) key to move the highlight bar to the various menu choices. Press **Esc** to return to the previous menu. Also, you can press the F5 key to switch between color and monochrome modes (if your monitor permits). To change the settings of the displayed items, follow the directions on the screen. Then, press **Enter**.

SCSISelect Utility Choices

The following choices appear on the SCSISelect Utility menu:

- Configure/View Host Adapter Settings
- SCSI Disk Utilities

Configure/View Host Adapter Settings

To view or change the SCSI controller settings, select **Configure/View Host Adapter Settings** and follow the directions on the screen.

Note: On the SCSISelect Utility menu, the SCSI controller is referred to as the *Host Adapter*.

This menu has the following choices:

- Host Adapter SCSI ID
The default SCSI ID of the SCSI controller is 7. Do not change this value.
- SCSI Parity Checking
The default value is *Enabled*. Do not change this value.
- Host Adapter SCSI Termination
The default value is *Automatic*. Do not change this value.

- Boot Device Configuration

Select this choice to configure startable device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.

- SCSI Device Configuration

Select this choice to configure SCSI device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.

Note: When the **Maximum Sync Transfer Rate** is set to 40.0, this value represents the transfer rate for UltraSCSI devices. When the **Maximum Sync Transfer Rate** is set to 20.0, this value represents the transfer rate for Fast SCSI devices.

- Advanced Configuration Options

Select this choice to view or change the settings for advanced configuration options. These options include enabling support for large hard disk drives and support for drives with UltraSCSI speed.

To reset the SCSI controller defaults, press **F6**; then, follow the directions on the screen.

SCSI Disk Utilities

To see the IDs that are assigned to each SCSI device or to format a SCSI device, select **SCSI Disk Utilities** from the SCSISelect Utility menu.

To use the utility, select a drive from the list. Read the screens carefully before making a selection.

Note: If the following screen appears, you might have pressed **Ctrl+A** before the selected drives were ready. Restart the server and watch the SCSISelect messages as each drive spins up. After the drive that you want to view or format spins up, press **Ctrl+A**.

```

                                Unexpected SCSI Command Failure

Target SCSI ID:                4
SCSI CDB Sent:                 03 00 00 00 0E 00 07 00 02 00
Host Adapter Status:          00h - No host adapter error
Target Status:                 02h - Check condition
Sense Key:                     02h - Not ready
+Sense Code:                   04h
+Sense Code Qualifier:         02h

                                Press 'Esc' to continue.

```

Performing a Low-Level Disk Format

You can use the *Format Disk* feature of the SCSISelect Utility to perform a low-level format on a hard disk drive.

Depending on the hard disk drive capacity, the low-level format program could take up to two hours.

When To Use the Low-Level Format Program

Use the Low-Level Format program:

- When you are installing software that requires a low-level format
- When you get recurring messages from the diagnostic tests directing you to run the Low-Level Format program on the hard disk drive
- As a last resort before replacing a failing hard disk drive

Note: For information about backing up all of your files, see your operating-system documentation.

Starting the Low-Level Format Program

Attention: The low-level format program erases *all* data and programs.

Note: If your server has a RAID adapter installed, refer to the RAID adapter documentation for instructions for performing a low-level format on a hard disk drive attached to the PCI RAID adapter.

1. If the hard disk is working, make a backup copy of all the files and programs on the hard disk drive
2. Select **Format Disk**; then, follow the instructions on the screen.

Note: Hard disks normally contain more tracks than their stated capacity (to allow for defective tracks). A message appears on the screen if the defect limit is reached. If this happens, have the system serviced.

3. To install an operating system after the hard disk drive is formatted, follow the instructions in the “ServerGuide and Netfinity Manager Information” section of this *Server Library*.

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.

This chapter contains:

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Before You Begin

Notes:

1. Review the power supply requirements described in “Installing a Hot-Swap Power Supply” on page 63.
2. You do not need to turn off the server to install or replace hot-swap power supplies, hot-swap fans, hot-swap drives, or hot-plug PCI adapters.

- Become familiar with the safety and handling guidelines specified under “Safety Information Statements” on page vii, “Electrical Safety” on page 33, and “Handling Static-Sensitive Devices” on page 34. These guidelines will help you work safely while working with your server or options.
- If you upgrade your server by installing a RAID adapter, you must configure your disk arrays after you install hard disk drives, as described in “Installing Internal Drives” on page 58. In this case, follow the instructions in the RAID adapter documentation after installing the drives. Then, return here to install your remaining options, if applicable. See Chapter 3, “Configuring Your Server” on page 15 for additional details about configuration, and a description of your server utility programs.
- 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 at least 305 mm (12 inches) of ventilated space at the front and rear of the server to allow the server's cooling system to work properly.
- Have a supply of 1 MB and 2 MB, 3.5-inch diskettes available.
- Back up all important data before you make changes to disk drives.
- Have a small, flat-blade screwdriver available.
- The orange color on components or labels in your Netfinity 7000 M10 indicates hot-plug components.
- For a list of supported options for the Netfinity 7000 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 to install or replace hot-swap power supplies, hot-swap fans, hot-swap drives, or hot-plug PCI adapters.

1. Except if you are installing or removing a hot-swap option, run the shutdown procedure for the operating system. 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 the power cord 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.

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.

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.
- The front access cover is in place during normal operation.
- There is at least 305 mm (12 inches) of ventilation space at the front and rear of the server.
- The Power switch on the power supply is off before you remove a functional power supply.
- Cables for optional adapters are routed according to the instructions provided with the adapters.
- A fan that has failed is replaced as soon as convenient to help maintain the redundant cooling capability.

Working Inside a Server with Power On

Your server 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 your server while the server is powered on:

- Avoid loose-fitting clothing on your forearms. (Button the cuffs on long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.)
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets and loose-fitting wrist watches.
- Remove items from your shirt pocket (such as pens and 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.

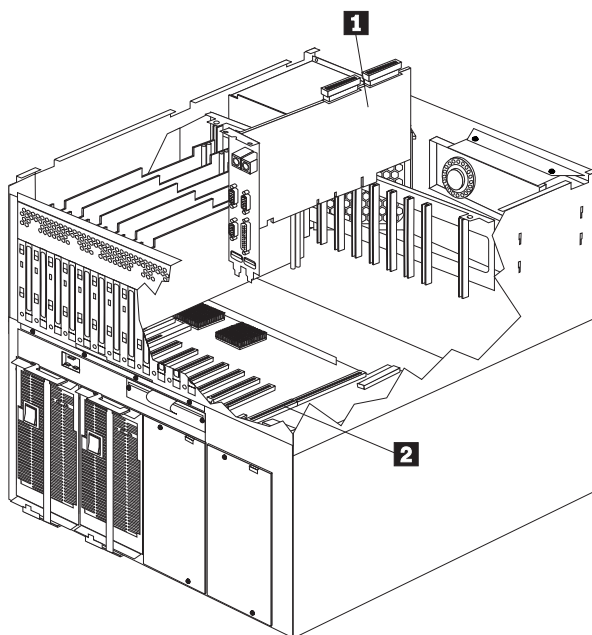
Understanding the Netfinity 7000 M10 Design

The Netfinity 7000 M10 incorporates new design features and components.

I/O Board and I/O Function Card

The server replaces the system board with an *I/O board* and an *I/O function card*. Together, the I/O board and the I/O function card provide the functionality of a system board. This modular design improves serviceability and provides for a compact design.

See “I/O Board Component Locations” on page 148 for a layout of the I/O board.
See “I/O Function Card Component Locations” on page 151 for a layout of the I/O function card.



- 1** I/O function card
- 2** I/O board

Netfinity Advanced System Management PCI Adapter

With a Netfinity Advanced System Management PCI Adapter, in conjunction with Netfinity Manager, you can locally and remotely configure and monitor many features of your server.

Note: You must have the Advanced System Management PCI Adapter installed for proper operation of your server and to use the system-management functions the adapter provides.

For more information:

- See “What Your IBM Netfinity 7000 M10 Offers” on page 3 for an overview of the functions and features
- See “Connecting External Options” on page 72 for a detailed description of the connectors
- See “Advanced System Management PCI Adapter Component Locations” on page 153 for a layout showing the component locations
- Refer to the “Advanced System Management Information” section of this *Server Library* for installation, startup, and operating instructions

Preparing to Install Options

Before you begin:

Read “Electrical Safety” on page 33, “Handling Static-Sensitive Devices” on page 34, and “Working Inside a Server with Power On” on page 35.

Note: You do not need to turn the server off to install or replace hot-swap power supplies, hot-swap fans, hot-swap drives, or hot-plug PCI adapters.

If you are:

- Installing or removing a hot-plug PCI adapter, go to “Working with Adapters” on page 49.
- Installing or replacing a hot-swap hard disk drive, go to “Installing Internal Drives” on page 58.
- Installing a hot-swap power supply, go to “Installing a Hot-Swap Power Supply” on page 63.
- Removing a hot-swap power supply, go to “Removing a Hot-Swap Power Supply” on page 65.
- Replacing a hot-swap fan, go to “Replacing a Hot-Swap Fan Assembly” on page 67.
- Installing or removing an option not listed in the preceding list, continue with the following steps.

Preparing to Install Options

1. 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.

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

10



CAUTION:

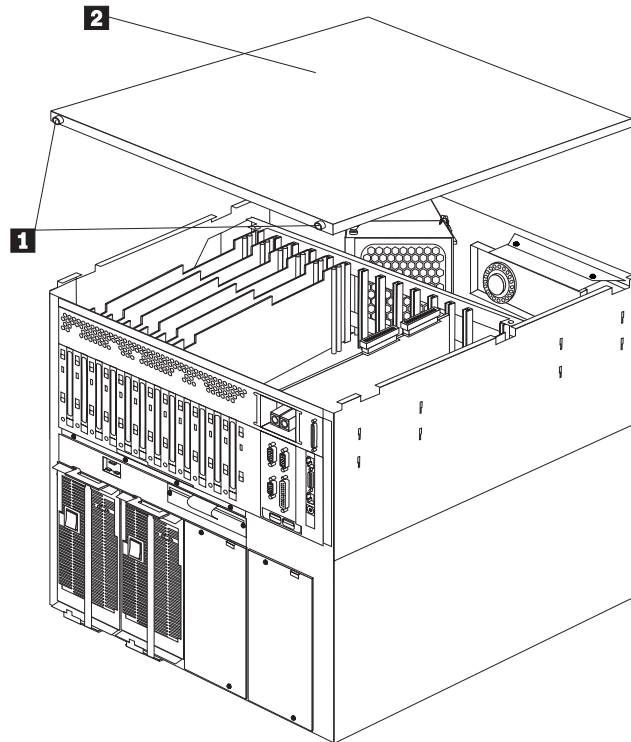
Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunications systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and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

Removing the Top Cover

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

Before you begin:

Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.



To remove the server top cover:

1. Except if you are installing or removing a hot-swap option, run the shutdown procedure for the operating system, turn off the server and all attached devices, and disconnect all external cables and power cords (see “Preparing to Install Options” on page 37).
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.

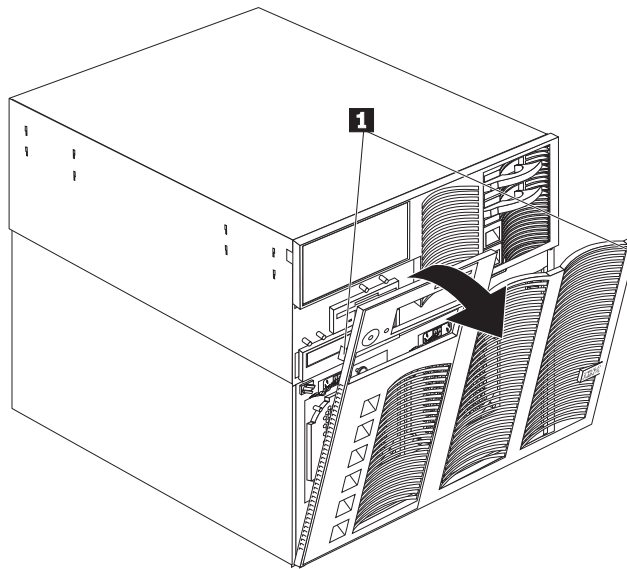
Removing the Front Bezel

Removing the Front Bezel

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

Before you begin:

Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.



To remove the front bezel:

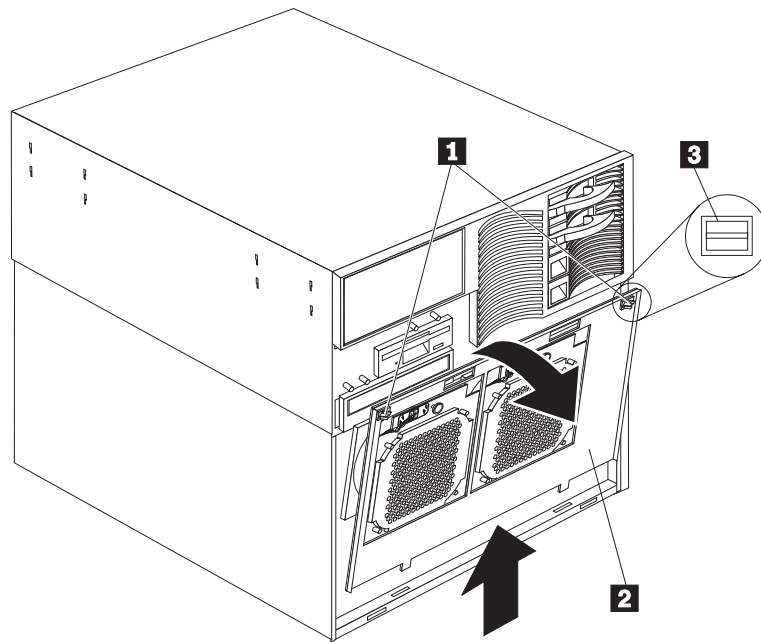
1. Press on the tabs at the top edge of the bezel **1**.
2. Pivot the top of the bezel slightly away from the server and remove the bezel from the server.

Removing the Front Access Cover

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

Before you begin:

Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.



To remove the server front access cover:

1. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 37); then remove the front bezel (see “Removing the Front Bezel” on page 40).
2. Turn the two quarter-turn fasteners **1** on the top edge of the front access cover **2** to the unlocked position **3**. Pivot the top of the front access cover away from the server and remove the cover from the server.

Attention: For correct cooling and airflow, install the front access cover before turning on the server. Operating the server with the front access cover removed might damage server components.

Installing a Microprocessor Kit

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

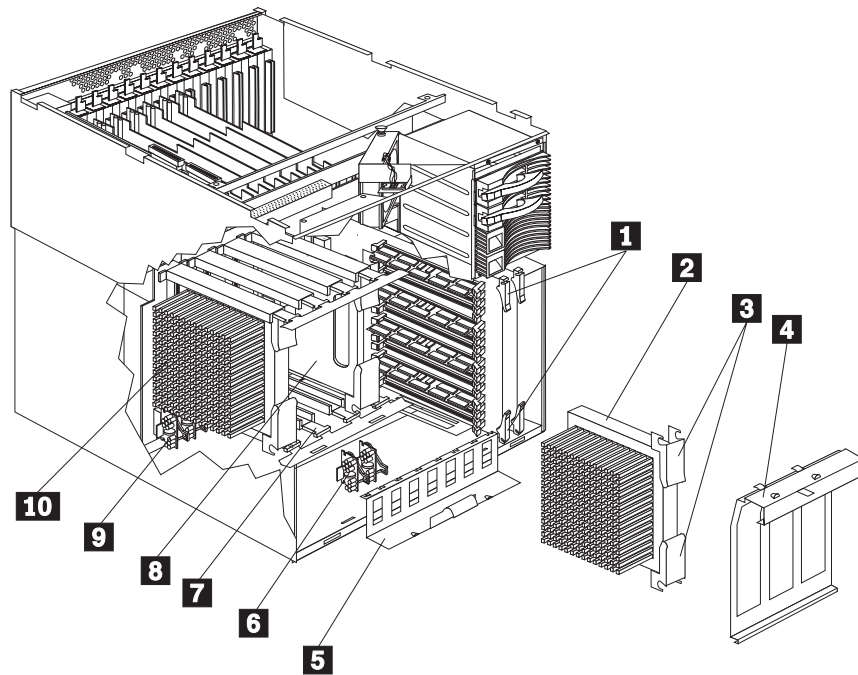
Before you begin:

- Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.
- Thoroughly review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server’s 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 ensure proper server operation, when you install a new or additional microprocessor, use microprocessors with the same cache size as those of the currently installed microprocessor.
3. If you replace the microprocessor in your server with a microprocessor with a different speed; be sure to set the Microprocessor Core Frequency Selection jumper block correctly. (See “Processor Board Jumpers” on page 150 for more information.)
4. If you install additional microprocessors, be sure to set the Microprocessor Core Frequency Selection jumper block for the slowest speed microprocessor installed in your server. (See “Processor Board Jumpers” on page 150 for more information.)
5. To maintain signal quality and system reliability, either a microprocessor or the microprocessor terminator card must be installed in microprocessor socket 4. A microprocessor must be installed in microprocessor socket 1.

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



- 1** Memory board latches
- 2** Optional microprocessor
- 3** Latches
- 4** Microprocessor retention bracket
- 5** VRM retention bracket
- 6** VRMs for optional microprocessor
- 7** Guides
- 8** Microprocessor terminator card
- 9** VRMs for installed microprocessor
- 10** Installed microprocessor

To install an additional microprocessor kit:

1. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 37); then remove the front bezel (see “Removing the Front Bezel” on page 40), and the front access cover (see “Removing the Front Access Cover” on page 41).
2. Remove the memory board from memory board socket 1:
 - a. Pull the memory board latches **1** so they rotate to a 90-degree angle from the memory board.
 - b. Grasp the two latches and carefully pull the memory board from the server.
 - c. Put the memory board aside on a flat, static-protective surface.

Installing a Microprocessor Kit

3. Remove the microprocessor retention bracket **4** :
 - a. Remove the shipping screw from the microprocessor retention bracket.
 - b. Grasp the bracket handle and pull downwards *firmly* to detach the bracket from the server.
 - c. Pivot the bracket to a 90-degree angle from the processor board.
 - d. Remove the bracket from the server.
4. Determine the microprocessor socket in which you want to install the new microprocessor.

Note: Your server comes with a microprocessor installed in socket 1. Install a second microprocessor in socket 2, a third microprocessor in socket 3, and a fourth microprocessor in socket 4.
5. If you are adding a fourth microprocessor, remove the microprocessor terminator card **8** :

Note: To maintain signal quality and system reliability, a microprocessor or the microprocessor terminator card must be installed in microprocessor socket 4.

 - a. Pull the microprocessor terminator card latches so they rotate to a 90-degree angle from the microprocessor terminator card.
 - b. Grasp the two latches and carefully pull the microprocessor terminator card from the server.
 - c. Store the microprocessor terminator card in a safe place.
6. Install the two voltage regulator modules (VRM) **6** included in the microprocessor kit.
 - a. Refer to the label in front of the processor board inside the server for the location of the VRM sockets.

Note: Install the VRMs for a second microprocessor in VRM sockets 2a and 2b. Install the VRMs for a third microprocessor in VRM sockets 3a and 3b. Install the VRMs for a fourth microprocessor in VRM sockets 4a and 4b.
 - b. Lift on the VRM retention bracket **5** to detach the bracket from the chassis.
 - c. Carefully remove the bracket from the server.
 - d. Install the VRMs in the VRM sockets.
 - e. Install the VRM retention bracket.

Note: When correctly installed, the bracket holds the VRMs securely in place and does not move or shift.

7. 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. Insert the microprocessor into the guides **7** and gently press the microprocessor into the socket. When correctly inserted, the microprocessor heat sink faces to the left.

Attention: Make sure the microprocessor is oriented and aligned correctly before you try to press it into the socket.

- c. Push the latches **3** until they close and lock in place.

8. Install the microprocessor retention bracket:

- a. Insert the bottom edge of the bracket in the matching openings in the guide support.
- b. Rotate the bracket over the microprocessors.
- c. Grasp the bracket handle and press the bracket firmly into place. Insert both tabs on the bracket in the matching openings on the server chassis.

Note: When correctly installed, the bracket holds the microprocessors securely in place and does not move or shift.

9. Install the memory board:

- a. Insert the memory board into the guides and gently press the memory board into the socket.

Attention: When you install the memory board in the server, be sure that it is completely and correctly seated in the connector before you apply force to close the latches. Incomplete insertion might cause damage to server components.

- b. Push the memory board latches **1** until they close and lock in place.

10. If you have other options to install or remove, do so now; otherwise, go to "Completing the Installation" on page 69.

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 four industry-standard, dual inline memory modules (DIMMs). Your server uses 50 ns, 168-pin, error correction code (ECC), DIMMs.

Notes:

1. The memory module sizes available for your server are 32 MB, 64 MB, 128 MB, and 256 MB. At a minimum, your server requires 128 MB memory modules in bank 1.
2. The preinstalled memory board contains banks 1–4. The optional memory board contains banks 5–8. Install additional memory in bank 2; then, bank 3, and continue in numeric sequence.
3. All the DIMMs installed in a bank must be the same size and speed, but each bank can have different sized DIMMs installed.
4. Your server comes with one memory board and one terminator board preinstalled. The memory board contains four *banks* arranged in 16 DIMM connectors and supports 4-way memory interleaving.

You can replace the terminator board with an optional memory board containing an additional 16 DIMM connectors. To obtain an optional memory board, contact an IBM reseller or IBM marketing representative.

5. Installing or removing memory modules changes the configuration of the server. Therefore, after installing or removing a DIMM, save the new configuration information in the Configuration/Setup Utility program. When you restart the server, the system displays a message indicating that the memory configuration has changed. Start the Configuration/Setup Utility program and select **Save Settings**. See “Using the Configuration/Setup Utility Main Menu” on page 18 for more information.
6. Consider the memory expansion that is available with the DIMM size you are installing.

DIMM Size	16 Connectors (1 Card)	32 Connectors (2 Cards)
32 MB	512 MB	1 GB
64 MB	1 GB	2 GB
128 MB	2 GB	4 GB
256 MB	4 GB	8 GB ¹

¹ Requires greater than 32-bit operating system memory support, or device driver support.

Your server provides two features that increase memory access speed: address bit permuting (ABP) and card-to-card (C2C).

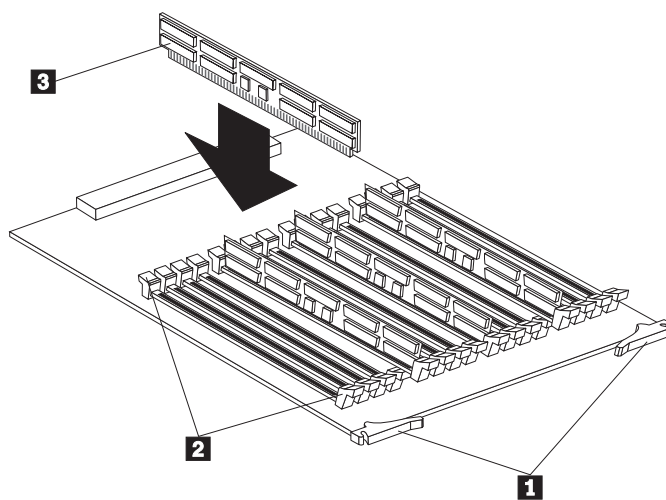
Notes:

1. BIOS automatically enables ABP, C2C, or ABP and C2C together, depending on the memory configuration.
2. ABP can function without replacing the terminator board with an optional memory board. C2C provides better performance but requires DIMMs in both memory boards. C2C and ABP together provide the best performance.

Table 2. Configurations for Memory Enhancement Features

Memory Enhancement	Configuration
2-Way ABP	Same size memory in banks: 1 and 2 3 and 4 (if populated) 5 and 6 (if populated) 7 and 8 (if populated)
4-Way ABP	Same size memory in banks: 1, 2, 3, and 4 5, 6, 7, and 8 (if populated)
C2C only	Same size memory in banks: 1 and 5 2 and 6 (if populated) 3 and 7 (if populated) 4 and 8 (if populated)
C2C and 2-Way ABP	Same size memory in banks: 1, 2, 5, and 6 3, 4, 7, and 8 (if populated)
C2C and 4-Way ABP	Same size memory in all banks

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



- 1** Latches
- 2** Retaining clips
- 3** DIMM

Installing Memory-Module Kits

Before you begin:

- Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.
- Read the documentation that comes with your option.

To install a memory module:

1. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 37); then remove the front bezel (see “Removing the Front Bezel” on page 40), and the front access cover (see “Removing the Front Access Cover” on page 41).
2. Remove the memory board from the server:
 - a. Pull the latches **1** so they rotate to a 90-degree angle from the memory board.
 - b. Grasp the two latches and carefully pull the memory board from the server.
 - c. Place the memory board connector-side up on a flat, static-protective surface.
3. 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.
4. Install the memory module:

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

- a. Turn the memory module (DIMM) **3** so that the pins align correctly with the connector.
- 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.
- c. Repeat the preceding step to make sure the DIMM is seated correctly.
- d. Make sure the retaining clips **2** are in the closed position.
- e. 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.
- f. Repeat these steps for each memory module that you install.

5. Reinstall the memory board:
 - a. Insert the memory board into the guides and gently press the memory board into the socket.

Attention: When you install the memory board in the server, be sure that it is completely and correctly seated in the connector before you apply force to close the latches. Incomplete insertion might cause damage to server components.
 - b. Push the latches **1** until they close and lock in place.
6. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 69.

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 microprocessors.

You add adapters to the expansion connectors, called slots, on the I/O board of your server. All slots are peripheral component interconnect (PCI) expansion slots. Your server supports up to 12 adapters in the PCI slots.

You can install a new PCI adapter or replace an existing PCI adapter with the same type of adapter without turning the server power off and restarting the system. These slots are called *hot-pluggable* PCI slots. They are also referred to as hot-plug PCI slots.

A PCI adapter comes with built-in identification and configuration specifications (set in memory on the device) 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.

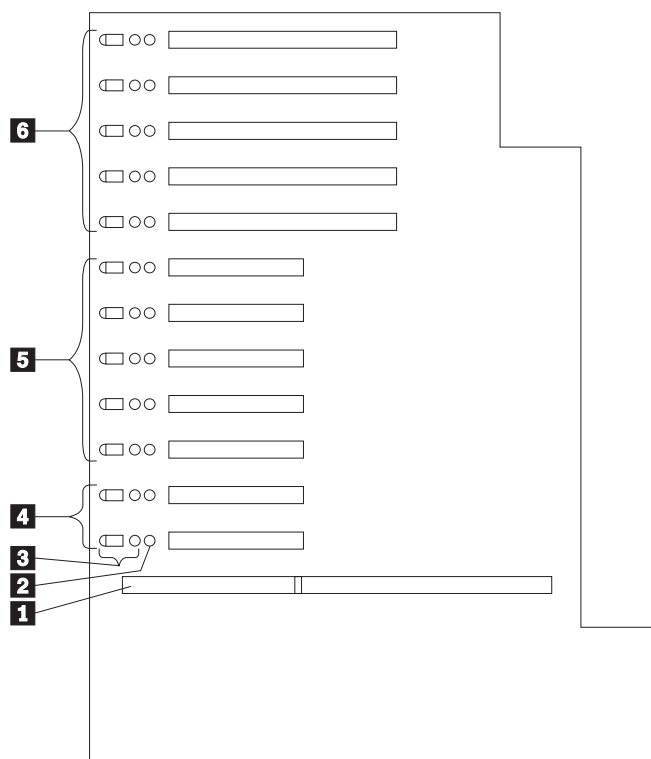
Your server comes with a video controller. This video controller is an integrated component on the I/O function card. The integrated video controller has super video graphics array (SVGA) technology.

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.

The integrated video controller has 1 MB of video memory. The integrated video controller supports the following screen resolutions:

- 640 × 480 pels with up to 65,536 colors
- 800 × 600 pels with up to 65,536 colors
- 1024 × 768 pels with up to 256 colors
- 1152 × 864 pels with up to 256 colors

The following illustration shows the location of the expansion slots and other components referred to in these steps.



- 1** I/O function card slot
- 2** Power LEDs
- 3** Attention LEDs for PCI slots
- 4** Hot-plug 32-bit PCI slots 11–12 (bus C)
- 5** Hot-plug 32-bit PCI slots 6–10 (bus B)
- 6** Hot-plug 64-bit PCI slots 1–5 (bus A)

LEDs for PCI Slots

Each PCI slot has three lights associated with it — two Attention lights and one Power On light.

- **Power On Light:** This light is on when the PCI slot is active and has power. Do not add or remove an adapter from the PCI slot when the Power On light is on. When this light is off, the PCI slot is inactive and has no power applied. You can install or remove an adapter when the Power On light is off. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters.
- **Attention Lights:** Each PCI slot has two Attention lights: one that is visible from the rear of the server and one that is visible inside the server. (The lights have the same meaning; they are duplicated to be visible from outside or inside 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.

Adapter Considerations

Before you continue with the adapter-installation procedure:

- Review and follow the instructions that come with the adapter and your operating system 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 full-length PCI adapters in all PCI expansion slots.
- Your server supports only 5.0 V dc PCI adapters.
- Your server 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.
- For a list of compatible RAID adapters, and installation requirements, refer to <http://www.pc.ibm.com/us/compat/> on the World Wide Web. If you install a RAID adapter, configure the adapter using the RAID adapter documentation.
- The I/O function card slot can support only the I/O function card. It is not an expansion slot.
- The system-management adapter slot can only support the Advanced System Management PCI Adapter. It is not an expansion slot.

Attention: You must have the Advanced System Management PCI Adapter installed for proper operation of your server and to use the system-management functions the adapter provides. See “Understanding the Netfinity 7000 M10 Design” on page 36 for more information about the Advanced System Management PCI Adapter.

- Your server has three 33 MHz PCI buses.
 - PCI slots 11 and 12 are on PCI bus C (bus numbers 0 and 1, with bus numbers 2 and 3 reserved for adapters that require bus number assignments).
 - PCI slots 6–10 are on PCI bus B (bus number 4, with bus number 5–9 reserved for adapters that require bus number assignments).
 - PCI slots 1–5 are on PCI bus A (bus number 10, with bus numbers 11–15 reserved for adapters that require bus number assignments).
- You can install 32-bit adapters in 64-bit slots and 64-bit adapters in 32-bit slots.
- Spread the installation of high speed adapters, such as 66 MHz Ethernet adapters, between the three PCI buses to optimize performance.

Configuring Adapters

PCI devices automatically communicate with the server configuration information. This usually results in automatic configuration of a PCI device. From the Configuration/Setup Utility program, you can select available resources for the adapter that you are installing. If a conflict does occur, see “Resolving Configuration Conflicts” on page 26.

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.

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.

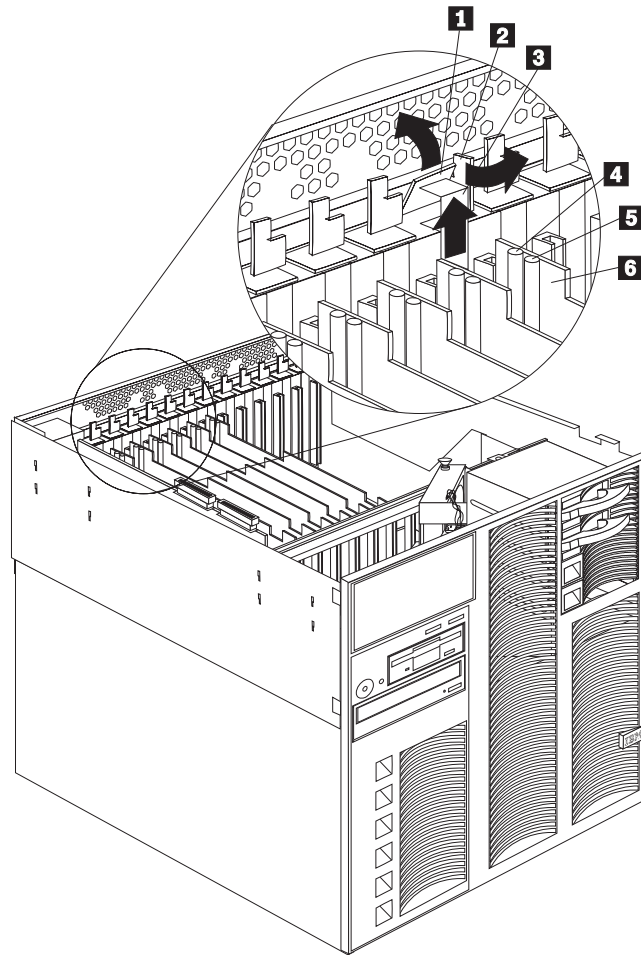
Before you begin:

- Read “Electrical Safety” on page 33, “Handling Static-Sensitive Devices” on page 34, and “Working Inside a Server with Power On” on page 35.
- Read the documentation that comes with your adapter for any special requirements or restrictions.
- Read the documentation that comes with your operating system.

Attention:

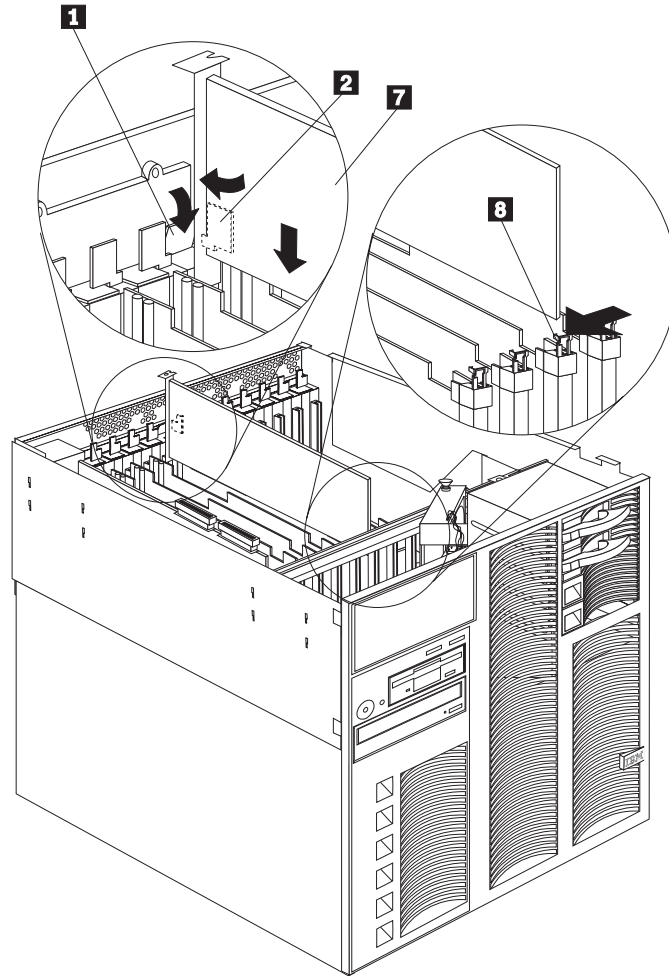
Do not remove a hot-plug adapter before performing the operating-system-defined procedure for disabling the hot-plug PCI slot that contains the adapter. Failure to do so might cause your system to lock up. Refer to your operating system documentation.

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

Working with Adapters



- 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 39).
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. Disable the 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.)

Attention: Make sure the Power On light **5** for the expansion slot is off before you continue with the next step. Failure to do so might cause your system to lock up.

4. Remove the expansion-slot cover **3** :
 - a. Rotate the adapter retention latch **2** .
 - b. Lift the tab **1** covering the top of the expansion-slot cover **3** and 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.

Note: 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. Set any jumpers or switches as described by the adapter manufacturer.
9. Install the adapter:

- a. Carefully grasp the adapter **7** by its top edge or upper corners, and align it with the expansion slot on the I/O 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 connector. Incomplete insertion might cause damage to server components or the adapter.

- c. Lower the tab **1** over the adapter. Rotate the adapter retention latch **2** until it snaps in place.

Note: The expansion slot also has an adapter retention latch **8** at the opposite end of the slot. To remove the adapter, push the adapter retention latch away from the adapter until the top edge of the adapter is past the latch.

10. Connect any cables to the adapter.

11. Enable the PCI slot from your operating system. Make sure the Power On light **5** for the PCI slot is on.
12. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 69.

Installing a Non-Hot-Plug PCI Adapter

This section gives the procedures 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 33 and “Handling Static-Sensitive Devices” on page 34.
- Read the documentation that comes with your adapter for any special requirements or restrictions.

Refer to the illustrations in “Installing a Hot-Plug PCI Adapter” on page 52 while you perform the steps in this procedure.

To install a non-hot-plug PCI adapter:

1. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to Install Options” on page 37); then remove the top cover (see “Removing the Top Cover” on page 39).
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 **3** :
 - a. See the illustrations in “Installing a Hot-Plug PCI Adapter” on page 52 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 **2** .
 - c. Lift the tab **1** 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.
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.
Note: 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 **7** by its top edge or upper corners, and align it with the expansion slot on the I/O 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 connector before you apply power. Incomplete insertion might cause damage to server components or the adapter.
 - c. Refer to the illustration in “Installing a Hot-Plug PCI Adapter” on page 52 for operation of the adapter retention latch on the end of the slot near the rear of the server.
 - d. Lower the tab over the adapter. Rotate the adapter retention latch until it snaps in place.
 - e. Connect any cables to the adapter.
9. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 69.

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 multiple processors. Refer to your network-adapter documentation for additional information about adapter compatibility requirements.

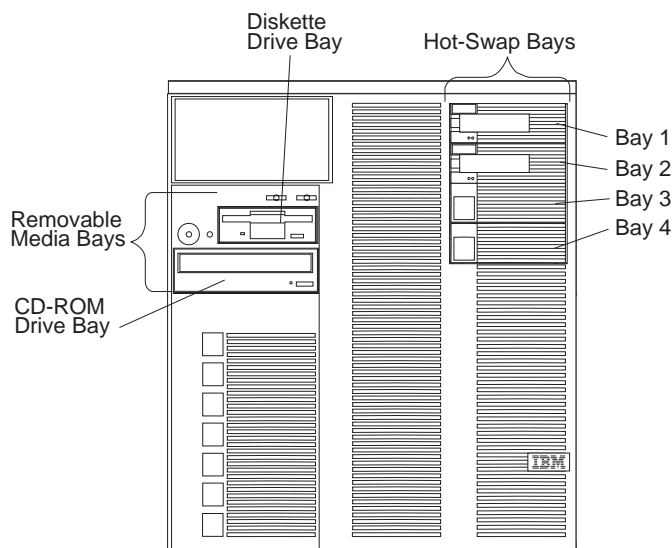
Installing Internal Drives

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.



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 “Controls and Indicators” on page 6). If the amber Hard Disk Status light for a drive is lit continuously, that individual drive is defective and needs to be replaced. When the Hard Disk Status light indicates a faulty drive, you can replace a hot-swap drive without turning off the server.

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.
- The Netfinity 7000 M10 supports one diskette drive only.
- Your server supports four slim-high (1-inch) or two 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 four 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 connector.

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 72, 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 SCSI controller on the I/O function card.

SCSI IDs

Each SCSI device that is connected to an individual integrated SCSI 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 integrated SCSI controllers 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 backplane. The server uses the hard disk drive SCSI IDs to send status information to the indicator lights above each hot-swap bay.

Note: Do not set the SCSI ID jumpers on hard disk drives.

The SCSI backplane in the server supports up to four hot-swap drives. Table 3 shows the default SCSI IDs that the backplane assigns for hot-swap hard disk drives.

Bay	1	2	3	4
ID	0	1	2	3
Note: The default SCSI ID for the SCSI backplane is 14. The default SCSI ID for each SCSI controller is 7.				

You can change the default IDs of the drives by changing the jumper settings on the SCSI backplane. See “SCSI Backplane Option Jumpers” on page 156. A simplified layout of the SCSI backplane is shown in “SCSI Backplane Component Locations” on page 155.

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

Installing Internal Drives

Termination

The devices at both ends of the SCSI bus must be terminated. If you attach SCSI devices (internal or external), you must terminate the last device in the chain. The SCSI cable that comes in your server (connected to the SCSI backplane) is terminated.

All the hot-swap drives in your server have automatic termination.

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

Preinstallation Steps

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.

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. Remove any SCSI ID jumpers from the drive.
3. To install the drive, go to “Installing a Drive in a Hot-Swap Bay.”

Installing a Drive in a Hot-Swap Bay

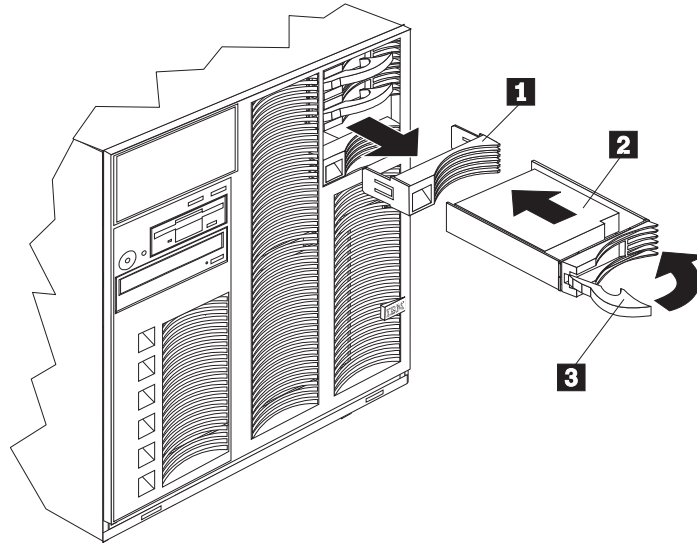
The bays on the right front of the server support hot-swap drives only.

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 33 and “Handling Static-Sensitive Devices” on page 34.
- Read the documentation that comes with your drive.

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. Determine the bay in which you want to install the drive.
2. Remove the filler panel **1** from the empty hot-swap bay 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 through Status Indicators” on page 126 for details.

Note: If your server has a RAID adapter installed, refer to the RAID adapter documentation for details about configuration requirements. Record the configuration information in the appropriate tables in “Installed Device Records” on page 136.

Replacing a Drive in a Hot-Swap Bay

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

If the amber Hard Disk Status light for a drive is lit continuously, that individual drive is defective and needs to be replaced.

Attention:

1. Before you hot-swap a drive, make sure it is defective. If you partially or completely remove a good drive instead of a defective one, your server might lose valuable data. If your server has a RAID adapter installed and you assigned RAID level 1 or 5 to the logical drives in your disk array, make sure the drive is defective. However, the RAID adapter can rebuild the data that you need, provided that certain conditions are met. Refer to the RAID adapter documentation for further details.
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 gently.

Before you begin:

- Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.
- Read the documentation that comes with your drive.
- Prepare the drive for installation (see “Preinstallation Steps” on page 60).

To replace a drive in a hot-swap bay:

Refer to the illustration in “Installing a Drive in a Hot-Swap Bay” on page 60 while you perform the steps in this procedure.

1. Remove the defective hard disk drive **2** by pressing on the lock to release the handle **3**, placing the handle in the open position (perpendicular to the drive), and pulling the hot-swap tray from the bay.
2. 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.
3. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly. See “Identifying Problems through Status Indicators” on page 126 for details.

Installing a Hot-Swap Power Supply

Notes:

1. If your server comes with one power supply, install a second power supply if you install one or more of the following:
 - Two microprocessors (For some microprocessors, a second power supply is required with the first additional microprocessor you install. For more information, contact an IBM reseller or IBM marketing representative.)
 - Optional memory board
 - Six or more PCI adapters
2. If a second power supply is not a requirement, a second power supply provides redundancy.
3. If a second power supply is a requirement, or if your server comes with two power supplies, a third power supply provides redundancy.

After you install a power supply, check the power-supply status indicators to verify that the power supply is operating properly. See “Power Supply LEDs” on page 127 for details.

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

9

**CAUTION:**

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

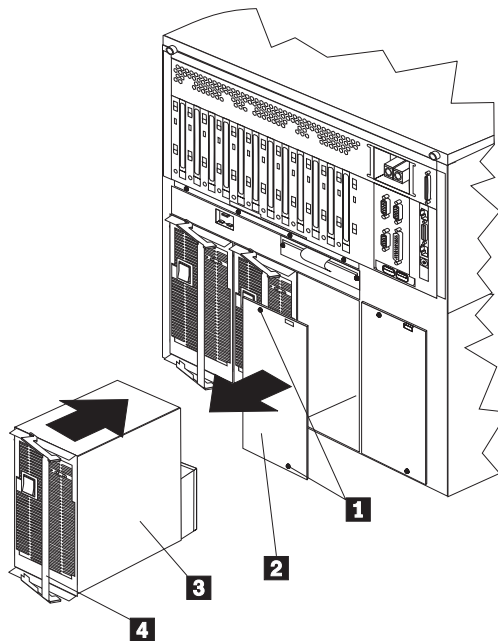


Hazardous voltage, current, and energy levels are present inside the power supplies, power backplane, and AC box. There are no serviceable parts inside the power supplies, power backplane, or AC box. If you suspect a problem with one of these parts, contact an IBM service technician.

Installing a Hot-Swap Power Supply

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

Note: Your server may differ slightly from the following illustration, depending on your model.



- 1** Screws
- 2** Filler panel
- 3** Power supply
- 4** Handle

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.

To add a power supply:

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

Attention: To help ensure system reliability when you install an additional power supply, install the power supply in the left-most empty power supply bay (as viewed from the back of the server).

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

Note: During normal operation, be sure that each power-supply bay has either a power supply or filler panel installed for proper cooling.
2. Remove any shipping screws from the power supply.

Note: You do not need to replace the shipping screws.
3. Place the handle **4** on the power supply **3** in the open position, and slide the power supply into the chassis.
4. Close the handle on the power supply to seat the power supply in the bay.
5. Make sure the Power switch on the power supply is in the On position.
6. Verify that the DC Power light and AC Power light on the power supply are lit, indicating that the power supply is operating correctly.

Removing a Hot-Swap Power Supply

Refer to “Installing a Hot-Swap Power Supply” on page 63 for information on power supply requirements. Each power supply has two status indicators; see “Power Supply LEDs” on page 127 for information about the status indicators.

Refer to the illustration in “Installing a Hot-Swap Power Supply” on page 63 while you perform the steps in this procedure.

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.

Removing a Hot-Swap Power Supply

To remove a hot-swap power supply:

1. If your server has only two functioning power supplies, turn off the server and peripheral devices (see “Preparing to Install Options” on page 37); 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:
 - a. Remove any shipping screws from the power supply.

Note: You do not need to replace the shipping screws.
 - b. Pull the handle on the power supply; then, slide the power supply out of the chassis.

Note: During normal operation, be sure that each power-supply bay has either a power supply or filler panel installed for proper cooling.
4. If you are not installing a replacement power supply, install a power-supply filler panel **2**; then go to step 5.

If you are replacing the power supply:

- a. Place the handle **4** on the power supply in the open position, and slide the power supply into the chassis.
 - b. Close the handle on the power supply to seat the power supply in the bay.
 - c. Make sure the Power switch on the power supply is in the On position.
 - d. Verify that the AC Power light and DC Power light are lit, indicating that the power supply is operating correctly.
5. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 69.

Replacing a Hot-Swap Fan Assembly

Your server comes with two hot-swap fan assemblies in the front access cover and two hot-swap fan assemblies behind the hot-swap drive bays.

Notes:

1. You do not need to turn off the power to the server to replace a fan assembly.
2. Replace a fan assembly that has failed as soon as convenient to maintain the redundant cooling capability.

To replace a hot-swap fan assembly:

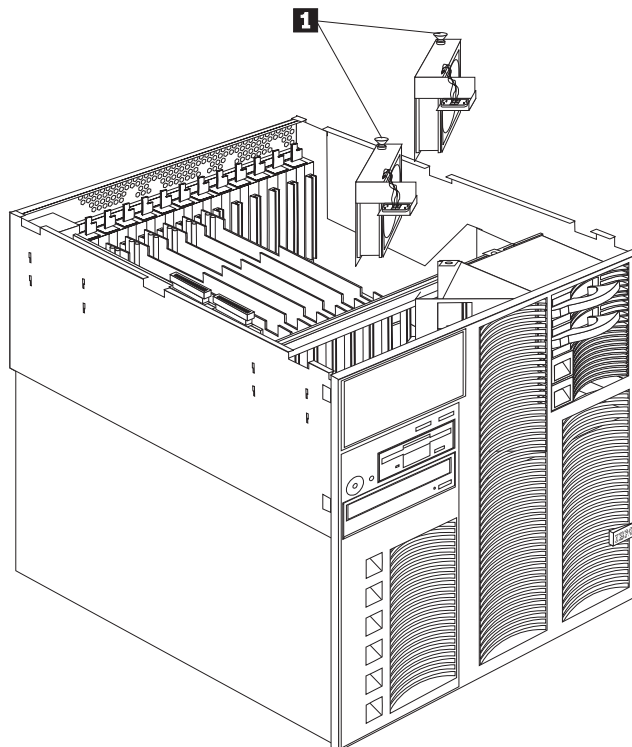
11



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. Determine which fan assembly you will replace.
 - To replace a fan assembly behind the hot-swap drive bays, go to step 2.
 - To replace a fan assembly in the front access cover, go to step 7 on page 68.
2. To replace a fan assembly behind the hot-swap drive bays, remove the top cover (see “Removing the Top Cover” on page 39).

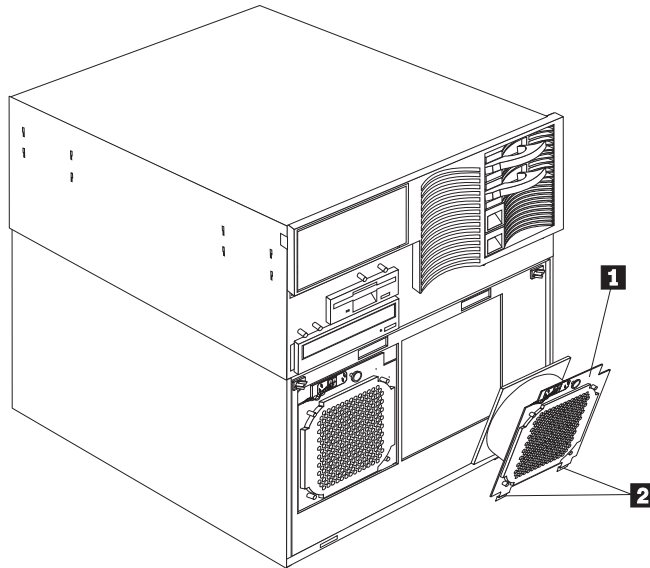


Replacing a Hot-Swap Fan Assembly

3. Pull on the fastener **1** and remove the fan assembly from the server.
4. Insert the replacement fan assembly in the server. Align the bottom edge of the fan assembly with the matching openings in the server chassis.
5. When you have the fan assembly correctly seated, press on the fastener to secure the fan assembly in the server.

Note: The power cable engages and the fan blades begin to spin when you correctly seat the fan assembly in the chassis.

6. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 69.
7. To replace a fan assembly in the front access cover, remove the front bezel (see “Removing the Front Bezel” on page 40).



8. Pull on the fastener and remove the fan assembly **1** from the front access cover.
9. Insert the replacement fan assembly in the front access cover. Align the bottom edge of the fan assembly **2** with the matching openings in the front access cover.
10. When you have the fan assembly correctly seated, press on the fastener to secure the fan assembly.

Note: The power cable engages and the fan blades begin to spin when you correctly seat the fan assembly.

11. If you have other options to install or remove, do so now; otherwise, go to “Completing the Installation” on page 69.

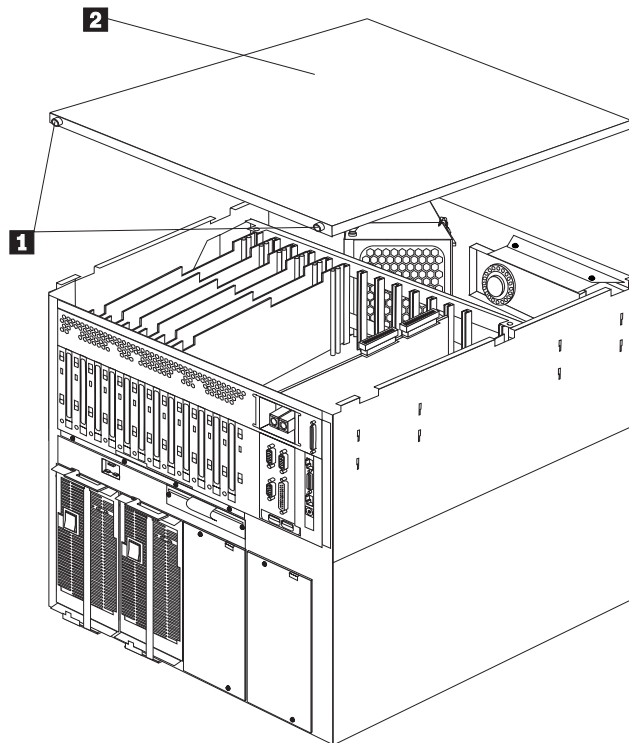
Completing the Installation

Depending on the options you have installed, you must reinstall the top cover, the front access cover, and the front bezel to complete the installation. You must also reconnect all the cables that you disconnected in “Preparing to Install Options” on page 37, and, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

Installing the 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 tools or loose 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 cord into a properly grounded electrical outlet.

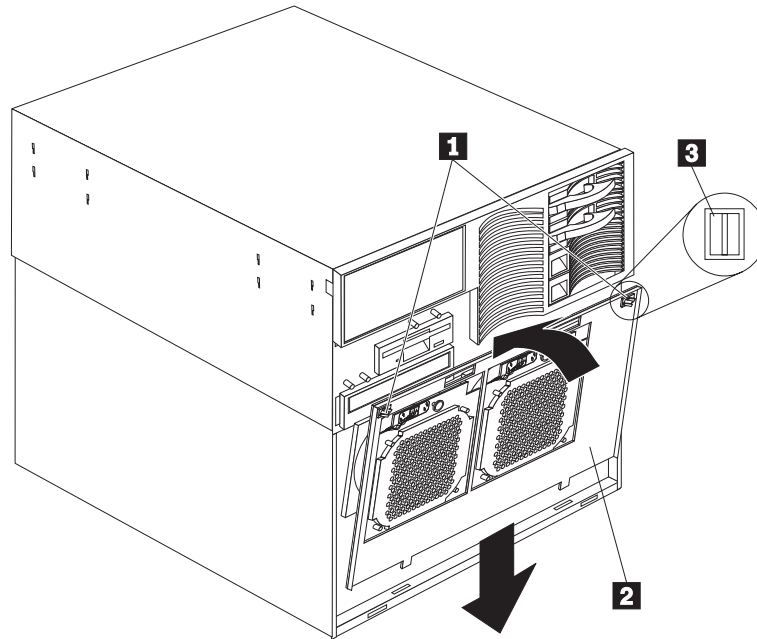
Notes:

- 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 Front Access Cover

To install the server front access cover:

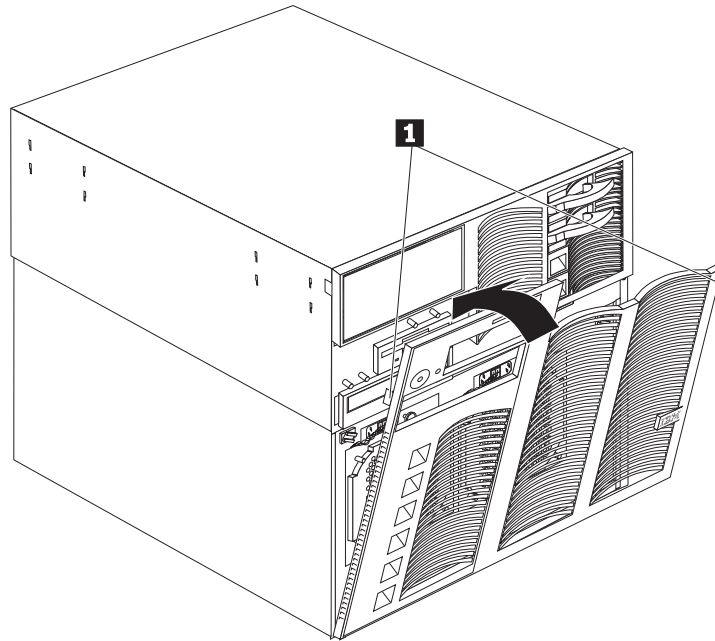
1. Insert the bottom edge of the cover **2** in the matching openings in the server chassis.
2. Pivot the top of the cover into place and turn the quarter-turn fasteners **1** to the closed position **3**.



Installing the Front Bezel

To install the front bezel:

1. Insert the bottom edge of the bezel in the matching openings in the server chassis.
2. Pivot the top of the bezel until the latches snap into place.



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 the “ServerGuide and Netfinity Manager Information” section of this *Server Library*.

Run the Configuration/Setup Utility program to save the new configuration information. See Chapter 3, “Configuring Your Server” on page 15.

Record your updated device and configuration information in the appropriate tables in “Installed Device Records” on page 136.

Connecting External Options

Before you begin:

- Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.
- 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

If you plan to install external SCSI devices, you must order additional SCSI cables. These cables must have the proper connectors for the SCSI external connector 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. Refer to “SCSI IDs” on page 59 and to the instructions that come with the SCSI devices for more information about setting a SCSI ID.

Installing External Devices

To attach an external device:

1. Run the shutdown procedure for the operating system. 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 parallel-port connector
- One video-port connector
- One keyboard-port connector
- One auxiliary-device-port connector
- One external UltraSCSI-port connector
- Two USB-port connectors
- One 10/100 Ethernet port connector
- One dual serial-port connector
- One RS 485 bus connector

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

Serial Port

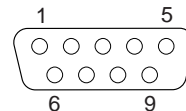
Your server comes with two serial ports. (Refer to “Input/Output Connectors and Expansion Slots” on page 9 for the locations of the connectors.) These ports are used to communicate with printers, plotters, external modems, scanners, and auxiliary terminals. You can also use these ports to transfer data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

Serial ports transfer data one bit at a time, using direct memory access (DMA). DMA is a method of transferring data between I/O devices and system memory without intervention by the system microprocessor.

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 345 600 bits per second. To use a serial port at 345 600 bits per second, you need a shielded serial cable. For information about this cable, contact your IBM marketing representative or your IBM authorized reseller.

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.



Connecting External Options

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

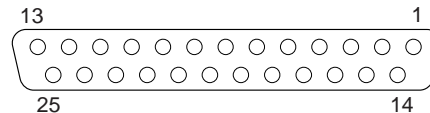
<i>Table 4. Serial Port Pin-Number Assignments</i>			
Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

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.

Parallel Port

The parallel port usually is used to communicate with printers, and transfers data one byte at a time using DMA. The parallel port has a 25-pin, female D-shell connector on the back of your server. (Refer to “Input/Output Connectors and Expansion Slots” on page 9 for the location of the connector.)



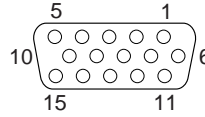
The following table shows the pin-number assignments for the parallel-port connector.

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

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 I/O function card 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. (Refer to “Input/Output Connectors and Expansion Slots” on page 9 for the location of the connector.)

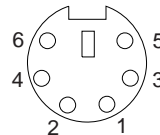


The following table shows the pin-number assignments for the video connector.

Pin	Signal
1	Red
2	Green or monochrome
3	Blue
4	Not connected
5	Ground
6	Ground
7	Ground
8	Ground
9	Not connected
10	Ground
11	Not connected
12	Not connected
13	Horizontal synchronization (Hsync)
14	Vertical synchronization (Vsync)
15	Not connected

Keyboard and Auxiliary-Device Ports

The I/O function card has one keyboard port and one auxiliary-device port that supports a mouse or other pointing device. (Refer to “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.

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

UltraSCSI Ports

Your server has two UltraSCSI bus-master controllers on the I/O function card; one supports internal devices and the other is connected to an external connector for support of external devices. Each controller supports up to 15 SCSI devices. You can use the 68-pin, SCSI connectors for these controllers to expand the capabilities of your server by attaching different types of SCSI devices, such as drives or printers.

Table 8 shows the pin-number assignments for the 68-pin SCSI connectors.

Pin	Signal	Pin	Signal
1	Ground	35	Data 12
2	Ground	36	Data 13
3	Ground	37	Data 14
4	Ground	38	Data 15
5	Ground	39	Data P1
6	Ground	40	Data 0
7	Ground	41	Data 1
8	Ground	42	Data 2
9	Ground	43	Data 3
10	Ground	44	Data 4
11	Ground	45	Data 5
12	Ground	46	Data 6
13	Ground	47	Data 7
14	Ground	48	Data P0
15	Ground	49	Ground
16	Ground	50	Ground
17	+Term power	51	+Term power
18	+Term power	52	+Term power
19	Reserved	53	Reserved
20	Ground	54	Ground
21	Ground	55	-Attention
22	Ground	56	Ground
23	Ground	57	-Busy
24	Ground	58	-Acknowledge
25	Ground	59	-Reset
26	Ground	60	-Message
27	Ground	61	-Select
28	Ground	62	-Control/Data
29	Ground	63	-Request
30	Ground	64	-Input/Output
31	Ground	65	Data 8
32	Ground	66	Data 9
33	Ground	67	Data 10
34	Ground	68	Data 11

Universal Serial Bus Ports

The I/O board in your Netfinity 7000 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 devices can be attached. USB provides 12 megabits-per-second (Mbps) data transfer rate with a maximum of 63 devices and a maximum signal distance of 5 meters (16 ft.) per data segment.

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

Table 9 shows the pin-number assignments for the USB connectors.

Pin	Signal
1	VCC
2	-Data
3	+Data
4	Ground

Diagnostic Programs and USB Devices: If you are trying to run the diagnostic programs on an IBM Netfinity Server, you must ensure that you do not have any Universal Serial Bus (USB) devices, such as a USB keyboard or USB mouse, connected to the server. If you do, the diagnostic programs will not run.

Note: If necessary, refer to the documentation that comes with your server for information on any of the following steps.

1. Shut down your operating system and then turn off your server.
2. Disconnect any USB devices from the server.
3. Ensure that a standard keyboard and a standard mouse are connected to the server.
4. Restart your server.
5. Run the diagnostic programs.

10/100 Ethernet Port

The Advanced System Management PCI Adapter contains a 10/100 Ethernet controller. The Ethernet controller has an external RJ-45 connector that is used with category 3, 4, or 5 unshielded twisted-pair (UTP) cable. The connector enables your Advanced System Management PCI Adapter to attach to an Ethernet network for remote communication.

Connecting External Options

Notes:

1. The 10/100 Ethernet port cannot be accessed from the network operating system. The connector is dedicated to connecting your Advanced System Management PCI Adapter to an Ethernet network through a service-processor interface, such as Netfinity Manager.
2. The 100BASE-TX Fast Ethernet standard requires that the cabling in the network is Category 5 or higher.

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

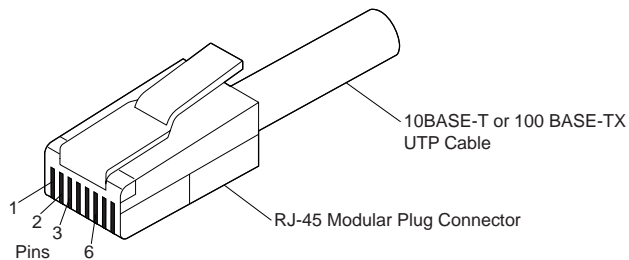


Table 10. 10/100 Ethernet Connector Pin-Number Assignments

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

Dual Serial Port

The Advanced System Management PCI Adapter contains a dual serial port. The port has an external connector that can be used to attach to a Y-cable that is shipped with your server. The serial connectors on the Y-cable and the pin-number assignments are the same as for the system serial ports. This Y-cable can be used to attach to a modem that is dedicated to communication with the Advanced System Management PCI Adapter.

You can obtain a listing of compatible modems and related information by accessing the following address: <http://www.pc.ibm.com/us/compat/> on the World Wide Web.

RS 485 Bus Port

The Advanced System Management PCI Adapter contains an RS 485 port. The port has an external connector that must be attached to an optional Y-cable that provides for chaining other compatible service processors for remote access. To obtain an optional Y-cable, contact an IBM reseller or IBM marketing representative.

The following table shows the pin-number assignments for the connectors used by the RS 485 bus port.

Table 11. RS 485 Bus Connector Pin-Number Assignments

Pin	Signal
1	Term power
2	+ Input
3	- Input
4	+ Output
5	- Output
6	Ground

Connecting External Options

Chapter 5. Rack Installation

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	81
Installing and Removing the Server	82
Preparing the Rack	82
Installing the Server in the Rack	87
Removing the Server from a Rack	90

Your server comes with all the rack installation hardware. Review the preinstallation information in “Before You Begin”; then, continue with “Installing and Removing the Server” on page 82.

5



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:

Use safe lifting practices when lifting your machine.

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 four 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 33. 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.
- Review the documentation that comes with your rack enclosure for safety or cabling considerations. Ensure that your planned installation is within the rack 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 143.

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.

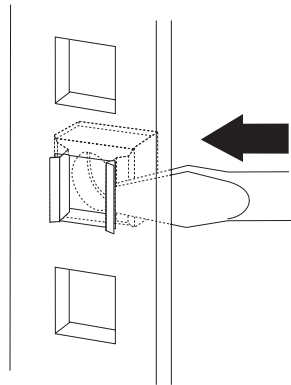
In this section, you will use the following parts:

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

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 for the cable-management arm and bezel brackets.



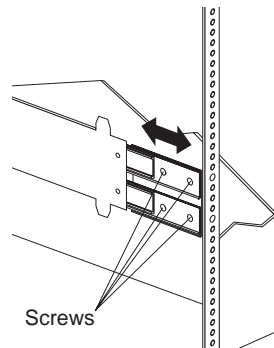
3. Attach a slide-bracket assembly to the front of the rack:
 - a. Position the slide-bracket assembly behind the mounting rail so that the slides will extend out from the front of the rack.

Notes:

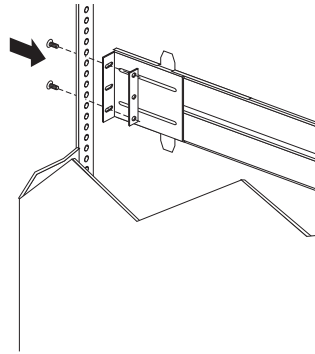
- 1) Get another person to help you attach the slide-bracket assemblies to the rack.
- 2) The slide-bracket assemblies can be installed on either the left or right side of the rack.
- 3) Refer to the illustrations for examples of the proper alignment of the slide-bracket assemblies.

Installing and Removing the Server

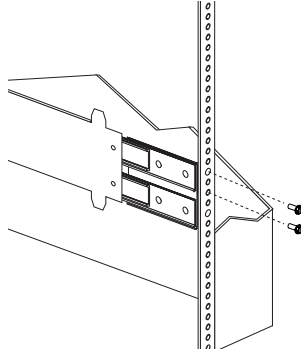
- b. If necessary, loosen the screws at the rear of the slide-bracket assembly and adjust the length of the slide bracket to fit the mounting rail. Tighten the screws.



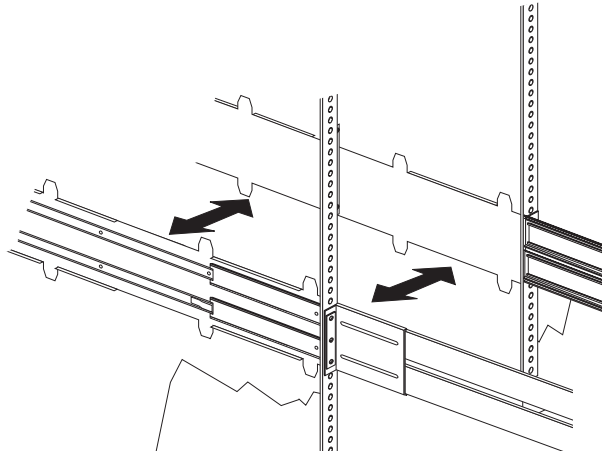
- c. Position a nut bar behind the slide-bracket assembly.
- d. Insert two screws (M6 by 16 mm) through the mounting rail, slide-bracket assembly, and nut bar. Do not tighten the screws.



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 two screws (M6 by 16 mm) through the mounting rail, slide-bracket assembly, and nut bar. Do not tighten the screws.



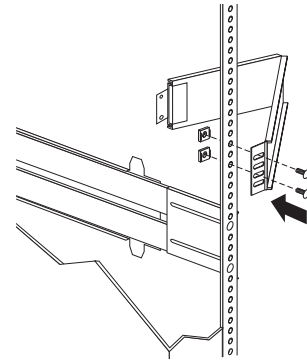
5. Attach the other slide-bracket assembly to the front and rear of the rack.
6. Push the slide-bracket assemblies to the outermost positions on the rack.



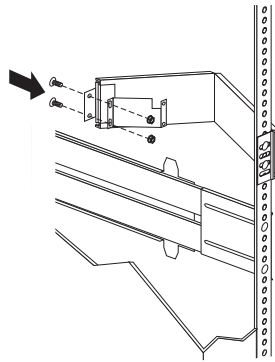
7. Tighten all screws to secure both slide-bracket assemblies. If you are using a torque screwdriver, use the following torque setting:
8–11 Nm (70.8–97.0 in/lbs).

Installing and Removing the Server

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 two 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 two screws (M6 by 16 mm) through the cable-management arm and the server bracket. Tighten the screws.

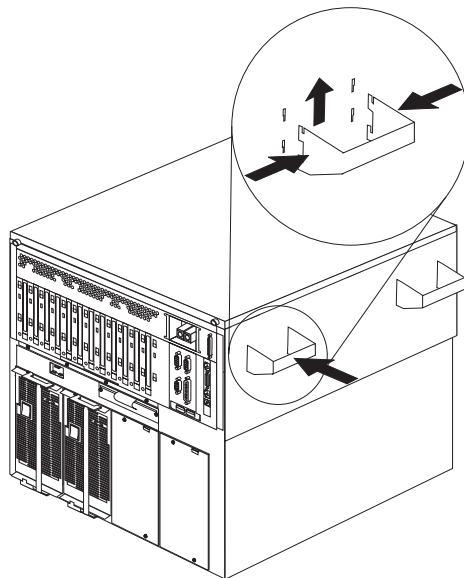


Installing the Server in the Rack

In this section, you will use eight screws (M4 by 8 mm) and four screws (M6 by 16 mm).

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 sides 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)

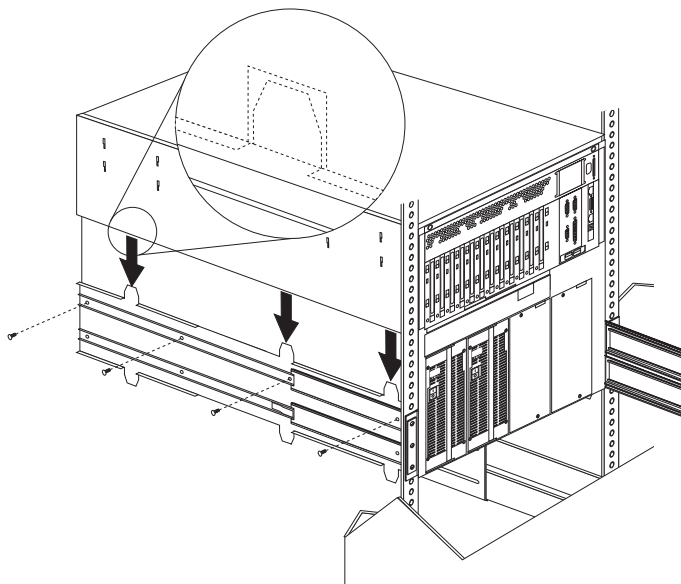
CAUTION:

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.

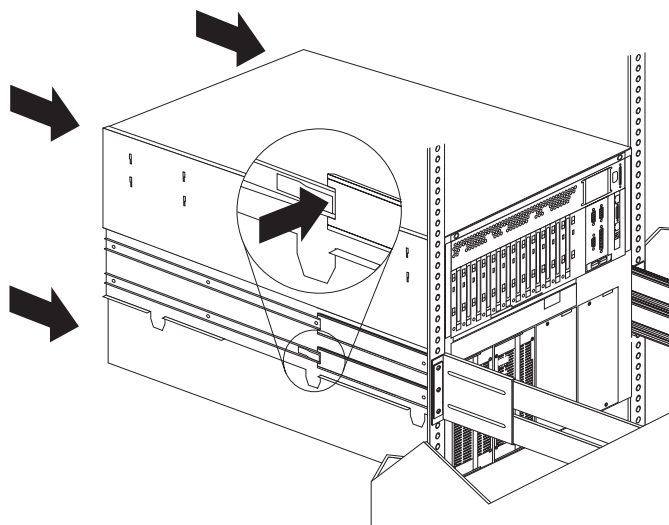
Installing and Removing the Server

5. 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.
6. Insert four screws (M4 by 8 mm) 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.

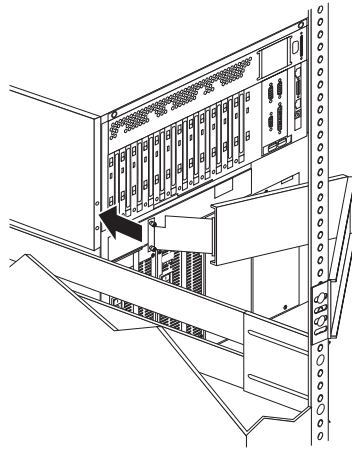


Note: When the drawer is fully extended, safety latches on the slide-brackets lock into place. To release the safety latch, press the latch on each side of the rack.

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

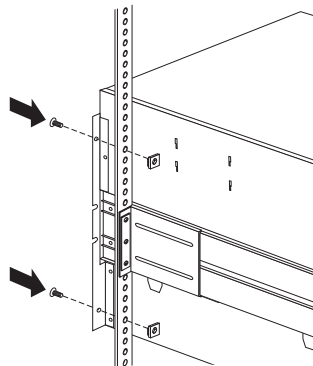


8. Attach the cable-management arm to the server using the captive screws.



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

Note: Depending on your model, the bezel brackets might have only one screw hole for attaching the server to the rack.



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

Removing the Server from a Rack

Before you begin

- Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.
- 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 cord.

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



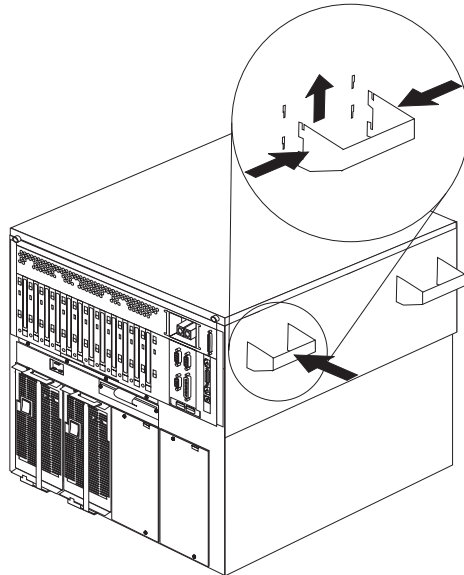
≥32 kg (70.5 lbs)



≥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 sides 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
- System error log
- Option diskettes

Diagnostic Programs

The server diagnostic programs are stored on electrically erasable programmable read-only memory (EEPROM). These programs are the primary method of testing the major components of your server and 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.

Diagnostic Programs and USB Devices

If you are trying to run the diagnostic programs on an IBM Netfinity Server, you must ensure that you do not have any Universal Serial Bus (USB) devices, such as a USB keyboard or USB mouse, connected to the server. If you do, the diagnostic programs will not run.

Note: If necessary, refer to the documentation that comes with your server for information on any of the following steps.

1. Shut down your operating system and then turn off your server.
2. Disconnect any USB devices from the server.
3. Ensure that a standard keyboard and a standard mouse are connected to the server.
4. Restart your server.
5. Run the diagnostic programs.

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 I/O function card, processor board, and I/O 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** 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 and the first screen of your operating system or application program appears.

Diagnostic Tools Overview

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 108.

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 99.

System Monitoring Messages

System monitoring messages occur as the Advanced System Management PCI Adapter monitors critical system functions. For more information, see “System Monitoring Messages” on page 111.

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 “Viewing the Test Log” on page 98.

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” on page 120 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 Advanced System Management PCI Adapter (service 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 can 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 Netfinity 7000 M10. If you want to test a non-IBM product, refer to the information that comes with that product.

Notes:

1. 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.
2. You can also run the diagnostic programs remotely with the Advanced System Management PCI Adapter in conjunction with the Advanced System Management service capabilities of Netfinity Manager, a terminal program, or a web browser. Refer to the “Advanced System Management Information” section of this *Server Library* for more information.

Running Diagnostic Programs

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

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.

Diagnostic Programs

3. If the diagnostic tests do not find a problem but the problem persists during normal operations, see “Troubleshooting” on page 120 and look for the problem symptom.
4. You might have to install a wrap connector on your active parallel or serial 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 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. 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**.
The Diagnostic Programs screen appears.
3. Select either **Extended** or **Basic** from the top of the screen.
4. 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 3 on page 99 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**.
The Diagnostic Programs screen appears.

3. Select **Utility** from the top of the screen.
4. 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. In addition to the actions given for the messages, see “Troubleshooting” on page 120 for general troubleshooting activities.
2. The actions for some of the messages require you to run the Configuration/Setup Utility program. For information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility Main Menu” on page 18.
3. If a password prompt appears with a POST message, type the administrator or power-on password; then, press **Enter**.

POST Message	Description
062	<p>The server failed to load the operating system 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” on page 15.) 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 I/O function card, I/O board, and microprocessor test.</p> <p>Action: Have the system serviced.</p>
106	<p>An error occurred during the I/O function card 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 adapters. If you can start the server without the adapters installed, 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>
129	<p>An error was detected in the L1 cache of a microprocessor.</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, run the diagnostic program for the microprocessors. <ul style="list-style-type: none"> • If the tests fail, replace the microprocessor. • If the microprocessor tests do not fail, have the system serviced. 3. Review the error logs in the Configuration/Setup Utility program for information on the microprocessor error. <p>If the problem persists, have the system serviced.</p>

POST Messages

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 130 and “Lithium Battery Notice” on page ix <i>before</i> you attempt to change the battery.</p> <p>You can use the server until you replace the battery. However, you must run the Configuration/Setup Utility program 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/Setup Utility program, see “Using the Configuration/Setup Utility Main Menu” on page 18. <p>If the message appears again, shut down the server, reseat the memory modules, and restart the server.</p> <ol style="list-style-type: none">3. Review the error logs in the Configuration/Setup Utility program for information on the memory error. <p>If the problem persists, have the system serviced.</p>
175	<p>A vital product data (VPD) error occurred.</p> <p>Action: Check to see if the error logs in the Configuration/Setup Utility program provide additional information on the error.</p> <p>If the problem persists, 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>

POST Message	Description
184	<p>The power-on password information stored in your server has been removed.</p> <p>Action: From the Configuration/Setup Utility main menu, select System Security. Then, follow the instructions on the screen. For information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility Main Menu” on page 18.</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 main menu, select Start Options; then, follow the instructions on the screen. For information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility Main Menu” on page 18.</p> <p>If this information cannot be restored, have the system serviced.</p>
186	<p>An I/O function card, I/O board, or hardware error occurred.</p> <p>Action: Check to see if the error logs in the Configuration/Setup Utility program provide additional information on the error.</p> <p>If the problem persists, 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 I/O function card has been replaced, the system serial number will be invalid and must 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: Check to see if the error logs in the Configuration/Setup Utility program provide additional information on the error.</p> <p>If the problem persists, 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 • An I/O function card problem • An I/O board problem <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed memory, see “Installing Memory-Module Kits” on page 46 to verify that the new memory is correct for your server. Verify that the memory modules are seated correctly and installed in groups of four. 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"> • Check the memory module status LEDs next to the memory sockets on the processor board (see “Memory Board Component Locations” on page 154). If a memory module status LED is on, run the diagnostic program for the module indicated by the LED. • 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. Review the error logs in the Configuration/Setup Utility program for information on the memory error. <p>If the problem persists, have the system serviced.</p>

POST Messages

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 memory module:<ul style="list-style-type: none">• Check the memory module status LEDs next to the memory sockets on the processor board (see “Memory Board Component Locations” on page 154). If a memory module status LED is on, run the diagnostic program for the module indicated by the LED.• Run the diagnostic program for the microprocessors. If the tests fail, replace the microprocessor.• If the microprocessor tests do not fail, have the system serviced.• Review the error logs in the Configuration/Setup Utility program for 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 46 to verify that the new memory is correct for your server. Verify that the memory modules are installed and seated correctly.2. Check to see if the error logs in the Configuration/Setup Utility program provide additional information on the error.3. 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:</p> <ol style="list-style-type: none">1. If you have just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least five seconds, and then turn on the server. If the error message goes away, replace the device.2. Ensure that:<ol style="list-style-type: none">a. Nothing is resting on the keyboard and pressing a key.b. No key is stuck.c. The keyboard cable is connected correctly to the keyboard and to the correct connector on the server.3. Attach another keyboard to the keyboard connector.4. 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.
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/Setup Utility program correctly reflects the type of diskette drive that you have installed.2. Run the diagnostic tests. If the diagnostic tests fail, have the system serviced.

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/Setup Utility program. If the setting is not correct, change it. For information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility Main Menu” on page 18.</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/Setup Utility program. If the setting is not correct, change it. For information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility Main Menu” on page 18.</p> <p>If the problem persists, have the system serviced.</p>
11xx	<p>An error occurred during the I/O function card, I/O board, and 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” on page 15.) 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 49. For information about setting interrupts, see Chapter 3, “Configuring Your Server.”
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/Setup Utility program. If the interrupt resource settings are not correct, change the settings. For information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility Main Menu” on page 18. 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 49. For information about setting interrupts, see “PCI Slot/Device Information” on page 24.

POST Message	Description
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/Setup Utility program. If the memory resource settings are not correct, change the settings. For information about using the Configuration/Setup Utility program, see "Using the Configuration/Setup Utility Main Menu" on page 18. 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 49. 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/Setup Utility program. For information about using the Configuration/Setup Utility program, see "Using the Configuration/Setup Utility Main Menu" on page 18. 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/Setup Utility program. If the memory resource settings are not correct, change the settings. For information about using the Configuration/Setup Utility program, see "Using the Configuration/Setup Utility Main Menu" on page 18. 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 49. 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>
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>An 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>

POST Message	Description
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 main menu. (See Chapter 3, “Configuring Your Server” on page 15.) 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? <p>Yes Exit from this screen; then select Exit Setup to exit the Configuration/Setup Utility main menu. Go to step 3.</p> <p>No Follow the instructions on the screen to add the drive; then save the changes and exit the Configuration/Setup Utility main menu. Restart the server.</p> 3. Is an operating system installed? <p>Yes Turn off the server. Go to step 4.</p> <p>No Install the operating system; follow your operating system instructions to shut down and restart the server.</p> 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 test. This error can be caused by a failing monitor, a failing I/O function card, 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 “I/O Board Component Locations” on page 148 for the locations of the cable connectors.</p> <p>If the problem persists, have the system serviced.</p>
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 I/O function card.</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 five seconds, and then turn it back on.</p> <p>Action: Ensure that the keyboard and mouse (pointing device) are attached to the correct connectors. (See “Input/Output Connectors and Expansion Slots” on page 9.) 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>

POST Messages

POST Message	Description
00019501	Processor 1 is not functioning. Action: Replace the microprocessor. If the problem persists, have the system serviced.
00019502	Processor 2 is not functioning. Action: Replace the microprocessor. If the problem persists, have the system serviced.
00019503	Processor 3 is not functioning. Action: Replace the microprocessor. If the problem persists, have the system serviced.
00019504	Processor 4 is not functioning. Action: Replace the microprocessor. If the problem persists, have the system serviced.
00019701	Processor 1 failed the built-in self test. Action: Replace the microprocessor. If the problem persists, have the system serviced.
00019702	Processor 2 failed the built-in self-test. Action: Replace the microprocessor. If the problem persists, have the system serviced.
00019703	Processor 3 failed the built-in self test. Action: Replace the microprocessor. If the problem persists, have the system serviced.
00019704	Processor 4 failed the built-in self-test. Action: Replace the microprocessor. If the problem persists, have the system serviced.
01298001	No update data for processor 1. 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 from the World Wide Web.
01298002	No update data for processor 2. 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 from the World Wide Web.
01298003	No update data for processor 3. 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 from the World Wide Web.
01298004	No update data for processor 4. 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 from the World Wide Web.
01298101	Invalid update data for processor 1. 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 from the World Wide Web.
01298102	Invalid update data for processor 2. 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 from the World Wide Web.

POST Message	Description
01298103	<p>Invalid update data for processor 3.</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 from the World Wide Web.</p>
01298104	<p>Invalid update data for processor 4.</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 from the World Wide Web.</p>
I9990301	<p>A hard disk drive error occurred.</p> <p>Action: Have the system serviced.</p>
I9990305	<p>POST could not find an operating system.</p> <p>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.</p> <p>If you cannot reinstall the operating system, have the system serviced.</p>
I9990605	<p>AC power has been restored.</p> <p>Action: No action is required. This message occurs each time AC power is restored to the server after an AC power loss.</p>
Other Numbers	<p>POST found an error.</p> <p>Action: Follow the instructions on the screen.</p>

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 startup microprocessor has failed, or the I/O function card, processor board, I/O 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 startup processor has failed; replace the startup 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 99 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 I/O function card, processor board, or I/O 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 beep code repeats, 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 five seconds, and then, turn on the server. If the beep code repeats, 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 I/O function card 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 I/O function card and an optional video adapter have failed the test. This beep combination might also indicate that the I/O function card, processor board, or I/O board contains a failing component.

One long and three short beeps

This beep combination indicates that the 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.

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 I/O function card.

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.
2-3-1	Screen initialization 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 inoperable.
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.
	Action: Have the system serviced.
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.
3-3-2	Critical Advanced System Management PCI Adapter bus error.
	Action: Disconnect the server from all electrical sources, wait for 30 seconds, and reconnect the server to the electrical sources. If the Processor Error LED (CR2 top) lights continuously, have your system serviced. (See "Advanced System Management PCI Adapter Component Locations" on page 153 for the location of the Processor Error LED.)

System Monitoring Messages

The following table shows the system monitoring messages that can appear on the information panel. The Advanced System Management PCI Adapter monitors critical system functions and generates the messages.

Notes:

1. In addition to the actions given for the messages, see “Troubleshooting” on page 120 for general troubleshooting activities that might help you resolve an error.
2. Refer to the “Advanced System Management Information” section of this *Server Library* for information about the system monitoring functions of the Advanced System Management PCI Adapter.

Code	Message	Description
00	Post Fail	Errors detected that prevent the system from successfully completing POST. Action: Review the error logs in the Configuration/Setup Utility program for information on the error.
01	Post Warn	Errors detected in POST that allow the system to complete POST (for example, a memory sizing configuration error). Action: Review the error logs in the Configuration/Setup Utility program for information on the error.
08	App Fail	An application has failed. Action: Review the error logs in the Configuration/Setup Utility program for information on the error.
09	App Warning	An application has issued a warning message. Action: Review the error logs in the Configuration/Setup Utility program for information on the error.
10	Boot Fail	The network operating system failed to load. Action: Restart the server. If the problem persists, review the error logs in the Configuration/Setup Utility program for information on the error.
18	OS Hang	A network operating system error occurred. Action: Restart the server.
20	Log Full	The system error log is full. Action: Review the error logs in the Configuration/Setup Utility program and clear error logs.
80	Over Temp	A monitored temperature is above the normal range. Action: <ol style="list-style-type: none"> 1. Make sure all four fans are functioning properly and air intakes are clear. 2. Make sure the room temperature is within normal limits. 3. If the problem persists, have the system serviced.
85	Over Volt	A monitored power source exceeds the threshold value. Action: Review the error logs in the Configuration/Setup Utility program for information on the error.
86	Under Volt	A monitored power source is below the threshold value. Action: Review the error logs in the Configuration/Setup Utility program for information on the error.

Code	Message	Description
9x	Power	Power supply failure, where x is the power supply identifier. Action: Replace the power supply.
98	Power Fail	A failure occurred in the power supply system. Action: Review the error logs in the Configuration/Setup Utility program for information on the error.
A0	Fan x Fail	A fan has failed, where x is the fan identifier. Action: Replace the fan.
B0	Intrusion	The intrusion-detection switches have been set. Action: Check that the covers are attached correctly. Then, verify that there has been an intrusion.
B8	Display Fail	The information panel has failed. Action: Check the cable connections to the front panel.
C0	SMI Error	A critical error has occurred. Action: Review the error logs in the Configuration/Setup Utility program for information on the error.
C1	Memory Fail	A double-bit ECC system memory error has occurred. Action: Review the error logs in the Configuration/Setup Utility program for information on the error.

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.

Note: In addition to the actions given for the messages, see “Troubleshooting” on page 120 for general troubleshooting activities.

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 7000 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 not listed.)
- iii** is the three-digit device ID. (These codes are for trained service personnel and are not listed.)
- 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 is additional information that can be used to analyze the diagnostic problem.

Failed Diagnostic Messages

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

Function: Core System Messages (001)

Result	Test-Specific String
Failed	Processor board, I/O function card, or I/O board. Action: Have the system serviced.

Function: Video System Messages (005)

Result	Test-Specific String
Failed	Processor board, I/O function card, or I/O board. Action: Have the system serviced.

Function: Serial Port Messages (011)

Result	Test-Specific String
Failed	Built-in serial port on I/O function card. Action: Have the system serviced.

Function: Parallel Port Messages (014)

Result	Test-Specific String
Failed	Built-in parallel port on I/O function card. Action: Have the system serviced.

Function: USB Port Interface Messages (015)

Result	Test-Specific String
Failed	I/O function card or I/O board. Action: Have the system serviced.

Function: PCI Interface Messages (020)

Result	Test-Specific String
Failed	Tab on PCI Hot Swap slot #xx has failed. Where xx represents a hot-plug PCI slot number. Action: Make sure the tab and latch on hot-plug PCI slot xx 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	I/O function card or I/O 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	RAID adapter. Action: Have the system serviced.
Failed	RAID adapter; indicates POST error. Action: Have the system serviced.
Failed	RAID adapter; testing drive in bay #1, SCSI ID 0. Action: Have the system serviced.
Failed	RAID adapter; testing drive in bay #2, SCSI ID 1. Action: Have the system serviced.
Failed	RAID adapter; testing drive in bay #3, SCSI ID 2. Action: Have the system serviced.
Failed	RAID adapter; testing drive in bay #4, SCSI ID 3. 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	Microprocessor in socket number xx. Where xx represents a microprocessor socket. Action: <ol style="list-style-type: none">1. Reseat the microprocessor.2. If the problem persists, replace the microprocessor. If the problem persists, have the system serviced.

Function: Advanced System Management PCI Adapter Messages (165)

Result	Test-Specific String
Failed	Advanced System Management PCI Adapter. Action: Have the system serviced.

Function: Thermal System Messages (175)

Result	Test-Specific String
Failed	Fan #1 Action: Replace fan 1. If the problem persists, have the system serviced.
Failed	Fan #2 Action: Replace fan 2. If the problem persists, have the system serviced.
Failed	Fan #3 Action: Replace fan 3. If the problem persists, have the system serviced.
Failed	Fan #4 Action: Replace fan 4. If the problem persists, have the system serviced.
Failed	Temperature sensed on processor board is out of range. Action: If one of the fans has failed, replace the 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	LED on I/O 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 Jxx Where xx represents a DIMM socket. Action: <ol style="list-style-type: none">1. Reseat the DIMM in DIMM socket Jxx.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 xx. Where xx represents a microprocessor socket. Action: 1. Reseat the microprocessor. 2. If the problem persists, replace the 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	I/O function card or I/O board. Action: Have the system serviced.

Function: Hard Disk Drive Messages (217)

Result	Test-Specific String
Failed	BIOS bay #1. Action: Have the system serviced.
Failed	BIOS bay #2. Action: Have the system serviced.
Failed	BIOS bay #3. Action: Have the system serviced.
Failed	BIOS bay #4. Action: Have the system serviced.

Function: Keyboard Messages (301)

Result	Test-Specific String
Failed	An I/O function card 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	An I/O function card pointing device test failed. Action: Replace the pointing device (mouse). If the problem persists, have the system serviced.

Failed Diagnostic Messages That Prevent Proper Testing

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

Function: Microprocessor Messages (089)

Result	Test-Specific String
Failed	Test setup error: Microprocessor in socket number <i>xx</i> is installed but not functioning; check system error log. Where <i>xx</i> represents a microprocessor socket. Action: <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 microprocessor and run the microprocessor diagnostic program again. If the problem persists, have the system serviced.
Failed	Test setup error: Invalid microprocessor in socket number <i>xx</i> or BIOS setup problem. Where <i>xx</i> represents a microprocessor socket. Action: <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 microprocessor and run the microprocessor diagnostic program again. If the problem persists, have the system serviced.
Warning	Test setup error: Microprocessor not installed in socket number <i>xx</i> or BIOS setup problem. Where <i>xx</i> represents a microprocessor socket. Action: <ol style="list-style-type: none">1. Verify that the 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 microprocessor and run the microprocessor diagnostic program again. If the problem persists, have the system serviced.

Function: System Memory Messages (201)

Result	Test-Specific String
Failed	<p>Test setup error: Damaged 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 <i>xx</i>.</p> <p>Where <i>xx</i> represents a microprocessor socket.</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 microprocessor. <p>If the problem persists, have the system serviced.</p>
Failed	<p>Test setup error: Damaged 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 <i>xx</i> or BIOS setup problem.</p> <p>Where <i>xx</i> represents a microprocessor socket.</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 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: Damaged 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>

Troubleshooting

Result	Test-Specific String
Failed	<p>Test setup error: Unknown hardware problem associated with microprocessor in socket number xx.</p> <p>Where xx represents a microprocessor socket.</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 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>

Troubleshooting

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

Do the following before using the troubleshooting charts:

1. Check to make sure that all cables and cords are securely connected to the rear of the server and to attached options.
2. Remove any software or device that you just installed.
3. Run any diagnostic tests that come with the options you have installed.
4. Run the server diagnostic tests.
5. Check to see if the system error logs in the Configuration/Setup Utility program provide additional information on the error.
6. Reinstall the new software or new device.
7. Refer to <http://www3.pc.ibm.com/support> on the World Wide Web for answers to frequently asked questions, technical updates, BIOS updates, updates to device drivers, and many other sources of technical support.
8. If the error persists, use the 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.

Note: If you cannot find the problem in the troubleshooting charts, go to “Running Diagnostic Programs” on page 97 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.

CD-ROM Drive 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>
CD-ROM drive tray not working	The server must be turned on. If the system is on and the tray does not eject, insert the end of a paper clip into the small hole (to the left of the tray eject/load button) on the front of the CD-ROM drive.

CD-ROM Drive Problems	Action
CD-ROM drive not recognized	Use the Configuration/Setup Utility program to verify that the CD-ROM drive is enabled.

Diskette Drive Problems	Action
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 is good and not damaged. (Try another diskette if you have one.) 2. The diskette is inserted correctly (label up and metal-shutter end first) in the drive. 3. The diskette contains the necessary files to start the system. 4. The system is not in unattended-start mode (see "System Security" on page 20). 5. The diskette drive is enabled. Check the drive startup sequence setting in the Configuration/Setup Utility program (see "Start Options" on page 23). 6. Your software program is OK (see the Software Problems troubleshooting chart provided later in this section). 7. Your drive startup sequence is set correctly (see "Start Options" on page 23). <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
Wavy, unreadable, rolling, distorted screen, or screen jitter.	<p>Verify that the correct device driver is properly installed.</p> <p>If the monitor self-tests show that 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>Notes:</p> <ol style="list-style-type: none"> 1. The distance between monitors and diskette drives should be at least 76 mm (3 in.) to prevent diskette drive read/write errors. 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. See your IBM reseller or IBM marketing representative for information about the enhanced monitor cable. <p>If the problem recurs, have the monitor and system serviced.</p>
The monitor works when you turn on the system, but goes blank when you start some application programs.	<p>Verify that the primary monitor cable is connected to the video port.</p> <p>Be sure you installed the necessary drivers for the application.</p>

Troubleshooting

Monitor Problems	Action
Blank screen	Verify that: <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 system. If the items above are correct and the screen remains blank, have the system serviced.
Only the cursor appears.	Have the system serviced.
Wrong characters appear on the screen.	Have the system serviced.
<hr/>	
General Problems	Action
Problems such as indicator lights not working.	Have the system serviced.
System continuously restarts.	Run the diagnostic programs. If the problem recurs, have the system serviced.
Server does not respond to the Power On or Reset button.	Unattended-start mode might be enabled; enter the user password to disable unattended-start mode and try again (see "System Security" on page 20). If the server still does not respond, have the system serviced.
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Intermittent Problems	Action
A problem occurs only occasionally and is difficult to detect.	Verify that: <ol style="list-style-type: none">1. All cables and cords are securely connected to the rear of the system and to attached options.2. The last external device in each SCSI chain is terminated correctly. (See "SCSI Drives" on page 59 for more information about SCSI termination.) If the items above are correct, have the system serviced.
<hr/>	
Keyboard, Mouse, or Pointing-Device Problems	Action
All or some keys on the keyboard do not work.	Do the following: <ol style="list-style-type: none">1. Verify that the keyboard cable is properly connected to the system and that the system and the monitor are turned on.2. Attach another keyboard to the keyboard connector. If the problem persists, have the system serviced.
The mouse or pointing device does not work.	Do the following: <ol style="list-style-type: none">1. Verify that the mouse or pointing-device cable is securely connected.2. Verify that the device drivers are installed correctly.3. Attach another mouse or pointing device to the pointing-device port. Note: The pointing-device port is also known as the auxiliary-device port or mouse port. If the problem recurs, have the system and the device serviced.

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 and memory boards are seated properly. 2. You have installed the correct type of memory (see “Installing Memory-Module Kits” on page 46). 3. If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. For information about updating the configuration, see “Using the Configuration/Setup Utility Main Menu” on page 18. <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 was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The option is designed for your server. For a list of supported options, refer to http://www.pc.ibm.com/us/compat/ on the World Wide Web. 2. You followed the installation instructions that were supplied 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. Whenever you change the memory or an option, you must update the configuration by running the Configuration/Setup Utility program (see “Using the Configuration/Setup Utility Main Menu” on page 18). <p>If all of the above items are correct, start the diagnostic programs. If the diagnostic programs find no problem, have the system and the option serviced.</p>
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 items above are correct and the test programs found no problem, have the system and the option serviced.</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. (See “Termination” on page 60 for more information on SCSI termination.) 3. All external SCSI options are turned on. External SCSI options must be turned on before the system is turned on. <p>If the problem recurs, 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 items above are correct, have the system serviced.</p>

Serial Port Problems	Action
The number of serial ports displayed is less than the number of serial ports installed.	Verify that: <ol style="list-style-type: none"> 1. Each port is assigned a unique address. 2. The serial-port adapter, if you installed one, is seated properly. If the items above are correct, have the system serviced.
Universal Serial Bus (USB) Port Problems	Action
The number of serial buses displayed is less than the number of serial buses installed.	Verify that: <ol style="list-style-type: none"> 1. Each bus is assigned a unique address. 2. The serial-port adapter, if you installed one, is seated properly. If the items above are correct, have the system serviced.
A USB device does not work.	Verify that: <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 data-bbox="760 730 1427 810">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. If the problem still persists, have the system serviced.
Printer Problems	Action
The printer does not work.	Verify that: <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 system. (For the location of the serial and parallel ports, see "Input/Output Connectors and Expansion Slots" on page 9.) <p data-bbox="760 1140 1427 1165">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/Setup Utility program. If the items above are correct and the printer still does not work, run the tests described in the manual that comes with your printer. If the tests show the printer is OK, have the system serviced.
Expansion Enclosure Problems	Action
The SCSI expansion enclosure used to work, but does not now work.	Verify that all of the SCSI expansion enclosure hardware and cable connections are secure. <p data-bbox="721 1560 824 1585">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. (See "Termination" on page 60 for more information on SCSI termination.) 3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. For more information, see your SCSI and expansion enclosure documentation. <p data-bbox="721 1833 1427 1883">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 data-bbox="721 1896 1427 1946">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 system has the minimum memory requirements needed to use the software. Refer to the information supplied with the software to verify memory requirements. <p>Note: If you have just installed an adapter or memory, you might have a memory address conflict (see “Resolving Configuration Conflicts” on page 26).</p> <ol style="list-style-type: none"> 2. The software is designed to operate on your system. 3. Other software works on your system. 4. The software you are using works on another system. <p>If you received any error messages when using the software program, refer to the information supplied 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 or service technician for help.</p>
Advanced System Management PCI Adapter Problems	Action
The Advanced System Management PCI Adapter is not working properly	<p>Disconnect the server from all electrical sources, wait for 30 seconds, and reconnect the server to the electrical sources. If the Processor Error LED (CR2 top) lights continuously, have your system serviced. (See “Advanced System Management PCI Adapter Component Locations” on page 153 for the location of the Processor Error LED.)</p>

SCSI Messages

The following table lists messages that reflect problems with the SCSI controller or a SCSI device.

Note: If your server does not have a hard disk drive, ignore any message that indicates that the BIOS is not installed.

You will get these messages only when running the SCSISelect Utility. For more information, see the documentation that comes with the SCSISelect Utility.

SCSI Messages	Description
All	<p>One or more of the following might be causing the problem.</p> <ul style="list-style-type: none"> • A failing SCSI device (adapter, drive, controller) • An improper SCSI configuration • Duplicate SCSI IDs in the same SCSI chain • An improperly installed SCSI terminator • A defective SCSI terminator • An improperly installed cable • A defective cable <p>Action:</p> <p>Verify that:</p> <ul style="list-style-type: none"> • The external SCSI devices are turned on. External SCSI devices must be turned on before the system. • The cables for all external SCSI devices are connected correctly. • The last device in each SCSI chain is terminated correctly. (See “SCSI Drives” on page 59 for more SCSI chain information.) • The SCSI devices are configured correctly. <p>If the above are correct, run the diagnostic programs for additional information about the failing device. If the error recurs, 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/Setup Utility program, see “Using the Configuration/Setup Utility Main Menu” on page 18.

Changing the Hardware Configuration Setup

An alternative way to resolve memory-address conflicts is to change the address of the conflicting hardware option.

Identifying Problems through Status Indicators

Your server has status indicators to help you identify problems with some server components. Status indicators are located on the following components:

- Hard disk drive trays
For more information, see “Controls and Indicators” on page 6.
- Power supplies
For more information, see “Power Supply LEDs” on page 127.
- I/O board
For more information, see “Installing a Hot-Plug PCI Adapter” on page 52.
- Front panel
For more information, see “Information LED Panel” on page 8.
- Rear panel
For more information, see “Input/Output Connectors and Expansion Slots” on page 9.

Power Supply LEDs

The AC and DC Power LEDs on the power supplies provide status information about the power supplies. See “Power Supplies” on page 11 for the location of the LEDs.

The following table describes the AC and DC Power 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 (the DC Power LEDs on all the power supplies are off). <i>Action:</i> Press the Power Control button to start the server. 2. The Power switch on the power supply is in the Off position. <i>Action:</i> Turn the Power switch to the On position. 3. The power supply has failed (the DC Power LED on at least one of the power supplies is on). <i>Action:</i> 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. <i>Action:</i> 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. <i>Action:</i> Replace the power supply. <p>If the problem persists, have the system serviced.</p>

System Component Status Indicators

Status indicators on the I/O board, processor board, memory board, and the Advanced System Management PCI Adapter can help identify problems. The indicators are lit during POST to ensure the indicators operate. After POST completes, the indicators show the status of the component.

For the location of the status indicators, see “Processor Board Component Locations” on page 149, “Memory Board Component Locations” on page 154, “I/O Board Component Locations” on page 148, and “Advanced System Management PCI Adapter Component Locations” on page 153.

Processor Board LEDs

Indicator	Description
Microprocessor Bus Activity LED	If activity on the microprocessor bus is present, the indicator for the slot is lit.
Microprocessor VRM Status LED	If a microprocessor voltage regulator module (VRM) is present and has failed, the indicator for the slot is lit.
Microprocessor Termination LED	If proper termination of the microprocessor slots is present, the indicator is lit.
ERR 0 and ERR 1 LEDs	Reserved.

Memory Board LED

Indicator	Description
Memory Module Status LED	If a memory module is present and has failed, the indicator for the slot is lit.

I/O Board LEDs

Indicator	Description
Power On LED	If power to a PCI slot is present, the indicator for the slot is lit.
Attention LED	Your operating system defines the meaning of this indicator. Refer to your operating system documentation for more information.

Advanced System Management PCI Adapter LEDs

Indicator	Description
Power On LED	If power to the Advanced System Management PCI Adapter is present, the indicator is lit.
Processor Error LED	If the processor on the Advanced System Management PCI Adapter has failed, the indicator is lit.
Ethernet Activity LED	If the Ethernet controller on the Advanced System Management PCI Adapter is transmitting data or receiving data, the indicator is lit.
Ethernet Link LED	If an active link to the Ethernet controller on the Advanced System Management PCI Adapter is present, the indicator is lit.

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.

Attention: 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 33 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 97.

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., please 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 1-800-388-7080 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.

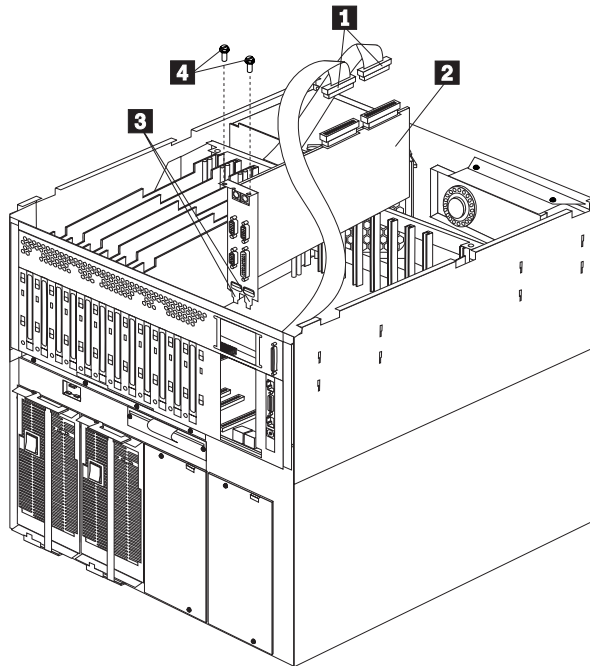
Before you begin, be sure you have:

- Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.
- Followed 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 37); then remove the top cover (see “Removing the Top Cover” on page 39).
2. Remove the I/O function card from the server:
 - a. Refer to the following illustration while you perform the steps in this procedure.

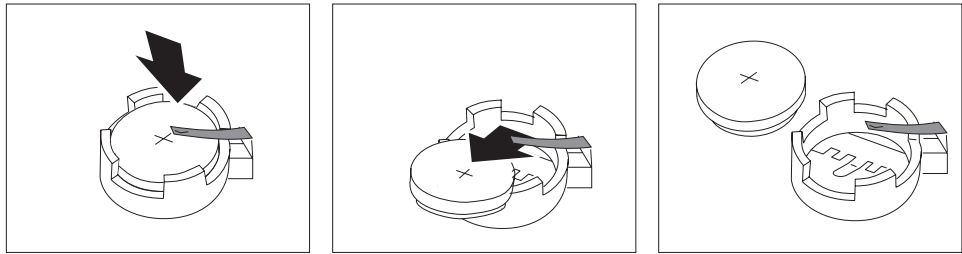


- b. Disconnect the cables **1** from the I/O function card **2**. Note carefully where each cable is connected before you remove it.
 - c. Remove the two screws **2** located on the metal connector plate inside the server.
 - d. Carefully grasp the I/O function card by its top edge and pull the I/O function card out of the server.
 - e. Place the I/O function card connector-side up on a flat, static-protective surface.
3. Locate the battery on the I/O function card (see “I/O Function Card Component Locations” on page 151).

Replacing the Battery

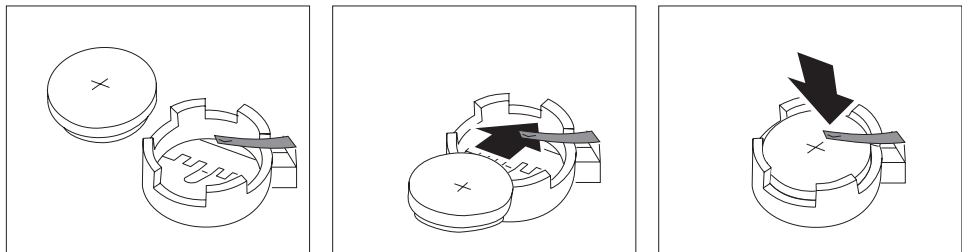
4. Remove the battery:

- 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 I/O function card. 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.



5. 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.



6. Install the I/O function card:

- a. Carefully grasp the I/O function card by its top edge, and insert the tabs **3** on the bottom edge of the metal connector plate in the matching openings on the server back panel.
- b. Align the I/O function card with the guide on the opposite end of the adapter and the slot on the I/O board.
- c. Press the I/O function card *firmly* into the slot.

Attention: When you install the I/O function card in the server, be sure that it is completely and correctly seated. Incomplete insertion might cause damage to server components.

- d. Insert the two screws you removed in step 2c on page 131.
- e. Connect the cables you disconnected in step 2b on page 131.

7. Reinstall the top cover and complete the installation (see “Completing the Installation” on page 69).

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.

8. 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, component layouts, and jumper settings.

This chapter contains:

Record the Identification Numbers	136
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Record the Identification Numbers

Record and retain the following information.

<i>Table 12. IBM Netfinity 7000 M10 Identification Numbers</i>	
Product Name	IBM Netfinity 7000 M10
Machine Type	8680
Model	_____
Serial Number	_____
Key Serial Number	_____

The server serial number and other identification numbers are located on a label at the front of the server behind the front bezel.

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 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 configuration.

Note: If necessary, you can also refer to the board layouts contained in this chapter.

Device Records

Table 15 (Page 1 of 4). Configuration/Setup Utility Program Defaults and Changes

Option	Default Value	New Value	Additional Information
System Summary			
Processor 1 ¹	Intel Pentium II Xeon or Intel Pentium III Xeon	_____	_____
Processor 2 ¹	_____	_____	_____
Processor 3 ¹	_____	_____	_____
Processor 4 ¹	_____	_____	_____
Processor Speed	_____	_____	_____
Math Coprocessor	Internal	_____	_____
System Memory	_____	_____	_____
Processor 1 Cache Size	_____	_____	_____
Processor 2 Cache Size	_____	_____	_____
Processor 3 Cache Size	_____	_____	_____
Processor 4 Cache Size	_____	_____	_____
System ROM	F000h — FFFFh	_____	_____
Diskette Drive A	1.44 MB 3.5-inch diskette drive	_____	_____
Primary Master Device	[CD-ROM]	_____	_____
Mouse	[Installed]	_____	_____
¹ All microprocessors must have the same cache size and type, and the same clock speed.			
System Memory Type	[EDO RAM]	_____	_____
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	_____	_____	_____
Change VPD Machine/Model Type	_____	_____	_____
System Card Data			
Model	_____	_____	_____
Submodel	_____	_____	_____
System Serial	_____	_____	_____
Planar	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Processor	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
DASD Backplane	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Power Backplane	_____	_____	_____
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____

Table 15 (Page 2 of 4). Configuration/Setup Utility Program Defaults and Changes

Option	Default Value	New Value	Additional Information
Power Supply #1			
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Power Supply #2			
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
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-inch	_____	_____
Video			
Video Controller	S3 Incorporated	_____	_____
Video Memory	1024 KB	_____	_____
Primary IDE Channel	[Enabled]	_____	_____
Primary 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]	_____	_____
Start Options			
Keyboard NumLock State	[On]	_____	_____
Keyboard Speed	[Fast]	_____	_____
Disketteless Operation	[Disabled]	_____	_____
Displayless Operation	[Disabled]	_____	_____
Keyboardless Operation Mode	[Disabled]	_____	_____
First Startup Device	[CD-ROM]	_____	_____
Second Startup Device	[Diskette Drive 0]	_____	_____
Third Startup Device	[Disabled]	_____	_____
Fourth Startup Device	[Disabled]	_____	_____
Power On Self Test	[Quick]	_____	_____
Virus Detection ²	[Disabled]	_____	_____
² The Virus Detection test checks for changes to the boot sector.			

Device Records

Table 15 (Page 3 of 4). Configuration/Setup Utility Program Defaults and Changes

Option	Default Value	New Value	Additional Information
Advanced Setup			
ACPI Control			
ACPI BIOS	[Enabled]	_____	_____
ACPI Hardware Signature	[Auto-configure]	_____	_____
Cache Control			
Processor Cache Type	[Write-Back]	_____	_____
Processor 1 Cache State	[Enabled]	_____	_____
Processor 1 Cache Size	512 KB	_____	_____
Processor 2 Cache State	[Enabled]	_____	_____
Processor 2 Cache Size	0 KB	_____	_____
Processor 3 Cache State	[Enabled]	_____	_____
Processor 3 Cache Size	0 KB	_____	_____
Processor 4 Cache State	[Enabled]	_____	_____
Processor 4 Cache Size	0 KB	_____	_____
PCI Slot/Device Information ³			
Slot 00			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 01			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 02			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 03			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 04			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 05			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 06			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 07			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
³ Before setting values, review "Resolving Configuration Conflicts" on page 26 and follow the instructions for avoiding configuration conflicts.			

Table 15 (Page 4 of 4). Configuration/Setup Utility Program Defaults and Changes

Option	Default Value	New Value	Additional Information
Slot 08			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 09			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 10			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 11			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Slot 12			
Latency Timer	_____	_____	_____
IO Decode	_____	_____	_____
Memory Decode	_____	_____	_____
Bus Decode	_____	_____	_____
Memory Settings			
Card1: Bank1	[Bank Is Enabled]	_____	_____
Card1: Bank2	[Bank Is Enabled]	_____	_____
Card1: Bank3	[Bank Is Enabled]	_____	_____
Card1: Bank4	[Bank Is Enabled]	_____	_____
Card2: Bank1 ⁴	[Bank Is Enabled]	_____	_____
Card2: Bank2 ⁴	[Bank Is Enabled]	_____	_____
Card2: Bank3 ⁴	[Bank Is Enabled]	_____	_____
Card2: Bank4 ⁴	[Bank Is Enabled]	_____	_____
⁴ Available only with an optional memory board installed.			
MPS Version	[1.4]	_____	_____

Device Records

Record the system memory (DIMMs) installed in your server in the following table.

<i>Table 16. System Memory</i>		
Memory Connector	DIMM Kit Size	Additional Information
Bank 1 (J4, J8, J12, J16)	32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/>	_____
Bank 2 (J3, J7, J11, J15)	32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/>	_____
Bank 3 (J2, J6, J10, J14)	32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/>	_____
Bank 4 (J1, J5, J9, J13)	32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/>	_____
Bank 5 (J4, J8, J12, J16) ¹	32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/>	_____
Bank 6 (J3, J7, J11, J15) ¹	32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/>	_____
Bank 7 (J2, J6, J10, J14) ¹	32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/>	_____
Bank 8 (J1, J5, J9, J13) ¹	32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 128 MB <input type="checkbox"/> 256 MB <input type="checkbox"/>	_____
Total Memory	_____	

¹ Available only with an optional memory board installed.

Specifications

The following table contains the specifications for the Netfinity 7000 M10.

Size	Environment	Acoustical Noise Emissions Values
<ul style="list-style-type: none"> • Depth: 650 mm (25.6 in.) • Height: 489 mm (19.25 in.) (11 U) • Width: 440 mm (17.3 in.) <p>Weight</p> <ul style="list-style-type: none"> • Unpacked, minimum configuration: 39 kg (85 lb.) • Unpacked, maximum configuration: 70.31 kg (155 lb.) <p>Electrical Input</p> <ul style="list-style-type: none"> • Sine-wave input (50± or 60± Hz) is required • Input voltage <ul style="list-style-type: none"> – Low range <ul style="list-style-type: none"> - Minimum: 90 V ac - Maximum: 137 V ac – High range <ul style="list-style-type: none"> - Minimum: 180 V ac - Maximum: 265 V ac – Input kilovolt-amperes (KVA) approximately <ul style="list-style-type: none"> - Minimum configuration as shipped: 0.2 KVA - Maximum configuration: 0.78 KVA 	<ul style="list-style-type: none"> • Air temperature <ul style="list-style-type: none"> – 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 <ul style="list-style-type: none"> – System on: 8% to 80%; maximum wet bulb 23° C (73.4° F) – System off: 8% to 80%; maximum wet bulb 27° C (80.6° F) • Altitude: 0 to 2133 m (0 to 7000 ft.) <p>Electrostatic Discharge</p> <ul style="list-style-type: none"> • Tested to 20 KV <p>Immunity</p> <ul style="list-style-type: none"> • Verified to comply with EN 50082-2 	<ul style="list-style-type: none"> • Declared (upper limit) sound power levels: <ul style="list-style-type: none"> – 6.5 bels operating – 6.5 bels idle <p>These levels are measured in controlled acoustical environments according to the American National Standards Institute (ANSI) procedure S12.10 and ISO 7779, and are reported in accordance with ISO 9296. The declared sound power levels indicate an upper limit, below which a large portion of machines operate.</p> <p>Heat Output</p> <ul style="list-style-type: none"> • Approximate heat output in British thermal units (Btu) per hour: <ul style="list-style-type: none"> – Minimum configuration: 1024 Btu – Maximum configuration: 2662 Btu <p>Safety Standards</p> <ul style="list-style-type: none"> • UL 1950 • CSA C22.2 No. 950-M93 • EN 60950 and countries deviations • IEC 950 • NOM-019

Changing Jumper Positions

Jumpers located on the I/O function card and processor board help you to customize the way your server operates.

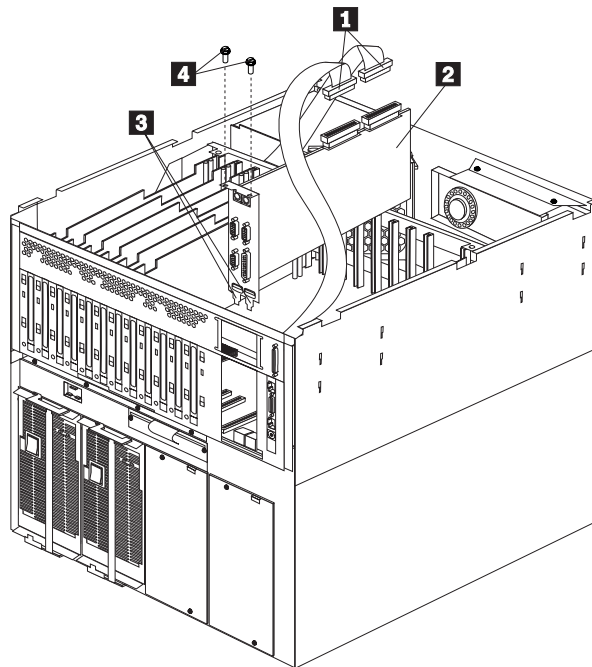
Your I/O function card and processor board contain two-pin and three-pin jumper blocks. In some cases, groups of jumpers might combine to define a function.

Before you begin:

Read “Electrical Safety” on page 33 and “Handling Static-Sensitive Devices” on page 34.

To change a jumper position:

1. Remove the server top cover or front access cover, depending on the location of the jumper (see “Preparing to Install Options” on page 37).
2. If the jumper is located on the I/O function card, remove the I/O function card from the server:
 - a. Refer to the following illustration while you perform the steps in this procedure.



- b. Disconnect the cables **1** from the I/O function card **2**. Note carefully where each cable is connected before you remove it.
 - c. Remove the two screws **4** located on the metal connector plate inside the server.
 - d. Carefully grasp the I/O function card by its top edge and pull the I/O function card out of the server.
 - e. Place the I/O function card connector-side up on a flat, static-protective surface.

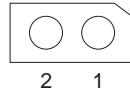
3. Locate the jumper:

- To change a two-pin jumper block, go to “Two-Pin Jumper Blocks.”
- To change a three-pin jumper block, go to “Three-Pin Jumper Blocks” on page 146.

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.

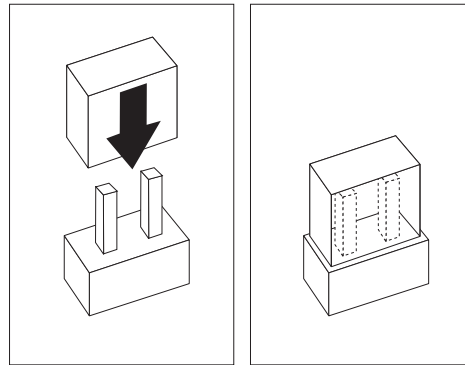
The following illustration identifies pins 1 and 2 on a two-pin jumper block.



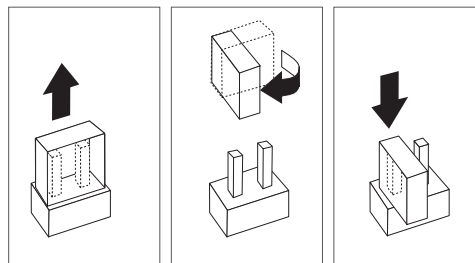
To change the jumper position on a two-pin jumper block:

1. Lift the jumper straight off the block and then do one of the following:

- Align the holes in the bottom of the jumper with the two pins on the pin block, and then slide the jumper carefully 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 carefully onto that pin only.



Changing Jumper Positions

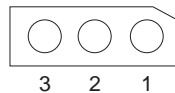
2. If you removed the I/O function card, install it:
 - a. Refer to the illustration in step 2a on page 144 while you perform the steps in this procedure.
 - b. Carefully grasp the I/O function card by its top edge, and insert the tabs **3** on the bottom edge of the metal connector plate into the matching openings on the server back panel.
 - c. Align the I/O function card with the guide on the opposite end of the adapter and the slot on the I/O board.
 - d. Press the I/O function card *firmly* into the slot.

Attention: When you install the I/O function card in the server, be sure that it is completely and correctly seated. Incomplete insertion might cause damage to server components.
 - e. Insert the two screws you removed in step 2c on page 144.
 - f. Connect the cables you disconnected in step 2b on page 144.
3. Reinstall the server top cover or front access cover and connect the cables (see “Completing the Installation” on page 69).

Three-Pin Jumper Blocks

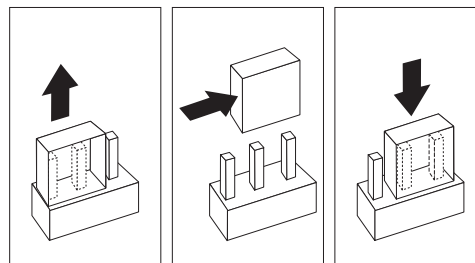
With the three-pin jumper blocks, each jumper covers two of the three pins on a pin block. You can position the jumper to fit over the center pin and either of the other two pins.

The following illustration identifies pins 1, 2, and 3 on a three-pin jumper block:



To change the jumper position on a three-pin jumper block:

1. Lift the jumper straight off the pin block.
2. Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.



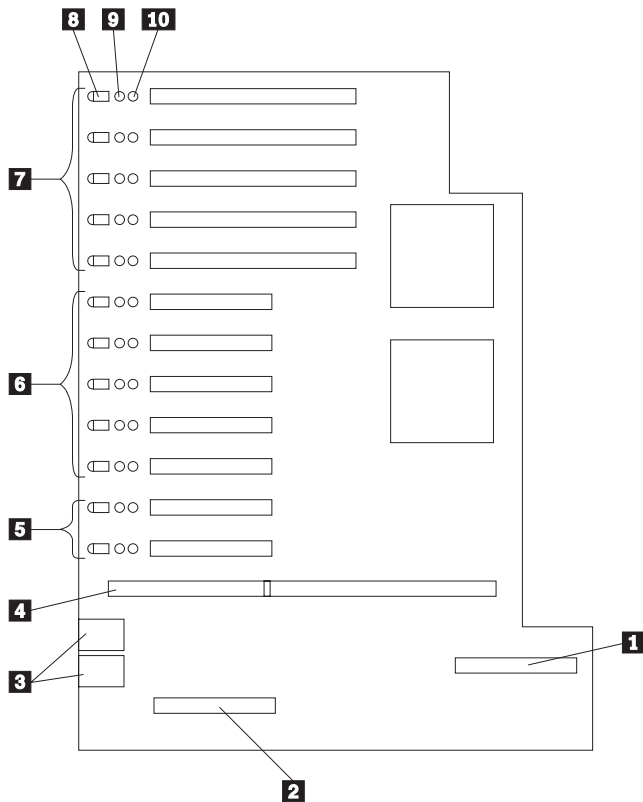
3. Slide the jumper fully onto these pins.

4. If you removed the I/O function card, install it:
 - a. Refer to the illustration in step 2a on page 144 while you perform the steps in this procedure.
 - b. Carefully grasp the I/O function card by its top edge, and insert the tabs **3** on the bottom edge of the metal connector plate into the matching openings on the back panel.
 - c. Align the I/O function card with the guide on the opposite end of the adapter and the slot on the I/O board.
 - d. Press the I/O function card *firmly* into the slot.

Attention: When you install the I/O function card in the server, be sure that it is completely and correctly seated. Incomplete insertion might cause damage to server components.
 - e. Insert the two screws you removed in step 2c on page 144.
 - f. Connect the cables you disconnected in step 2b on page 144.
5. Reinstall the server top cover or front access cover and connect the cables (see “Completing the Installation” on page 69).

I/O Board Component Locations

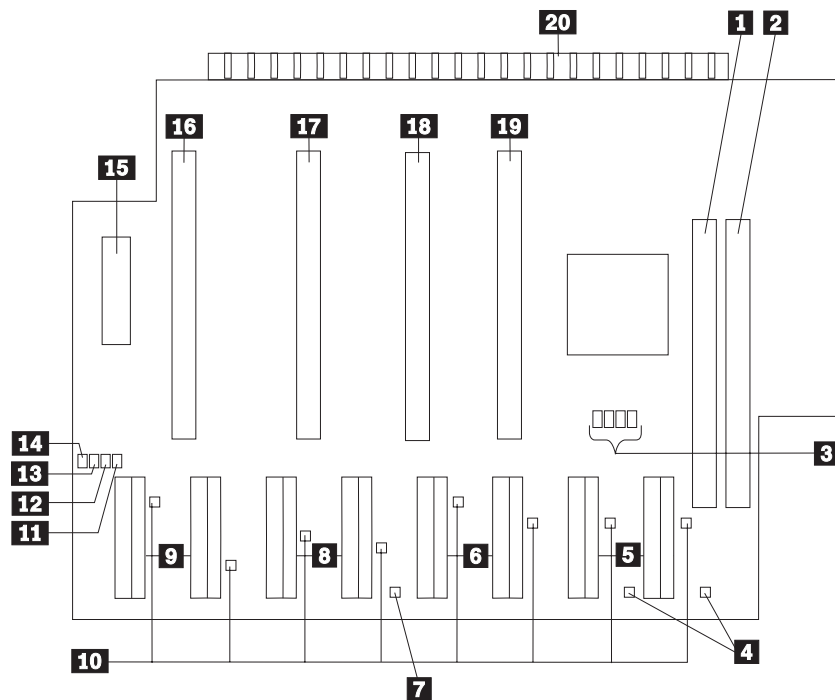
A simplified layout of the I/O board is shown in the following illustration.



- 1** IDE connector
- 2** System-management adapter slot
- 3** USB 1 and USB 2 port connectors
- 4** I/O function card slot
- 5** Hot-plug 32-bit PCI slots 11–12 (bus C)
- 6** Hot-plug 32-bit PCI slots 6–10 (bus B)
- 7** Hot-plug 64-bit PCI slots 1–5 (bus A)
- 8** Attention LED for PCI slot
- 9** Attention LED for PCI slot
- 10** Power LED for PCI slot

Processor Board Component Locations

A simplified layout of the processor board is shown in the following illustration.



- 1** Memory board slot 1 connector (primary slot)
- 2** Memory board slot 2 connector (secondary slot)
- 3** Microprocessor core frequency selection jumper block (J43–J46)
- 4** ERR 0 and ERR 1 LEDs
- 5** Microprocessor voltage-regulator connectors for microprocessor 4
- 6** Microprocessor voltage-regulator connectors for microprocessor 3
- 7** Microprocessor termination LED
- 8** Microprocessor voltage-regulator connectors for microprocessor 2
- 9** Microprocessor voltage-regulator connectors for microprocessor 1
- 10** Microprocessor voltage-regulator LEDs
- 11** Microprocessor bus activity LED for microprocessor 4
- 12** Microprocessor bus activity LED for microprocessor 3
- 13** Microprocessor bus activity LED for microprocessor 2
- 14** Microprocessor bus activity LED for microprocessor 1
- 15** Power backplane connector
- 16** Microprocessor 1 socket
- 17** Microprocessor 2 socket
- 18** Microprocessor 3 socket
- 19** Microprocessor 4 socket
- 20** I/O board connector

Processor Board Jumpers

Table 17 describes the jumpers on the processor board. The highlighted numbers in the table correspond to the highlighted numbers on the illustration in “Processor Board Component Locations” on page 149.

Notes:

1. Turn off the server, and disconnect the power cord before moving any jumpers.
2. Be sure the microprocessor bus-to-core ratio is set correctly. For example, if you have a 450 MHz microprocessor installed and the system bus speed is 100 MHz (the default), be sure that the jumpers are set to a bus-to-core ratio of 4.5 (450/100). Refer to jumpers J43–J46 in Table 17.
3. Be sure to set the Microprocessor Core Frequency Selection jumper block for the slowest speed microprocessor installed in your server. For example, if your server has a 400 MHz microprocessor installed and you install three 450 MHz microprocessors, set the Microprocessor Core Frequency Selection jumper block for the 400 MHz microprocessor.

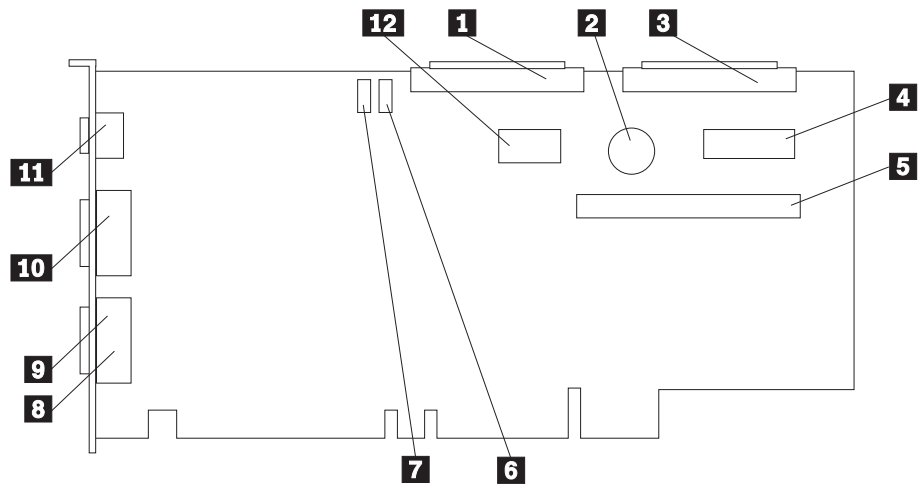
MHz denotes internal clock speed of the microprocessor only; other factors also affect application performance.

Attention: If the microprocessor bus-to-core ratio is incorrect, board components will overheat and component damage might occur. Be sure that the microprocessor bus-to-core ratio jumper is properly set.

Jumper Name	Description
3 Microprocessor core frequency selection (J43–J46)	<p>The default core/bus fraction is 4.0 (400/100 MHz). Jumpers are installed on pins 1 and 2 of J44, J45, and J46, and jumpers are installed on pins 2 and 3 of J43.</p> <p>For the core/bus fraction 4.5 (450/100 MHz), jumpers are installed on pins 1 and 2 of J44 and J46, and jumpers are installed on pins 2 and 3 of J43 and J45.</p> <p>For the core/bus fraction 5.0 (500/100 MHz), jumpers are installed on pins 1 and 2 of J45 and J46, and jumpers are installed on pins 2 and 3 of J43 and J44.</p>

I/O Function Card Component Locations

The following simplified layout of the I/O function card identifies the components.



- 1** External SCSI connector (channel A)
- 2** Battery
- 3** Internal SCSI connector (channel B)
- 4** Operator panel connector
- 5** Diskette drive connector
- 6** Password override jumper (J17)
- 7** Flash page swap jumper (J16)
- 8** Parallel port connector
- 9** Video port connector (The video port connector is behind the parallel port connector)
- 10** Serial port A and B connectors
- 11** Keyboard and mouse connectors (The keyboard connector is behind the mouse connector)
- 12** Advanced System Management PCI Adapter connector

I/O Function Card Jumpers

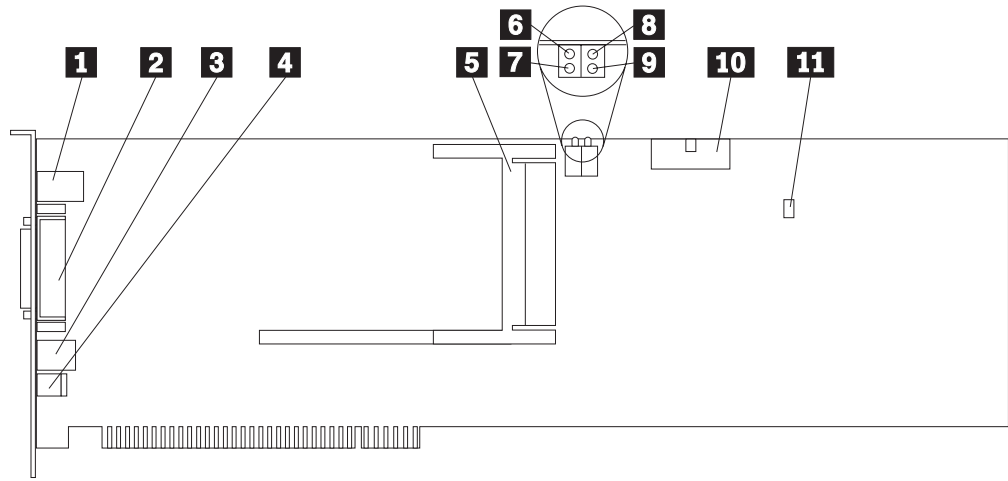
Table 18 describes the jumpers on the I/O function card. The highlighted numbers in the table correspond to the highlighted numbers on the illustration in “I/O Function Card Component Locations” on page 151.

Note: Turn off the server, and disconnect the power cord before moving any jumpers.

<i>Table 18. I/O Board Jumpers</i>	
Jumper Name	Description
6 J17 Power on password override	Changing the position of this jumper bypasses the power-on password check. 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.
7 J16 Flash 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.

Advanced System Management PCI Adapter Component Locations

The following simplified layout of the Advanced System Management PCI Adapter identifies the components.



- 1** 10/100 Ethernet port connector
- 2** Dual serial port connector
- 3** RS 485 bus connector
- 4** External power supply connector
- 5** PCMCIA token ring connector
- 6** Power on LED (CR2 bottom)
- 7** Processor error LED (CR2 top)
- 8** Ethernet activity LED (CR3 bottom)
- 9** Ethernet link LED (CR3 top)
- 10** I/O function card connector
- 11** Reserved J9

Advanced System Management PCI Adapter Jumper

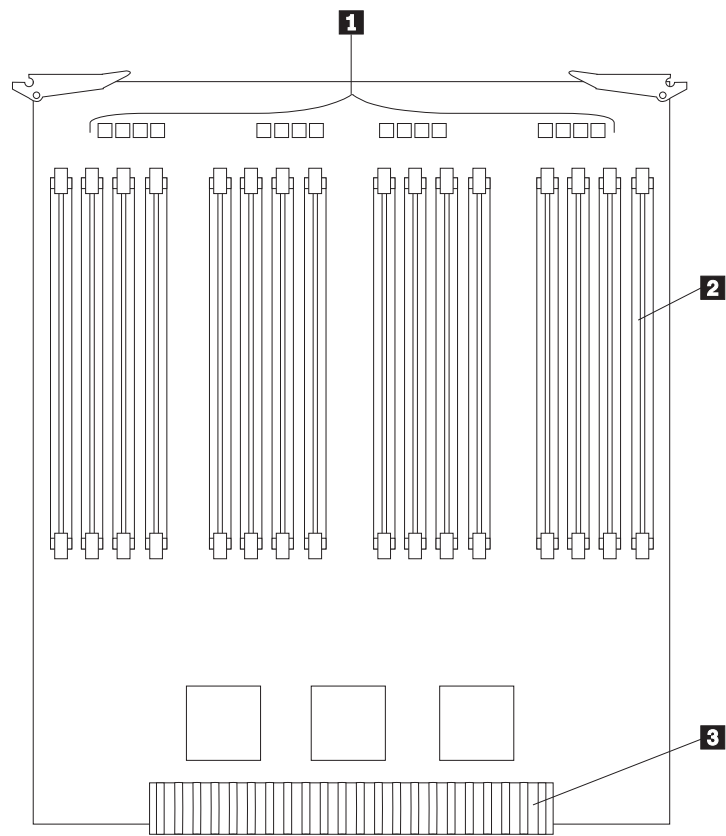
Table 19 describes the jumper on the Advanced System Management PCI Adapter. The highlighted number in the table corresponds to the highlighted number on the illustration in “Advanced System Management PCI Adapter Component Locations.”

Note: Turn off the server, and disconnect the power cord before moving any jumpers.

<i>Table 19. Advanced System Management PCI Adapter Jumper</i>	
Jumper Name	Description
11	J9 Reserved

Memory Board Component Locations

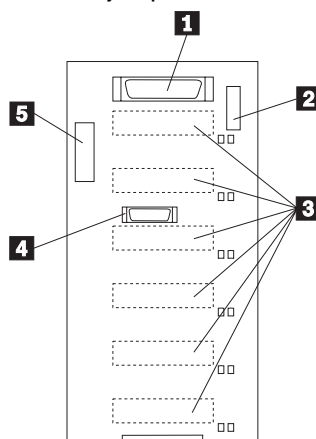
The following simplified layout of the memory board identifies the components.



- 1** DIMM error LEDs
- 2** DIMM connectors
- 3** Processor board connector

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 opposite 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.

Table 20 summarizes the settings for the SCSI backplane option jumper block (J10).

Pins	Description
1–2	Reserved.
3–4	Reserved
5–6	Placing a jumper on these two pins enables SCSI IDs 8–15.
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 21 shows the SCSI IDs that you can use for hot-swap drives.

J10 Pins 5–6	J10 Pins 11–12	Bay 1	Bay 2	Bay 3	Bay 4
No jumper ¹	No jumper ¹	0	1	2	3
No jumper	Jumper	5	4	3	2
Jumper	No jumper	13	12	11	10
Jumper ²	Jumper ²	-	-	-	-
Notes: 1. This is the default jumper setting. 2. This combination is not supported.					

Appendix A. I2O-Ready and S3 Video Modes

This appendix contains the I2O-ready statement, and information about unsupported S3 video modes.

I2O-Ready Statement

The Netfinity 7000 M10 is intended to support I2O deep adapters as listed in the ServerProven program. Refer to <http://www.pc.ibm.com/us/compat/> on the World Wide Web for information on 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 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

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.

universal serial bus (USB). A serial interface standard for telephony and multimedia connections to personal computers.

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 dependent on, this component.

hot swap. (1) 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 on, 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.

I/O board. In the system unit, a circuit board that provides adapter slots, and an interface for the processor board to the I/O function card and the Advanced System Management PCI Adapter. The I/O function card and I/O board together replace the system board.

I/O function card. In the system unit, a circuit board connected to the I/O board that supports a variety of basic system devices, such as a keyboard or a mouse, and provides other basic system functions. The I/O function card and I/O board together replace the system board.

IRQ. Interrupt request.

ISA. Industry standard architecture

J

jumper. A connector between two pins on a network adapter that enables or disables an adapter 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

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.

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.

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

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.

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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