Netfinity 5600

Hardware Information

IBM

Netfinity 5600

Hardware Information

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

First Edition (September 1999)

Contents

Tables

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 pečítaje 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

Electrical current from power, telephone, and communication cables is hazardous.

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.**

– **Connect all power cords to a properly wired and grounded electrical outlet.**

– **Connect to properly wired outlets any equipment that will be attached to this product.**

– **When possible, use one hand only to connect or disconnect signal cables.**

– **Never turn on any equipment when there is evidence of fire, water, or structural damage.**

– **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**

– **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	To Disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Lithium battery notice

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CAUTION:
When replacing the lithium 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 laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

– **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**

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

DANGER

Some laser products 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 problems if they occur.

How this book is organized

Chapter 1, "Introducing the IBM Netfinity 5600," describes the Netfinity 5600 server and provides an overview of the server's features.

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

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

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

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

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

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

Appendix A, "I$_2$O-compliant statement," contains the I$_2$O-compliant statement.

Appendix B, "Power cords," contains information about power cords for use in other countries.

An index follows the appendices.

To find the meanings of various computer-related terms, you can access the IBM *Dictionary of Computing* at the following World Wide Web address:

`http://www.networking.ibm.com/nsg/nsgmain.htm`

Notices used in this book

This book contains information notices that relate to a specific topic. The **Caution** and **Danger** notices also appear in a multilingual safety booklet. Each notice is numbered for easy reference to the corresponding notices in the safety booklet. The notice definitions are as follows:

- **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.

- **Danger**

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

Related publications

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

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

- *IBM LAN Technical Reference IEEE 802.2 and NETBIOS API*, SC30-3587

- *IBM LAN Server Command and Utilities*, S10H-9686

- *Guide to LAN Server Books*, S10H-9688

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

- In the U.S., Canada, and Puerto Rico, call 1-800-879-2755.

- In all other countries, contact the IBM support organization that services your area, your IBM marketing representative, or your IBM reseller.

Chapter 1. Introducing the IBM Netfinity 5600

Your IBM® Netfinity® 5600 server is a high-performance, symmetric multiprocessing (SMP) server. It is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and large amounts of reliable data storage.

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

Your IBM Netfinity 5600 server comes with a three-year limited warranty and IBM Netfinity/PC Server 90-Day Start Up Support. If you have access to the World Wide Web, you can obtain up-to-date information about your Netfinity 5600 model and other IBM server products at the following World Wide Web address:

`http://www.ibm.com/pc/us/netfinity/`

Your server serial number and model number are located on labels on the rear of the server and on the front under the trim bezel. Write these numbers in the spaces provided in "Record the identification numbers" on page 163. You will need these numbers when you register your server with IBM. After you register your server, you can receive information about updates, performance tips, and compatibility. To register your server, go to the following World Wide Web address:

`http://www.ibm.com/pc/register`

For service, assistance, or additional information on IBM Netfinity/PC Server 90-Day Start Up Support and the World Wide Web, see the "Getting Help, Service, and Information" section of this *Server Library*.

If you have not yet set up your server, see the "Start Here" section of this *Server Library* for detailed information about attaching cables and installing an operating system. Before you set up your server, be sure to read the information on IBM ServerGuide™ in the "ServerGuide and Netfinity Manager Information" section of this *Server Library*.

To find the meanings of various computer-related terms, you can access the IBM *Dictionary of Computing* at the following World Wide Web address:

`http://www.networking.ibm.com/nsg/nsgmain.htm`

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≥18 kg (37 lbs) ≥32 kg (70.5 lbs) ≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

Features at a glance

The following table summarizes the features of the Netfinity 5600 server.

Microprocessor

- Intel® Pentium® III microprocessor with MMX™ technology and SIMD extensions
- 32 KB of level-1 cache
- 256 KB of level-2 cache (min.)
- Expandable to two microprocessors

Memory

- Standard: 128 MB, expandable to 4 GB
- 133 MHz, registered, error correcting code (ECC), synchronous dynamic random access memory (SDRAM) complying with PC 133 SDRAM Registered DIMM Specification, Revision 1.0 or later. (When installed in systems using 100 MHz front-side bus microprocessors, the memory operates at 100 MHz.
- Four dual inline memory-module (DIMM) sockets

Diskette Drive

- Standard: One 3.5-inch, 1.44 MB

Hard Disk Drives

- Up to six hot-swappable hard disk drives supported

CD-ROM Drive

- Standard: 40X IDE

Keyboard and Auxiliary Device
(standard only on tower models)

- Keyboard
- Mouse

Expansion Bays

- Six slim (1-inch) or three half-high (1.6-inch) hot-swap drive bays
- Three 5.25-inch non-hot-swap bays (one used by CD-ROM drive)

Expansion Slots

Up to five adapters can be installed.

- Three 64-bit hot-plug PCI slots
- Two standard (non-hot-plug) 32-bit PCI slot

Upgradable Microcode

- BIOS, diagnostics, and Netfinity Advanced System Management Processor upgrades (when available) can update EEPROMs on the system board

Security Features

- Door and side cover lock (tower model only)
- Power-on and administrator passwords
- Selectable drive-startup
- Keyboard password
- Systems management security
  - User log-in password
  - Read-only or read/write access
  - Dial back

Predictive Failure Analysis™ (PFA) Alerts

- Power supplies
- Fans
- Memory
- Hard disk drives
- Microprocessors
- Voltage regulator modules (VRMs)

Integrated Functions

- Two serial ports
- Two universal serial bus (USB) ports
- One parallel port
- Mouse port
- Keyboard port
- Video port
- Advanced System Management Interconnect port
- Two SCSI ports (one internal, one external)
- 10BASE-T/100BASE-TX Ethernet port (controller on system board)
- Redundant Ethernet capability, through the use of an optional network interface card (NIC)
- Netfinity Advanced System Management Processor on system board
- Dedicated Advanced System Management I/O port
- Video controller (with 4 MB video memory) compatible with:
  - Super video graphics array (SVGA)
  - Video graphics adapter (VGA)

Power Supply

- Two 250 W (115–230 V ac)
  - Standard - 500 W non-redundant, 250 W redundant
  - Optional - Additional 250 W power supply is available for 500 W redundancy
- Automatic voltage range selection
- Built-in overload and surge protection
- Automatic restart after a loss of power

Redundant Cooling

- Three hot-swap fans

What your IBM Netfinity 5600 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 two Pentium III microprocessors. Your server comes with one microprocessor installed; you can install an additional microprocessor to enhance performance and provide SMP capability.

- Large data-storage and hot-swap capabilities

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

- Hot-plug PCI adapter capabilities

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

- Redundant cooling and power capabilities

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

  The two 250-watt power supplies in your server provide redundant power for many configurations of your server. If the average load on your server is less than 250 watts and a problem occurs with one of the power supplies, the other power supply can handle the load. For power loads above 250 watts, you can install a third, optional power supply to provide a full 500 watts of power. The NON REDUNDANT light emitting diode (LED) on the diagnostic LED panel is lit when the power load is 250 watts or greater with two power supplies installed.

- Large system memory

  The memory bus in your server supports up to 4 GB of system memory. The memory controller provides error correcting code (ECC) support for up to four industry standard PC133, 3.3 V, 168-pin, 8-byte, registered, synchronous-dynamic-random access memory (SDRAM) DIMMs (Intel PC-Registered SDIMM Specifications, Revision 1.0 or later), synchronous, dual inline memory modules.

- System-management capabilities

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

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

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

- Integrated network environment support

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

- Redundant network-interface card

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

- IBM ServerGuide CDs

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

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

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

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

Reliability, availability, and serviceability features

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

The following is an abbreviated list of the RAS features that your server supports. Many of these features are explained in later chapters or sections of this *Server Library*.

- Menu-driven setup, system configuration, RAID configuration, and diagnostic programs
- Power-on self-test (POST)
- Integrated Netfinity Advanced System Management Processor
- Predictive failure alerts

RAS features

- 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, and Netfinity Advanced System Management Processor code
- Automatic restart after a power failure
- Parity checking on the SCSI and PCI buses
- Error checking and correcting (ECC) memory
- Redundant hot-swap power supply option
- Redundant hot-swap cooling
- Redundant Ethernet capabilities (with optional adapter)
- Vital Product Data (VPD) on processor complex, system board, power backplane, SCSI backplane, and each power supply.
- Operator information and diagnostic LED panels
- Customer support center 24 hours per day 7 days a week[1]
- Update Connector
- Remote Connect

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[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 illustrations.

Tower model
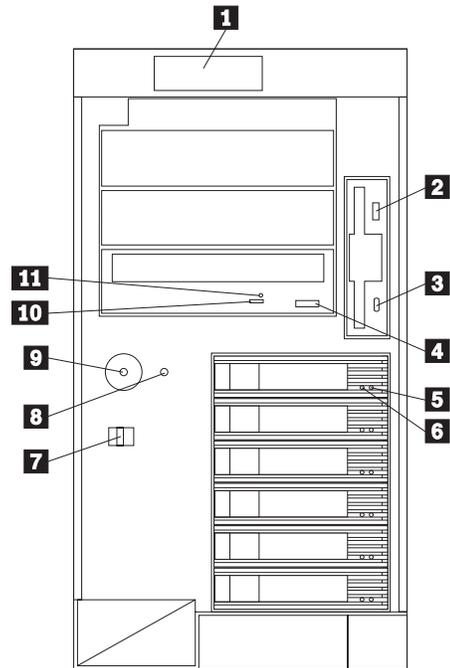
Rack model
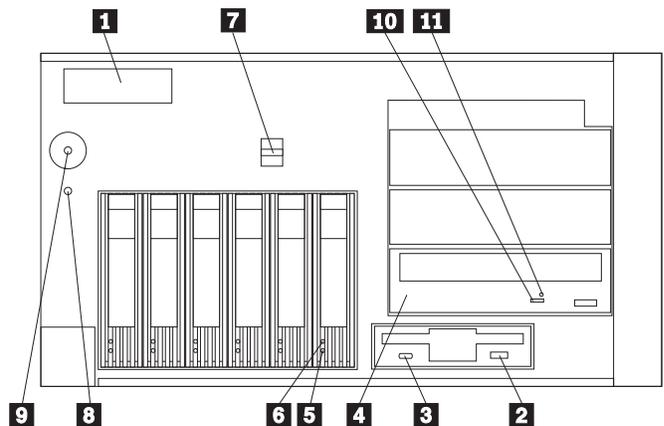
1 **Operator Information Panel:** The lights on this panel give status information for your server. See "Operator information panel" for more information.

2 **Diskette-Eject Button:** Press this button to eject a diskette from the drive.

3 **Diskette Drive In-Use Light:** When this light is on, the diskette drive is being accessed.

4 **CD-ROM Eject/Load Button:** Press this button to eject or retract the CD-ROM tray so that you can insert or remove a CD.

5 **Hard Disk Status Light:** Each of the hot-swap drive bays has a Hard Disk Status light. When this amber light is on continuously, the drive has failed. When the light flashes slowly (one flash per second), the drive is being rebuilt. When the light flashes rapidly (three flashes per second), the controller is identifying the drive.

6 **Hard Disk Activity Light:** Each of the hot-swap drive bays has a Hard Disk Activity light. When this green light is flashing, the drive is being accessed.

7 **Cover Release Lever:** Use this lever to release the left-side cover on the tower model or the top cover on the rack model.

8 **Reset Button:** Press this button to reset the server and run the power-on self-test (POST).

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

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CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

2 →
1 →
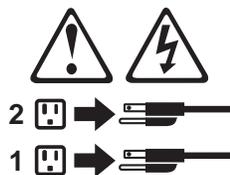
The server can be activated in several ways:

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

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

- If the server is activated and a power failure occurs, the server will start automatically when power is restored.

- The server can also be powered on by the Netfinity Advanced System Management Processor.

The server can be deactivated as follows:

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

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

- You can press and hold the Power Control button for more than 4 seconds to cause an immediate shutdown of the server and place the server in standby mode. This feature can be used if the operating system hangs.

- You can disconnect the server power cords from the electrical outlets to shut off all power to the server.

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

10 **CD-ROM Drive In-Use Light:** When this light is on, the CD-ROM drive is being accessed.

11 **CD-ROM Manual Tray-Release Opening:** Insert a straightened paper clip in the opening to release the CD-ROM tray when using the CD-ROM eject button is not successful.

Operator information panel

The operator information panel on the front of the server contains status lights.
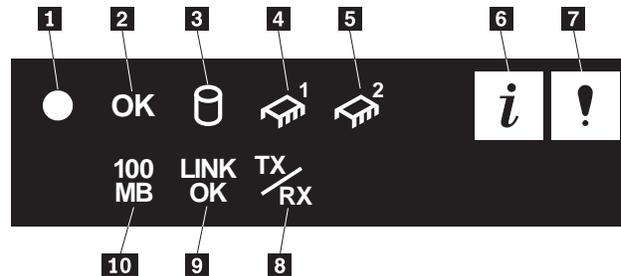
1 **System Power Light:** When this green light is on, system power is present in the server. When this light flashes, the server is in standby mode (the system power supply is turned off and AC current is present). When this light is off, either a power supply, AC power, or a light has failed.

Attention: If this light is off, it does not mean there is no electrical current present in the server. The light might be burned out. To remove all electrical current from the server, you must unplug the server power cords from the electrical outlets.

2 **System POST Complete Light:** This green light is on when the power-on self-test (POST) completes without any errors.

3 **SCSI Hard Disk Drive Activity Light:** This green light is on when there is activity on a hard disk drive.

4 **Processor 1 Activity Light:** This green light is on when there is microprocessor 1 activity.

5 **Processor 2 Activity Light:** This green light is on when there is microprocessor 2 activity.

6 **Information Light:** This amber light is on when the information log contains information about certain conditions in your server that might affect performance. For example, the light will be on if your server does not have redundant power. A light on the diagnostic LED panel will also be on. (For more information, see "Identifying problems using status LEDs" on page 151.)

7 **System Error Light:** This amber light is on when a system error occurs. A light on the diagnostic LED panel will also be on to further isolate the error. (For more information, see "Identifying problems using status LEDs" on page 151.)

8 **Ethernet Transmit/Receive Activity Light:** When this green light is on, there is transmit or receive activity to or from the server.

9 **Ethernet Link Status Light:** When this green light is on, there is an active connection on the Ethernet port.

10 **Ethernet Speed 100 Mbps:** When this green light is on, the Ethernet speed is 100 Mbps. When the light is off, the Ethernet speed is 10 Mbps.

Input/output connectors and expansion slots

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

Tower model
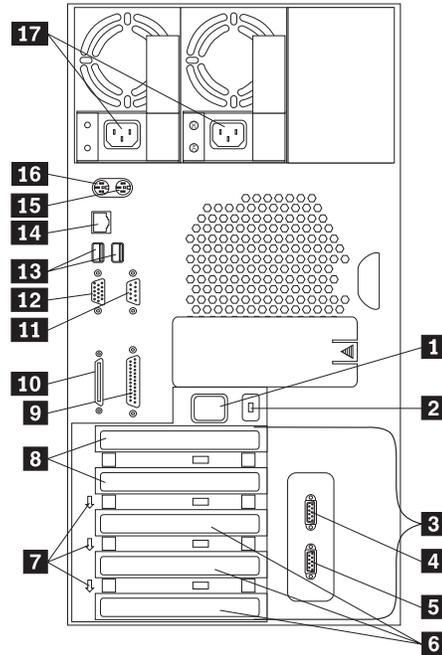
Rack model
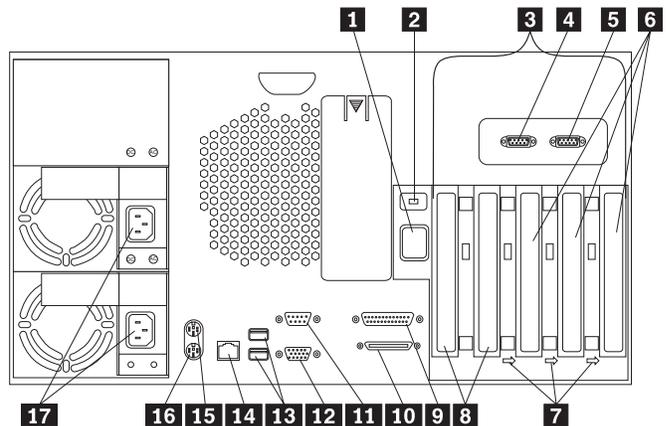
1 **Advanced System Management Interconnect Knockout:** Your server has an external connector knockout for the Advanced System Management Interconnect option. This option allows you to connect rack or multirack systems through a daisy-chain cable in half-duplex mode.

2 **External Connector Knockout:** Your server has an external connector knockout that can be used when you install options.

3 **PCI Expansion Slots:** Your server has five available peripheral component interconnect (PCI) expansion slots. Three of the PCI slots support hot-plug PCI adapters.

Many adapters provide bus-master capabilities, which enable the adapters to perform operations without interrupting the system microprocessors.

4 **Serial A Connector:** A serial signal cable for a modem or other serial device connects to this 9-pin serial connector. Serial port A can be shared by the Netfinity Advanced System Management Processor and the operating system. See "Devices and I/O Ports" on page 21 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

5 **Serial B Connector:** A serial signal cable for a modem or other serial device connects to this 9-pin serial connector. Serial port B is used by the operating system and cannot be shared by the Netfinity Advanced System Management Processor. See "Devices and I/O Ports" on page 21 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

6 **Hot-Plug PCI Expansion Slots:** Your server has three hot-plug PCI expansion slots.

7 **Attention Lights for Hot-Plug PCI Slots:** Each hot-plug PCI slot has an Attention light that is visible from the rear of the server. An Attention light flashes approximately once per second when it is on. The meaning of the Attention lights is defined by your operating system. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters and, if so, what the Attention lights indicate.

8 **Non-Hot-Plug PCI Expansion Slots:** Your server has two non-hot-plug PCI expansion slots.

9 **Parallel Connector:** A signal cable for a parallel device, such as a printer, connects here.

10 **SCSI Connector:** External SCSI devices attach here. For more information, see "Connecting external options" on page 89.

11 **Management Port C Connector:** This connector is used to attach a modem that is dedicated to communication with the Netfinity Advanced System Management Processor.

12 **Video Connector:** The monitor signal cable connects here.

13 **Universal Serial Bus 1 and 2 Connectors:** You can attach an I/O device to either of these universal serial bus (USB) connectors. USB 2 is the connector nearest to the edge of the server. You need a 4-pin cable to connect a device to USB 1 or 2.

> **Note:** If a standard (non-USB) keyboard is attached to the keyboard port, the USB ports are disabled while the power-on self-test (POST) is running and no USB devices will work during POST.

14 **Ethernet Connector:** Your server has one RJ-45 Ethernet connector. This connector is for attaching the network cable to the integrated 10BASE-T or 100BASE-TX, twisted-pair transceiver.

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

16 **Keyboard Connector:** The keyboard cable connects here.

17 **Power Connectors:** The power cords for the power supplies connect here.

> **Note:** For pin assignments and other details about these connectors, see "Connecting external options" on page 89.

Power supplies

The following illustrations show the power supplies and power lights on your server. Your server comes with two hot-swap power supplies installed. You can install a third power supply. See "Installing a hot-swap power supply" on page 78 for instructions about installing an additional power supply and information about power redundancy.)

Note: See Appendix B, "Power cords" on page 179 for information about power cords for use with your server in your country or region.

Tower model
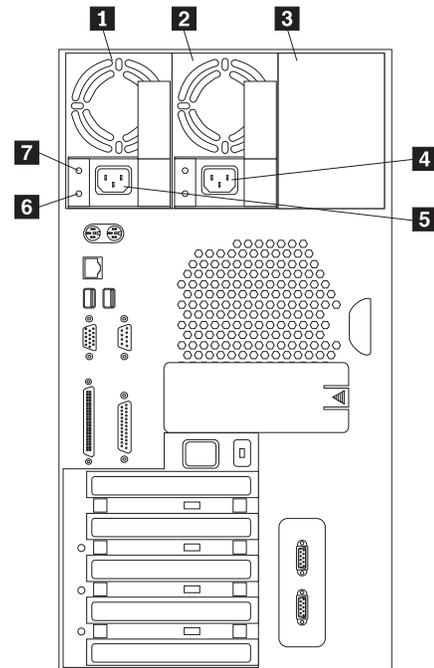
Rack model
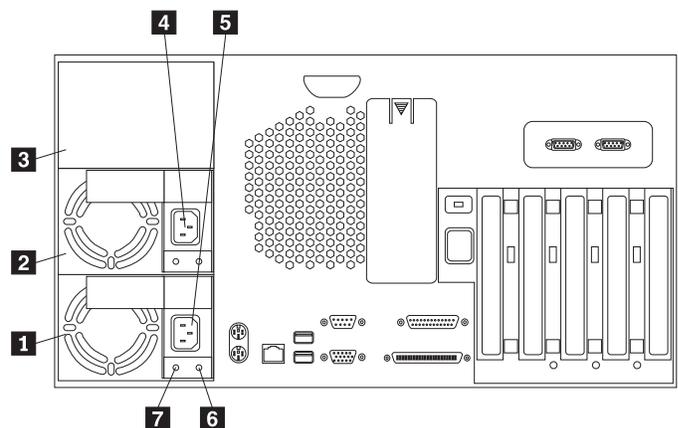
1 **Power Supply 1:** Your server comes with two hot-swap power supplies installed. (See "Installing a hot-swap power supply" on page 78 for instructions about installing an additional power supply and information about power redundancy.)

2 **Power Supply 2:** Your server comes with two hot-swap power supplies installed.

Power supplies

3 **Filler Panel**: You can remove this filler panel and install a third hot-swap power supply on power supply bay 3.

4 **Power Supply 2 Power Connector:** The power cord for power supply 2 connects here.

5 **Power Supply 1 Power Connector:** The power cord for power supply 1 connects here.

6 **DC Power Light:** This light provides status information about the power supply. During normal operation, both the AC and DC Power lights are on. For any other combination of lights, see "Power supply LEDs" on page 152 for more information.

7 **AC Power Light:** This light provides status information about the power supply. During normal operation, both the AC and DC Power lights are on. For any other combination of lights, see "Power supply LEDs" on page 152 for more information.

Chapter 2. Arranging your workspace

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

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

This chapter contains:

Comfort

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

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

When using the keyboard, keep your forearms parallel to the floor and your wrists in a neutral, comfortable position. Try to keep a light touch on the keyboard and your hands and fingers relaxed. You can change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.
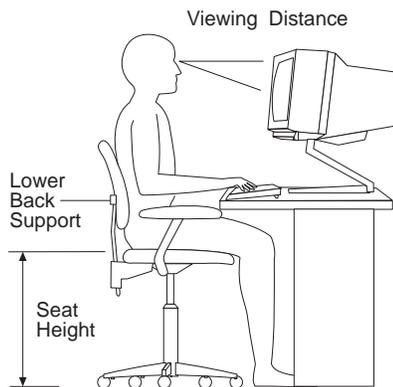
Adjust the monitor so the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so you can view it without having to twist your body. Also position other equipment you use regularly, such as the telephone or a mouse, within easy reach.

Glare and lighting

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

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

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

Air circulation

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

Electrical outlets and cable lengths

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

When arranging your workspace:

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

For more information about power cords, refer to the "Legal 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.

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 program

  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 program

  With the built-in SCSISelect Utility program, 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 171.

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 39.

5. Install software programs.

   See the installation instructions that come with the software.

6. Resolve configuration conflicts.

   See "Resolving configuration conflicts" on page 29.

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 22 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 20.

Notes:

a. 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 110.

b. When the message `Press Alt-F1 for System Partition Boot` appears, press Alt-F1 to start the system from the system partition. See the "ServerGuide and Netfinity Manager Information" section of this *Server Library* for information about using ServerGuide to create a system partition.

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.

```
IBM Netfinity Setup - © Copyright IBM Corporation

        Configuration/Setup Utility
        • System Summary
        • System Information
        • Devices and I/O Ports
        • Date and Time
        • System Security
        • Start Options
        • Advanced Setup
        • Event/Error Logs
          Save Settings
          Restore Settings
          Load Default Settings

          Exit Setup


     <F1>  Help                    < ↑ > < ↓ >  Move
     <Esc> Exit                    <Enter> Select
```
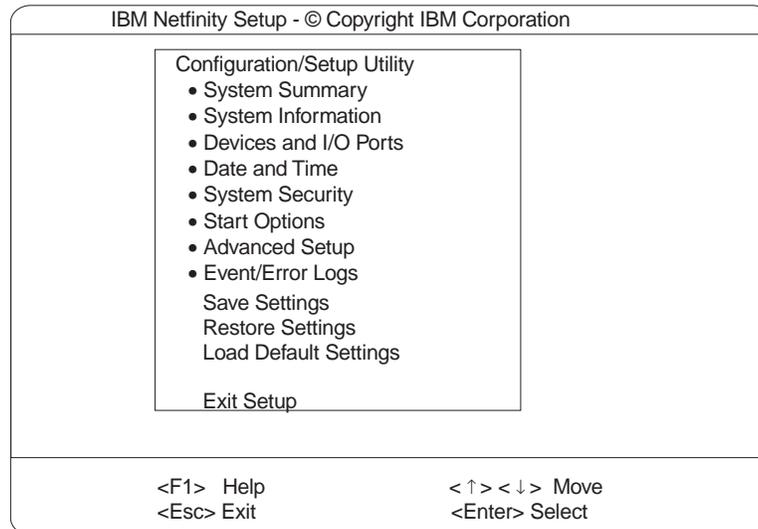
Pressing F1 displays Help information for a selected menu item.

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

To change configuration settings:

1. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the menu item for the configuration setting that you want to change; then, press Enter.

2. Use the Left Arrow (←) or Right Arrow (→) key to choose the appropriate setting for the selected menu item; then, press Enter.

3. Repeat step 1 through step 2 for each setting that you want to change. Press Esc to return to the Configuration/Setup Utility 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 server. 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 ($\leftarrow$) or Right Arrow ($\rightarrow$) key to advance through the settings.

   The Devices and I/O Ports choice appears only on the full 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 and to change the system time sent to the Advanced System Management Processor (service processor) when the server is started.

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.

You can set a time delta to be added or subtracted from the system time that is sent to the service processor (Advanced System Management Processor) each time the server is started. Use the number keys to enter the hours and minutes and + or – to add or subtract from the system time. If the system clock time should be the same as the Advanced System Management Processor clock time, leave the value set at the default of 0.

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 12 on page 165.

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	• No password required to start the system. • You can access all choices on the Configuration/Setup Utility main menu.
Power-on password only	• 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	• No password is required to start the system. • You must enter the password to access the Configuration/Setup Utility program. • The Administrator password provides access to all choices on the Configuration/Setup Utility main menu.
Administrator *and* power-on password	You can enter either password to complete the system startup. • 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 24 for details.) Start the Configuration/Setup Utility program and change the power-on password as previously described in this section (see steps 1 through 5 on page 24).

- You can change the position of the password override switch (switch 4 of switch block 2) to the ON position as described in "Bypassing an unknown power-on password" on page 176.

- You can remove the battery as described in "Replacing the battery" on page 159 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.

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. If a message appears telling you to select another password, press Enter to return to the Power-On Password menu. Choose a different password to use for your power-on password.

5. 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 system board.

To set an administrator password:

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

   The Administrator Password menu appears.

2. Type the password in the **Enter Administrator Password** data field.

   A password can contain any combination of up to seven alphanumeric characters (A–Z, a–z, and 0–9). Keep a record of your password in a secure place.

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

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

4. If a message appears telling you to select another password, press Enter to return to the Administrator Password menu. Choose a different password to use for your administrator password.

5. 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.

Defining a system owner's name

You can specify a system owner's name that displays during POST. The system owner's name can only be removed or changed from the System Security menu. If you set an administrator password, only the administrator can set, change, or delete the system owner's name.

To set the system owner's name:

1. Select **System Owner's Name** from the System Security screen, and press Enter.

2. Enter the name in the **Enter system owner's name string** data field.

3. Press the Down Arrow (↓) key to select the **Set or change system owner's name** data field.

4. Press Enter to set the name or change a previously defined name.

You can use any combination of up to 16 characters in the system owner's name.

To delete the system owner's name, select **Delete stored system owners name**; then, press Enter.

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, monitor, or keyboard.

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

You can also select which PCI SCSI adapter is given boot precedence. The first drive that is attached to the selected adapter will be assigned drive number 80L and the operating system will start from that drive. The default for boot precedence is Disabled. The range of choices depends upon the number of PCI SCSI adapters installed in the server.

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

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

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

Processor Serial Number Access
Select this choice to identify if the microprocessor serial number in the microprocessor is readable.

Core Chipset Control
Select this choice to modify settings that control features of the core chip set on the system board. Do not make changes here unless directed to do so by an IBM authorized service representative.

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.

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 29.

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 and exit the PCI Utility** to save the changes and return to the Advanced Setup choice.

- **Exit the PCI Utility without saving changes** to ignore the changes, restore the previous settings, and return to the Advanced Setup choice.

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.

Selecting **PCI Device Control** allows you to enable or disable the system board SCSI, video, and Ethernet controllers and the PCI slots.

- The default setting is Enable for all the controllers and PCI slots. If you select Disable, the disabled device will not be configured and will be invisible to the operating system. This is equivalent to unplugging the device.

- If the on-board SCSI controller is disabled and no other controller and mass storage device are installed, operating system startup cannot occur.

- If the video controller is disabled and no video adapter is installed, the server will have no video capability. However, turning the server off and on three times results in a default startup that enables video again.

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**.

System Service Processor Settings

Select this choice to view the IRQ used by the Advanced System Management Processor (system service processor). You can then use the Left Arrow (←) or Right Arrow (→) key to select the IRQ for the Advanced System Management Processor from the list of available choices.

Event/Error Logs

Select **Event/Error Logs** to choose to view either the POST error log or the system event/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 Event/Error Log

Select **System Event/Error Log** to view the system event/error log. The system event/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 event/error log. You can clear the event log by selecting **Clear error logs**.

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 164 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 19.

2. Set jumpers or switches on the server components.

   See "Changing jumper positions" on page 171.

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 52.

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" on page 30 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 19 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 171.

5. Remove the device or adapter. Some configurations are not supported. If you must remove an adapter, see "Working with adapters" on page 52.

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 19 for instructions.)

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

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

Using the SCSISelect utility program

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 program, called SCSISelect, that allows you to view and change SCSI settings.

You can use the SCSISelect Utility program to:

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

Starting the SCSISelect Utility program

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! >>>
```

Note: If an administrator password has been set, a prompt appears asking you to enter the password to start the SCSISelect Utility program.

You will be prompted to select either channel A (internal) or channel B (external).

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 program 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 assigned SCSI ID of the SCSI controller is 7.

- SCSI Parity Checking

  The assigned value is *Enabled*.

- Host Adapter SCSI Termination

  The assigned value is *Automatic*.

- Boot Device Options

  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 80.0, this value represents the transfer rate for UltraSCSI devices. When the **Maximum Sync Transfer Rate** is set to 80.0, this value represents the transfer rate for Ultra2 SCSI LVD 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 program, 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 program 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*.

Configuring the Ethernet controller

Your Netfinity 5600 server comes with an Ethernet controller on the system board. The Ethernet controller provides 10BASE-T and 100BASE-TX support through the RJ-45 connector on the back of your server. When you connect your server to the network, the Ethernet controller automatically detects the data-transfer rate (10 Mbps or 100 Mbps) on the network and then sets the controller to operate at the appropriate rate. That is, the Ethernet controller will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX), half duplex (HDX), or full duplex (FDX). This process is also known as *auto-negotiating*. This auto-negotiation occurs without requiring software intervention. The controller supports half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

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

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

For troubleshooting information, see "Troubleshooting the Ethernet controller" on page 149.

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

Failover for redundant Ethernet

Your Netfinity 5600 has an integrated Ethernet controller. The IBM Netfinity 10/100 Fault Tolerant Adapter is an optional redundant network interface card (NIC adapter) that you can install in your server. If you install this NIC adapter and connect it to the same logical segment as the primary Ethernet controller, you can configure the server to support a *failover* function. You can configure either the integrated Ethernet controller or the NIC adapter as the primary Ethernet controller. In failover mode, if the primary Ethernet controller detects a link failure, all Ethernet traffic associated with it is switched to the redundant (secondary) controller. This switching occurs without any user intervention. When the primary link is restored to an operational state, the Ethernet traffic switches back to the primary Ethernet controller. The switch back to the primary Ethernet controller can be automatic or manually controlled depending on the setup and operating system.

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

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

Special considerations when combining failover and hot-plug functions

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

Note: If the primary adapter is hot-replaced while the Ethernet traffic is being handled by the secondary Ethernet controller, the traffic does not automatically switch back to the primary adapter when the primary adapter comes back online. See "Configuring for failover."

Configuring for failover

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

OS/2

Note: The OS/2 operating system does not support hot-plug operations.

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in "Working with adapters" on page 52.

2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver. (Refer to the "ServerGuide and Netfinity Manager Information" section of this *Server Library.*)

3. Using the MPTS Utility program, select the driver from the list and select the **Edit** button.

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

4. Change the PermaNet Server Feature keyword to **TRUE** and specify the Primary and Standby slots that contain the redundant pair. Refer to "System board component locations" on page 173 for the locations and slot numbers of the PCI slots. The integrated controller is located in slot 2 (PCI bus A slot 2).

5. To enable the writing of messages to the IBMCOM\LANTRAN.LOG file when a failover occurs:

   a. Copy the file PCNETOS2.EXE from the root directory of the diskette created using the ServerGuide CDs to your hard disk drive.

   b. Add the following statement to the CONFIG.SYS file:

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

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

6. Restart the server.

The failover function is now enabled.

Windows NT Server

IBM offers hot-plug support for Windows NT Server Version 4.0. Failover can work in conjunction with hot-plug support or independently. If you are not using hot-plug support, go to "Windows NT Server failover setup" on page 37.

Windows NT Server hot-plug setup: IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package is available for download from the IBM Web site at:

`http://www.pc.ibm.com/support`

Enter the brand type of **Server**, click on **Downloadable files** and look for **Hot Plug**. The IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package uses the Intel Desktop Management Interface (DMI) to control hot-plug support for the Ethernet controllers. The Ethernet controller in your computer is DMI compliant. Download and install the following software in the order listed:

1. IBM Failover DMI Agent
2. IBM PCI Hot Plug Solution
3. IBM Netfinity 10/100 Fault Tolerant Adapter device drivers

Note: The order of installation is important. The IBM Netfinity Hot Plug for Windows NT Server 4.0 package must be installed before the IBM Netfinity 10/100 Fault Tolerant Adapter driver is installed. If the adapter device driver is installed before the PCI Hot Plug Solution package, the adapter device driver will not recognize the hot-plug code. This happens because the adapter device driver only checks the NT registry for the Hot Plug package during installation. If the PCI Hot Plug Solution package is added after the adapter device driver is installed, the adapter must be removed and added again in order for it to detect the PCI Hot-Plug Solution code.

To install the IBM Failover DMI Agent:

1. Download the DMI EXE file from the Netfinity Support web page and extract the files onto a diskette.

2. Insert the diskette into the diskette drive.

3. From the Start menu, select the **Run** option.

4. Type A:\SETUP.EXE in the Open box.

5. Click **Ok**. The setup wizard opens.

6. Follow the instructions given by the setup wizard until the program is installed.

7. Restart the server.

To install the IBM PCI Hot Plug Solution package:

1. Download the IBM PCI Hot Plug Services EXE file from the Netfinity Support web page and extract the files onto a diskette.

2. Log on to Windows NT Server as a user in the Administrator group.

3. Insert the diskette into the diskette drive.

4. From the Start menu, select the **Run** option.

5. Type A:\SETUP.EXE in the Open box.

6. Click **OK**. The Setup wizard opens.

7. Follow the instructions given by the setup wizard until the program is installed.

Windows NT Server failover setup: To install the IBM Netfinity 10/100 Fault Tolerant Adapter device drivers:

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in "Working with adapters" on page 52.

2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver. (Refer to the "ServerGuide and Netfinity Manager Information" section of this *Server Library.*)

3. Do not select the Grouping box at this point; you must first restart the machine.

4. From the Windows NT Server desktop, select **Control Panel**, then select the **Network** icon, then select the **Adapters** tab.

5. Highlight one of the adapters that will be in the redundant pair and then click the **Properties...** button.

6. Check the Grouping box. This will show the possible combinations for redundant pairs.

7. Select the adapter pair you want and then select **OK**. Note that the integrated Ethernet controller is located at PCI bus A, slot 2.

   Two options are available for recovering from a failover condition. The options are determined by the Enable for DMI / Hot Swap Support checkbox. If the IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package is installed, this checkbox will appear at the bottom of the Adapter Properties panel. If you do not have the IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package installed on your server, you will not see the Enable for DMI / Hot Swap Support checkbox.

   If the Enable for DMI / Hot Swap Support checkbox is not checked or is not present, traffic will automatically switch back to the primary adapter when the primary link status is restored. In this mode, the adapter cannot be hot-swapped. Users with the IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package installed should check the Enable for DMI / Hot Swap Support checkbox.

   If the Enable for DMI / Hot Swap Support checkbox is checked, traffic will remain on the secondary adapter until the user directs it to return to the primary adapter. This can be done after the hot-swap replacement of the primary adapter or by using the DMI interface.

8. Select **Close** to exit from the Network setup.

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

If a failover occurs, a message is written to the NT Event Viewer log. In addition, if the Enable for DMI / Hot Swap Support checkbox is checked, a DMI alert will also be generated.

IntraNetWare

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in "Working with adapters" on page 52.

2. Load the device driver by using the following command:

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

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

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

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

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

- A message is generated to the operating system console.

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

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

LOAD *d*:*path*\PCNTNW SCAN

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

Chapter 4. Installing options

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

Note: The illustrations in this book are similar to your server; details might vary.

Before you begin

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

Notes:

1. Become familiar with the safety and handling guidelines specified under "Safety information statements" on page vii, "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42. These guidelines will help you work safely while working with your server or options.

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

3. The orange color on components and labels in your server indicates hot-swap or hot-plug components. This means that you can install or remove the component while the system is running, provided that your system is configured to support this function. For complete details about installing or removing a hot-swap or hot-plug component, see the information provided in this chapter.

4. The blue color on components and labels indicates touch points where a component and can be gripped, a latch moved, and so on.

5. 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.

6. Place your server in a location that is dry. Rain or spilled liquids might damage your server.

7. Be sure to leave space around the server to allow the server cooling system to work properly.

   - On a tower model, leave about 127 mm (5 in.) of space around the front and rear of the server.

   - On a rack model, refer to the documentation that comes with the rack.

8. Leave about 50 mm (2 inches) of ventilated space on the right and left sides of the server to allow the server cooling system to work properly. Leave 100 mm (4 inches) of clearance at the rear of the server for cables.

9. Have a supply of 1 MB and 2 MB, 3.5-inch diskettes available.

10. Back up all important data before you make changes to disk drives.

11. Have a small, flat-blade screwdriver available.

12. For a list of supported options for the Netfinity 5600 server, refer to http://www.ibm.com/pc/us/compat on the World Wide Web.

Electrical safety

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

Note: You do *not* need to turn off the server and attached devices before you remove the cover to install or remove a hot-plug PCI adapter (see "Installing a hot-plug PCI adapter" on page 55), to replace a hot-swap fan (see "Replacing a hot-swap fan assembly" on page 82), or to check the diagnostic LED panel.

1. Turn off the server and any attached devices, such as printers, monitors, and external drives.

2. Unplug all the power cords from electrical outlets.

3. Disconnect all communication cables from external receptacles.

4. Disconnect all cables and power cords from the back of the server.

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

8

CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a 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 and memory modules (DIMMs) 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 cover is in place during normal operation.

  Note: The front door (tower model) can be permanently removed without affecting system reliability.

- Be sure to leave space around the server to allow the server cooling system to work properly.

  - On a tower model, leave about 127 mm (5 in.) of space around the front and rear of the server.
  - On a rack model, refer to the documentation that comes with the rack.

- The cover is removed for no longer than 30 minutes while the server is operating.
- A removed hot-swap drive is replaced within two minutes of removal.
- Cables for optional adapters are routed according to the instructions provided with the adapters.
- A failed fan is replaced within 48 hours.

Working inside a Netfinity 5600 server with power on

Your Netfinity 5600 server is designed with special features that make it highly available. These features include hot-plug PCI expansion slots and hot-swap fans. You can add or replace PCI adapters (if supported by your operating system) or replace a fan which no longer functions. In the past you would need to power off the server and disconnect power to perform these operations. With the hot-plug features you remove the cover of your server with the power on — something most people have not done before.

Your Netfinity 5600 server is designed to operate safely while powered on with the cover removed. The server is designed to protect you and the server. Here are some simple guidelines to follow when you work inside a Netfinity 5600 server that is powered on:

- Avoid loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cufflinks while you are working inside the server.

- Do not allow your necktie to hang inside the server.

- Remove jewelry, such as bracelets and loose-fitting wrist watches.

- Remove items from your shirt pocket (such as pens or pencils) that could fall into the server as you lean over it.

- Take care to avoid dropping any metallic objects, such as paper clips, hair pins, or screws, into the server.

Preparing to install options

> **Before you begin:**
>
> Read "Electrical safety" on page 41, "Handling static-sensitive devices" on page 42, and "Working inside a Netfinity 5600 server with power on."

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

If you are:

- Installing or removing a hot-plug PCI adapter, go to "Working with adapters" on page 52.

- Installing or replacing a hot-swap hard disk drive, go to "Installing internal drives" on page 66.

- Installing or replacing a hot-swap power supply, go to "Installing a hot-swap power supply" on page 78.

- Removing a hot-swap power supply, go to "Removing a hot-swap power supply" on page 80.

- Replacing a hot-swap fan, go to "Replacing a hot-swap fan assembly" on page 82.

- Installing or removing an option not listed in the preceding list, continue with the following steps.

1. Unlock and open the server door.

7

CAUTION:
If the device has doors, be sure to remove or secure the doors before moving or lifting the device to avoid personal injury. The doors will not support the weight of the device.

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

5

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

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.

1

DANGER

> **Electrical current from power, telephone, and communication cables is hazardous.**
>
> **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.**
>
> – **Connect all power cords to a properly wired and grounded electrical outlet.**
>
> – **Connect to properly wired outlets any equipment that will be attached to this product.**
>
> – **When possible, use one hand only to connect or disconnect signal cables.**
>
> – **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
>
> – **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
>
> – **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	**To Disconnect:**
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Preparing to install options

If you are:

- Installing or removing a non-hot-plug adapter, go to "Working with adapters" on page 52.
- Installing or removing a microprocessor, go to "Installing a microprocessor kit" on page 61.
- Installing or removing a memory-module kit, go to "Installing memory-module kits" on page 64.
- Installing or removing a drive in a non-hot-swap drive bay, go to "Installing internal drives" on page 66.

Removing the left-side cover (tower model)

> ─ **Before you begin:** ─
>
> Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.

Note: The illustrations in this book are similar to your server; details might vary.
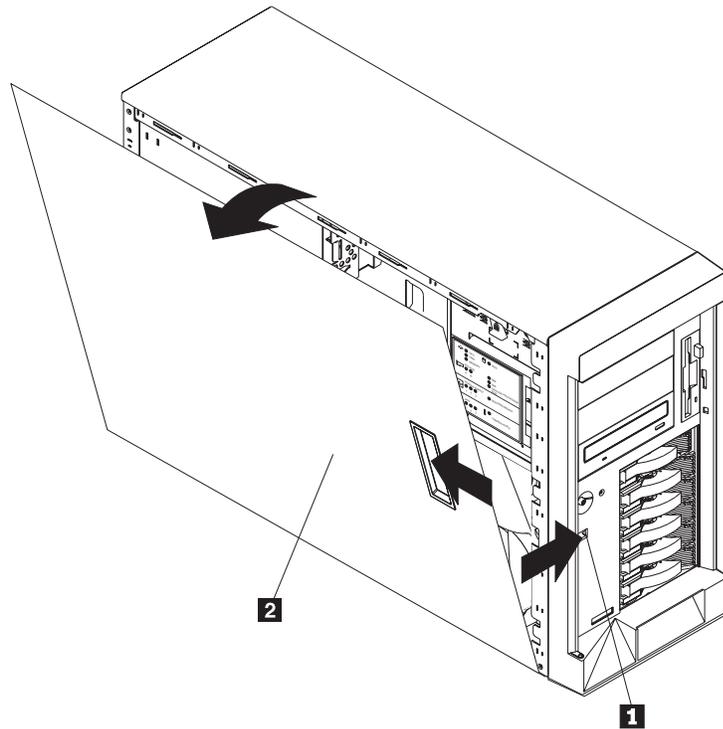
1	Cover-release latch
2	Cover

To remove the left-side cover of the tower model or the top cover of the rack model:

1. If you are planning to install or remove any part other than a hot-swap hard disk drive, hot-plug adapter, hot-swap power supply, or hot-swap fan, turn off the server and all attached devices and disconnect all external cables and power cords (see "Preparing to install options" on page 43).

2. Slide the cover-release lever **1** on the front of the server to release the cover and slide the cover **2** toward the rear of the server about 25 mm (1 inch). Move the top edge of the cover out from the server; then, lift the cover off the server. Set the cover aside.

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

Removing the cover (rack model)

Before you begin:

Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.

Note: The illustrations in this book are similar to your server; details might vary.
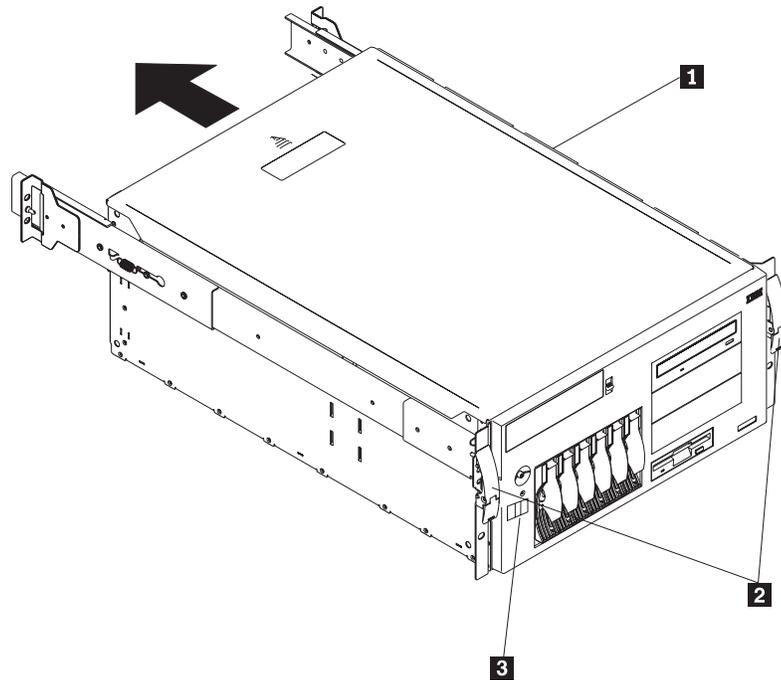
1 Top cover
2 Side latches
3 Cover-release latch

To remove the server top cover:

1. If you are planning to install or remove any part other than a hot-swap hard disk drive, hot-plug adapter, hot-swap power supply, or hot-swap fan, turn off the server and all attached devices and disconnect all external cables and power cords (see "Preparing to install options" on page 43).

2. Release the left and right side latches **2** and pull the server out of the rack enclosure until both slide rails lock.

   Note: When the server is in the locked position, you can easily reach the cables on the back of the server.

3. Move the cover-release lever **3** down while sliding the top cover **1** toward the rear of the server about 25 mm (1 inch). Lift the cover off the server and set the cover aside.

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

Removing the server door (tower model)

Refer to the following illustration while you perform the steps in this procedure.
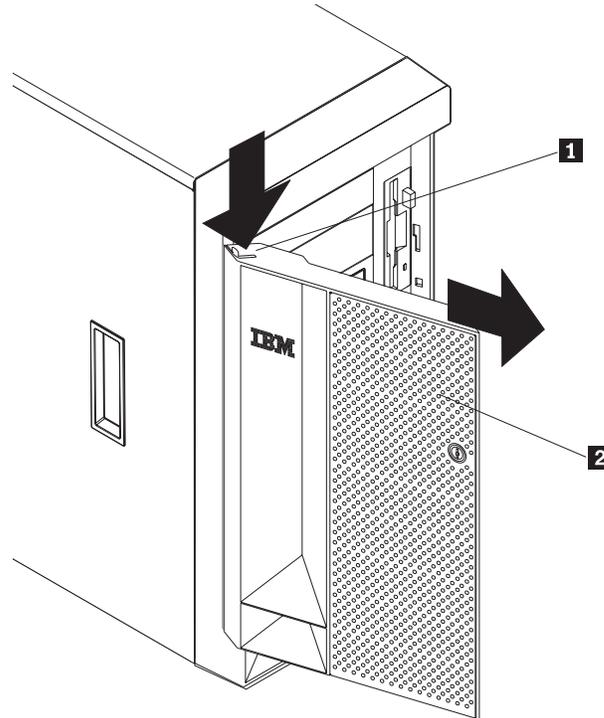
`1` Flange
`2` Server door

To remove the server door:

1. Unlock and open the server door `2`.

2. Locate the flange `1` on the top edge of the door.

3. Press down on the flange while pressing out on the door; then lift the server door up and off the hinge. Set the door aside in a safe place.

Removing the trim bezel

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

Tower model
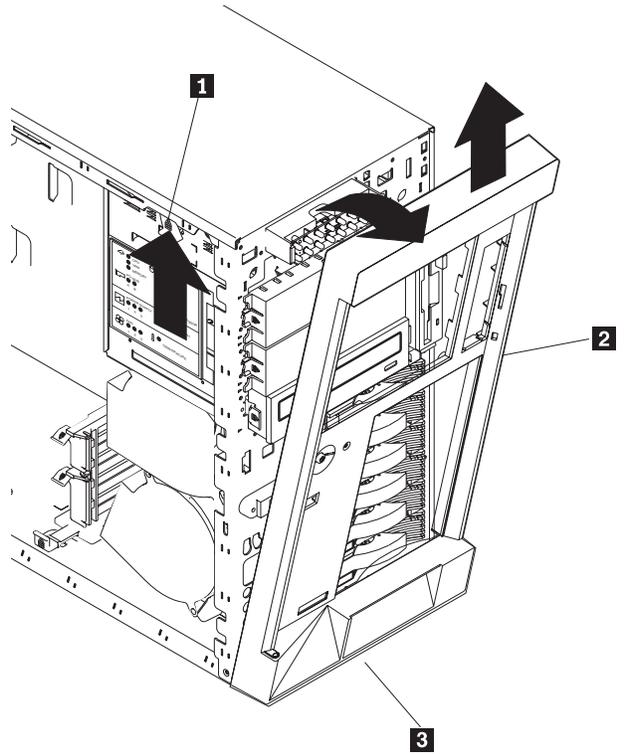
Rack model
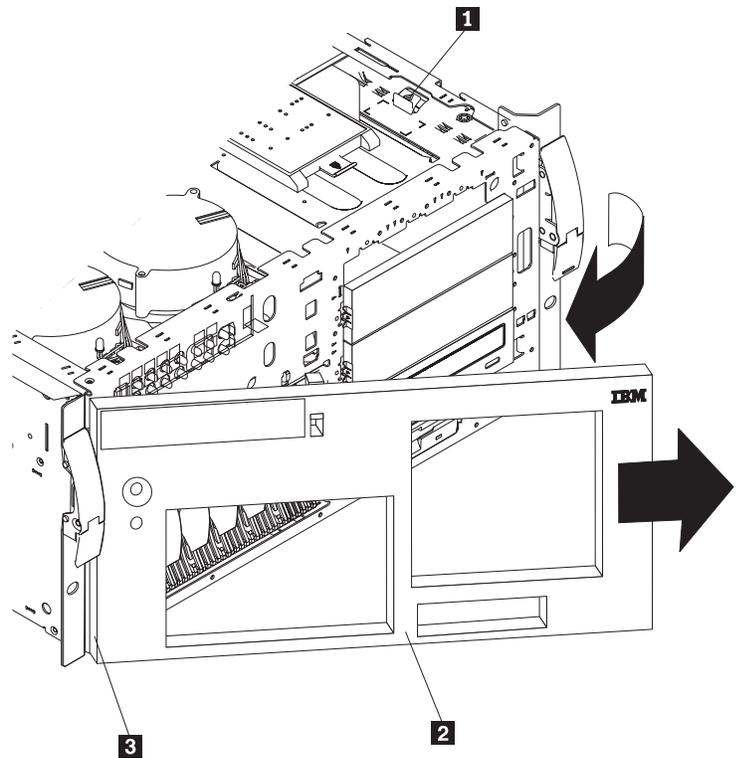
1 Bezel-release lever
2 Trim bezel
3 Side with bezel tabs and slots

To remove the trim bezel:

1. Move the blue bezel release lever 1 following the curve of the lever opening.

2. Lift the bezel tabs out of the slots 3 and pull the bezel 2 away from the server front. Store the bezel in a safe place.

Working with adapters

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

You can install up to five peripheral component interconnect (PCI) adapters in the expansion connectors, called slots, on the system board of your server.

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

The two remaining PCI slots support standard (non-hot-plug) PCI adapters. PCI

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

The integrated video controller is not removable. If you want to disable this controller and use a video adapter instead, you can install a video adapter in an expansion slot. When you install a video adapter, the server BIOS automatically disables the integrated video controller.

The following illustration shows the location of the PCI expansion slots on the system board.
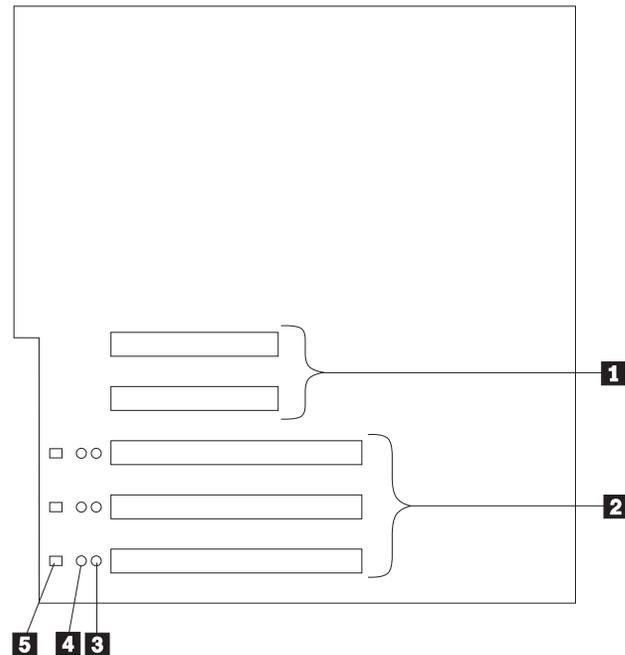
1 Non-hot-plug 32-bit PCI slots 1 and 2 (on PCI bus A)
2 Hot-plug 64-bit PCI slots 3–5 (on PCI bus B)
3 Power LEDs for hot-swap slots
4 Internal Attention LEDs for hot-swap slots
5 External Attention LEDs for hot-swap slots

LEDs for hot-plug PCI slots

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

- **Power LED:** This LED is on when the hot-plug PCI slot is active and has power. An adapter **must not** be added to or removed from the PCI slot when the Power LED is on. When this LED is off, the PCI slot is inactive and has no power applied. An adapter can be installed when the Power LED for the PCI slot is off. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters, and, if so, how to disable the hot-plug PCI slot.

- **Attention LEDs:** Each hot-plug PCI slot has an Attention LED that is visible from the rear of the server and one that can be seen from inside the server. (The LEDs have the same meaning; they are duplicated to be visible from outside or inside the server.) An Attention LED flashes approximately once per second when it is on. The meaning of the Attention LEDs is defined by your operating system. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters and, if so, what the Attention LEDs indicate.

:.The following table describes the LEDs:

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

Adapter considerations

Before you continue with the adapter-installation procedure:

- Review the documentation that comes with the adapter and follow those instructions in addition to the instructions given in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that come with the adapter documentation.

- You can install full-length adapters in all expansion slots.

- You can install hot-plug PCI adapters in PCI slots 3–5, if your operating system supports this feature. Non-hot-plug PCI adapters can also be installed in these slots.

- Your server supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.

  Note: A universal PCI adapter supports both 3.3 V and 5.0 V operation.

- Your server uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support sharing of PCI interrupts.

- PCI slots 1 and 2 are on PCI bus A and PCI slots 3–5 are on PCI bus B. Both PCI buses are primary buses. The system scans PCI slots 1 through 5 to assign system resources; then the system starts (boots) the PCI devices in the following order, if the default boot precedence has not been changed: PCI slots 1 and 2, system board SCSI devices, and then PCI slots 3 through 5. See"Start Options" on page 26 for information about changing the boot precedence.

  Note: The performance of the PCI adapters depends on the configuration of adapters in your system.

Enabling hot-plug PCI support

Your Netfinity 5600 server has hot-plug PCI capability. In order to enable this feature, you must install the operating system services for hot-plug PCI support code. To obtain the operating system hot-plug PCI support code, access the IBM Web site at:

```
http://www.ibm.com/pc/support
```

Click on **IBM Server Support**. From the **select family** field, click on **Netfinity 5600**. Click on **Downloadable files**.

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

Installing a hot-plug PCI adapter

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

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

Before you begin:

- Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.

- 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.

Working with adapters

Refer to the following illustrations of the rack model while you perform the steps in this procedure.
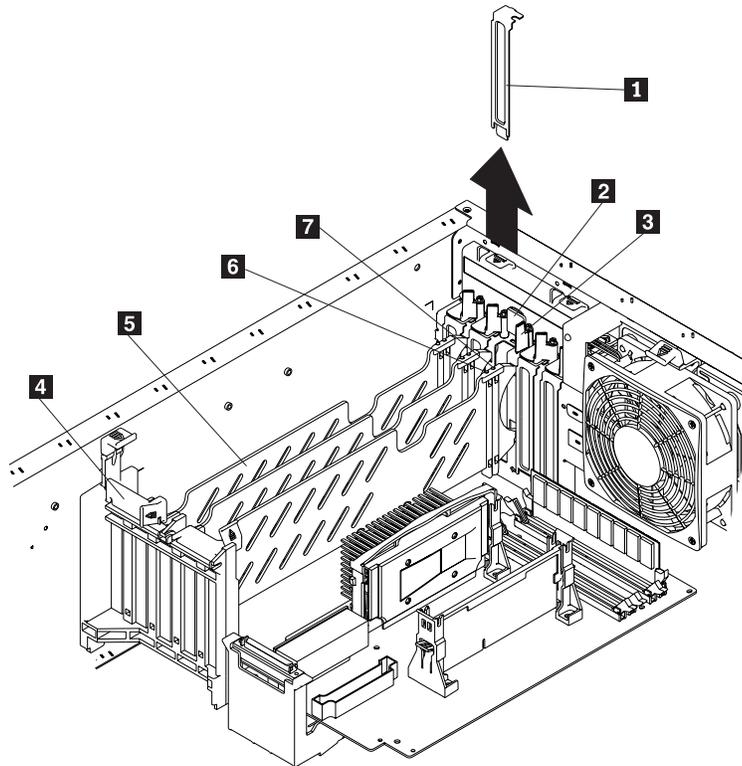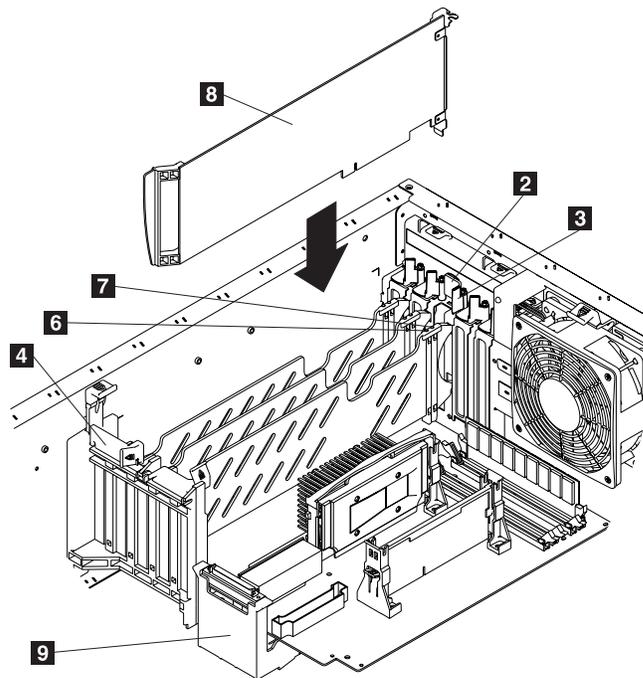
1	Expansion-slot cover
2	Tab
3	Adapter retention latch
4	Adapter retention flap
5	Plastic divider
6	Power light
7	Attention light
8	Adapter
9	SCSI cable extender

To install a hot-plug PCI adapter:

1. Remove the cover. See "Removing the left-side cover (tower model)" on page 47 or "Removing the cover (rack model)" on page 48.

2. Determine which PCI adapter expansion slot you will use for the adapter.

   Note: Only PCI slots 3–5 can be used for hot-plug PCI adapters.

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

   Attention: Make sure the Power light **6** for the hot-plug PCI slot is off before you continue to the next step.

4. Remove the expansion-slot cover **1** :

   a. Rotate the adapter retention latch **3** counterclockwise.

   b. Lift the tab **2** covering the top of the expansion-slot cover **1** and then remove the expansion-slot cover from the server. Store it in a safe place for future use.

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

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

6. Press on the touchpoint on the adapter retainer flap **4** at the end of the slot nearest the front of the server and rotate the adapter retainer flap upward.

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

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

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

9. Install the adapter **8** :

   a. Carefully grasp the adapter **8** by its top edge or upper corners, and align it with the expansion slot on the system board.

   b. Press the adapter *firmly* into the expansion slot.

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

   c. Lower the tab **2** on the adapter guide over the tab on the top corner of adapter. Rotate the adapter retention latch **3** clockwise until it snaps into place.

      Attention: Power cannot be restored to the adapter slot if the tab is not lowered into place.

   d. Close the adapter retainer flap **4** .

10. Connect any needed cables to the adapter.

    Attention: Route cables so that the flow of air from the fans is not blocked.

11. Enable the PCI slot from your operating system. (Refer to the documentation that comes with your operating system for information about enabling a hot-plug PCI slot.) Make sure that the Power light **6** for the hot-plug 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 84.

# Installing a non-hot-plug adapter

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

> **Before you begin:**
>
> - Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.
>
> - Read the documentation that comes with your option.

Refer to the illustrations in "Installing a hot-plug PCI adapter" on page 55 while you perform the steps in this procedure.

To install a non-hot-plug adapter:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 43); then remove the cover. See "Removing the left-side cover (tower model)" on page 47 or "Removing the cover (rack model)" on page 48.

2. Determine which PCI adapter 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 **1** :

   a. Rotate the adapter retention latch **3** counterclockwise.

   b. 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. Press on the touchpoint on the adapter retainer flap **4** at the end of the slot nearest the front of the server and rotate the adapter retainer flap upward.

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

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

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

8. Set any jumpers or switches as described by the adapter manufacturer.

9. Install the adapter **8** :

   a. Carefully grasp the adapter **8** by its top edge or upper corners, and align it with the expansion slot on the system board.

   b. Press the adapter *firmly* into the expansion slot.

   Attention: When you install an adapter in the server, be sure that it is completely and correctly seated in the system-board connector before you

apply power. Incomplete insertion might cause damage to the system board or the adapter.

   c. Lower the tab **2** on the adapter guide over the tab on the top corner of the adapter. Rotate the adapter retention latch **3** clockwise until it snaps into place.

   d. Close the adapter retainer flap **4** .

10. Connect any needed cables to the adapter.

    Attention: Route cables so that the flow of air from the fans is not blocked.

11. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 84.

Special considerations for installing a RAID adapter

You can install an optional RAID adapter in your server to control the hot-swap hard-disk drives.

To install the RAID adapter:

1. Disconnect the SCSI cable from the SCSI cable extender on the system board. See the illustration in "Installing a hot-plug PCI adapter" on page 55 for the location of the SCSI cable extender. (The other end of the SCSI cable is connected to the SCSI HDD backplane.) The Service Label on the inside of the cover of your server shows cable routing for an optional RAID adapter.

2. Connect the end of the SCSI cable that you disconnected from the SCSI cable extender to the RAID adapter. The other end of the cable is connected to the SCSI HDD backplane; the drives in the hot-swap bays are now connected to the RAID adapter.

3. Connect the 2-drop SCSI cable to the SCSI cable extender on the system board, and attach the device in the non-hot-swap bay to one of the drops on the other end of the 2-drop SCSI cable. The device is attached to the integrated SCSI controller.

Refer to the documentation provided with the RAID adapter for more information about installing the adapter and configuring a disk array.

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

Installing a microprocessor kit

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

Before you begin:

- Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.

- Thoroughly review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server basic input/output system (BIOS). The latest level of BIOS for your server is available through the World Wide Web and the IBM Bulletin Board System (BBS). Refer to the "Getting Help, Service, and 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.ibm.com/pc/us/compat/ on the World Wide Web.

Attention: To avoid damage and ensure proper server operation when you install a new or an additional microprocessor, use microprocessors that have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical.

Notes:

1. The illustrations in this section might differ slightly from your hardware.

2. To order additional microprocessor options, contact your IBM reseller or IBM marketing representative.

3. The microprocessor that is installed in microprocessor connector U5 is CPU or processor 1. If a microprocessor is installed in microprocessor connector U6, it is CPU or processor 2. If the server has only one microprocessor installed, that microprocessor is installed in microprocessor connector U5 and is the startup (boot) processor. If more than one microprocessor is installed, the microprocessor with the lower stepping level is the startup processor and the microprocessor with the higher stepping level is the application processor. If both microprocessors have the same stepping level, the microprocessor installed in microprocessor connector U6 is the startup processor and the microprocessor installed in U5 is the application processor.

   Note: You can determine the stepping levels of the installed microprocessors using the Configuration/Setup. See "System Summary" on page 21.

Installing a microprocessor kit

Refer to the following illustrations while you perform the steps in this section.
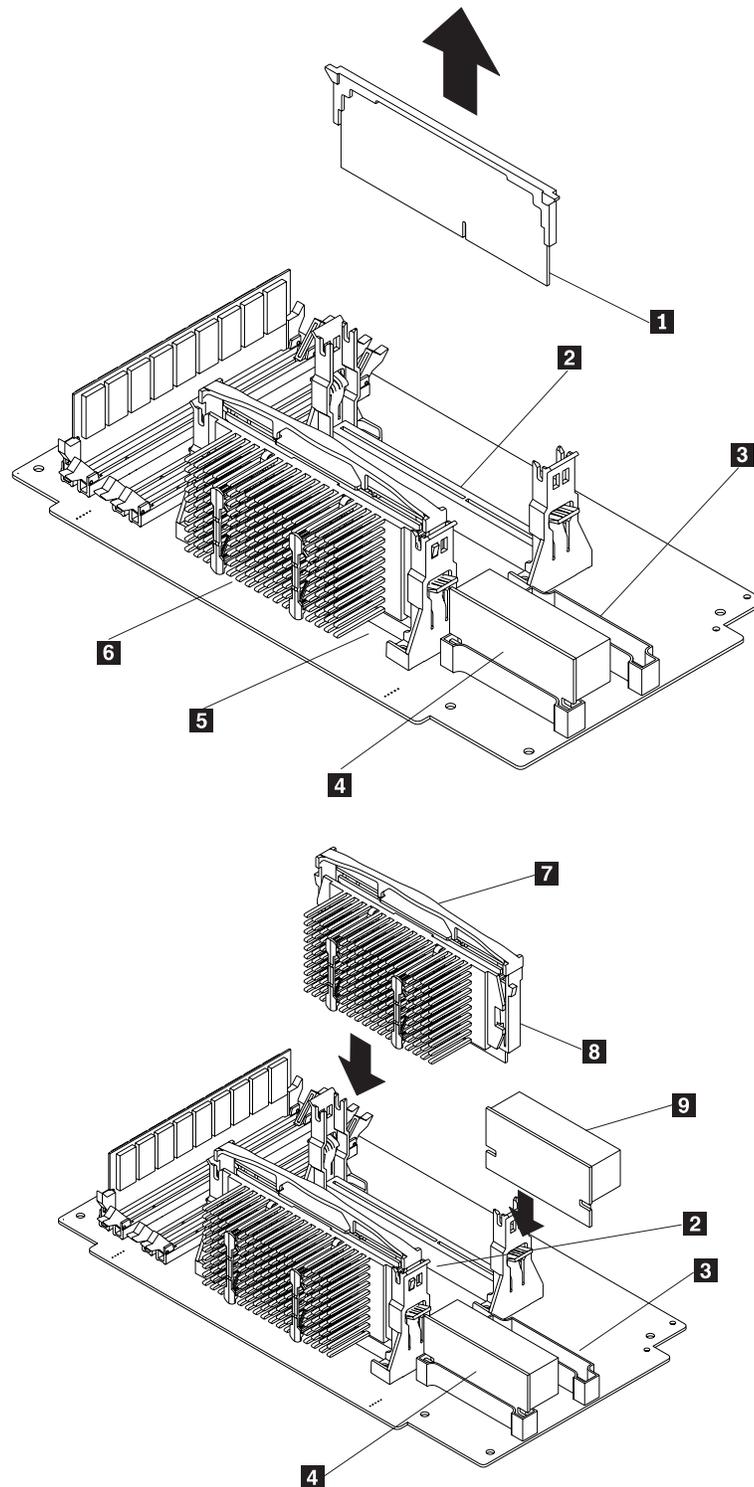
1 Terminator card
2 Microprocessor connector 2 (U6)
3 Voltage regulator module (VRM) connector for second VRM
4 VRM for first microprocessor (VRM 1)
5 Microprocessor connector 1 (U5)
6 Microprocessor 1

7 Microprocessor handle

8 Microprocessor 2

9 VRM for second microprocessor (VRM 2)

To install an additional microprocessor kit:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 43); then remove the cover (see "Removing the left-side cover (tower model)" on page 47 or "Removing the cover (rack model)" on page 48.)

2. Remove the terminator card **1** from the microprocessor connector **2** . Store the terminator card in a safe place in the static-protective package that your new microprocessor is shipped in; you will need to install it again if you ever remove the microprocessor.

3. 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. Center the microprocessor **8** over the microprocessor connector **2** and carefully press the microprocessor into the connector.

4. Install the VRM **9** included in the microprocessor kit:

   Attention: When installing or replacing a VRM, use only VRMs specified for use with the Netfinity 5600 server. Use of other VRMs might cause your server to overheat.

   a. Center the VRM **9** over the VRM connector **3** . Make sure that the VRM is oriented and aligned correctly.

   b. Press the VRM into the connector.

      Notes:

      1) To remove a microprocessor, pull upward on the microprocessor handle **7** .

      2) If you remove the microprocessor later, remember to install the terminator card in the appropriate microprocessor connector and to remove the VRM for that microprocessor.

5. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 84.

Installing memory-module kits

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

Your server comes with a DIMM installed on the processor board in connector J1.

Notes:

1. Install additional DIMMs in connectors J2, J3, and J4, in that order. (See the following illustration for memory connector locations.) If you mix DIMM sizes, install the largest sized DIMM in connector J1, the next largest sized DIMM in connector J2, and so forth.

2. Your Netfinity 5600 server supports 128 MB, 256 MB, 512 MB, and 1 GB DIMMs. Your server supports a minimum of 128 MB and a maximum of 4 GB of system memory. Only 133 MHz, 3.3 V, 168-pin, 8-byte, 72-bit registered, synchronous-dynamic-random-access memory (SDRAM), error correcting code (ECC) with x4 configuration DIMM memory complying with PC 133 Registered DIMM Specification, Revision 1.0 or later is supported. When installed in systems using 100 MHz front-side bus processors, the memory operates at 100 MHz.

3. Installing or removing DIMMs changes the configuration information in the server. Therefore, after installing or removing a DIMM, you must save the new configuration information in the Configuration/Setup 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 20 for more information.
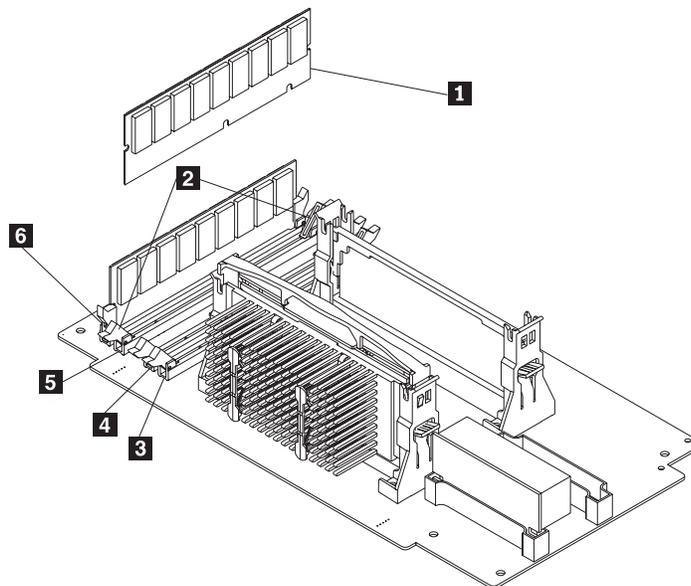
1 DIMM
2 Retaining clips
3 DIMM connector 1 (J4)
4 DIMM connector 2 (J3)

5   DIMM connector 3 (J2)

6   DIMM connector 4 (J1)

Before you begin:

- Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.

- Read the documentation that comes with your option.

To install a DIMM:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 43); then remove the cover. See "Removing the left-side cover (tower model)" on page 47 or "Removing the cover (rack model)" on page 48.

2. Locate the DIMM connectors on the processor board. Determine the DIMM connector into which you will install the DIMM. (See the notes at the beginning of this procedure.)

3. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

   Note: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.

4. Install the DIMM:

   a. Turn the DIMM 1 so that the pins align correctly with the connector 5 .

   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. Be sure that the retaining clips 2 snap into the closed positions.

   c. Make sure the retaining clips are in the closed position. If a gap exists between the DIMM and the retaining clips, the DIMM has not been properly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.

   d. Repeat these steps for each DIMM that you install.

5. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 84.

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.

Tower model
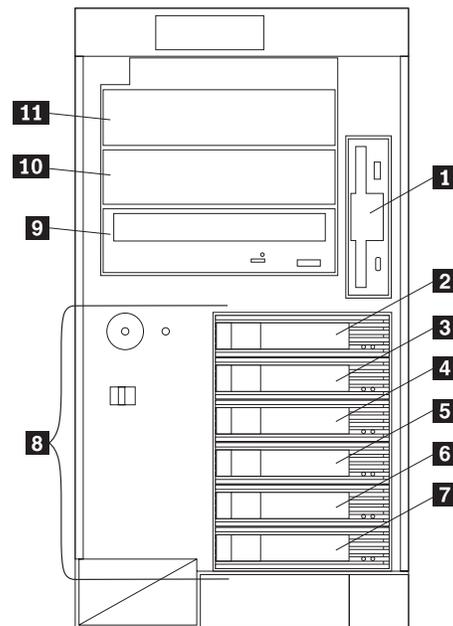
1 Diskette drive bay
2 SCSI ID 0 bay
3 SCSI ID 2 bay
4 SCSI ID 3 bay
5 SCSI ID 4 bay
6 SCSI ID 8 bay
7 SCSI ID 9 bay
8 Hot-swap bays
9 CD-ROM drive bay
10 Non-hot-swap bay B
11 Non-hot-swap bay A

Rack model
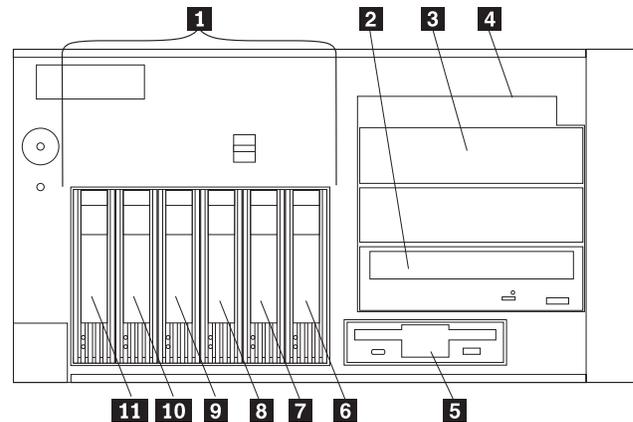
1   Hot-swap bays
2   CD-ROM drive bay
3   Non-hot-swap bay B
4   Non-hot-swap bay A
5   Diskette drive bay B
6   SCSI ID 9 bay
7   SCSI ID 5 bay
8   SCSI ID 4 bay
9   SCSI ID 3 bay
10   SCSI ID 1 bay
11   SCSI ID 0 bay

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

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

- Your server comes with a preinstalled 3.5-inch, 1.44 MB diskette drive and a preinstalled IDE CD-ROM drive.

- Bays A and B come without a device installed. These bays are for 5.25-inch, half-high, removable-media drives, such as tape backup drives. Bays A and B can be combined into a single full-high bay.

- The Netfinity 5600 server supports only one diskette drive.

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

- If you are installing a device with a 50-pin connector in one of the non-hot-swap bays (bays A–B), you need a 68-pin to 50-pin converter. To order the converter, contact your IBM reseller or IBM marketing representative.

- Your server supports six slim (1-inch) or three half-high (1.6-inch), 3.5-inch hot-swap hard disk drives in the hot-swap bays.
- The hot-swap bays connect to a SCSI *backplane*. This backplane is the printed circuit board behind the bay. The backplane supports up to six hard disk drives.
- The diskette drive uses 1 MB and 2 MB diskettes. For optimum use, format 1 MB diskettes to 720 KB and format 2 MB diskettes to 1.44 MB.

SCSI drives

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

Notes:

1. Any information about SCSI drives also applies to other SCSI devices, such as tape drives.

2. If you plan to install both internal and external SCSI devices, you must follow the instructions in "Connecting external options" on page 89, in addition to the instructions in this section.

A 16-bit (wide) SCSI cable connects the SCSI HDD (hard disk drive) backplane to an integrated SCSI controller on the system board. An additional 16-bit 2-drop SCSI cable is shipped disconnected inside your server. It is folded and restrained with a cable clamp to the side of the power supply housing.

If you want to install a device in one of the non-hot-swap bays, you can either:

- Install an additional SCSI adapter and use the 2-drop SCSI cable to attach the device to that adapter.
- Install a RAID adapter as follows:

  1. Disconnect the SCSI cable from the SCSI cable extender on the system board. See the illustration in "Installing a hot-plug PCI adapter" on page 55 for the location of the SCSI cable extender. (The other end of the SCSI cable is connected to the SCSI HDD backplane.)

  2. Connect the end of the SCSI cable that you disconnected from the SCSI cable extender to the RAID adapter. The other end of the cable is connected to the SCSI HDD backplane; the drives in the hot-swap bays are now connected to the RAID adapter.

  3. Connect the 2-drop SCSI cable to the SCSI cable extender on the system board, and attach the device in the non-hot-swap bay to one of the drops on the other end of the 2-drop SCSI cable. The device is attached to the integrated SCSI controller.

SCSI IDs

Each SCSI device that is connected to an individual channel of a 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. 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. The SCSI ID assigned to each hot-swap bay is shown on your server beside the bay and in the illustrations in "Internal drive bays" on page 66. The server uses the hard disk drive SCSI IDs to send status information to the indicator lights above each hot-swap bay.

The SCSI backplane in the server supports up to six hot-swap bays.

The processing sequence for SCSI devices proceeds from the lowest SCSI ID to the highest (0 to 6, then 8 to 15).

Termination (internal SCSI devices)

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

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

You must disable termination on any SCSI devices that you install in the non-hot-swap bays. Refer to the information that come with the SCSI device for instructions about setting device jumpers or switches that control termination.

Preinstallation steps (all bays)

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

Before you begin:

- Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.
- Read the documentation that comes with the internal drive.

---

1. Choose the bay in which you want to install the drive.

2. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive.

3. To install the drive, go to "Installing a non-hot-swap drive" or "Installing a drive in a hot-swap bay" on page 72.

Installing a non-hot-swap drive

Before you begin:

- Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.

- Read the documentation that comes with your drive.

- Prepare the drive for installation (see "Preinstallation steps (all bays)").

Note: The server's EMI integrity and cooling are both protected by having the non-hot-swap bays covered or occupied. When you install a drive, save the

Installing internal drives

filler panel from the bay, in case you later remove the drive and do not replace it with another.

Refer to the following illustration of the tower model while you perform the steps in this procedure.
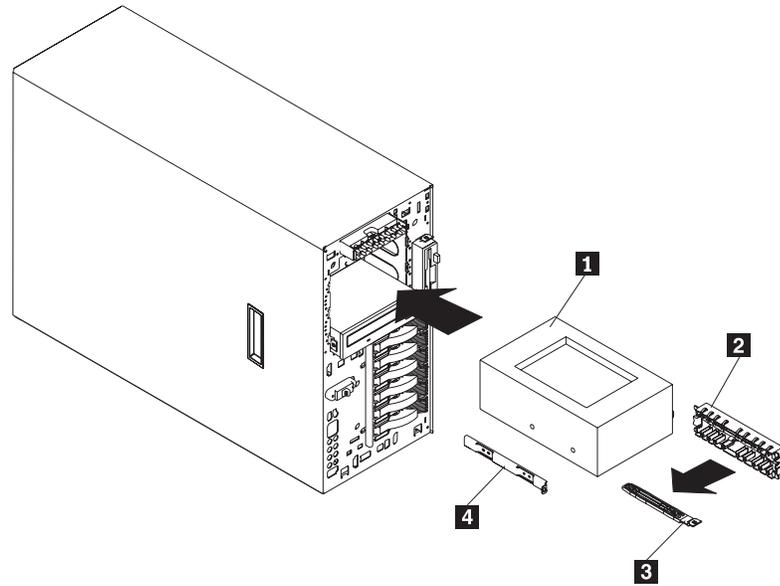
1 DLT drive
2 Filler panel
3 Blue slide rails
4 Metal slide rails

To install a non-hot-swap drive in one of the non-hot-swap bays:

1. Turn off the server and peripheral devices (see "Preparing to install options" on page 43) and then remove the cover. See "Removing the left-side cover (tower model)" on page 47 or "Removing the cover (rack model)" on page 48.

2. Remove the trim bezel. (See "Removing the trim bezel" on page 50.)

3. Remove the filler panel **2** from the bay opening by pulling the filler panel away from the server. You do not need the filler panel when you have a drive installed in the bay.

4. Touch the static-protective bag containing the drive to any unpainted metal surface on the server; then, remove the drive from the bag and place it on a static-protective surface.

5. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

6. Install rails on the drive.

   - If you are installing a standard-size drive:

     a. Pull the blue slide rails **3** off the back of the filler panel.

     b. Clip the rails onto the sides of the drive.

   - If you are installing a digital linear tape (DLT) backup drive **1**, the slide rails **4** and screws are included in the country kit.

7. Place the drive so that the slide rails engage in the bay guide rails. Push the drive into the bay until it clicks into place.

8. If you have not already done so, install an optional SCSI adapter. (See to "Working with adapters" on page 52 for information about installing an adapter.) See "SCSI drives" on page 68 for information about optional SCSI adapters, installation of drives in the non-hot-swap bays, and the 16-bit 2-drop SCSI cable that is provided for use with optional SCSI adapters.

9. Connect one of the connectors on the SCSI cable for the non-hot-swap drive bays to the back of the drive **1**.

10. Connect a power cable to the back of the drive. Power cables for non-hot-swap drives come installed in your server. The connectors are keyed and can be inserted only one way.

11. If you are installing another non-hot-swap drive, do so at this time. Otherwise, continue with the next step.

12. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 84.

# Installing a drive in a hot-swap bay

The hot-swap drive bays support hot-swap drives only.

This section gives the procedure for installing a hot-swap hard disk drive. If you want to remove a drive, reverse the following steps.

Note: To minimize the possibility of damage to the hard disk drives when you are installing a hard disk drive in a rack model, install the rack model in the rack before installing the hard disk drives.

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 41 and "Handling static-sensitive devices" on page 42.

- Read the documentation that comes with your drive.

- If your server has a RAID adapter installed, review the documentation that came with your RAID adapter for information about the RAID adapter and disk-array configuration.

- Prepare the drive for installation (see "Preinstallation steps (all bays)" on page 69).

Refer to the following illustrations of the tower model while you perform the steps in this procedure.
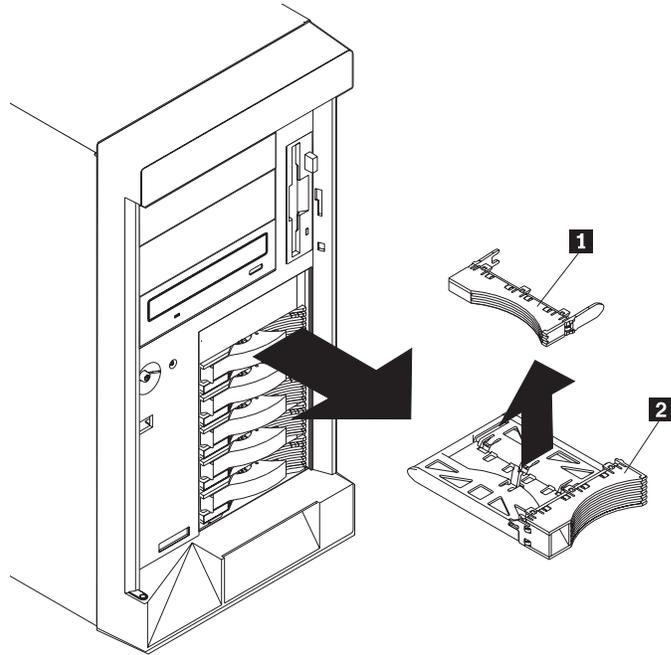
1 Filler panel for use with half-high drives
2 Filler panel (slim-high)
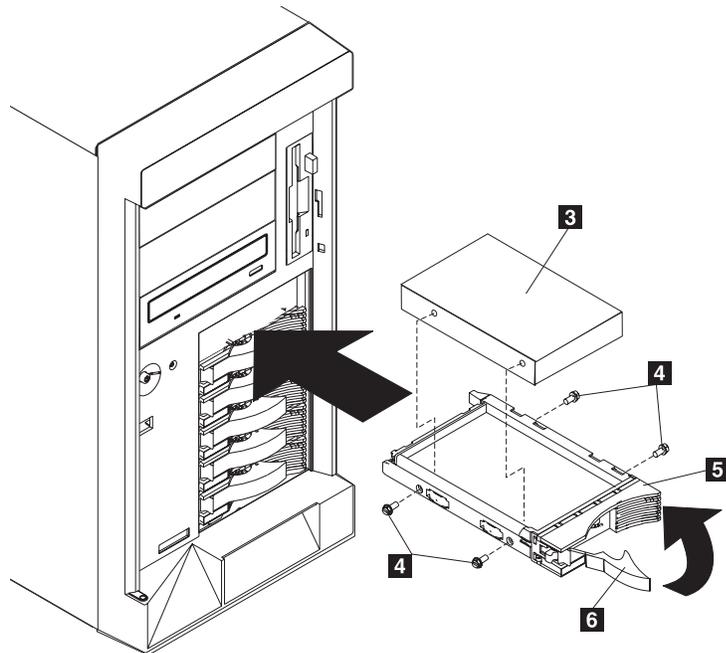
3 Drive
4 Screws
5 Drive tray
6 Drive tray handle (in open position)

To install a drive in a hot-swap drive bay:

1. If your server is a tower model, unlock and open the server door.

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

2. Remove the filler panel **2** from one of the empty hot-swap bays by inserting your finger into the depression at the left side of the filler panel and pulling it away from the server.

   Note: If you are installing a half-high hard disk drive, you will need to remove two adjacent filler panels. The two filler panels should be from either the top pair of bays, the middle pair of bays, or the bottom pair of bays.

3. If your hard disk drive is not installed on the drive tray **5**, place the drive in the drive tray and, **being careful not to over-tighten the screws**, attach the drive to the tray using the four screws provided with the option kit.

4. Install the hard disk drive **3** in the hot-swap bay:

   a. Ensure the tray handle **6** 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/tray assembly into the bay until the drive connects to the backplane.

   d. Push the tray handle to the right until it locks.

5. If you installed a half-high hard disk drive, install a filler panel **1** in the gap above the drive:

   a. Locate the smaller filler panel **1** that is designed for use with half-high drives. It is stored on the slim-high filler panel **2** that you removed earlier in this procedure.

   b. Pull the smaller filler panel off the filler panel.

   c. Gently push the filler panel **1** into place in the gap above the drive.

6. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly. See "Identifying problems using status LEDs" on page 151 for details.

7. If your server is a tower model, close and lock the server door.

   Note: If your server has a RAID adapter installed, you must reconfigure your disk arrays after installing hard disk drives. Record the configuration information in the appropriate tables in "Installed device records" on page 164.

Replacing a drive in a hot-swap bay

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

Attention:

1. Before you remove a hot-swap hard disk drive that is not defective, back up all important data.

2. To avoid damage to a hard disk drive, DO NOT remove the drive from the hot-swap bay until it has had time to spin down (approximately 30 seconds). Handle the drive carefully.

3. 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.

   This situation is especially relevant if your server has a RAID adapter installed and you assigned RAID level 1 or 5 to the logical drives in your disk array. The RAID adapter can rebuild the data that you need, provided that certain conditions are met. Refer to the information provided with the RAID adapter for further details.

Before you begin:

- Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.

- Read the documentation that comes with your drive.

- If your server has a RAID adapter installed, review the information provided with the RAID adapter for information about the RAID adapter and disk-array configuration.

- Prepare the drive for installation (see "Preinstallation steps (all bays)" on page 69).

Installing internal drives

Refer to the following illustration of the tower model while you perform the steps in this procedure.
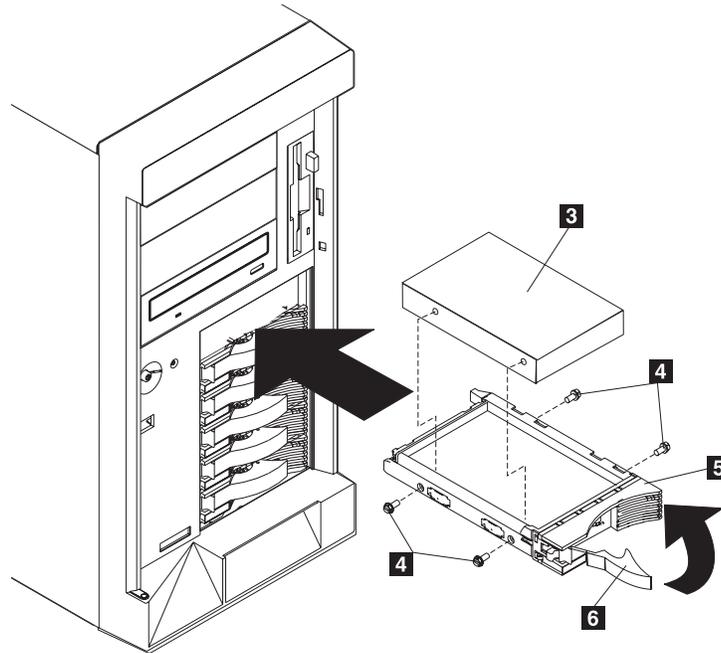
3 Drive
4 Screws
5 Drive tray
6 Drive tray handle (in open position)

To replace a drive in a hot-swap bay:

1. If your server is a tower model, unlock and open the server door (see "Preparing to install options" on page 43).

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

2. Remove the defective hard disk drive **3** by placing the handle **6** on the drive to the open position (perpendicular to the drive) and pulling the hot-swap tray from the bay.

3. Remove the four screws **4** that attach the drive **3** to the hot-swap tray **5** , and remove the drive from the tray.

4. Place the new hard disk drive on the hot-swap tray and, **being careful not to over-tighten the screws**, attach the drive to the tray using four screws.

5. Install the hard disk drive in the hot-swap bay:

   a. Ensure the tray handle is open (that is, perpendicular to the drive).

   b. Align the drive/tray assembly so that it engages the guide rails in the bay.

   c. Push the drive assembly into the bay until the drive connects to the backplane.

   d. Push the tray handle to the right until it locks.

6. Check the hard disk drive status indicators to verify that the hard disk drive is installed properly. See "Identifying problems using status LEDs" on page 151 for details.

7. If your server is a tower model, close and lock the server door.

Installing a hot-swap power supply

Your server comes with two power supplies. You can add a third power supply. After you install a power supply, check the power-supply status indicators to verify that the power supply is operating properly. See "Power supplies" on page 13 for details.

8

CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

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

Note: You do not need to turn off the power to the server to install hot-swap power supplies.
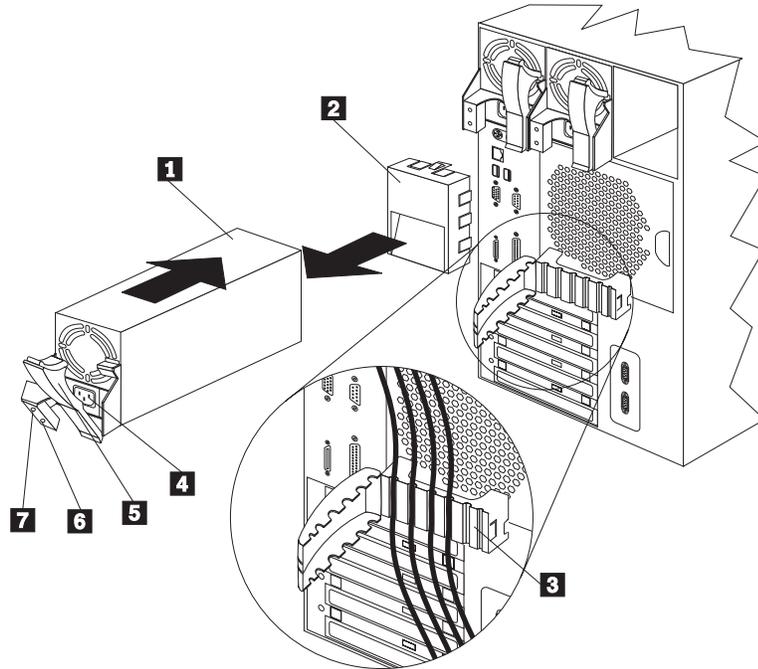
1 Power supply
2 Filler panel
3 Cable-restraint bracket
4 Power cord connector
5 Handle on power supply (in open position)
6 AC Power light
7 DC Power light

To add a power supply:

1. Remove the filler panel **2** from the empty power supply bay by inserting your finger into the depression on the filler panel and pulling it away from the server. Save the filler panel in case you remove the power supply at a later time.

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

2. Install the power supply **1** in the bay:

   a. Place the handle **5** on the power supply in the open position (that is, perpendicular to the power supply) and slide the power supply into the chassis.

   b. Gently close the handle to seat the power supply in the bay.

3. Plug the power cord for the added power supply into the power cord connector **2** .

4. Route the power cord through the cable-restraint bracket **3** .

5. Plug the power cord into a properly grounded electrical outlet.

6. Verify that the DC Power light **7** and AC Power light **6** on the power supply are lit, indicating that the power supply is operating correctly.

7. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 84.

Removing a hot-swap power supply

Your server comes with two power supplies. You can add a third power supply. Each power supply has two status indicators; see "Power supplies" on page 13 for information about the status indicators.

Attention: If the NON REDUNDANT LED on the diagnostic LED panel is lit, do not remove a hot-swap power supply without first turning the server off.

Refer to the illustration in "Installing a hot-swap power supply" on page 78 while you perform the steps in this procedure.

8

CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

To remove a hot-swap power supply:

1. If the NON REDUNDANT LED on the diagnostic LED panel is lit, turn off the server and peripheral devices (see "Preparing to install options" on page 43); otherwise, go to the next step.

2. Remove the power supply **1** :

   a. Unplug the power cord connector from the power supply.

      Note: Be careful when you remove the hot-swap power supply; the power supply might be too hot to handle comfortably.

12

⚠

CAUTION:
The following label indicates a hot surface nearby.

♨

   b. Remove the defective power supply by placing the handle **5** on the power supply in the open position (perpendicular to the power supply) and pulling the power supply from the bay.

3. If you are not replacing the power supply:

   a. Install a power-supply filler panel **2** .

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

   b. Open the cable-restraint bracket **3** and remove the power cord from the cable-restraint bracket. Close the cable-restraint bracket.

   c. Unplug the power cord from the electrical outlet.

   If you are replacing the power supply:

   a. Place the handle **5** on the power supply in the open position, and slide the power supply into the chassis.

   b. Gently close the handle on the power supply to seat the power supply in the bay.

   c. Plug the power cord for the power supply into the power cord connector **4** .

   d. Verify that the AC Power light **6** and DC Power light **7** are lit, indicating that the power supply is operating correctly.

4. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 84.

Replacing a hot-swap fan assembly

Your server comes with three hot-swap fan assemblies.

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

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

The following illustrations show the replacement of a hot-swap fan assembly. Refer to these illustrations while performing the steps in this procedure.
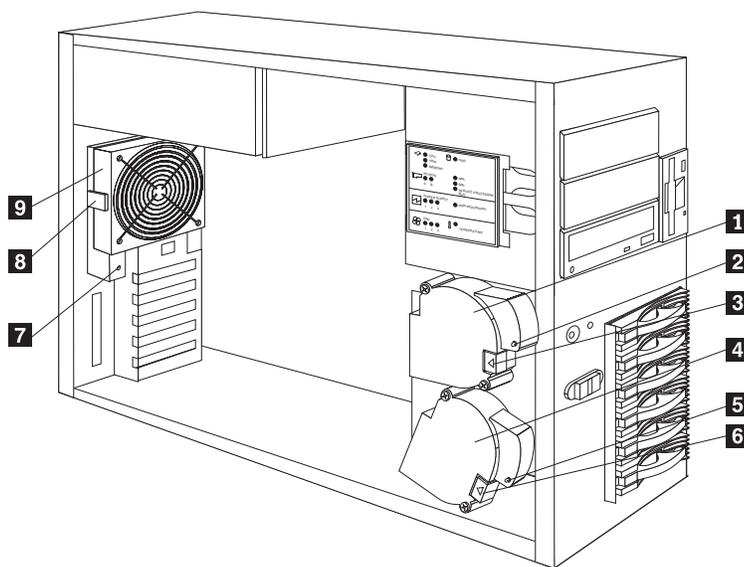
1 Hot-swap fan assembly 1
2 Fan assembly 1 LED
3 Fan 1 release latch
4 Hot-swap fan assembly 2
5 Fan assembly 2 LED
6 Fan 2 release latch
7 Fan Assembly 3 LED
8 Fan 3 release latch
9 Hot-swap fan assembly 3

To replace a hot-swap fan assembly:

1. Remove the cover. See "Removing the left-side cover (tower model)" on page 47 or "Removing the cover (rack model)" on page 48.

   Attention: To ensure proper system cooling, do not remove the top cover for more than 30 minutes during this procedure.

2. Determine which fan assembly (fan 1 **1**, fan 2 **4**, or fan 3 **9** to replace by checking the fan LEDs on the diagnostic LED panel (see "Diagnostic LED panel" on page 153) and the LEDs located on the fan assemblies.

3. Remove the fan assembly from the server by pressing the orange release latch (**3**, **6**, or **8**) for the fan and pulling the fan away from the server.

4. Slide the replacement fan assembly into the server until it clicks into place.

5. Verify that the FAN LED on the diagnostic panel is not lit. If the FAN LED is lit, reseat the fan.

6. Replace the cover. For a tower model, see "Completing the tower model installation" on page 84. For a rack model, see "Completing the rack model installation" on page 87.

Completing the installation

To complete your installation, you must reinstall the cover reconnect all the cables that you disconnected in "Preparing to install options" on page 43, and, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

- If you have a tower model, continue with "Completing the tower model installation."

- If you have a rack model, go to "Completing the rack model installation" on page 87.

Completing the tower model installation

To complete the installation for the tower model:

1. Install the left-side cover, if it was removed.
2. Install the trim bezel, if it was removed.
3. Install the server door, if it was removed.
4. Restart your server.
5. Update device records and reconfigure your server (see "Updating device records and reconfiguring the server" on page 88).

To install the server left-side cover:
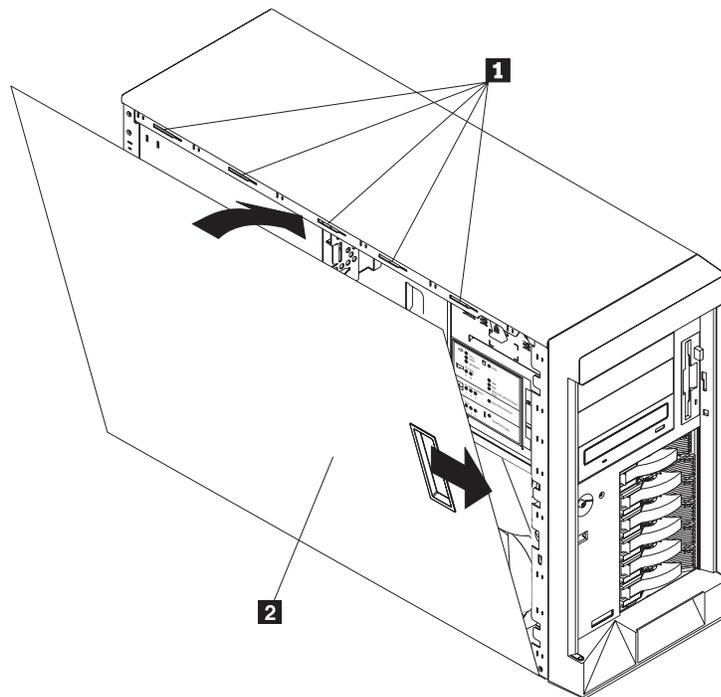
1 Slots
2 Left-side cover

a. Align the left-side cover **2** with the left side of the server, about 25 mm (1 inch) from the front of the server; place the bottom of the left-side cover on the bottom rail of the left-side side of the chassis.

b. Insert the tabs at the top of the cover into the slots **1** at the top of the server side.

    c. Hold the cover against the server and slide the cover toward the front of the server until the cover clicks into place.

To install the trim bezel:
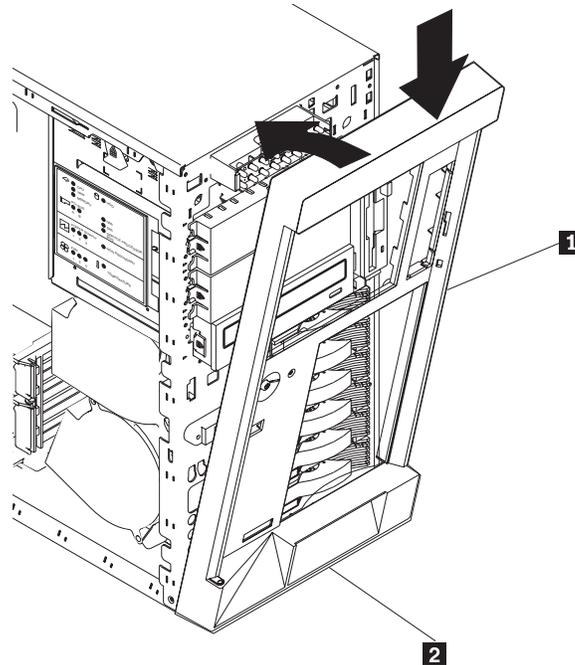
1 Trim bezel
2 Slots (hidden by bezel)

a. Place the tabs at the bottom edge of the trim bezel **1** in the slots **2** at the bottom front of the server.

b. Press the top of the bezel toward the server until the bezel clicks into place.

To install the server door:
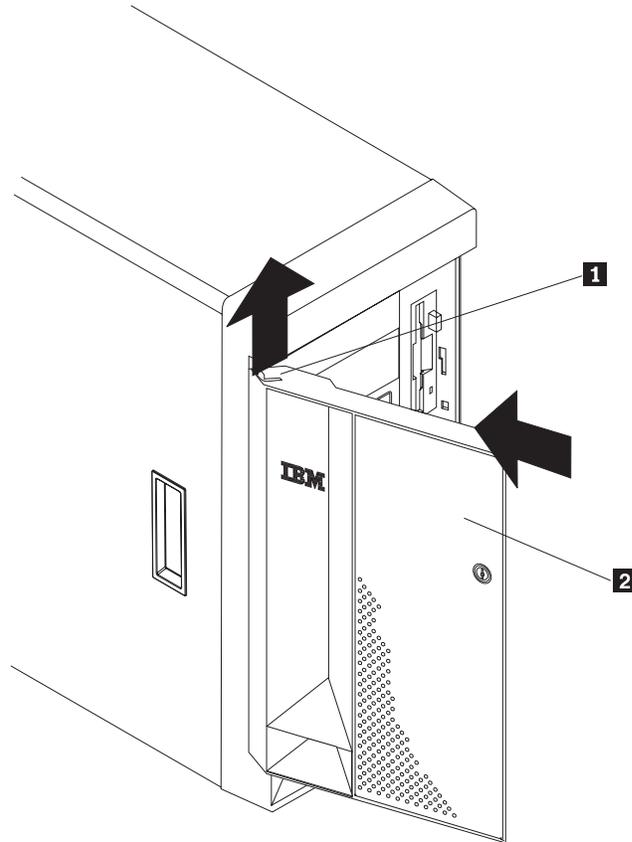
1 Flange
2 Server door

   a. Set the door 2 on the bottom hinge.

   b. Press the flange 1 downward while pressing the top of the door toward
      the server, until the flange connects with the top hinge. Release the flange.

6. Close and lock the server door.

   Attention: Be sure to maintain a clearance of at least 127 mm (5 inches) on
   the front and rear of the server to allow for air circulation.

7. If you disconnected any cables from the back of the server, reconnect the
   cables; then, plug the power cords into properly grounded electrical outlets.

   Note: If necessary, see "Input/output connectors and expansion slots" on
            page 11 for connector locations.

Completing the rack model installation

To complete the installation for the rack model:

1. Install the top cover, if it was removed.
2. Install the trim bezel, if it was removed.
3. Restart your server.
4. Update device records and reconfigure your server (see "Updating device records and reconfiguring the server" on page 88).

To install the server top cover:
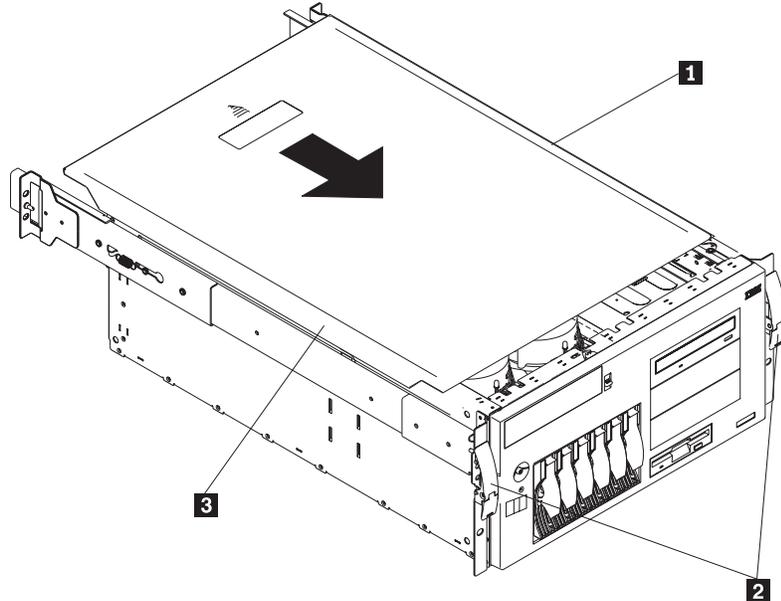
1 Top cover
2 Side latches
3 Flanges

a. Align the top cover 1 with the top of the server, about 25 mm (1 inch) from the front of the server; the flanges on the left and right sides of the cover should be on the outside of the server chassis.

b. Hold the cover against the server and slide the cover toward the front of the server until the cover clicks into place.

To install the trim bezel:
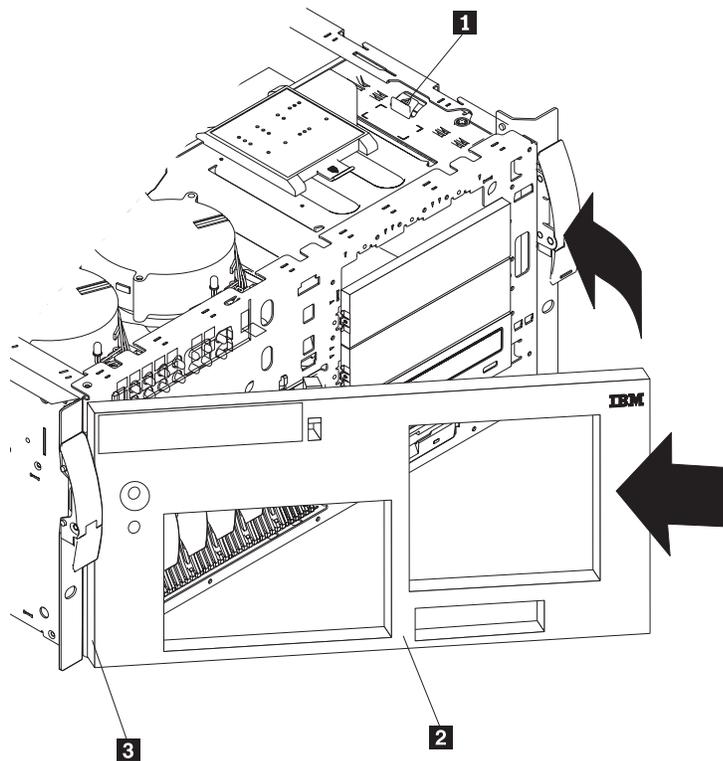
1 Bezel-release lever
2 Trim bezel
3 Slots (hidden by bezel)

a. Place the tabs on the left side of the trim bezel in the slots 3 at the left front of the server.

b. Press the right end of the bezel toward the server until the bezel clicks into place.

5. If you disconnected any cables from the back of the server, reconnect the cables; then, plug the power cords into properly grounded electrical outlets.

> **Note:** If necessary, see "Input/output connectors and expansion slots" on page 11 for connector locations.

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 more than one microprocessor installed, you might want to upgrade your operating system. Refer to "ServerGuide and Netfinity Manager Information" section of this *Server Library*. If you have installed or removed hard disk drives and your server has a RAID adapter installed, refer to the documentation provided with your RAID adapter for information about reconfiguring your disk arrays.

Run the Configuration/Setup Utility program to save the new configuration information. See Chapter 3, "Configuring your server."

Record your updated device and configuration information in the appropriate tables in "Installed device records" on page 164.

Connecting external options

> ┌─ **Before you begin:** ─
>
> - Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.
>
> - Read the documentation that comes with your options.

Connecting external SCSI devices

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

Cabling requirements

The SCSI controller in your server has one channel that can be used to attach external devices. This channel is connected to the SCSI connector on the back of the server and supports 14 unique SCSI IDs. To select and order the correct cables for use with external devices, contact your IBM reseller or IBM marketing representative.

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. The SCSI controller uses one of the SCSI IDs; the default SCSI ID for the SCSI controller is 7. See "SCSI IDs" on page 68 and refer to the instructions that come with the SCSI devices for more information about setting a SCSI ID.

Installation procedure

To attach an external device:

1. Turn off the server and all attached devices.

2. Follow the instructions that come with the option to prepare it for installation and to connect it to the server.

Input/output ports and connectors

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

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

See the illustration in "Input/output connectors and expansion slots" on page 11 for the locations of the connectors.

Serial ports

Your server comes with two serial ports. (See "Input/output connectors and expansion slots" on page 11 for the locations of the connectors.) These ports are used to communicate with printers, plotters, external modems, scanners, and auxiliary terminals. These ports also enable you to transfer data between computers.

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

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

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

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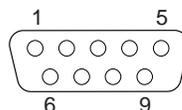
The following table shows the pin-number assignments for the serial-port connectors.

Table 1. Serial port pin-number assignments			
Pin	**Signal**	**Pin**	**Signal**
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

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

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

Management port C

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

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

Parallel port

The parallel port usually is used to communicate with printers, and transfers data one byte at a time. The parallel port has a 25-pin, female D-shell connector on the back of your server. It support three standard IEEE 1284 modes of operation: Standard Parallel Port (SPP), Enhanced Parallel Port (EPP), and Extended Capability Port (ECP). (See "Input/output connectors and expansion slots" on page 11 for the location of the connector.)
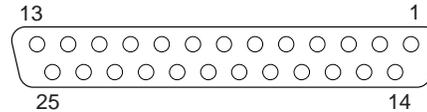
The following table shows the pin-number assignments for the parallel-port connector.

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

When you turn on your server, the POST routine assigns the parallel port a specific port address. You can change the parallel-port assignment by using the Configuration/Setup Utility program. See "Devices and I/O Ports" on page 21.

Video port

The system board in your server has one SVGA video port. This port is used to attach a video monitor. The video port has a 15-pin analog connector on the back of the server. (See "Input/output connectors and expansion slots" on page 11 for the location of the connector.)
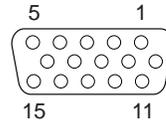
The following table shows the pin-number assignments for the video connector.

Table 3. Video port pin-number assignments	
Pin	**Signal**
1	Red
2	Green or monochrome
3	Blue
4	Monitor ID bit 2
5	Ground
6	Ground
7	Ground
8	Ground
9	+5 V dc
10	Ground
11	Monitor ID bit 0
12	DDC SDA
13	Horizontal synchronization (Hsync)
14	Vertical synchronization (Vsync)
15	DDC SCL

Keyboard port

The system board has one keyboard port. (See "Input/output connectors and expansion slots" on page 11 for the location of the connector.)
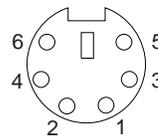
The following table shows the pin-number assignments for the connector used by the keyboard port.

Table 4. Keyboard port pin-number assignments	
Pin	**Signal**
1	Keyboard data
2	Mouse data
3	Ground
4	+5 V dc
5	Keyboard clock
6	Mouse clock

Auxiliary-device (pointing device) port

The system board has one auxiliary-device port that supports a mouse or other pointing device. (See "Input/output connectors and expansion slots" on page 11 for the location of the connector.)
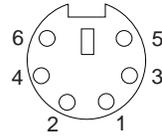
The following table shows the pin-number assignments for the connector used by the auxiliary-device port.

Table 5. Auxiliary-device port pin-number assignments	
Pin	**Signal**
1	Data
2	Not connected
3	Ground
4	+5 V dc
5	Clock
6	Not connected

SCSI ports

Your server comes with a LVD SCSI controller on the system board, which provides two independent SCSI channels. A 16-bit (wide) SCSI cable connects the hot-swap backplane to one channel of the integrated LVD SCSI controller. Another SCSI cable connects the other channel of the controller to the SCSI connector on the rear of the server.

To attach an external SCSI device to your server, connect an external SCSI cable from the SCSI device to the SCSI connector on the back of the server. Ensure that the last device on the external SCSI cable is terminated.

Table 6 shows the pin-number assignments for the 68-pin SCSI connectors.

Table 6. 68-pin SCSI port connector pin-number assignments

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

Ethernet port

The system board in your Netfinity 5600 server contains an Ethernet *controller*. The controller has an external RJ-45 connector on the rear of the server that is used with a category 3, 4, or 5 unshielded twisted-pair (UTP) cable. The connector enables an Ethernet network to attach to the internal transceiver in your server.

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

See "Configuring the Ethernet controller" on page 34 for additional information about the Ethernet controller.

Table 7 shows the pin-number assignments for the RJ-45 connector. These assignments apply to both 10BASE-T and 100BASE-TX devices.
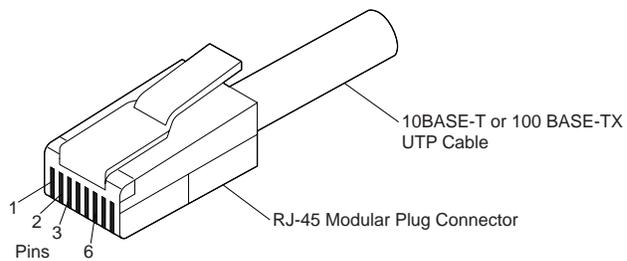
Table 7. Ethernet port pin-number assignments

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

Universal serial bus ports

The system board in your Netfinity 5600 server contains two universal serial bus (USB) ports. Each USB port has an external connector on the rear of 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 technology to determine what device is attached to the connector. Each USB device is accessed by a unique *USB address*. A device called a hub is used to convert the USB port into multiple attachment points. A hub has multiple ports where peripherals can be attached. USB provides 12 megabits-per-second (Mbps) bandwidth with a maximum of 63 peripherals and a maximum signal distance of five meters (16 ft.) per segment.

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

Table 8 shows the pin-number assignments for the USB connectors.

Table 8. USB port pin-number assignments	
Pin	**Signal**
1	VCC
2	–Data
3	+Data
4	Ground

Connecting external options

Chapter 5. Installing a server in a rack enclosure

This chapter provides instructions for installing a server in a rack.

This chapter contains:

Your server comes with all the rack installation hardware (rack model only).
Review the preinstallation information in "Preparing to install the server in a rack
enclosure"; then, continue with "Installing the rack model in a rack enclosure."

10

CAUTION:
**Do not place any object weighing more than 82 kg (180 lbs.) on top of
rack-mounted devices.**

>**82 kg (180 lbs)**

Installing the rack model in a rack enclosure

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

- Preparing the rack enclosure
- Installing the server into the rack enclosure

Preparing to install the server in a rack enclosure

You will need the following items:

- One rack mounting kit
  - Two slide-rail assemblies
  - One cable-management arm, including hitch pins
  - One bag of screws and nuts
  - Hook and loop fastener strips
  - One installation template
  - One packet of tie wraps
  - Two wheel-shaped knobs
- Flat-blade screwdriver
- The documentation that comes with the rack

Preparing the rack enclosure

To attach the mounting hardware to the rack enclosure:

1. Mark the positions of the slide brackets and the cable management arm on the mounting rails of the rack enclosure.

    a. Position the template on the front mounting rail, aligning the holes.

    b. Mark the holes for the slide bracket cage nuts, using the dots supplied with the template. Also mark the holes for the chassis bracket cage nuts.

    c. Move the template to the rear mounting rails. Mark the locations for the slide bracket cage nuts and the cable-management-arm mounting bracket.

    Note: You must align the slide brackets correctly or the installation cannot be completed.

2. Install the cage nuts or clip nuts, as required for your rack enclosure, in the marked positions.
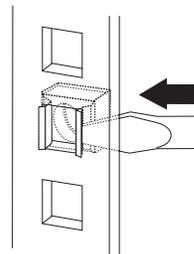
3. Attach the slide rails to the rack.

    a. Insert the left slide-rail rear bracket pin into the hole between the two cage nuts for the slide rail at the rear of the rack. The two holes in the rear bracket line up with the cage nuts.

    b. Pull the slide-rail front bracket to the front of the rack; insert the front bracket pin into the hole above the cage nuts for the slide rail. The two holes in the front bracket line up with the cage nuts.

    c. Do the same for the other slide rail.
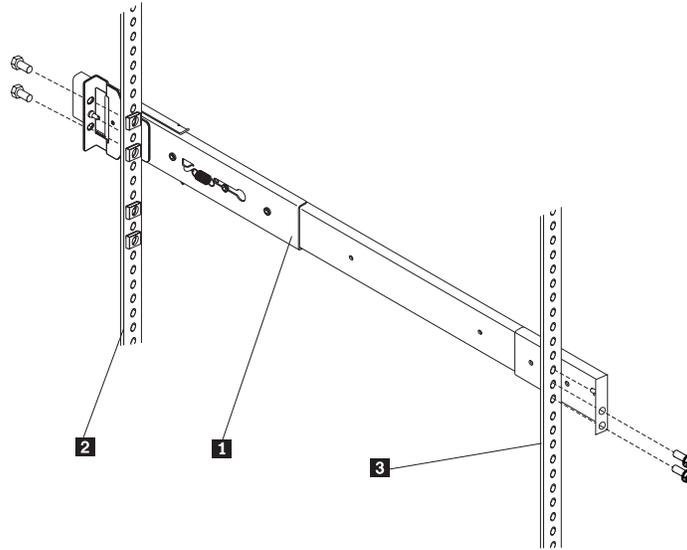
1	Left slide rail
2	Left rear
3	Left front

    d. From the outside of the rack enclosure, insert two M6 by 16-mm screws through each slide-rail bracket and cage nut; then, tighten the screws.

4. Attach the cable-management arm to the left rear of the rack enclosure.

    a. Align the cable-management-arm mounting bracket with the cage nuts on the rear mounting rail.

b. Insert two M6 by 16-mm screws to secure the mounting bracket to the rack.
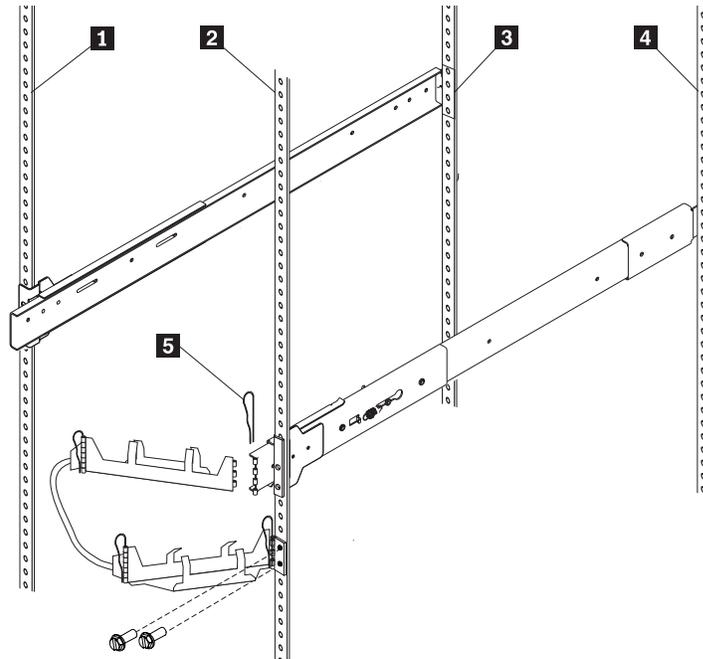
1	Right rear
2	Left rear
3	Right front
4	Left front
5	Hitch pin

c. Attach the free end of the cable-management arm to the rear of the left slide rail, using a hitch pin 5 .

Installing the server

To install the server in the rack enclosure:

1. Mount the server on the slide rails.

   a. Extend the slide rails fully from the rack until the slide rails lock.

   b. Rest the wheel-shaped knobs **1** on the slide rails at a point close to the rack.

   c. Lower the front of the server until the bottom notch in each chassis bracket fits into the top notch in the slide rail end.
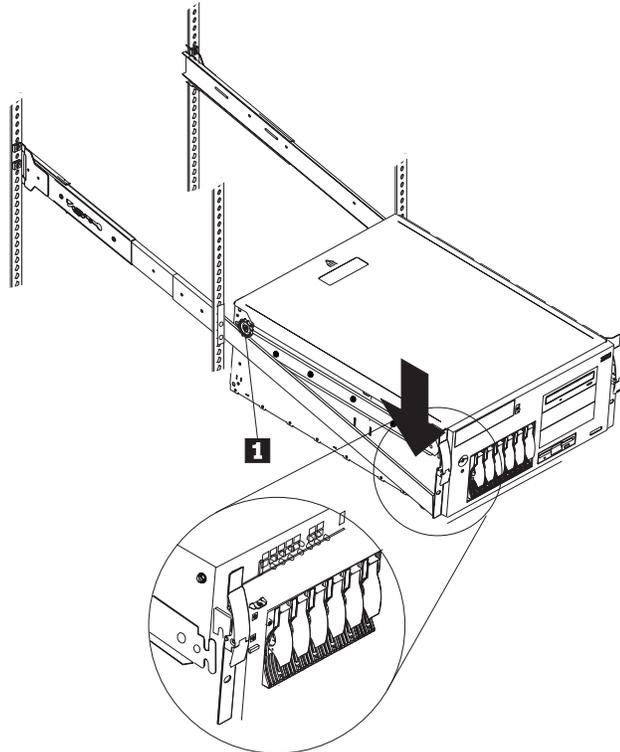
Slide the server backward or forward as necessary until the notches meet.

d. Attach the rails to the sides of the server with M4 by 5-mm screws.
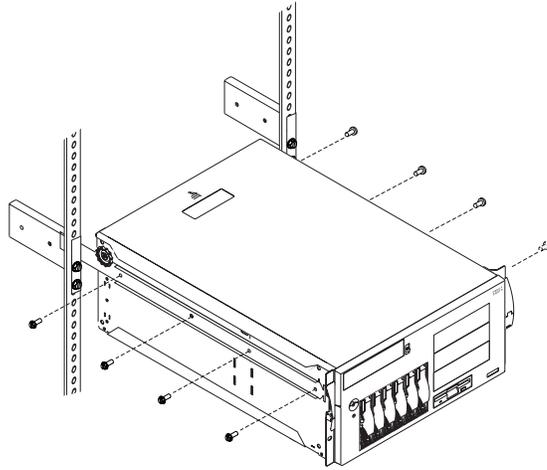
2. Remove the wheel-shaped knobs from the server. Store the knobs in a safe place to use if you need to remove the server from the rack at a later time.

3. Press the safety latches on the slide rails **1** and slide the server about halfway into the rack enclosure.

   Note: When the server is fully extended, safety latches on the slide rails lock into place. This prevents the server from being accidentally pulled out too far and dropped. To release the safety latch, press in.
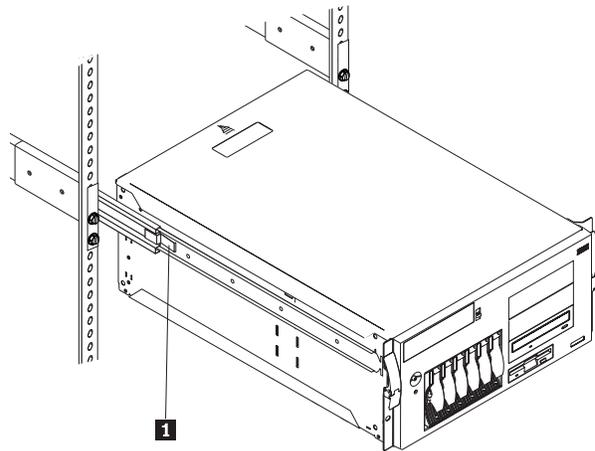
4. Attach the cables to the server.

   a. Attach all cables to the corresponding connectors on the server. Refer to the "Express Setup and Installation" section of this *Server Library* for instructions.

   b. Route the power cords, mouse cable, and keyboard cable through the cable-restraint bracket.

   c. Route all cables through the cable-management arm, attaching the cables to the arm with the hook and loop fastener strips provided. The wraps are provided for additional cable management.
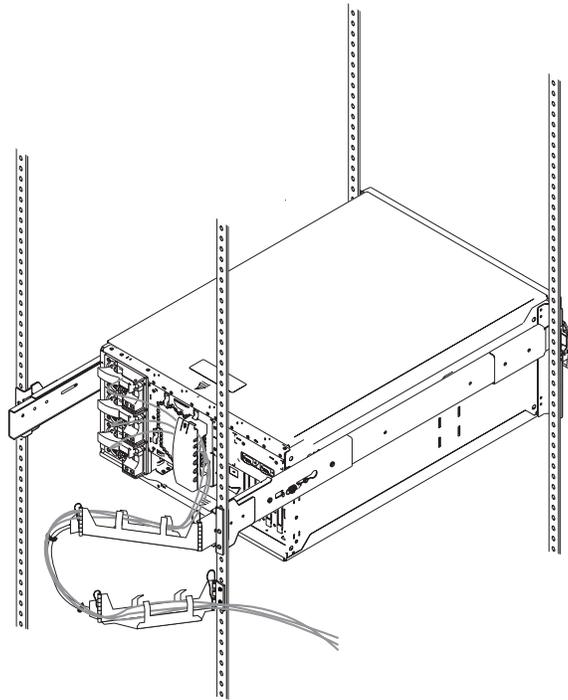
5. Secure the server in the rack enclosure.

   a. Slide the server into the rack enclosure until the slide latches on the front chassis brackets click into place.

   b. Using a screwdriver, tighten the screws that hold the rear of the slide rails to the rear of the rack.

c. Release the server and pull the server forward about half-way.

Note: To release the server, release the left and right slide latches and pull the server forward.
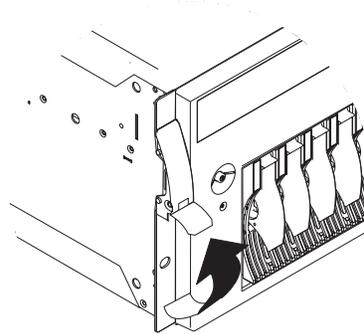
d. Using a screwdriver, tighten the screws that hold the front of the slide rails to the front of the rack.

e. Slide the server into the rack enclosure again until the slide latches on the front chassis brackets click into place.

6. (Optional) For additional security, such as when transporting the rack, fasten the server to the rack enclosure by inserting a M6 by 16-mm screw through the chassis bracket, mounting rail, and cage nut on each side.
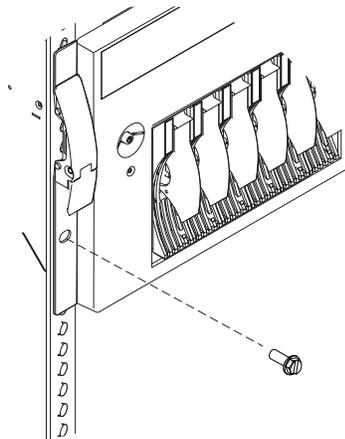
7. To complete the installation, refer to the documentation that comes with the rack enclosure.

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.

Diagnostic tools overview

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

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

Diagnostic programs

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

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

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

Power-on self-test (POST)

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

POST does the following:

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

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

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

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

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

POST beep codes

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

- One beep indicates the successful completion of POST.

- More than one beep indicates that POST detected a problem. For more information, see "Power-on self test (POST) beep codes" on page 122.

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 112.

Diagnostic error messages

Diagnostic error messages occur when a test finds a problem with the server hardware. These error messages are alphanumeric and they are saved in the Test Log. For more information, see "Diagnostic error message tables" on page 125.

Software-generated error messages

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

Troubleshooting charts

The charts under "Troubleshooting charts" on page 143 list symptoms of problems (for example, a symptom might be "The mouse or pointing device does not work."), along with steps to correct the problems.

System error log

The system error log contains all error and warning messages issued during POST and all system status messages from the Netfinity Advanced System Management Processor. See "System Event/Error Log" on page 28 for information about how to view the system error log.

Option diskettes

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

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

Diagnostic programs

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

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

Running diagnostic programs

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

> **Important**
>
> If you run the diagnostic programs with either no mouse or a USB mouse attached to your server, you will not be able to navigate between test categories using the **Next Cat** and **Prev Cat** buttons. All other functions provided by mouse-selectable buttons are also available using the function keys.
>
> You can test the USB keyboard using the regular keyboard test. The regular mouse test cannot test a USB mouse. Also, you can run the USB hub test only if there are no USB devices attached.

Notes:

1. To run the diagnostic programs, you must start the server with the highest level password that is set. That is, if an administrator password is set, you must enter the administrator password, not the power-on password, to run the diagnostic programs.

2. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem persists, have the system serviced.

3. If the diagnostic tests do not find a problem but the problem persists during normal operations, see "Troubleshooting" on page 143 and look for the problem symptom.

4. You might have to install a wrap connector on your active parallel, serial, or Ethernet port to obtain accurate test results for these ports. If you do not have a wrap connector, contact your IBM reseller or IBM marketing representative.

5. You might need a scratch diskette (that is, a diskette which has no contents that you want to save) to obtain accurate test results when testing the diskette drive.

6. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.

To start the diagnostic programs:

1. Turn on the server and watch the screen.

   If the server is turned on already, shut down your operating system and restart the server.

2. When the message F2 for Diagnostics appears, press F2.

   If a power-on password or administrator password is set, the server prompts you for it. Type in the appropriate password; then, press **Enter.**

3. The Diagnostics Programs screen appears.

4. Select either **Extended** or **Basic** from the top of the screen.

5. Select the test you want to run from the list that appears; then, follow the instructions on the screen.

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

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

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

Viewing the test log

If you are already running the diagnostic programs, continue with step 4 on page 112 in this procedure.

Notes:

1. The test log will not contain any information until after the diagnostic program has run.

2. The test log is maintained in memory while the server is powered on. Turning off the power clears the test log.

To view the Test Log:

1. Turn on the server and watch the screen.

   If the server is turned on already, shut down your operating system and restart the server.

2. When the message F2 for Diagnostics appears, press F2.

   If a power-on password or administrator password is set, the server prompts you for it. Type in the appropriate password; then, press Enter.

3. The Diagnostic Programs screen appears.

4. Select **Utility** from the top of the screen.

5. Select **View Test Log** from the list that appears; then, follow instructions on the screen.

Power-on self-test (POST) messages

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

Notes:

1. The actions for some of the messages require you to run the Configuration/Setup Utility program. For information about using these programs, see "Using the Configuration/Setup Utility main menu" on page 20.

2. If a password prompt appears with a POST message, type the administrator or power-on password; then, press Enter.

POST message table

POST message	Description
062	The server failed to boot on three consecutive attempts.
	All caches are disabled. This can be caused by repeatedly turning the server on and then off or resetting the server.
	Action: Start the Configuration/Setup Utility program and verify that all settings are correct. (See Chapter 3, "Configuring your server.") Use the **Cache Control** selection in the Advanced Setup menu of the Configuration/Setup Utility program to enable the caches. (See "Advanced Setup" on page 26.)
	If the problem persists, have the system serviced. When the problem is corrected, make sure to enable the caches.
101 102	An error occurred during the system board and microprocessor test.
	Action: Have the system serviced.
106	An error occurred during the system board and microprocessor test.
	Action: Have the system serviced.
114	An adapter read-only memory (ROM) error occurred.
	Action: Remove the options. If you can start the server without the options installed, reinstall each option one at a time and retest after each is reinstalled. When an option fails, replace it.
	If you cannot isolate and correct the problem, have the system serviced.

POST message	Description

129	An error was detected in the L1 cache of one of the microprocessors.
	
	Action:
	
	1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly.
	2. If the problem persists, check to see if the system has isolated the problem to a microprocessor:
	   • If the System Error light on the operator information panel is on, check to see if the CPU LED on the diagnostic LED panel is on. If it is on, check the Microprocessor Error LEDs next to the microprocessor sockets on the processor board (see "Processor board component locations" on page 175).
	     – If a Microprocessor LED is on, run the diagnostic program for the microprocessor indicated by the LED. If the tests fail, replace the indicated microprocessor.
	     – If the microprocessor tests do not fail, have the system serviced.
	   • If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information about the microprocessor error.
	
	If the problem persists, have the system serviced.

151	A real-time clock (RTC) error occurred. **Action:** Have the system serviced.
161	The real-time clock battery has failed. **Action:** Have the system serviced or replace the battery yourself. For additional information, see "Replacing the battery" on page 159 and "Lithium battery notice" on page ix **before** you attempt to change the battery. 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.
162	A change in device configuration occurred. This error occurs under one or more of the following conditions: • 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. **Action:** Verify that all external devices are turned on. You must turn on external devices before turning on the server. 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.
163	The time of day has not been set. **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. The server can be used until the system is serviced, but any application programs that use the date and time will be affected.

POST message	Description
164	A change in the memory configuration occurred. This message might appear after you add or remove memory.
	Note: The server can be used with decreased memory capacity.
	Action:
	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 20.
	If the message appears again, shutdown the server, reseat the memory modules, and restart the server.
	3. If the problem persists, check to see if the system has isolated the problem to a memory module:
	• If the System Error light on the operator information panel is on, check to see if the MEM LED on the diagnostic LED panel is on. If it is on, check the DIMM Error LEDs next to the memory sockets on the processor board (see "Processor board component locations" on page 175). If a DIMM Error LED is on, run the diagnostic program for the memory.
	– If the tests fail, replace the DIMM. If the problem persists after you replace the DIMM, have the system serviced.
	– If the memory tests do not fail, have the system serviced.
	• If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the memory error.
	If the problem persists, have the system serviced.
175	A vital product data (VPD) error occurred.
	Action: Have the system serviced.
176 177 178	A security hardware error occurred.
	Action: Check for indications that someone has tampered with the server. If no one has tampered with the server, have the system serviced.
184	The power-on password information stored in your server has been removed.
	Action: From the Configuration/Setup Utility program main menu, select **System Security.** Then, follow the instructions on the screen. For information about using the Configuration/Setup Utility program, see "Using the Configuration/Setup Utility main menu" on page 20.
	If this information cannot be restored, have the system serviced.
185	A power failure damaged the stored information about the drive-startup sequence.
	Action: From the Configuration/Setup Utility program main menu, select **Start Options**; then, follow the instructions on the screen. For information about using the Configuration/Setup Utility program, see "Using the Configuration/Setup Utility main menu" on page 20.
	If this information cannot be restored, have the system serviced.
186	A system board or hardware error occurred.
	Action: Have the system serviced.
187	The VPD serial number is not set.
	Action: The system serial number is set in the VPD EEPROM at the time of manufacturing. If the system board has been replaced, the system serial number will be invalid and should be set. From the main menu of the Configuration/Setup Utility program, select **System Information**, then select **Product Data**. If the problem persists, have the system serviced.
188	A vital product data (VPD) error occurred.
	Action: Have the system serviced.
189	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.

POST message	Description

201	An error occurred during the memory controller test. This error can be caused by:
	
	• Incorrectly installed memory
	• A failing memory module
	• A processor-board problem
	• A system board problem
	
	Action:
	
	1. If you just installed memory, see "Installing memory-module kits" on page 64 to verify that the new memory is correct for your server. Verify that the memory modules are installed and seated correctly.
	2. If the problem persists, check to see if the system has isolated the problem to a memory module:
	  • If the System Error light on the operator information panel is on, check to see if the MEM LED on the diagnostic LED panel is on. If it is on, check the DIMM Error LEDs next to the memory sockets on the processor board (see "Processor board component locations" on page 175). If a DIMM Error LED is on, run the diagnostic program for the memory.
	  • If the tests fail, replace the DIMM. If the problem persists after you replace the DIMM, have the system serviced.
	  • If the memory tests do not fail, have the system serviced.
	3. If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the memory error.
	
	If the problem persists, have the system serviced.

229	An error was detected in the L2 cache of one of the microprocessors.
	
	Action:
	
	1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly.
	2. If the problem persists, check to see if the system has isolated the problem to a microprocessor:
	  • If the System Error light on the operator information panel is on, check to see if the CPU LED on the diagnostic LED panel is on. If it is on, check the Microprocessor Error LEDs next to the microprocessor sockets on the processor board (see "Processor board component locations" on page 175).
	    – If a Microprocessor LED is on, run the diagnostic program for the microprocessor indicated by the LED. (If the Secondary Microprocessor Error LED is on, run the "Alt CPU" diagnostic program.) If the tests fail, replace the microprocessor.
	    – If the microprocessor tests do not fail, have the system serviced.
	  • If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the microprocessor error.
	
	If the problem persists, have the system serviced.

289	An error occurred during POST memory tests and a failing DIMM was disabled. **Note:** The server can be used with decreased memory. **Action:** 1. If you just installed memory, see "Installing memory-module kits" on page 64 to verify that the new memory is correct for your server. Verify that the memory modules are installed and seated correctly. Start the Configuration/Setup Utility program (see Chapter 3, "Configuring your server"). In the Advanced Setup menu, select **Memory Settings** and enable the DIMM. (See "Advanced Setup" on page 26.) 2. If the problem persists, replace the failing DIMM. If the problem persists, have the system serviced.

POST message	Description
301 303	An error occurred during the keyboard and keyboard controller test. These error messages also might be accompanied by continuous beeping. **Action:** Ensure that: 1. Nothing is resting on the keyboard and pressing a key. 2. No key is stuck. 3. The keyboard cable is connected correctly to the keyboard and to the correct connector on the server. Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, have the keyboard, cable, and system serviced. **Note:** If you have just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds, and then, turn on the server. If the error message goes away, replace the device.
602	Invalid diskette boot record **Action:** 1. Replace the diskette. 2. If the problem persists, make sure that the diskette drive cables are correctly and securely connected. 3. If the problem persists, replace the diskette drive. If the problem persists, have the system serviced.
604	An error occurred during a diskette drive test. **Action:** 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.
662	A diskette drive configuration error occurred. **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 20. If the problem persists, have the system serviced.
962	A parallel port configuration error occurred. **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 20. If the problem persists, have the system serviced.
11*xx*	An error occurred during the system-board serial port test. **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: 1. Turn off the server. 2. Disconnect the serial cable from the serial port. 3. Wait five seconds; then, turn on the server. 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. If the POST error message reappears, have the system serviced.

POST message	Description
1162	The serial port configuration conflicts with another device in the system. **Action:** 1. Make sure the IRQ and I/O port assignments needed by the serial port are available. (See Chapter 3, "Configuring your server.") 2. If all interrupts are being used by adapters, you might need to remove an adapter to make an interrupt available to the serial port, or force other adapters to share an interrupt. For information about removing adapters, see "Working with adapters" on page 52. For information about setting interrupts, see Chapter 3, "Configuring your server."
1301	Cable to Information LED panel not detected. **Action:** Make sure that the cable to the operator information panel is connected. If the problem persists, have the system serviced.
1302	Cable to Power and Reset pushbuttons not detected. **Action:** Make sure that the cable to the Power and Reset pushbuttons is connected. If the problem persists, have the system serviced.
1303	I2C cable to Power Backplane not detected. **Action:** Make sure that the cable to the power backplane is connected. If the problem persists, have the system serviced.
1304	Cable to Diagnostic LED panel not detected. **Action:** Make sure that the cable to the diagnostic LED panel is connected. If the problem persists, have the system serviced.
1600	The Netfinity Advanced System Management Processor is not functioning. **Action:** 1. If a jumper is installed on pins 7 and 8 of jumper block J20 of the system board, remove it or move it to pins 8 and 9. 2. Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server. If the problem persists, have the system serviced.
1601	The Netfinity Advanced System Management Processor BIOS needs to be updated. **Action:** 1. Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server. 2. If the problem persists, update the Netfinity Advanced System Management Processor BIOS. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates. If the problem persists, have the system serviced.
1800	A PCI adapter has requested a hardware interrupt that is not available. **Action:** 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 "PCI Slot/Device Information" on page 27. 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 52. For information about setting interrupts, see "PCI Slot/Device Information" on page 27.

POST messages

POST message	Description
1962	No valid startup devices were found. The system cannot find the startup drive or operating system.
	Action: Be sure that the drive you want to start from is in the startup sequence.
	1. Select **Start Options** from the Configuration/Setup Utility program main menu. If you are unable to set the startup sequence, have the system serviced. 2. Check the list of startup devices in the **Startup device** data fields. Is the drive you want to start from in the startup sequence?
	Yes Exit from this screen; then select **Exit Setup** to exit the Configuration/Setup menu. Go to step 3.
	No Follow the instructions on the screen to add the drive; then save the changes and exit the Configuration/Setup menu. Restart the server.
	3. Is an operating system installed?
	Yes Turn off the server. Go to step 4.
	No Install the operating system in your server; follow your operating system instructions to shut down and restart the server.
	4. During server startup, watch for messages indicating a hardware problem.
	If the same error message appears, have the system serviced.
2400	An error occurred during the testing of the video controller on the system board. This error can be caused by a failing monitor, a failing system board, or a failing video adapter (if one is installed).
	Action: Verify that the monitor is connected correctly to the video connector. If the monitor is connected correctly, have the system serviced.
2462	A video memory configuration error occurred.
	Action: Make sure that the monitor cables are correctly and securely connected to the server.
	If the problem persists, have the system serviced.
5962	An IDE CD-ROM configuration error occurred.
	Action: Check the signal and power cable connections to the CD-ROM drive. See "System board component locations" on page 173 for the locations of the cable connectors on the system board.
	If the problem persists, have the system serviced.
8603	An error occurred during the mouse (pointing device) and mouse (pointing device) controller test. This error can be caused by the addition or removal of a mouse, or by a failing system board.
	Note: This error also can occur if electrical power was lost for a very brief period and then restored. In this case, turn off the server for at least 5 seconds, and then, turn it back on.
	Action: Ensure that the keyboard and mouse (pointing device) are attached to the correct connectors. If they are connected correctly, use the following procedure:
	1. Turn off the server. 2. Disconnect the mouse from the server. 3. Turn on the server.
	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.
	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.
00012000	Processor machine check.
	Action:
	1. Update the system BIOS. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates. 2. If the problem persists, replace the microprocessor.

POST message	Description
00019501	Processor 1 is not functioning.
	Action: Replace microprocessor 1. (The Microprocessor 1 Error LED on the processor board will be on. See "Processor board component locations" on page 175 for the location of the LED.)
	If the problem persists, have the system serviced.
00019502	Processor 2 is not functioning.
	Action: Replace microprocessor 2. (The Microprocessor 2 Error LED on the processor board will be on. See "Processor board component locations" on page 175 for the location of the LED.)
	If the problem persists, have the system serviced.
00019701	Processor 1 failed the built-in self test.
	Action: Replace microprocessor 1. (The Microprocessor 1 Error LED on the processor board will be on. See "Processor board component locations" on page 175 for the location of the LED.)
	If the problem persists, have the system serviced.
00019702	Processor 2 failed the built-in self-test.
	Action: Replace microprocessor 2. (The Microprocessor 2 Error LED on the processor board will be on. See "Processor board component locations" on page 175 for the location of the LED.)
	If the problem persists, have the system serviced.
00180100	A PCI adapter has requested memory resources that are not available
	Action:
	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 20.
	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 52. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation provided with the adapter.
00180200	A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective.
	Action:
	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 20.
	2. If the I/O port resource settings are correct, the PCI adapter might be defective. Have the system serviced.
00180300	A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective.
	Action:
	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 20.
	2. If the memory resource settings are correct, the PCI adapter might be defective. Have the system serviced.

POST message	Description
00180400	A PCI adapter has requested a memory address that is not available.
	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 52. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation provided with the adapter.
00180500	A PCI adapter ROM error occurred.
	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.
	If you cannot isolate and correct the problem, have the system serviced.
00180600	A PCI-to-PCI bridge error occurred. More than one PCI bus tried to access memory below 1 MB.
	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.
	If you cannot isolate and correct the problem, have the system serviced.
00180700	*xxxxyyyy* Planar PCI device does not respond.
	where *xxxx* is the PCI vendor ID and *yyyy* is the PCI device ID.
	Action: Have the system serviced.
00180800	An unsupported PCI device is installed.
	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.
	If the problem persists, have the system serviced.
00181000	PCI error.
	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.
	If the problem persists, have the system serviced.
01295085	The ECC checking hardware test failed.
	Action: Have the system serviced.
01298001	No update data is available for processor 1.
	Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates.
01298002	No update data is available for processor 2.
	Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates.
01298101	The update data for processor 1 is incorrect.
	Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates.
01298102	The update data for processor 2 is incorrect.
	Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates.
01298200	Microprocessor speed mismatch
	Action: The microprocessors installed do not run at the same speed; install microprocessors with identical speeds.

POST message	Description
I9990301	A hard disk drive error occurred.
	Action: Have the system serviced.
I9990305	POST could not find an operating system.
	Action: Install an operating system. If you have already installed the operating system, check the drive startup sequence (see "Start Options" on page 26). If the drive sequence is correct, run the diagnostic tests to verify that the hard disk drive is functioning correctly. If there is a problem with the hard disk drive (such as a bad sector), you might have to reinstall the operating system.
	If you cannot reinstall the operating system, have the system serviced.
I9990650	AC power has been restored.
	Action: No action is required. This message appears each time AC power is restored to the server after an AC power loss.
Other Numbers	POST found an error.
	Action: Follow the instructions on the screen.

Power-on self test (POST) beep codes

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

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

POST beep code descriptions

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

No beeps

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

Continuous beep

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

Note: If the server has only one microprocessor installed, that microprocessor is installed in microprocessor connector U5 and is the startup (boot) processor. If two microprocessors are installed, the microprocessor installed in U6 is the startup processor and the microprocessor installed in U5 is the application processor.

One short beep

If one beep occurs after your server successfully completes POST (that is, after the System POST Complete (OK) light on the operator information 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 112 for explanations of any POST error messages.

Three short beeps

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

Repeating short beeps

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

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

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

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

One long and one short beep

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

One long and two short beeps

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

One long and three short beeps

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

Two long and two short beeps

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

POST beep code table

Beep code	Description
1-1-2	Microprocessor register test has failed.
1-1-3	CMOS write/read test has failed.
1-1-4	BIOS ROM checksum has failed.
1-2-1	Programmable Interval Timer test has failed.
1-2-2	DMA initialization has failed.
1-2-3	DMA page register write/read test has failed.
1-4-3	Interrupt vector loading test has failed.
2-1-1	Secondary DMA register test has failed.
2-1-2	Primary DMA register test has failed.
2-1-3	Primary interrupt mask register test has failed.
2-1-4	Secondary interrupt mask register test has failed.
2-2-1	Interrupt vector loading has failed.
2-2-2	Keyboard controller test has failed.
2-2-3	CMOS power failure and checksum checks have failed.
2-2-4	CMOS configuration information validation has failed.
2-3-2	Screen memory test has failed.
2-3-3	Screen retrace tests have failed.
2-3-4	Search for video ROM has failed.
2-4-1	Screen test indicates the screen is operable.
3-1-1	Timer tick interrupt test has failed.
3-1-2	Interval timer channel 2 test has failed.
3-1-3	RAM test has failed above address hex 0FFFF.
3-1-4	Time-of-Day clock test has failed.
3-2-1	Serial port test has failed.
3-2-2	Parallel port test has failed.
3-2-3	Math Coprocessor test has failed.
3-2-4	Comparison of CMOS memory size against actual has failed.
	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.
3-3-3	No memory has been detected in the system.
	Action: Reseat the memory modules or install a memory module. If the problem persists, have the system serviced.
2-3-1	Screen initialization has failed.
3-3-2	I2C bus has failed.
	Action: Turn off the server and then restart the server. If the problem persists, have the system serviced.

Recovering BIOS

If your BIOS has become corrupted, such as from a power failure during a flash update, you can recover your BIOS using the recovery boot block and a BIOS flash diskette.

Note: You can obtain a BIOS flash diskette from one of the following sources:

- Use the ServerGuide program to make a BIOS flash diskette.

- Download a BIOS flash diskette from the World Wide Web. Go to http://www.pc.ibm.com/support/, select IBM Server Support, and make the selections for your server.

- Contact your IBM service representative.

The flash memory of your server contains a protected area that cannot be overwritten. The recovery boot block is a section of code in this protected area that

enables the server to start up and to read a flash diskette. The flash utility recovers the system BIOS from the BIOS recovery files on the diskette.

To recover the BIOS:

> **Before you begin:**
>
> Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 43); then remove the cover (see "Removing the left-side cover (tower model)" on page 47 or "Removing the cover (rack model)" on page 48).

2. Locate switch block 2 (SW2) on the system board (see "System board component locations" on page 173).

3. Set switch 1 on switch block 2 to ON to enable BIOS recovery mode.

4. Insert the BIOS flash diskette into the diskette drive.

5. Restart the server.

   The Recovery Boot screen will appear. A progress report, `Loading data from diskette xx%`, is displayed. When programming is underway, a further progress report, `Programming block n of 7 yy%`, is displayed. When recovery is complete, `Recovery complete, remove the diskette and return boot block switch to the off position before rebooting..`

6. Remove the flash diskette from the diskette drive.

7. Turn the server off.

8. Set switch 1 on switch block 2 (SW2) to Off to return to normal startup mode.

9. Restart the server. The system should start up normally.

Diagnostic error message tables

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

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

The following pages contain the error codes that you might receive in the diagnostic program detailed test log and summary log when running the diagnostic programs for your Netfinity 5600 server.

The format for the codes is:

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

where:

fff is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.

ttt is the three-digit failure code that indicates the exact test failure that was encountered. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

iii is the three-digit device ID. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

date is the date that the diagnostic test was run and the error recorded.

cc is the check digit that is used to verify the validity of the information.

text message is a message that the diagnostic program generates that indicates the reason for the problem. More information about the text message follows.

Text messages

The text message format is:

```
Function Name: Result (test specific string)
```

where:

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

Result can be one of the following:

Passed This result occurs when the diagnostic test completes without any errors.

Failed This result occurs when the diagnostic test discovers an error.

User Aborted This result occurs when the user ends the diagnostic test before it is complete.

Not Applicable This result occurs when the user specifies a diagnostic test for a device that is not present.

Aborted This result occurs when the test could not proceed because of the system configuration.

Warning This result occurs when a possible problem is reported during the diagnostic test, such as when a device that is to be tested is not installed.

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

Diagnostic error messages

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

Function: core system messages (001)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Processor board, ECC Test
	Action: Have the system serviced.
Failed	System board
	Action: Have the system serviced.

Function: video system messages (005)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Processor and system boards
	Action: Have the system serviced.

Function: serial port messages (011)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Built-in serial port on system board
	Action: Have the system serviced.

Function: parallel port messages (014)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Built-in parallel port on system board
	Action: Have the system serviced.

Function: USB port interface messages (015)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Aborted	Can NOT test USB interface while it is in use
	If you have a USB keyboard or mouse attached to your server, you cannot run the diagnostic program for the USB interface.
	Action: If you want to test the USB interface, turn the server off, disconnect the USB keyboard and mouse, attach a regular keyboard and mouse, turn the server on, and then run the diagnostic program for the USB interface.

Result	Test specific string
Failed	System board
	Action: Have the system serviced.

Function: PCI interface messages (020)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	System board
	Action: Have the system serviced.
Failed	Tab on PCI Hot Swap slot #*n* is bad.
	where *n* is the number of the failing PCI slot.
	Action: Make sure the tab and latch on hot-plug PCI slot *n* 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.

Function: SCSI interface messages (030)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	SCSI adapter in slot *n* failed register/counter/power test
	where *n* is the slot number of the failing adapter.
	Action: Refer to the documentation provided with the adapter.
	If the problem persists, have the system serviced.
Failed	SCSI controller on system board failed register/counter/power test
	Action: Have the system serviced.

Function: RAID messages (035)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Aborted	Test setup error: No ServeRAID adapter found on system board or PCI bus
	Action: Have the system serviced.
Failed	Adapter in slot *n*; adapter/drive configuration error
	where *n* is the slot number of the failing adapter.
	Action:
	1. Run the ServeRAID Configuration Utility program.
	2. If the problem persists, replace the ServeRAID adapter in slot *n*.
	If the problem persists, have the system serviced.

Result	Test specific string
Failed	Adapter in slot *n*; internal error
	where *n* is the slot number of the failing adapter.
	Action:
	1. Run the ServeRAID Configuration Utility program. 2. If the problem persists, replace the ServeRAID adapter in slot *n*.
	If the problem persists, have the system serviced.
Failed	Adapter in slot *n*; memory allocation error
	where *n* is the slot number of the failing adapter.
	Action: Have the system serviced.
Failed	Adapter in slot *n*; PCI configuration error
	where *n* is the slot number of the failing adapter.
	Action: Replace the ServeRAID adapter in slot *n*. If the problem persists, have the system serviced.
Failed	Adapter in slot *n*; POST error
	where *n* is the slot number of the failing adapter.
	Action: Replace the ServeRAID adapter in slot *n*. If the problem persists, have the system serviced.
Failed	Logical drive *m* on adapter in slot *n*
	where *m* is the number of the failing logical drive and *n* is the slot number of the adapter.
	Action:
	1. Run the ServeRAID Configuration Utility program. 2. If the problem persists, replace the ServeRAID adapter in slot *n*.
	If the problem persists, have the system serviced.
Failed	Logical drive on system board adapter
	Action: Run the ServeRAID Configuration Utility program. If the problem persists, have the system serviced.
Failed	On system board; adapter/drive configuration error
	Action: Run the ServeRAID Configuration Utility program. If the problem persists, have the system serviced.
Failed	On system board; internal error
	Action: Run the ServeRAID Configuration Utility program. If the problem persists, have the system serviced.
Failed	On system board; memory allocation error
	Action: Have the system serviced.
Failed	On system board; PCI configuration error
	Action: Have the system serviced.
Failed	On system board; POST error
	Action: Have the system serviced.
Failed	SCSI drive in bay #*n*, SCSI ID *m*
	where *n* is the bay number of the failing drive and *m* is the SCSI ID of the drive.
	Action: Check the cable and power connections on the drive. If the problem persists, have the system serviced.
Failed	SCSI drive on adapter in slot *n*, SCSI ID *m*
	where *n* is the slot number of the adapter and *m* is the SCSI ID of the drive.
	Action: Check the cable and power connections on the drive. If the problem persists, have the system serviced.

Function: power supply messages (075)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Voltage sensed by the system is out of range **Action:** Have the system serviced.

Function: microprocessor error messages (089)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Invalid microprocessor in socket id *xyz* or BIOS setup problem where *xyz* identifies the microprocessor causing the error message. **Action:** 1. Check the system error log for related error messages. 2. If your server does not have the latest level of BIOS installed, update the BIOS to the latest level. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates. 3. If the problem persists, replace the indicated microprocessor and run the microprocessor diagnostic program again. If the problem persists, have the system serviced.
Failed	Microprocessor in socket id *xyz* where *xyz* identifies the microprocessor causing the error message. **Note:** The Microprocessor Error LED associated with the microprocessor identified will be on. See "Processor board component locations" on page 175 for the location of the Microprocessor LEDs. **Action:** 1. Reseat the microprocessor. 2. If the problem persists, replace the identified microprocessor. If the problem persists, have the system serviced.
Failed	Processor in socket id *xyz* is defective where *xyz* identifies the microprocessor that is causing the error message. **Action:** Replace the microprocessor. If the problem persists, have the system serviced.
Failed	Processor in socket id *xyz* is installed but not functioning where *xyz* identifies the microprocessor causing the error message. **Action:** 1. Check the system error log for related error messages. 2. If your server does not have the latest level of BIOS installed, update the BIOS to the latest level. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates. 3. If the problem persists, replace the microprocessor indicated and run the microprocessor diagnostic program again. If the problem persists, have the system serviced.

Result	Test specific string
Failed	Test setup error: Application microprocessor not installed or BIOS setup problem
	Action:
	1. Verify that the application microprocessor is installed and seated correctly.
	2. Check the system error log for related error messages.
	3. If your server does not have the latest level of BIOS installed, update the BIOS to the latest level. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates.
	4. If the problem persists, replace the application microprocessor and run the microprocessor diagnostic program again.
	If the problem persists, have the system serviced.
Failed	VRM corresponding to Microprocessor in socket id *xyz* is defective
	where *xyz* identifies the microprocessor whose VRM is causing the error message.
	Action: Replace the VRM.
	If the problem persists, have the system serviced.
Failed	VRM corresponding to Microprocessor in socket id *xyz* is not installed
	where *xyz* identifies the microprocessor whose VRM is not installed.
	Action: Install a VRM.
	If the problem persists, have the system serviced.

Function: Netfinity Advanced System Management Processor messages (165)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Netfinity Advanced System Management Processor on system board
	Action: Have the system serviced.

Function: thermal system messages (175)

Function	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Fan #*n*
	where *n* is the number of the failing fan.
	Note: The Fan*n* LED on the diagnostic LED panel will also be on.
	Action: Replace the indicated fan.
Failed	Temperature sensed on processor board is out of range
	Action: If one of the fan LEDs on the diagnostic LED panel is on, replace the indicated fan.
	If the problem persists, have the system serviced.

Function: status display messages (180)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Diagnostic LED panel
	Action: Have the system serviced.
Failed	Operator information panel
	Action: Have the system serviced.
Failed	LED on hot-swap SCSI backplane
	Action: Have the system serviced.
Failed	LED on processor board
	Action: Have the system serviced.
Failed	LED on system board
	Action: Have the system serviced.

Function: system memory messages (201)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	DIMM location Jn
	where n is the number of the socket containing the failing DIMM.
	Note: The DIMM Error LED for the failing DIMM will be on. See "Processor board component locations" on page 175 for the locations of the LEDs and the DIMM connectors.
	Action:
	1. Reseat the DIMM in DIMM socket Jn.
	2. If the problem persists, replace the DIMM.
	If the problem persists, have the system serviced.
Failed	Test setup error: Corrupt BIOS in ROM
	Action: If your server does not have the latest level of BIOS installed, update the BIOS to the latest level. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates.
	If the problem persists, have the system serviced.
Failed	Test setup error: Corrupt DMI BIOS, information in BIOS is not as expected
	Action: If your server does not have the latest level of BIOS installed, update the BIOS to the latest level. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates.
	If the problem persists, have the system serviced.

Function: system cache messages (202)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Aborted	Test setup error: BIOS cannot access VPD information **Action:** If your server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates. If the problem persists, have the system serviced.
Aborted	Test setup error: Corrupt DMI BIOS. Information in BIOS is not as expected **Action:** If your server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates. If the problem persists, have the system serviced.
Aborted	Test setup error: No L2 cache detected on microprocessor socket id *xyz* or BIOS setup problem where *xyz* identifies the microprocessor causing the error message. **Action:** 1. If your server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates. 2. If the problem persists, replace the identified microprocessor. If the problem persists, have the system serviced.
Aborted	Test setup error: Unknown hardware problem associated with microprocessor in socket id *xyz* where *xyz* identifies the microprocessor causing the error message. **Action:** 1. If your server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates. 2. If the problem persists, replace the identified microprocessor and run the diagnostic program again. If the problem persists, have the system serviced.
Failed	Microprocessor in socket ID *xyz* where *xyz* identifies the microprocessor causing the error message. **Note:** The Microprocessor Error LED for the indicated microprocessor will be on. See "Processor board component locations" on page 175 for the location of the LEDs and the microprocessor connectors. **Action:** 1. Reseat the identified microprocessor. 2. If the problem persists, replace the identified microprocessor. If the problem persists, have the system serviced.
Warning	Test setup error: Cache is disabled. Use system setup to enable before retrying the test **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 26.) If the problem persists, have the system serviced.

Function: diskette drive messages (206)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	Internal diskette drive bay
	Action: Have the system serviced.

Function: CD-ROM messages (215)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	On system board
	Action: Have the system serviced.

Function: hard disk drive messages (217)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	BIOS drive #n
	where n is the drive bay number.
	Action: Have the system serviced.

Function: magnetic tape drive messages (264)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Aborted	Test setup error: No tape drives found
	Action:
	1. Check the cable and power connections to the drive. 2. If the problem persists, refer to the documentation provided with the tape drive.
	If the problem persists, have the system serviced.
Failed	The load/mount test failed for device n on adapter m
	where n is the number of the device and m is the adapter number.
	Action: Refer to the documentation provided with the tape drive.
	If the problem persists, have the system serviced.
Failed	The Read/Write Self-diagnostic failed for device n on adapter m
	where n is the number of the device and m is the adapter number.
	Action:
	1. Insert a new tape cartridge and run the diagnostic test again. 2. If the problem persists, refer to the documentation provided with the tape drive.
	If the problem persists, have the system serviced.

Result	Test specific string
Failed	The Self-diagnostic failed for device *n* on adapter *m*
	where *n* is the number of the device and *m* is the adapter number.
	Action: Refer to the documentation provided with the tape drive.
	If the problem persists, have the system serviced.
Failed	The unload/eject pushbutton test failed for device *n* on adapter *m*
	where *n* is the number of the device and *m* is the adapter number.
	Action: Refer to the documentation provided with the tape drive.
	This test is only applicable to SCSI tape drives that have a pushbutton. If the problem persists, have the system serviced.
Failed	The unload/eject test failed for device *n* on adapter *m*
	where *n* is the number of the device and *m* is the adapter number.
	Action: Refer to the documentation provided with the tape drive.
	If the problem persists, have the system serviced.

Function: keyboard messages (301)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	On system board keyboard test failed
	Action:
	1. Replace the keyboard.
	2. If the problem persists, replace the keyboard cable.
	If the problem persists, have the system serviced.

Function: pointing device (mouse) messages (302)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	On system board pointing device test failed
	Action: Replace the pointing device (mouse).
	If the problem persists, have the system serviced.

Function: Ethernet messages (405)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Failed	In PCI slot *n*
	where *n* is the number of the PCI slot where the failing Ethernet adapter is installed.
	Action: Replace the Ethernet adapter in slot *n*. If the problem persists, have the system serviced.
Failed	On system board
	Action: Have the system serviced.

Function: analog/digital modem messages (415)

Result	Test specific string
Note: If you receive any diagnostic error messages that are not shown in this table, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed. If the problem persists, have the system serviced.	
Not Applicable	No modem was detected **Action:** 1. Make sure that the modem is present and attached to the server. 2. If the problem persists, replace the modem. If the problem persists, have the system serviced.
Failed	Modem Reset Failed **Action:** Replace the modem. If the problem persists, have the system serviced.
Failed	No dialtone detected **Action:** 1. Make sure that the phone line is attached to the modem and that there is a dial tone. (Connect a phone to the phone line and listen for a dial tone.) If there is no dial tone, have the phone line serviced. 2. If the problem persists, replace the modem. If the problem persists, have the system serviced.
Not Applicable	PCI modem detected but not enabled **Action:** 1. Change the configuration to enable the modem. 2. If the problem persists, replace the modem. If the problem persists, have the system serviced.

Ethernet controller messages

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

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

Novell NetWare or IntraNetWare server ODI driver messages

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

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

Explanation: The user entered an incorrect parameter keyword.

Action: Reload the driver using the correct keyword.

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

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

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

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

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

Action: Make sure the IRQ settings are correct in the Configuration/Setup Utility program. See "PCI Slot/Device Information" on page 27 for information on setting the interrupt requests. If the IRQ settings are correct, have the system serviced.

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

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

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

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

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

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

PCNTNW-NW-072 A resource tag is unavailable.

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

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

PCNTNW-NW-073 Unable to allocate memory.

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

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

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

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

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

If you have an Ethernet adapter installed, make sure the adapter does not share an IRQ with any other device (see "PCI Slot/Device Information" on page 27.)

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

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

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

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

Explanation: The MSMTx Free Count is not initialized correctly.

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

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

Explanation: The driver parameter block is too small.

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

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

Explanation: The driver media parameter block is too small.

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

PCNTNW-NW-091 The hardware configuration conflicts.

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

Action: Make sure that your hardware configuration matches the software settings. See "PCI Slot/Device Information" on page 27 for information on viewing and changing interrupt requests.

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

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

Action: None necessary, message is for information only.

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

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

Action: None necessary, message is for information only.

PCNTNW-NW-164 The device was not found.

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

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

PCNTNW-NW-165 The device was not found at IOADDRESS.

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

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

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

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

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.)

If the problem persists, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

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

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

Action: None necessary, message is for information only.

NDIS 2.01 (OS/2) driver messages

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

PCNTND-1   Unable to open the Protocol Manager.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-6   Out of memory while allocating buffers.

Explanation: The driver could not allocate the requested buffers.

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

PCNTND-7   A Protocol Manager device error occurred.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-8   Bad status for the Protocol Manager.

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

Action: Check and correct your configuration.

PCNTND-9   Cannot find the PROTOCOL.INI entry.

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

Action: Check and correct your configuration.

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

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

Action: Check and correct your configuration.

PCNTND-11 Protocol Manager registration failed.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-15 Device not found.

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

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

PCNTND-16 PCI scan specified, device not found.

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

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

PCNTND-21 The adapter failed the checksum test.

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

PCNTND-23 WARNING: PCNET IRQ found = *xx*

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

Action: Remove the IRQ setting from the PROTOCOL.INI file or change the IRQ setting in the PROTOCOL.INI file to match the IRQ setting shown in the **PCI Slot/Device Information** selection of the Advanced Setup menu in the Configuration/Setup Utility program. (See "PCI Slot/Device Information" on page 27.)

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

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

Action: Remove the IRQ setting from the PROTOCOL.INI file or change the IRQ setting in the PROTOCOL.INI file to match the IRQ setting shown in the **PCI Slot/Device Information** selection of the Advanced Setup menu in the Configuration/Setup Utility program. (See "PCI Slot/Device Information" on page 27.)

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

Explanation: The driver cannot locate the PCI bus.

Action: Run the diagnostic programs (see "Diagnostic programs" on page 110).

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

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

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

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

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

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

NDIS 4.0 (Windows NT) driver messages

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

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

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

Action: Make sure the correct adapter is installed. .

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

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

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

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

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

Action: None needed, message is for information only. .

UNIX messages

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

---

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

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

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

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

---

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

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

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

Modify the interrupt request (IRQ) settings in the Configuration/Setup Utility program, or run the NETCONFIG program to match the hardware settings.

---

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

Explanation: The system is out of Streams memory blocks.

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

---

pnt0-11   Device not found!

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

---

pnt0-12   Device failed checksum test!

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

---

pnt0-13   add_intr_handler failed! Interrupts already enabled.

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

Action: Modify your hardware settings.

Run the NETCONFIG program to match the hardware settings.

---

pnt0-14   Cannot locate hardware.

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

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 27.) If the Ethernet controller is enabled, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

---

pnt0-15   No more devices to open.

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

Action: Verify that additional IBM Netfinity 10/100 Fault Tolerant Adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

---

pnt0-17   Device fault...Reset initiated!

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

Action: Verify that additional IBM Netfinity 10/100 Fault Tolerant Adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, go to "Diagnostic programs" on page 110 to run the diagnostic programs.

---

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

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

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

---

pnt0-20   add_intr_handler failed! Unknown interrupt type.

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

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

---

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

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

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

---

pnt0-22   add_intr_handler failed! Out of range IPL.

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

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

---

pnt0-23   add_intr_handler failed! Vector already occupied.

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

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

---

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

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

Action: Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

---

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

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

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

---

pnt0-29   The IRQ number is already in use.

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

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

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

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

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

Troubleshooting

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

Note: Review "Electrical safety" on page 41 before you start troubleshooting.

Troubleshooting charts

Look for the symptom in the left column of the chart. Instructions and probable solutions to the problem are in the right column. If you have just added new software or a new option and your server is not working, do the following before using the troubleshooting charts:

- Remove the software or device that you just added.

- Run the diagnostic tests to determine if your server is running correctly.

- Reinstall the new software or new device.

CD-ROM drive problems	Action
The CD is not working properly.	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.
	If a problem still exists, have the system serviced.
The CD-ROM drive tray is not working.	The server must be turned on. If the server is on and the tray does not eject, insert the end of a paper clip into the manual tray-release opening. If the drive still does not work correctly, have the system serviced.
The CD-ROM drive is not recognized.	Verify that: 1. The primary IDE channel is enabled in the Configuration/Setup Utility program. 2. All cables and jumpers are installed correctly. 3. The correct device driver is installed for the CD-ROM drive.

Diskette drive problems	Action
The diskette drive in-use light stays on, or the system bypasses the diskette drive.	If there is a diskette in the drive, verify that: 1. The diskette drive is enabled in the Configuration/Setup Utility program. 2. The diskette is good and not damaged. (Try another diskette if you have one.) 3. The diskette is inserted correctly in the drive. 4. The diskette contains the necessary files to start the server. 5. Your software program is OK. See "Software Problem" on page 148.
	If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, have the system serviced.

Monitor self-tests	Action
	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.
	If you still cannot find the problem, have the monitor and system serviced.

Troubleshooting

Monitor problems	Action
The screen is blank.	Verify that: 1. The server power cord is plugged into the server and a working electrical outlet. 2. The monitor power cord is plugged into the monitor and a working electrical outlet. 3. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. 4. The monitor signal cable is connected to the correct connector on the server. If the items above are correct and the screen remains blank, have the system serviced.
Only the cursor appears.	Have the system serviced.
The monitor works when you turn on the server, but goes blank when you start some application programs.	Verify that the primary monitor cable is connected to the video port. To find the video port, see "Input/output connectors and expansion slots" on page 11. Be sure that you installed the necessary device drivers for the applications.
The screen flickers.	Set the monitor for the highest, noninterlaced refresh rate available. To reset the refresh rate, use a utility program, such as AnyView Professional or WinMode.
Wavy, unreadable, rolling, distorted screen, or screen jitter.	If the monitor self-tests show the monitor is OK, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. **Note:** 1. To prevent diskette drive read/write errors. be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, see your IBM reseller or IBM marketing representative. If the problem still exists, have the monitor and system serviced.
Wrong characters appear on the screen.	If the wrong language is displayed, update the BIOS with the correct language. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining updates for the BIOS. If the problem still exists, have the system serviced.

General problems	Action
Problems such as broken cover locks or indicator lights not working.	Have the system serviced.

Power problems	Action
The server does not power on.	Verify that: 1. The power cables are properly connected to the server. 2. The power outlet functions properly. 3. The type of memory installed is correct. 4. If you just installed an option, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports. 5. The LEDs on the power supply are on. See "Power supply LEDs" on page 152 for more information about the power supply LEDs. If the problem still exists, have the system serviced.

Intermittent problems	Action
A problem occurs only occasionally and is difficult to detect.	Verify that: 1. All cables and cords are connected securely to the rear of the server and attached options. 2. When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no air flow, the fan is not working. This causes the server to overheat and shut down. 3. Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. See "SCSI drives" on page 68. If the items above are correct, have the system serviced.

Microprocessor problems	Action
The server emits a continuous tone during POST.	The startup (boot) microprocessor is not working properly. If your server contains two microprocessors, the microprocessor in the highest numbered microprocessor socket is the startup microprocessor. 1. Verify that the startup microprocessor is seated properly. 2. If your server contains two microprocessors, remove the startup microprocessor, install a terminator card, and restart the server. If the server starts properly, replace the old startup microprocessor. 3. Replace the startup microprocessor. Restart the server. If the problem still exists, have the system serviced.

Keyboard, mouse, or pointing-device problems	Action
All or some keys on the keyboard do not work.	1. Make sure that the keyboard cable is properly connected to the server. 2. Make sure that the server and the monitor are turned on. 3. Try using another keyboard. If the items above are correct, have the system serviced.
The mouse or pointing device does not work.	1. Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly. 2. Try using another mouse or pointing device. If the problem still exists, have the server and the device serviced.

Memory problems	Action
The amount of memory displayed is less than the amount of memory installed.	Verify that: 1. The memory modules are seated properly. 2. You have installed the correct type of memory (see "Installing memory-module kits" on page 64). 3. If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. For information about using the Configuration/Setup Utility program, see "Using the Configuration/Setup Utility main menu" on page 20. 4. All banks of memory on the DIMMs are enabled (see "Memory Settings" on page 28). The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. 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.

Option problems	Action
An IBM option that used to work does not work now.	Verify that all of the option hardware and cable connections are secure. If the option comes with its own test instructions, use those instructions to test the option. If the failing option is a SCSI option, verify that: 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. If the problem still exists, have the system serviced.
An IBM option that was just installed does not work.	Verify that: 1. The option is designed for the server. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining ServerProven™ compatibility information from the World Wide Web. 2. You followed the installation instructions that come with the option. 3. The option is installed correctly. 4. You have not loosened any other installed options or cables. 5. You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. For information about using the Configuration/Setup Utility program, see "Using the Configuration/Setup Utility main menu" on page 20. If the problem still exists, have the system serviced.

Parallel port problems	Action
The number of parallel ports displayed is less than the number of parallel ports installed.	Verify that: 1. Each port is assigned a unique address. 2. The parallel-port adapter, if you installed one, is seated properly. If the problem still exists, have the system serviced.

Serial port problems	Action
The number of serial ports identified by the operating system is less than the number of serial ports installed.	Verify that:
	1. Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports are disabled.
	Note: The management C connector is the same as a serial port connector, but it is used only by the integrated Netfinity Advanced System Management Processor, and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured using Netfinity Manager.
	2. The serial-port adapter, if you installed one, is seated properly.
	If the problem still exists, have the system serviced.
A serial device does not work.	Verify that:
	1. The device is compatible with the server. Refer to the "Getting Help, Service, and Information" section of this *Server Library* for information about obtaining ServerProven compatibility information from the World Wide Web.
	2. The serial port is enabled and is assigned a unique address.
	3. Make sure that the device is not connected to the management port C.
	Note: The management C connector is the same as a serial port connector, but it is used only by the integrated Netfinity Advanced System Management Processor and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured using Netfinity Manager.
	If the problem still exists, have the system serviced.

Universal Serial Bus (USB) port problems	Action
A USB device does not work.	Verify that:
	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.
	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.
	2. The correct USB device driver is installed.
	3. Your operating system supports USB devices.
	If the problem still exists, have the system serviced.

Printer problems	Action
The printer does not work.	Verify that:
	1. The printer is turned on and is online.
	2. The printer signal cable is connected to the correct serial or parallel port on the server. For the location of the serial or parallel port, see "Input/output connectors and expansion slots" on page 11.
	Note: Non-IBM printer cables might cause unpredictable problems.
	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 documentation that comes with your printer. If the tests show that the printer is OK, have the system serviced.

Expansion enclosure problems	Action
The SCSI expansion enclosure used to work, but does not work now.	Verify that all of the SCSI expansion enclosure hardware and cable connections are secure.
	Verify that:
	1. The cables for all external SCSI options are connected correctly.
	2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.
	3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server.
	For more information, see your SCSI and expansion enclosure documentation.
	If the SCSI expansion enclosure comes with its own test instructions, use those instructions to test it. In addition, test the power supply.
	If the items above are correct and the test programs found no problem, have the server and SCSI expansion enclosure serviced.

Software problems	Action
Suspected software problem.	To determine if problems are caused by the software, verify that:
	1. Your server has the minimum memory requirements needed to use the software. For memory requirements, refer to the information that comes with the software.
	Note: If you have just installed an adapter or memory, you might have a memory address conflict.
	2. The software is designed to operate on your server.
	3. Other software works on your server.
	4. The software that you are using works on another system.
	If you received any error messages when using the software program, refer to the information that comes with the software for a description of the messages and solutions to the problem.
	If the items above are correct and the problem remains, contact your place of purchase.

Netfinity Service Processor Manager problems	Action
Netfinity Service Processor Manager reports a general monitor failure	Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server.
	If a problem still exists, have the system serviced.

Note: If you cannot find the problem in the troubleshooting charts, go to "Running diagnostic programs" on page 110 to test the server. If you have run the diagnostic test programs or if running the tests does not reveal the problem, have the system serviced.

Troubleshooting the Ethernet controller

This section provides troubleshooting information for problems that might occur with the 10/100 Mbps Ethernet controller.

Network connection problems

If the Ethernet controller cannot connect to the network, check the following:

* Make sure that the cable is installed correctly.

   The network cable must be securely attached at all connections. If the cable is attached but the problem persists, try a different cable.

   If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.

   If you directly connect two workstations (without a hub), or if you are not using a hub with X ports, use a crossover cable.

   Note: To determine whether a hub has an X port, check the port label. If the label contains an *X*, the hub has an X port.

* Determine if the hub supports auto-negotiation. If not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.

* Check the Ethernet controller lights on the operator information panel.

   These lights indicate whether a problem exists with the connector, cable, or hub.

   – The Ethernet Link Status light illuminates when the Ethernet controller receives a LINK pulse from the hub. If the light is off, there might be a bad connector or cable, or a problem with the hub.

   – The Ethernet Transmit/Receive Activity light illuminates when the Ethernet controller sends or receives data over the Ethernet Network. If the Ethernet Transmit/Receive Activity light is off, make sure that the hub and network are operating and that the correct device drivers are loaded.

   – The Ethernet Speed 100 Mbps light illuminates when the Ethernet controller LAN speed is 100 Mbps.

* Make sure that you are using the correct device drivers, supplied with your server.

* Check for operating system-specific causes for the problem.

* Make sure that the device drivers on the client and server are using the same protocol.

* Test the Ethernet controller.

   How you test the Ethernet controller depends on which operating system you are using (see the Ethernet controller device driver README file).

Ethernet controller troubleshooting chart

You can use the following troubleshooting chart to find solutions to 10/100 Mbps Ethernet controller problems that have definite symptoms.

Controller problem	Action
The server stops running when loading device drivers.	The PCI BIOS interrupt settings are incorrect. Check the following: • Determine if the interrupt (IRQ) setting assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program. Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet controller or the other device. (See "Resolving configuration conflicts" on page 151.) For example, for NetWare Versions 3 and 4 it is recommended that disk controllers not share interrupts with LAN controllers. • Make sure that you are using the most recent device driver available from the World Wide Web. (Refer to the "Getting Help, Service, and Information" section of this *Server Library* for World Wide Web addresses.) • Run the network diagnostic program. If the problem still exists, have the system serviced.
Ethernet Link Status light does not light.	Check the following: • Make sure that the hub is turned on. • Check all connections at the Ethernet controller and the hub. • Check the cable. A crossover cable is required unless the hub has an *X* designation. • Use another port on the hub. • If the hub does not support auto-negotiation, manually configure the Ethernet controller to match the hub. • If you manually configured the duplex mode, make sure that you also manually configure the speed. • Run diagnostics for the LEDs. If the problem still exists, have the system serviced.
The Ethernet Transmit/Receive Activity light does not light.	Check the following: **Note:** The Ethernet Transmit/Receive Activity LED illuminates only when data is sent to or by this Ethernet controller. • Make sure that you have loaded the network device drivers. • The network might be idle. Try sending data from this workstation. • Run diagnostics on the LEDs. • The function of this LED can be changed by device driver load parameters. If necessary, remove any LED parameter settings when you load the device drivers.
Data is incorrect or sporadic.	Check the following: • Make sure that you are using Category 5 cabling when operating the server at 100 Mbps. • Make sure that the cables do not run close to noise-inducing sources like fluorescent lights.

Controller problem	Action
The Ethernet controller stopped working when another adapter was added to the server.	Check the following: • Make sure that the cable is connected to the Ethernet controller. • Make sure that your PCI system BIOS is current. • Reseat the adapter (see "Working with adapters" on page 52). • Determine if the interrupt (IRQ) setting assigned to the Ethernet adapter is also assigned to another device in the Configuration/Setup Utility program. Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet adapter or the other device. (See "Resolving configuration conflicts" on page 151.) If the problem still exists, have the system serviced.
The Ethernet controller stopped working without apparent cause.	Check the following: • Run diagnostics for the Ethernet controller. • Try a different connector on the hub. • Reinstall the device drivers. Refer to your operating-system documentation and to the "ServerGuide and Netfinity Manager Information" section of this *Server Library*. If the problem still exists, have the system serviced.

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 bytes) 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 20.

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 using status LEDs

Your server has LEDs to help you identify problems with some server components. These LEDs are part of the light path diagnostics built into the server. By following the *path of lights*, you can quickly identify the type of system error that occurred. See "Light path diagnostics" on page 153 for more information.

Status LEDs are located on the following components:

• Operator information panel

   For more information, see "Operator information panel" on page 10.

- Hard disk drive trays

  For more information, see "Controls and indicators" on page 7.

- Power supply

  For more information, see "Power supply LEDs."

- Diagnostic LED panel

  For more information, see "Diagnostic LED panel" on page 153.

- System board

  See "System board component locations" on page 173 for locations of the LEDs on the system board.

- Processor board

  See "Processor board component locations" on page 175 for locations of the LEDs on the processor board.

Power supply LEDs

The AC and DC Power LEDs on the power supply provide status information about the power supply. See "Power supplies" on page 13 for the location of these 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	There is a DC power problem.
		
		Possible causes:
		
		1. The Power Control button on the front of the server is in the Off position.
		
		   Action: Press the Power Control button to start the server.
		
		2. The power supply has failed.
		
		   Action: Replace the power supply.
		
		If the problem persists, have the system serviced.

Off	Off	There is an AC power problem.
		
		Possible causes:
		
		1. There is no AC power to the power supply.
		
		   Actions: Verify that:
		
		   - The power cord is properly connected to the server.
		   - The power outlet functions properly.
		
		2. The power supply has failed.
		
		   Action: Replace the power supply.
		
		If the problem persists, have the system serviced.

Diagnostic LED panel

The following illustration shows the LEDs on the diagnostic LED panel inside the server. See "Light path diagnostics" for information on identifying problems using these LEDs.
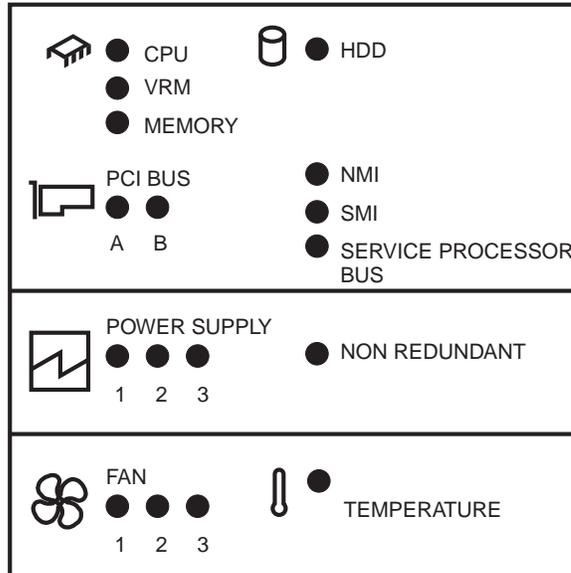
Light path diagnostics

You can use the light path diagnostics built into your server to quickly identify the type of system error that occurred. Your server is designed so that any LEDs that are illuminated remain illuminated when the server shuts down as long as the AC power source is good and the power supplies can supply +5V dc current to the server. This feature helps you isolate the problem if an error causes the server to shut down. See Table 9 on page 154.

Identifying problems using status LEDs

Table 9 (Page 1 of 4). Light path diagnostics			
System Error LED (operator information panel)	**Lit LED on diagnostic LED panel**	**Cause**	**Action**
On A system error was detected. Check to see which of the LEDs on the diagnostic LED panel inside the server are on.	None	The system error log is 75% or more full or a PFA alert was logged.	Check the system error log and correct any problems. See "POST Error Log" on page 28 for information about clearing the error log. Disconnecting the server from all power sources for at least 20 seconds will turn off the System Error LED.
	CPU	One of the microprocessors has failed or a microprocessor is installed in the wrong connector.	1. Check the Microprocessor Error LEDs on the processor board. 2. Turn off the server, reseat the microprocessor indicated by the lit Microprocessor Error LED, and restart the server. 3. If the problem persists, replace the microprocessor. If the problem persists, have the system serviced.
	VRM	One of the voltage regulator modules on the processor board has failed.	1. Check the VRM Error LEDs on the processor board. 2. Turn off the server, reseat the VRM indicated by the lit VRM Error LED, and restart the server. 3. If the problem persists, replace the VRM. If the problem persists, have the system serviced.
	MEMORY	A memory error occurred.	1. Check the DIMM Error LEDs on the processor board. 2. Replace the DIMM indicated by the lit DIMM Error LED.

Table 9 (Page 2 of 4). Light path diagnostics			
System Error LED (operator information panel)	**Lit LED on diagnostic LED panel**	**Cause**	**Action**
On (continued)	PCI BUS A	An error occurred on PCI bus A. An adapter in PCI slot 1 or 2 or the system board caused the error.	1. Check the error log for additional information. If the error log indicates a problem with the integrated Ethernet controller, have your system serviced. 2. If you cannot isolate the failing adapter from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus A (PCI slot 1 and 2) and restarting the server after each adapter is removed. If the problem persists, have the system serviced.
	PCI BUS B	An error occurred on PCI bus B. An adapter in PCI slot 3, 4, or 5 or the system board caused the error.	1. Check the error log for additional information. If the error log indicates a problem with the integrated SCSI controller, have the system serviced. 2. If you cannot correct the problem from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus B (PCI slots 3–5) and restarting the server after each adapter is removed. If the problem persists, have the system serviced.
	HDD	A hot-swap hard disk drive has failed on bus 1.	1. Check the error log for additional information. If the error log indicates a temperature problem and the fans are working correctly, have the system serviced. 2. If the amber Hard Disk Status LED on one of the hot-swap hard disk drives is on, and you have an optional RAID adapter installed, refer to the documentation provided with the adapter for more information.
	NMI	A nonmaskable interrupt occurred.	1. If the PCI BUS A or PCI BUS B LED is on, follow the instructions for those LEDs. 2. If the PCI BUS A or PCI BUS B LED is not on, restart the server. If the problem persists, have the system serviced.

Identifying problems using status LEDs

System Error LED (operator information panel)	Lit LED on diagnostic LED panel	Cause	Action
On (continued)	SMI	A systems management event occurred.	1. Check the system error log for more information. 2. If the problem persists, restart the server. If the problem persists, have the system serviced.
	SERVICE PROCESSOR BUS	An error has occurred on the service processor bus.	Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources and restart the server. If the problem persists, have the system serviced.
	POWER SUPPLY 1	Power supply 1 has failed.	Replace power supply 1.
	POWER SUPPLY 2	Power supply 2 has failed.	Replace power supply 2.
	POWER SUPPLY 3	Power supply 3 has failed.	Replace power supply 3.
	POWER SUPPLY NON REDUNDANT	Power supply redundancy has been lost.	1. If one of the power supply LEDs is on, replace the indicated power supply. 2. Install an additional power supply to regain redundancy.
	FAN 1	Fan 1 has failed or is operating too slowly. **Notes:** 1. An LED on the failing fan assembly will also be on. 2. A failing fan can also cause the TEMPERATURE and HDD LEDs to be on.	Replace fan 1.
	FAN 2	Fan 2 has failed or is operating too slowly. **Notes:** 1. An LED on the failing fan assembly will also be on. 2. A failing fan can also cause the TEMPERATURE and HDD LEDs to be on.	Replace fan 2.
	FAN 3	Fan 3 has failed or is operating too slowly. **Notes:** 1. An LED on the failing fan assembly will also be on. 2. A failing fan can also cause the TEMPERATURE and HDD LEDs to be on.	Replace fan 3.

Table 9 (Page 3 of 4). Light path diagnostics

Table 9 (Page 4 of 4). Light path diagnostics			
System Error LED (operator information panel)	**Lit LED on diagnostic LED panel**	**Cause**	**Action**
On (continued)	TEMPERATURE	The system temperature has exceeded a threshold level.	1. Check to see if a fan has failed. If it has, replace the fan. 2. Make sure the room temperature is not too hot. (See "Specifications" on page 170.) If the problem persists, have the system serviced.
Off	None	The light path diagnostics have not detected a system error.	None

Checking the system for damage

This section provides instructions on what to do if your server might be damaged.

After dropping it

Look for loose cables and obvious damage. If any cables are loose, reconnect them securely. If there is obvious damage to the server, have it serviced.

If you see no damage, turn on the server. If it works correctly, the server probably did not suffer any damage. Observe all electrostatic precautions listed in this book to avoid damage to your server.

If the server does not work correctly, turn it off and check the adapters and memory modules to ensure that they are connected correctly. Go to "Electrical safety" on page 41 and follow the instructions for opening your server; then, reseat 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 110.

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.

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

Do not:

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

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

Note: In the U.S., call 1-800-IBM-4333 for information about battery disposal.

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

To order replacement batteries, call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

> **Before you begin:**
>
> • Read "Electrical safety" on page 41 and "Handling static-sensitive devices" on page 42.
>
> • Follow any special handling and installation instructions supplied with the replacement battery.

Note: After you replace the battery, you must reconfigure your server and reset the system date and time.

To replace the battery:

 1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 43); then remove the cover (see "Removing the left-side cover (tower model)" on page 47 or "Removing the cover (rack model)" on page 48).

Replacing the battery

2. Locate the battery on the system board (see "System board component locations" on page 173).

3. Remove adapters to allow access to the battery. (See "Installing a hot-plug PCI adapter" on page 55 for information about installing and removing adapters from the hot-plug PCI slots.)

4. Remove the plastic dividers between the hot-swap PCI slots to allow access to the battery.

5. Remove the battery:

   a. Use one finger to lift the battery clip over the battery.

   b. Use one finger to slightly slide the battery toward the rear of the server. The spring mechanism behind the battery will push it out toward you as you slide it forward.

   c. Use your thumb and index finger to pull the battery from under the battery clip.

   d. Ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.
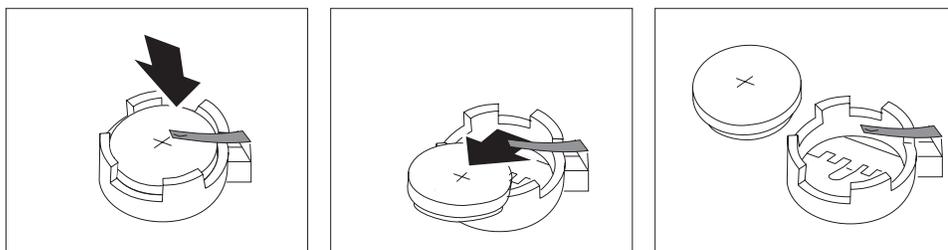
6. Insert the new battery:

   a. Tilt the battery so that you can insert it into the front of the socket, under the battery clip.

   b. As you slide it under the battery clip, press the battery down into the socket.
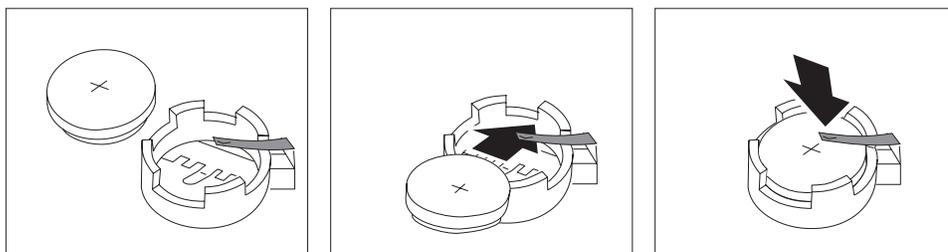
7. Reinstall any adapters you removed. (See "Installing a hot-plug PCI adapter" on page 55 for information about installing and removing adapters from the hot-plug PCI slots.)

8. Reinstall any plastic dividers that you removed.

9. Reinstall the top cover and complete the installation (see "Completing the installation" on page 84).

Note: You will have to wait approximately 20 seconds after you plug the power cord of your server into an electrical outlet for the Power Control button to become active.

10. Start the Configuration/Setup Utility program and set configuration parameters as needed.

- To set the system date and time, go to "Date and Time" on page 22.

- To set the power-on password, go to "Using the power-on password menu" on page 23.

- To reconfigure your server, follow the instructions given in "The Configuration/Setup Utility program" on page 19 (all models).

Replacing the battery

Chapter 7. Server records and specifications

Whenever you add options to your server, be sure to update the information in this chapter. Accurate, up-to-date records make it easier to add other options and, if the need should arise, to report a hardware problem.

In addition to server records, this chapter contains specifications. These specifications include product dimensions, environmental operating requirements, system board and processor board layouts, and jumper settings.

Record the identification numbers

Record and retain the following information.

Table 10. IBM Netfinity 5600 identification numbers	
Product Name	IBM Netfinity 5600
Machine Type	_____
Model	_____
Serial Number	_____
Key Serial Number	_____

The server serial number and other identification numbers are located on labels on the rear of the server and on the front of the server under the trim bezel.

Note: Your server keys cannot be duplicated by locksmiths. If you lose them, order replacement keys from the key manufacturer. The key serial number and phone number of the manufacturer are on a tag attached to the keys.

Installed device records

Use the following tables to keep a record of the options installed in, or attached to, your system. You can also record your system's default configuration settings. This information can be helpful when you install additional options in your server or if you ever need to have your server serviced. Copy these tables before recording information in them, in case you need extra space to write new values later, when you update your system's configuration.

Note: If necessary, you can also refer to the system-board layout in "System board component locations" on page 173 for connector locations.

In the following table record the types and SCSI IDs for drives or devices attached to your server. If you attach a drive or other device to an adapter, be sure to record the descriptive information properly.

Table 11. Internal and external drives and devices	
Location	**Drive or Device Description**
	Internal Devices
Diskette Drive Bay	_____
CD-ROM Drive Bay	_____
Bay A	_____
Bay B	_____
SCSI ID 0 bay	_____
SCSI ID 1 bay (rack)	_____
SCSI ID 2 bay (tower)	_____
SCSI ID 3 bay	_____
SCSI ID 4 bay	_____
SCSI ID 5 bay (rack)	_____
SCSI ID 8 bay (tower)	_____
SCSI ID 9 bay	_____
	External Devices
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____

Table 12 shows the Configuration/Setup Utility program defaults. In the table, record any configuration changes you make.

Table 12 (Page 1 of 4). Configuration/Setup Utility program defaults and changes

Option	Default Value	New Value	Additional Information
System Summary			
Processor 1[1]	_____	_____	_____
Processor 1 Speed	_____	_____	_____
Processor 1 Cache Size	_____	_____	_____
Processor 2[1]	_____	_____	_____
Math Coprocessor	Internal	_____	_____
System Memory	640 KB	_____	_____
Extended Memory	127 MB	_____	_____
Shadow RAM	384 KB	_____	_____
System ROM	F000h — FFFFh	_____	_____
Diskette Drive A	1.44 MB 3.5"	_____	_____
Primary Master Device	CD-ROM	_____	_____
Primary Slave Device	_____	_____	_____
Mouse	Installed	_____	_____
System Memory Type	Registered SDRAM	_____	_____

[1] All microprocessors must be the same type and have the same cache size and clock speed.

Option	Default Value	New Value	Additional Information
System Information			
Product Data			
BIOS Build Level	_____	_____	_____
BIOS Date	_____	_____	_____
BIOS Revision Level	_____	_____	_____
BootBlock Build Level	_____	_____	_____
SP ROM Build Level	_____	_____	_____
SP ROM Date	_____	_____	_____
SP ROM Revision Level	_____	_____	_____
Diagnostics Build Level	_____	_____	_____
Diagnostics Date	_____	_____	_____
Diagnostics Revision Level	_____	_____	_____
SCSI BIOS Version	_____	_____	_____
Machine Type/System Serial Number			
Machine Type/Model	_____	_____	_____
System Serial Number	_____	_____	_____
System Card Data			
Model	_____	_____	_____
Submodel	_____	_____	_____
System Serial	_____	_____	_____
Planar			
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
Processor			
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____

Installed device records

Table 12 (Page 2 of 4). Configuration/Setup Utility program defaults and changes

Option	Default Value	New Value	Additional Information
System Information (cont.)			
DASD Backplane			
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
Power Backplane			
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
Power Supply 1			
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
Power Supply 2			
FRU Number	_____	_____	_____
Unique Number	_____	_____	_____
Mfg ID	_____	_____	_____
Slot Number	_____	_____	_____
Devices and I/O Ports			
Serial Port A	[Port 3F8, IRQ 4]		
Serial Port B	[Port 2F8, IRQ 3]	_____	_____
Parallel Port	[Port 378]	_____	_____
Parallel Port Mode	[Standard]	_____	_____
Parallel Port IRQ	[IRQ 7]	_____	_____
Parallel Port DMA	None	_____	_____
Mouse	[Installed]	_____	_____
Diskette Controller	[Enabled]	_____	_____
Diskette Drive A	[1.44 MB 3.5"]	_____	_____
Video		_____	_____
Video Controller	S3 Incorporated	_____	_____
Video Memory	4096 KB	_____	_____
IDE Configuration Menu		_____	_____
Primary IDE Channel	[Enabled]	_____	_____
Master Device		_____	_____
Device Type	CD-ROM	_____	_____
Size	650 MB	_____	_____
Transfer Selection:	Autoconfigure	_____	_____
Transfer Mode	PIO Mode 4	_____	_____
LBA Mode	Supported	_____	_____
Slave Device		_____	_____
System Security			
Power-On Password	_____	_____	_____
Allow for Unattended			
Boot with Password	[Off]	_____	_____
Administrator Password	_____	_____	_____
Power-on Password			
Changeable by User	[No]	_____	_____
System Owner's Name	_____	_____	_____

Table 12 (Page 3 of 4). Configuration/Setup Utility program defaults and changes

Option	Default Value	New Value	Additional Information
Start Options			
Keyboard NumLock State	[On]		
Keyboard Speed	[Fast]	_____	_____
Disketteless Operation Mode	[Disabled]	_____	_____
Displayless Operation Mode	[Disabled]	_____	_____
Keyboardless Operation Mode	[Disabled]	_____	_____
First Startup Device	[CD-ROM]	_____	_____
Second Startup Device	[Diskette Drive 0]	_____	_____
Third Startup Device	[Hard Drive 0]	_____	_____
Fourth Startup Device	[Disabled]	_____	_____
Boot Fail Count	[Enabled]	_____	_____
Power On Self-Test	[Quick]	_____	_____
Virus Detection[3]	[Enabled]	_____	_____
[3]The Virus Detection test checks for changes to the boot sector.			
System Boot Precedence	[Disabled]	_____	_____
Advanced Setup			
Processor Serial Number Access	[Disabled]	_____	_____
Core Chipset Control			
North Bridge Revision	[2.1]	_____	_____
IOQ Depth	[8]	_____	_____
PCI 2.1 Non Compliant	[Disabled]	_____	_____
Adapter Support			
Slot 1 Grant Timer	[Disabled]	_____	_____
Slot 2 Grant Timer	[Disabled]	_____	_____
Slot 3 Grant Timer	[Disabled]	_____	_____
Slot 4 Grant Timer	[Disabled]	_____	_____
Slot 5 Grant Timer	[Disabled]	_____	_____
Cache Control			
Processor Cache Type	[Write-Back]	_____	_____
Processor 1 Cache State	[Enabled]	_____	_____
Processor 1 Cache Size	_____	_____	_____
Processor 2 Cache State	_____	_____	_____
Processor 2 Cache Size	_____	_____	_____
PCI Slot/Device Information			
Slot 0	Host Bridge	_____	_____
Bus	_____	_____	_____
Dev	_____	_____	_____
Function	_____	_____	_____
Device Type	_____	_____	_____
Slot 1	_____	_____	_____
Bus	_____	_____	_____
Dev	_____	_____	_____
Function	_____	_____	_____
Device Type	_____	_____	_____
Slot 2	_____	_____	_____
Bus	_____	_____	_____
Dev	_____	_____	_____
Function	_____	_____	_____
Device Type	_____	_____	_____

Installed device records

Table 12 (Page 4 of 4). Configuration/Setup Utility program defaults and changes			
Option	**Default Value**	**New Value**	**Additional Information**
Advanced Setup (cont.)			
Slot 3	_____	_____	_____
Bus	_____	_____	_____
Dev	_____	_____	_____
Function	_____	_____	_____
Device Type	_____	_____	_____
Slot 4	_____	_____	_____
Bus	_____	_____	_____
Dev	_____	_____	_____
Function	_____	_____	_____
Device Type	_____	_____	_____
Slot 5	_____	_____	_____
Bus	_____	_____	_____
Dev	_____	_____	_____
Function	_____	_____	_____
Device Type	_____	_____	_____
PCI Device Control			
Planar SCSI	[Enabled]	_____	_____
Planar Video	[Enabled]	_____	_____
Planar Ethernet	[Enabled]	_____	_____
Slot 1	[Enabled]	_____	_____
Slot 2	[Enabled]	_____	_____
Slot 3	[Enabled]	_____	_____
Slot 4	[Enabled]	_____	_____
Slot 5	[Enabled]	_____	_____
Memory Settings			
J04: Row 0	[Row Is Empty]	_____	_____
J04: Row 1	[Row Is Empty]	_____	_____
J03: Row 2	[Row Is Empty]	_____	_____
J03: Row 3	[Row Is Empty]	_____	_____
J02: Row 4	[Row Is Empty]	_____	_____
J02: Row 5	[Row Is Empty]	_____	_____
J01: Row 6	[Row Is Enabled]	_____	_____
J01: Row 7	[Row Is Empty]	_____	_____
Sys. Service Proc. HW Int. (IRQ)	[Autoconfigure]	_____	_____

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

Table 13. System memory

Memory Connector	DIMM Size	Additional Information
Connector J1	128 MB ☐ 256 MB ☐ 512 MB ☐ 1 GB ☐	_____
Connector J2	128 MB ☐ 256 MB ☐ 512 MB ☐ 1 GB ☐	_____
Connector J3	128 MB ☐ 256 MB ☐ 512 MB ☐ 1 GB ☐	_____
Connector J4	128 MB ☐ 256 MB ☐ 512 MB ☐ 1 GB ☐	_____
Total Memory (MB)	_____	

Record expansion slot configuration information for your server in the following table.

Table 14. Expansion slot configuration information

Expansion Slot	IRQ	DMA	I/O Port	Memory Resources	Option Description and Additional Information
PCI slot 1	_____	_____	_____	_____	_____ _____
PCI slot 2	_____	_____	_____	_____	_____ _____
PCI slot 3	_____	_____	_____	_____	_____ _____
PCI slot 4	_____	_____	_____	_____	_____ _____
PCI slot 5	_____	_____	_____	_____	_____ _____

Notes:

1. PCI slots 3–5 are hot-plug slots.

2. Before setting values, review "Resolving configuration conflicts" on page 29 and follow the instructions for avoiding configuration conflicts.

Specifications

The following table contains the specifications for the Netfinity 5600 server.

Table 15. Netfinity 5600 server operating specifications		

Size (Tower Model)
 	
   – Depth: 659.3 mm (26 in.)
 	
   – Height: 426.5 mm (16.8 in.)
 	
   – Width: 217.3 mm (8.6 in.)
 	
Size (Rack Model)
 	
   – Depth: 629.3 mm (24.8 in.)
 	
   – Height: 217.3 mm (8.6 in.) (5 U)
 	
   – Width: 426.6 mm (16.8 in.)
 	
Weight (Tower Model)
 	
• Minimum configuration: 26.6 kg (58.6 lb)
 	
• Maximum configuration: 37.5 kg (82.7 lb)
 	
Weight (Rack Model)
 	
• Minimum configuration: 25.3 kg (55.7 lb)
 	
• Maximum configuration: 36.2 kg (79.8 lb)
 	
Environment
 	
• Air temperature:
 	
   – Server on: 10° to 35° C (50° to 95° F) Altitude: 0 to 914 m (3000 ft.)
 	
   – Server on: 10° to 32° C (50° to 90° F) Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)
 	
   – Server off: 10° to 43° C (50° to 110° F) Maximum Altitude: 2133 m (7000 ft.)
 	
• Humidity:
 	
   – Server on: 8% to 80%
 	
   – Server off: 8% to 80%
 	
• Maximum altitude: 2133 m (7000 ft)
	Electrical Input
	
	• Sine-wave input (50 to 60 Hz) is required
	
	• Input voltage:
	
	   – Low range:
	
	     - Minimum: 90 V ac
	
	     - Maximum: 137 V ac
	
	   – High range:
	
	     - Minimum: 180 V ac
	
	     - Maximum: 265 V ac
	
	   – Input kilovolt-amperes (kVA) approximately:
	
	     - Minimum configuration as shipped: 0.08 kVA
	
	     - Maximum configuration: 0.52 kVA
	
	Power Available for Drives
	
	• Each hot-swap drive bay:
	
	   – +5 V dc line: 15 A
	
	   – +12 V dc line: 17.2 A
		Heat Output
		
		• Approximate heat output in British Thermal Units (Btu) per hour:
		
		   – Minimum configuration: 683 Btu (200 watts)
		
		   – Maximum configuration: 2048 Btu (600 watts)
		
		Acoustical Noise Emissions Values
		
		• Sound power, idling: 6.6 bel maximum
		
		• Sound power, operating: 6.8 bel maximum
		
		• Sound pressure, operating: 67 dBa maximum

Changing jumper positions

Jumpers located on the system board and the processor board help you to customize the way your server operates.

Your system board and processor board contain two-pin and three-pin jumper blocks.

In some cases, groups of jumpers might combine to define a function.

Two-pin jumper blocks

Covering both pins with a jumper defines one function of the jumper block. To change the function of the jumper block, cover one pin only or remove the jumper entirely.

The following illustration identifies pins 1 and 2 on a two-pin jumper block.
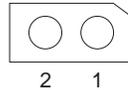
To change a jumper's position for a two-pin jumper block:

1. Turn off the server; then, disconnect the server power cords.

2. Remove the server cover (see "Preparing to install options" on page 43).

3. Do one of the following:

   - Lift the jumper straight off the pin block.
   - Align the holes in the bottom of the jumper with the two pins on the pin block, and then slide the jumper onto these pins.
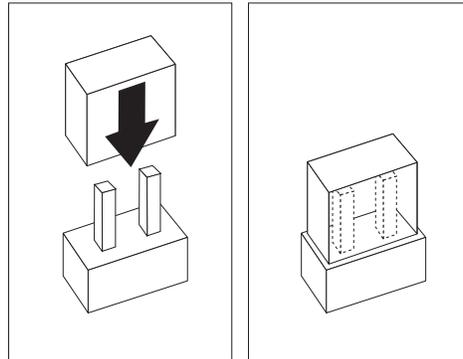
   - Align one of the holes in the bottom of the jumper with one of the pins on the pin block, and then slide the jumper onto that pin only.
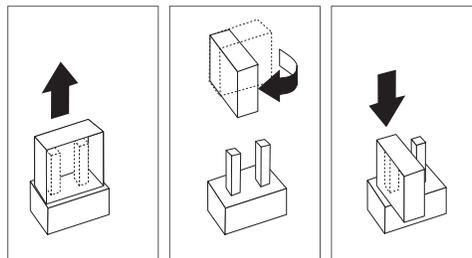
4. Reinstall the server cover and connect the cables (see "Completing the installation" on page 84).

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.

3   2   1
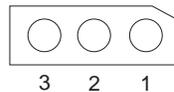
To change a jumper's position for a three-pin jumper block:

1. Turn off the server; then, disconnect the server power cords.

2. Remove the server cover (see "Preparing to install options" on page 43).

3. Lift the jumper straight off the pin block.

4. Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.
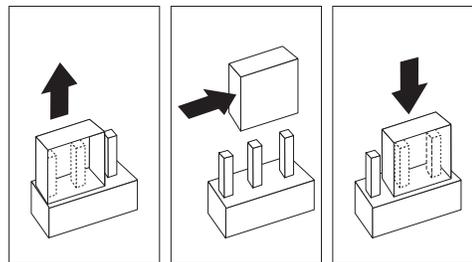
5. Slide the jumper fully onto these pins.

6. Reinstall the server cover and connect the cables (see "Completing the installation" on page 84).

System board component locations

The following illustration shows a layout of the system board and identifies system-board components. You might need to refer to this figure before you install hardware in your server, or when you record information in the tables in this chapter.
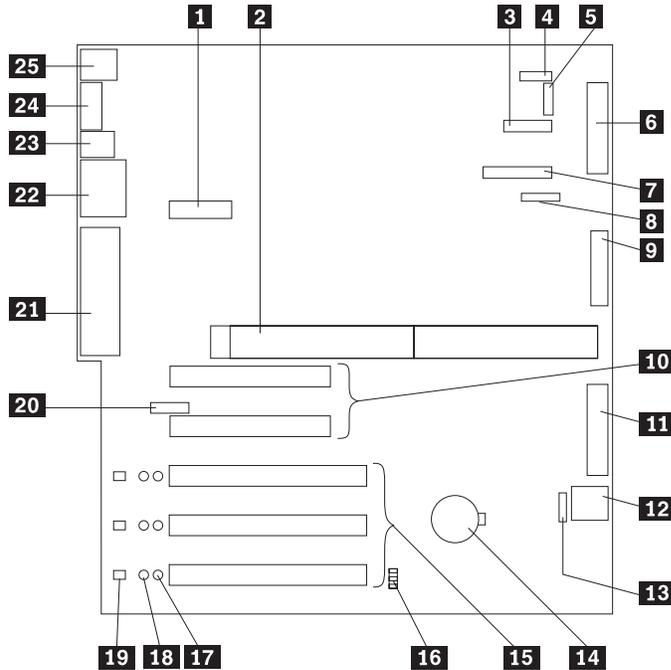
1 Dual serial and PCI hot-plug control switch connector (J1)
2 Microprocessor board connector (J4, J8)
3 Operator information panel connector (J29)
4 Reserved (J32)
5 Reserved (J10)
6 Diskette drive connector (J23)
7 Diagnostic LED panel connector (J6)
8 Reserved (J17)
9 Internal LVD (low voltage differential) SCSI connector (J25) (with extender cable on bracket)
10 PCI slots 1 and 2 (on primary PCI bus A)
11 IDE connector (J27)
12 Power control and reset panel cable connector (J18)
13 Advanced System Management Interconnect connector (J35)
14 Battery
15 PCI (hot-plug) slots 3–5 (on primary PCI bus B)
16 Jumper block (J20)
17 PCI slot Power Good LEDs
18 Internal PCI slot Attention LEDs
19 External PCI slot Attention LEDs
20 Advanced System Management adapter connector (J21)
21 External LVD SCSI/Parallel port connectors (J19)
22 Serial/video port connectors (J11)
23 USB 1 and USB 2 port connectors (J9) (USB 2 is below USB 1.)
24 Ethernet port connector (J7)

25 Mouse and keyboard connectors (J5) (The mouse connector is above the keyboard connector.)

System board jumpers

Table 16 describes the jumpers on the system board. The numbers in the table correspond to the highlighted numbers on the illustration in "System board component locations" on page 173.

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

The following illustration shows pin positions for the system board jumper J20. Pin 1 is the pin at the upper-left corner of J20 in the illustration of the system board in "System board component locations" on page 173.
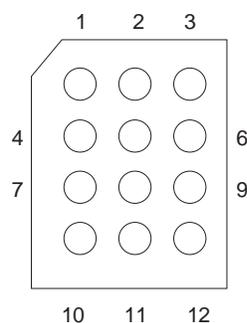
Table 16. System board jumper (J20)	
Jumper Pin Positions	**Description**
Pins 1–3	The default is no jumper on pins 1 , 2, and 3.
Pins 4–6	The default is a jumper on pins 4 and 5.
Pins 7–9	The default is a jumper on pins 8 and 9.
Pins 10–12	The default is a jumper on pins 10 and 11.

Processor board component locations

A layout of the processor board is shown in the following illustration.
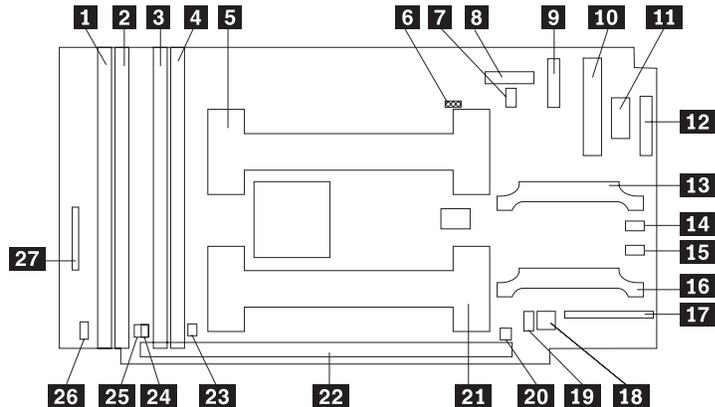
1 DIMM connector 4 (J1)
2 DIMM connector 3 (J2)
3 DIMM connector 2 (J3)
4 DIMM connector 1 (J4)
5 Microprocessor 2 connector (U6)
6 Reserved (J15)
7 Microprocessor 2 Error LED (CR13)
8 Reserved (J19)
9 Power supply connector (J6)
10 Power supply connector (J11)
11 Power supply connector (J12)
12 Power supply connector (J14)
13 VRM 2 connector (J13)
14 VRM 2 Error LED (CR19)
15 VRM 1 Error LED (CR17)
16 VRM 1 connector (J5)
17 Fans 1 and 2 connector (J8)
18 Switch block 2 (SW2)
19 Switch block 1 (SW1) (might not be present on your server)
20 Microprocessor 1 Error LED (CR12)
21 Microprocessor 1 connector (U5)
22 System board connectors (J9 and J25) (on reverse side of processor board)
23 DIMM 1 Error LED (CR8)
24 DIMM 2 Error LED (CR9)
25 DIMM 3 Error LED (CR10)
26 DIMM 4 Error LED (CR11)
27 Fan 3 connector (J10)

Processor board jumper and switches

Table 17 on page 176 contains the description of the jumper block located on the processor board. Table 18 on page 176 shows the switch settings for switch block 2. The highlighted numbers in the tables refer to the highlighted numbers in the illustration in "Processor board component locations."

Notes:

1. Turn off the server, and disconnect the power cords before moving any jumpers or changing any switch settings.

2. Be sure the processor speed switch is set correctly. For a 600/100 MHz[2] microprocessor, switch 2 of switch block 2 (SW2) must be set to ON. See Table 18 on page 176.

Attention: If switch 2 of switch block 2 is set incorrectly, components might overheat and component damage might occur. Be sure that the microprocessor core-frequency selection is properly set.

Table 17. Processor board jumpers	
Jumper name	**Description**
6 J15 Reserved	The default position is a jumper on pins 2 and 3.

Table 18. Processor board switch block 2 (SW2) Settings		
Switch	**Name**	**Description**
1	BIOS Recovery	The default position is OFF.
2	Processor Speed	The default position is ON (100 MHz). Changing the switch position to OFF sets the system bus speed to 133 MHz.
3	Reserved	The default position is OFF.
4	Bypass Power On Password	The default position is OFF. Changing the switch position to ON bypasses the power-on password check.

Bypassing an unknown power-on password

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

- Enter the administrator password at the power-on prompt, if an administrator password has been set. (If necessary, see "Using the administrator password menu" on page 24 for details.) Start the Configuration/Setup Utility program and change the power-on password. See "Using the power-on password menu" on page 23.

- Change switch 4 of switch block 2 (SW2) to the ON position to bypass the power-on password check. You can then start the Configuration/Setup Utility program and change the power-on password. See "Using the power-on password menu" on page 23.

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[2] 600 MHz denotes internal clock speed of the microprocessor only; other factors also affect application performance.

Appendix A. I₂O-compliant statement

I$_2$O is a new standard architecture for intelligent I/O that offloads low-level interrupts from the server processor to input/output processors (IOPs) designed specifically to handle I/O. I$_2$O-compliant adapters can improve I/O performance in high-bandwidth applications, such as client/server processing, video, and groupware.

The Netfinity 5600 server is intended to support I$_2$O-compliant (deep) adapters as listed in the ServerProven program. A deep adapter is a PCI card that has an embedded input/output processor (IOP). For the deep adapter to function correctly, the following items are needed:

- An operating system vendor-provided operating system service module (OSM) that supports the class of adapter (such as storage) that is being installed in the server.
- A PCI card vendor-provided hardware device module (HDM).

Appendix B. Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries and regions
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand

IBM power cord part number	Used in these countries and regions
62X1045	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

Index

Numerics

A

CD-ROM drive *(continued)*
  locations 67
  manual tray-release opening 9
  preinstalled 66, 67
  problems 143
  sizes 68
chair adjustments 15
changing
  configuration settings 20
  hardware configuration 151
  jumper positions 171
  memory addresses 30
  port assignments 21, 91, 92
  SCSI controller settings 31
  software configuration 151
  termination on SCSI devices 69
channels, SCSI 89
channels, ServeRAID
circulation, air 16
cleaning the monitor 16
clock
  real-time 113
comfort 15
communication
  requirements viii
communication port 91
compatibility
  adapter 52, 54
  video controller 3
completing the installation 84
configuration
  adapter conflicts 151
  adapter installation sequence 29
  adapter locations 165
  changing hardware 151
  changing software 151
  Configuration/Setup Utility program 19
  conflicts 29, 151
  default settings
    device records 165
    load default settings 28
  device change 113
  device records 165, 169
  EEPROM 19
  errors 19
  Ethernet adapter 34
  Ethernet controller 34
  Ethernet failover
    IntraNetWare 37
    OS/2 35
    Windows NT Server 36, 37
  hardware change 125
  memory change 114
  memory-address conflicts 151
  option conflicts 151
  peripheral component interconnect (PCI) 27

configuration *(continued)*
  power-on self-test (POST) 18
  restoring 20, 28
  universal serial bus (USB) 22
  utility programs 18
Configuration/Setup Utility program
  administrator password 24
  configuring devices 21
  configuring I/O ports 21
  controlling access to 24
  defining system security 22
  main menu 20
  power-on password 23
  setting Advanced System Management Processor
    time 22
  setting date and time 22
  setting passwords 22, 24
  setting service processor time 22
  starting 19
configure/view host adapter settings 31
configuring your server 18, 88
conflicts, configuration 29, 151
connecting
  adapter 52
  cables
    requirements for external devices 89
  external options 89
  internal drives, all bays 66, 67
connectors
  Advanced System Management Interconnect 3, 11
  auxiliary device 94
  descriptions 11
  device records 165
  Ethernet 12, 96
  expansion slots 52
  input/output 90
  input/output locations 11
  keyboard 3, 12, 93
  list of 3
  management port C 12, 91
  memory 64, 65
  monitor 3, 12
  mouse 3, 12
  parallel device 3, 12, 166
  parallel port 92
  pointing device 3, 12
  power 12, 14
  printer 12
  rear view of server 11
  SCSI 3, 12, 95
  serial device 3, 12
  serial port 91
  systems management port 91
  universal serial bus (USB) 3, 97
  universal serial bus 1 12
  universal serial bus 2 12

P

V

W

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