

326m Type 7969



Hardware Maintenance Manual and Troubleshooting Guide

326m Type 7969



Hardware Maintenance Manual and Troubleshooting Guide

Before using this information and the product it supports, read Appendix C, "Notices," on page 149.

The most recent version of this document is available at <http://www.ibm.com/pc/support/>.

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About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the IBM® 326m Type 7969 server.

Important: This manual is intended for trained servicers who are familiar with IBM @server® products. Before servicing an IBM product, be sure to review “Safety information” on page 107.

Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Leia todas as instruções de cuidado e perigo antes de executar qualquer operação.

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

安裝本產品之前，請先閱讀「安全資訊」。

Prenez connaissance de toutes les consignes de type Attention et

Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Accertarsi di leggere tutti gli avvisi di attenzione e di pericolo prima di effettuare qualsiasi operazione.

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.

Lea atentamente todas las declaraciones de precaución y peligro ante de llevar a cabo cualquier operación.

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. **Wash hands after handling.**

ADVERTENCIA: El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. **Lávese las manos después de usar el producto.**

Online support

You can download the most current diagnostic, BIOS flash, and device-driver files from <http://www.ibm.com/support/>.

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Chapter 1. General information

The IBM 326m Type 7969 server is a 1-U-high¹ rack model server for high-volume network transaction processing. This high-performance, symmetric multiprocessing (SMP) server is ideally suited for networking environments that require superior microprocessor performance, input/output (I/O) flexibility, and high manageability.

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

The server comes with a limited warranty. For more information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

You can obtain up-to-date information about the server at <http://www.ibm.com/us/eserver/opteron/>. You can obtain information about other IBM server products at <http://www.ibm.com/eserver/xseries/>.

For service or assistance information, see Appendix A, "Getting help and technical assistance," on page 105.

1. Racks are marked in vertical increments of 1.75 inches each. Each increment is referred to as a unit, or a "U". A 1-U-high device is 1.75 inches tall.

Related documentation

This *Hardware Maintenance Manual and Troubleshooting Guide* is provided in Portable Document Format (PDF). It contains information to help you solve a problem yourself or to provide helpful information to a service technician.

In addition to this *Hardware Maintenance Manual and Troubleshooting Guide*, the following 326m documentation is provided with your server:

- *Warranty and Support Information*

This document is in Portable Document Format (PDF) on the IBM @server *Documentation* CD. It contains information about the terms of the warranty and getting service and assistance.

- *Installation Guide*

This printed document contains instructions for setting up your server and basic instructions for installing some options.

- *User's Guide*

This document provides general information about the server, including information about features, how to configure the server, and how to get help.

- *Option Installation Guide*

This document is in PDF on the IBM @server *Documentation* CD. It contains detailed instructions for installing, removing, and connecting optional devices that your server supports.

- *Rack Installation Instructions*

This printed document contains instructions for installing your server in a rack cabinet.

- *Safety Information*

This document is in PDF on the IBM @server *Documentation* CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* book.

The server might have features that are not described in the documentation that you received with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the IBM Web site. Complete the following steps to check for updated documentation and technical updates:

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 7969, and click **Search**.

Notices and statements used in this book

The caution and danger statements that appear in this book are also in the multilingual *Safety Information* book, which is on the IBM @server *Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* book.

The following notices and statements are used in the documentation:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Features and specifications

The following information is a summary of the features and specifications of the server. Depending on the server model, some features might not be available, or some specifications might not apply.

Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors.

Racks are marked in vertical increments of 1.75 inches. Each increment is referred to as a unit, or “U.” A 1-U-high device is 1.75 inches tall.

Table 1. Features and specifications

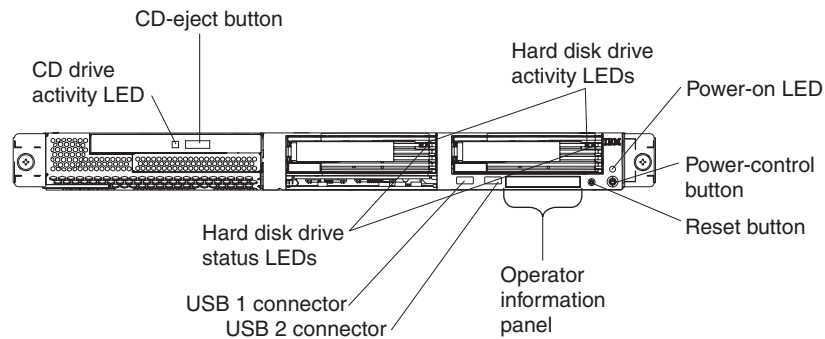
<p>Microprocessor:</p> <ul style="list-style-type: none"> • AMD Opteron™ processor • 1 MB Level-2 cache <p>Note: Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors.</p> <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 1024 MB • Maximum: 16 GB • Type: PC3200 error correcting code (ECC), double-data rate (DDR) SDRAM, registered DIMMs with Chipkill™ memory protection • Sizes: 512 MB, 1 GB, or 2 GB DIMMs in pairs • Four interleaved slots with standard microprocessor • Four additional interleaved slots with optional microprocessor <p>Drives:</p> <ul style="list-style-type: none"> • CD: Slim IDE (standard only on some models) • Hard disk drives: <ul style="list-style-type: none"> – Slim-high 3.5-inch drives, hot-swap SCSI or non-hot-swap Serial ATA (SATA) (drive capacity and speed vary with model) – Maximum: Two <p>Expansion slots:</p> <ul style="list-style-type: none"> • Two, used in either of the following configurations: <ul style="list-style-type: none"> – One 133 MHz/64-bit PCI-X (full-length) and one PCI Express x8 (half-length) – One PCI Express x8 (half-length) and one PCI Express x8 (full length) with purchase of PCI Express x8 riser card • Supports 3.3 V or universal adapters only 	<p>Video controller:</p> <ul style="list-style-type: none"> • ATI RN50b video controller on system board • Compatible with SVGA • 16 MB DDR1 video memory <p>Power supply:</p> <p>One 411 watt (115-230 V ac)</p> <p>Size:</p> <ul style="list-style-type: none"> • Height: 43 mm (1.69 in.) • Depth: 660 mm (25.98 in.) • Width: 440 mm (17.32 in.) • Weight: approximately 12.7 kg (28 lb) when fully configured <p>Integrated functions:</p> <ul style="list-style-type: none"> • Baseboard management controller • One single-channel LSI Ultra320 SCSI controller • Two Broadcom 10/100/1000 Ethernet controllers (dual-port design) with Wake on LAN® support • Four Universal Serial Bus (USB) ports • One serial port • One video port <p>Note: The baseboard management controller is also known as the service processor.</p> <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Declared sound power, idling: 6.5 bels • Declared sound power, operating: 6.5 bels <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Server on: 10° to 35°C (50.0° to 95.0°F). Altitude: 0 to 914 m (2998.7 ft) – Server on: 10° to 32°C (50.0° to 89.6°F). Altitude: 914 m (2998.7 ft) to 2133 m (6998.0 ft) – Server off: 10° to 43°C (50.0° to 109.4°F). Maximum altitude: 2133 m (6998.0 ft) • Humidity: <ul style="list-style-type: none"> – Server on: 8% to 80% – Server off: 8% to 80% • Airflow rates: <ul style="list-style-type: none"> – Minimum: 28 CFM – Maximum: 47 CFM 	<p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour for dual multiprocessor configurations:</p> <ul style="list-style-type: none"> • Minimum configuration: 409 Btu (120 watts) • Maximum configuration: 1366 Btu (400 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50-60 Hz) required • Input voltage low range: <ul style="list-style-type: none"> – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: <ul style="list-style-type: none"> – Minimum: 200 V ac – Maximum: 240 V ac • Input kilovolt-amperes (kVA), approximately: <ul style="list-style-type: none"> – Minimum: 0.120 kVA – Maximum: 0.400 kVA <p>Notes:</p> <ol style="list-style-type: none"> 1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use. 2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.
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Server controls, LEDs, and power

This section describes the controls and light-emitting diodes (LEDs) and how to turn the server on and off.

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server.



CD drive activity LED: When this LED is lit, it indicates that the CD drive is in use.

CD-eject button: Press this button to release a CD from the CD drive.

Hard disk drive activity LEDs: When one of these LEDs is flashing, it indicates that the associated SCSI hard disk drive is in use.

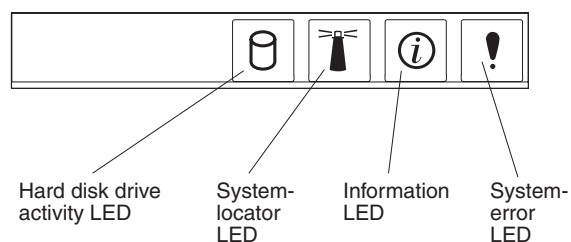
Power-on LED: When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed. A power-on LED is also on the rear of the server.

Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.

Power-control button: Press this button to turn the server on and off manually.

Reset button: Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button.

Operator information panel: This panel contains LEDs. The following illustration shows the LEDs on the operator information panel.



The following LEDs are on the operator information panel:

- **Hard disk drive activity LED:** When this LED is lit, it indicates that either of the hard disk drives is in use.
- **System-locator LED:** Use this blue LED to visually locate the server if it is in a location with numerous other servers. If your server supports IBM Director, you can use IBM Director to light this LED remotely.
- **Information LED:** When this LED is lit, it indicates that a noncritical event has occurred and is recorded in the error log. An LED near the failing component on the system board is also lit to help isolate the error.
- **System-error LED:** When this LED is lit, it indicates that a system error has occurred. A system-error LED is also on the rear of the server. An LED near the failing component on the system board is also lit to help isolate the error.

USB connectors: Connect a USB device to either of these connectors.

Important: If a Remote Supervisor Adapter II is installed in the server, the USB 1 connector is disabled.

Notes:

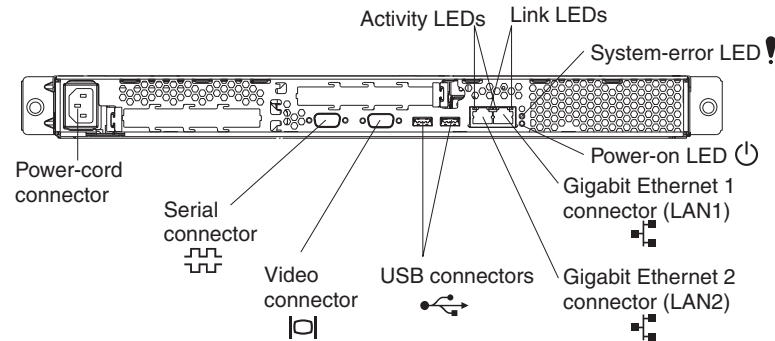
1. If you want to attach a keyboard or mouse to this server, you must use a USB keyboard or a USB mouse. For detailed information about the USB keyboard and how to connect it to your server, see the documentation that comes with the USB keyboard.
2. The server supports keyboardless operation. If a USB keyboard is not connected to the server, when the server is turned on or restarted, error message 301 will appear during POST. No action is required. POST will continue within one minute.
3. You must use an external USB diskette drive if:
 - You want to attach a diskette drive to this server.
 - You need to create an update diskette that contains the latest baseboard management controller firmware (see “Using the baseboard management controller firmware update program” on page 14).
 - You need to create update diskettes that contain the latest server BIOS code (see “Updating the BIOS code” on page 27).

Hard disk drive status LEDs: On some server models, each hot-swap hard disk drive has a status LED. If the status LED for a drive is lit continuously, that individual drive is faulty. The interpretation of a flashing status LED depends on the SCSI controller that is connected to the hot-swap drive, as follows:

- When the drive is connected to the integrated SCSI controller with RAID capabilities, a flashing status LED indicates that the drive is a secondary drive in a mirrored pair and the drive is being synchronized.
- When the drive is connected to an optional ServeRAID™ controller, a slowly flashing (one flash per second) status LED indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

Rear view

The following illustration shows the connectors and LEDs on the rear of the server.



Power-cord connector: Connect the power cord to this connector.

Activity LEDs (Ethernet): These green LEDs are on the dual Ethernet connector. When either LED flashes, it indicates that data is being transmitted or received between the server and the network device that is connected to the left or right connector. The flashing frequency is proportional to the amount of traffic on the network link.

Link LEDs (Ethernet): These LEDs are on the dual Ethernet connector. When either LED is lit, it indicates that there is an active link between the server and the network device that is connected to the left or right connector.

System-error LED: When this LED is lit, it indicates that a system error has occurred. An LED near the failing component on the system board is also lit to help isolate the error. A system-error LED is also on the front of the server.

Power-on LED: When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed. A power-on LED is also on the front of the server.

Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.

Gigabit Ethernet 1 (LAN 1) connector: Use this connector to connect the server to a network.

Gigabit Ethernet 2 (LAN 2) connector: Use this connector to connect the server to a network.

USB connectors: Connect a USB device to either of these connectors.

Video connector: Connect a monitor to this connector.

Serial connector: Connect a 9-pin serial device to this connector.

If an optional Remote Supervisor Adapter II (system-management adapter) is installed in PCI-X slot 1, the server has additional connectors and LEDs. See the documentation that comes with the adapter for more information about these connectors and LEDs.

Server power features

When the server is connected to an ac power source but is not turned on, the operating system does not run, and all core logic except for the service processor (also called the baseboard management controller) is shut down; however, the server can respond to requests from the service processor, such as a remote request to turn on the server. The power-on LED flashes to indicate that the server is connected to ac power but not turned on.

Turning on the server

Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active, and one or more fans might start running to provide cooling while the server is connected to power. You can turn on the server and start the operating system by pressing the power-control button.

The server can also be turned on in any of the following ways:

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned on from the Remote Supervisor Adapter II user interface.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to requests from the service processor, such as a remote request to turn on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.

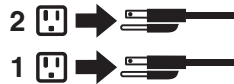
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 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.



The server can be turned off in any of the following ways:

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned off from the Remote Supervisor Adapter II user interface.
- The service processor can turn off the server as an automatic response to a critical system failure.
- You can turn off the server through a request from the service processor.

Chapter 2. Configuration

Note: Detailed information about configuration is available in the *User's Guide* for this server.

The following configuration programs and capabilities come with your server:

- **Configuration/Setup Utility program**

The Configuration/Setup Utility program is part of the basic input/output system (BIOS) code in your server. Use it to configure serial port assignments, change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords.

- **Ethernet controller configuration**

Detailed information about configuring the Ethernet controllers can be found in the *User's Guide* for this server.

- **RAID configuration programs**

- **LSI Logic Configuration Utility program**

Use the LSI Logic Configuration Utility to configure the integrated SCSI controller with RAID capabilities and the devices that are attached to it.

- **ServeRAID Manager**

ServeRAID Manager is available as a stand-alone program and as an IBM Director extension. If a ServeRAID adapter is installed in your server or if you are using the RAID capabilities of the SCSI controller, use ServeRAID Manager to define and configure your disk-array subsystem *before* you install the operating system. For more information on these programs, see the *User's Guide* for this server.

Using the Configuration/Setup Utility program

Use the Configuration/Setup Utility program to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords
- Set and change the startup characteristics of the server and the order of startup devices (startup-drive sequence)
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features
- View and clear error logs
- Change interrupt request (IRQ) settings
- Resolve configuration conflicts

Starting the Configuration/Setup Utility program

Complete the following steps to start the Configuration/Setup Utility program:

1. Turn on the server.
2. When the prompt Press F1 for Configuration/Setup appears, press F1. If you have set both a user (power-on) password and a supervisor (administrator) password, you must type the supervisor password to access the full Configuration/Setup Utility menu. If you do not type the supervisor password, a limited Configuration/Setup Utility menu is available.

3. Follow the instructions on the window.
4. Select settings to view or change.

For more information on using the Configuration/Setup Utility program, see the *IBM 326m User's Guide* on the IBM @server Documentation CD.

Using the RAID configuration programs

Use the LSI Logic Configuration Utility program and ServeRAID Manager to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use these programs as described in this book.

- Use the LSI Logic Configuration Utility program to:
 - Perform a low-level format on a SCSI hard disk drive
 - View or change SCSI IDs for attached devices
 - Set SCSI protocol parameters on SCSI hard disk drives
- Use ServeRAID Manager to:
 - Configure arrays
 - View your RAID configuration and associated devices
 - Monitor operation of your RAID controllers

Detailed information about these programs is available in the *User's Guide* that comes with this server.

Configuring the Gigabit Ethernet controllers

The two Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10-Mbps, 100-Mbps, or 1-Gbps network and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme Gigabit Ethernet Software CD* that comes with the server. To find updated information about configuring the controllers, complete the following steps.

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 7969, and click **Search**.
3. In the **Additional search terms** field, type ethernet, and click **Go**.

Note: To use the Wake on LAN features that appear on the configuration menu, your server must contain Wake on LAN hardware and software and your operating system must support Wake on LAN functions.

The Ethernet controllers support optional modes, such as teaming, priority packets, load balancing, fault tolerance, and virtual LANs, which provide higher performance,

security, and throughput for the server. These modes apply to the integrated Ethernet controllers and to the controllers on supported Ethernet adapters.

Using the LSI Logic Configuration Utility program

Use the LSI Logic Configuration Utility program to perform the following tasks:

- Perform a low-level format of a SCSI hard disk drive
- Set a SCSI device scan order
- View or change SCSI IDs for attached devices
- Create a mirrored pair of SCSI hard disk drives with or without a hot-spare drive
- Set SCSI protocol parameters on SCSI hard disk drives

The integrated SCSI controller with RAID capabilities supports redundant array of independent disks (RAID) arrays. You can use the LSI Logic Configuration Utility program to configure RAID level 1 for a single pair of attached devices. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change SCSI settings for attached devices.

The following sections provide instructions for starting the LSI Logic Configuration Utility program and performing selected functions.

Starting the LSI Logic Configuration Utility program

To start the LSI Logic Configuration Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt <<< Press <CTRL><C> to start LSI Logic Configuration Utility >>> appears, press Ctrl+C. If you have set an administrator password, you are prompted to type the password.
3. To select a controller (channel) from the list of adapters, use the arrow keys and press Enter.
4. To change the settings of the selected items, follow the instructions on the screen. If you select **Device Properties** or **Mirroring Properties**, additional screens are displayed.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Formatting a SCSI hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before performing this procedure.

Note: Before you format a SCSI hard disk, make sure that the disk is not part of a mirrored pair. From the list of adapters, select the controller (channel) for the drive that you want to format. Select **Mirroring Properties** and make sure that the mirroring value for the drive is **None**.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format.
2. Select **Device Properties**.
3. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key.

4. To start the low-level formatting operation, select **Format** and press Enter.

Using the baseboard management controller firmware update program

The baseboard management controller firmware update program updates the baseboard management controller firmware only and does not affect any device drivers.

Important: For correct server operation, be sure to update the baseboard management controller firmware before updating the BIOS code.

To download the program, go to <http://www.ibm.com/support/>, and click **Downloads and drivers**; then, copy the EXE file to a firmware update diskette or copy the ISO file to a firmware update CD.

To update the firmware, use one of the following procedures:

- If the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained it, follow the instructions that come with the package.
- If you are using a diskette or CD, complete the following steps.

Important: If you are using a diskette to update the firmware, you must have an external USB diskette drive attached to the server.

1. Turn off the server.
2. Insert the firmware update diskette into the diskette drive or insert the firmware update CD into the CD drive.
3. Turn on the server.

Note: If the server does not start from the external USB diskette drive, use the Configuration/Setup Utility program to configure the external USB diskette drive as a startup device. (For information about the Configuration/Setup Utility program, see the *User's Guide* on the IBM @server *Documentation* CD.) Then, start again at step 1 of this procedure.

If there is an error in updating the firmware, try the update again.

Configuring the baseboard management controller LAN connection

To configure the baseboard management controller local area network (LAN) connection options for the server, use the LAN configuration utility (`lancfg.exe`). This utility is on the baseboard management controller firmware update diskette. You can start the LAN configuration utility after you update the baseboard management controller firmware. See “Using the baseboard management controller firmware update program” on page 14 for instructions for downloading and updating the baseboard management controller firmware.

To configure the baseboard management controller LAN connection by using the LAN configuration utility, complete the following steps.

Note: You must run the LAN configuration utility (`lancfg.exe`) in a DOS command-line session after you start the server from the startable baseboard management controller firmware update diskette. Do not run the utility from a DOS window.

1. After the baseboard management controller firmware update is completed, a command prompt is displayed. Type `lancfg` and press Enter. The LAN configuration utility starts, and the BMC Information screen is displayed. The default values that are displayed are read-only. You cannot make changes in this screen.

To use the LAN configuration utility, press F10 and use the arrow keys to select the menu items at the top of the window.

2. Select **LanCfg**. The LAN Configuration screen is displayed. Type the values for the baseboard management controller in the fields and select **OK**.

Note: The **Host MAC Address** field is read-only and cannot be changed from the LAN configuration utility.

3. Select **Alert**. The Alert Setting screen is displayed. Type the applicable values for the server in the fields and select **OK**.

Note: In the **IP Address** field, type the IP address of the workstation to which the baseboard management controller will forward alerts.

4. Select **Security**. The Security Setting screen is displayed. You can maintain the four baseboard management controller user accounts on this screen. To make changes on this screen, select **Edit**, type your changes in the Edit screen, and select **OK**.
5. After you make all the changes and before you exit the LAN configuration utility, remove the firmware update diskette from the diskette drive.
6. Select **Exit**. When you are prompted to restart the server, select **Reboot**.

Chapter 3. Diagnostics

This chapter provides basic troubleshooting information to help you solve some common problems that might occur with the server.

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 105 for more information.

General checkout

The diagnostic programs are on the *IBM Enhanced Diagnostics* CD. These programs are the primary method of testing the major components of the server: the system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), serial ports, hard disk drives, and parallel port. You can also use them to test some external devices. See “Diagnostic programs and error messages” on page 20..

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 correctly.

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.

A failed server might be part of a shared hard disk drive cluster (two or more servers sharing the same external storage devices). Before running the diagnostic programs, make sure that the failing server is not part of a shared hard disk drive cluster.

A server might be part of a cluster if one or more of the following is true:

- The customer identifies the server as part of a cluster.
- One or more external storage units are attached to the server and at least one of the attached storage units is additionally attached to another server or unidentifiable source.
- One or more servers are located near the failing server.

If the failing server is suspected to be part of a shared hard disk drive cluster, all diagnostic tests can be run except diagnostic tests that test the storage unit (a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit.

Notes:

1. For servers that are part of a shared hard disk drive cluster, run one test at a time in looped mode. Do not run all tests in looped mode, because this could enable the hard disk drive diagnostic tests.
2. If multiple error codes are displayed, diagnose the first error code that is displayed.
3. If the server is suspended with a POST error, go to “POST error codes” on page 90.

4. If the server is suspended and no error message is displayed, see “Error symptoms” on page 84 and “Undetermined problems” on page 97.
5. For information about power-supply problems, see “Power checkout” on page 28 and Chapter 7, “Symptom-to-FRU index,” on page 77
6. For safety information, see “Safety information” on page 107.
7. For intermittent problems, check the error log; see “POST error messages” on page 20 and “Diagnostic programs and error messages” on page 20.

Checkout procedure

Complete the following steps to perform the checkout procedure.

001

IS THE SERVER PART OF A CLUSTER?

YES. Schedule maintenance with the customer. Shut down all servers related to the cluster. Run the storage test.

NO. Go to step **002**.

002

IF THE SERVER IS NOT PART OF A CLUSTER:

1. Turn off the server and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Turn on all external devices.
5. Turn on the server.
6. Record any POST error messages that are displayed on the screen. If an error is displayed, look up the first error in the “POST error codes” on page 90.
7. Check the System Error log. If an error was recorded by the server, see Chapter 7, “Symptom-to-FRU index,” on page 77.
8. Start the diagnostic programs. See “Diagnostic programs and error messages” on page 20.
9. Check for the following responses:
 - a. One beep
 - b. Readable instructions or the main menu

003

DID YOU RECEIVE BOTH OF THE CORRECT RESPONSES?

NO. Find the failure symptom in Chapter 7, “Symptom-to-FRU index,” on page 77.

YES. Run the diagnostic programs. If necessary, see “Diagnostic programs and error messages” on page 20.

If you receive an error, see Chapter 7, “Symptom-to-FRU index,” on page 77.

If the diagnostics were completed successfully and you still suspect a problem, see “Undetermined problems” on page 97.

Diagnostic tools overview

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST beep codes and error messages**

The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “Power-on self-test” for more information.

- **Diagnostic programs**

The diagnostic programs are stored on the *IBM Enhanced Diagnostics CD*. These programs are the primary method of testing the major components of the server. See “Diagnostic programs and error messages” on page 20 for more information.

- **Error charts**

These charts list problem symptoms and steps to correct the problem. See “Error charts” on page 23 for more information.

- **Symptom-to-FRU index**

This index lists problem symptoms and steps to correct each problem. See Chapter 7, “Symptom-to-FRU index,” on page 77 for more information.

Power-on self-test

When you turn on the server, the power on self-test (POST) performs a series of tests to check the operation of system components and some of the installed options.

If POST finishes without detecting any problems, the first window of the operating system opens or an application program appears.

If POST detects a problem, more than one beep might sound, and an error message appears on the screen.

Notes:

1. If you have a user password set, you must type the password and press Enter, when prompted, before the operating system will start.
2. A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will be resolved 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 short beep indicates the successful completion of POST.
- More than one beep indicates that POST detected a problem. For more information, see “Beep symptoms” on page 78.

If POST detects a problem (more than one beep sounds), an error message appears on the screen. See “Beep symptoms” on page 78 and “POST error codes” on page 90 for more information.

POST error messages

POST error messages can appear when a problem is detected during startup. For a complete list of POST messages, see “POST error codes” on page 90.

Diagnostic programs and error messages

The system diagnostic programs are stored on the *IBM Enhanced Diagnostics CD*. These programs are the primary method of testing the major components of the server.

The IBM Enhanced Diagnostics programs isolate problems from the server hardware and software. The programs run independently of the operating system and *must be run either from a CD or diskette*. If you want to run the diagnostic programs from a diskette, you must attach an external USB diskette drive to the server.

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing 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.

Error codes that might be displayed are listed at “Diagnostic error codes” on page 80.

The error code format is as follows:

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 201 is for memory.

ttt is the three-digit failure code for the exact test failure. (These codes are for trained service personnel.)

iii is the three-digit device ID. (These codes are for trained service personnel.)

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

cc are the check digits that are used to verify the validity of the information.

text message

is the diagnostic message that indicates the reason for the problem.

Text messages

The diagnostic text message format is as follows:

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) described in the previous list.

Result

can be one of the following text strings:

Passed

This result occurs when the diagnostic test is completed without any errors.

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

User Aborted

This result occurs when you stop the diagnostic test before it is complete.

Not Applicable

This result occurs when you specify 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

is additional information that is used to analyze the problem.

Downloading the diagnostics program

Complete the following steps to download the latest image of the IBM Enhanced Diagnostics and create a startable Enhanced Diagnostics diskette:

1. Go to <http://www.ibm.com/support/>.
2. Download the diagnostics file for the server to a hard disk drive directory (not to a diskette).
3. Go to a DOS prompt, and change to the directory where the file was downloaded.
4. Insert a blank high-density diskette into the diskette drive.

Note: Attach an external USB diskette drive to the server for this purpose.

5. Type in the following, and then press Enter: *filename a:* where *filename* is the name of the file you downloaded from the Web.

The downloaded file is self-extracting and is copied to the diskette. When the copy is completed, you have a startable or bootable IBM Enhanced Diagnostics diskette.

Starting the diagnostic programs and viewing the test log

The IBM Enhanced Diagnostics programs isolate problems from the server hardware and software. The programs run independently of the operating system and *must be run either from a CD or diskette*. This method of testing is generally used when other methods are not accessible or have not been successful in isolating a problem suspected to be hardware related.

An *IBM Enhanced Diagnostics* CD comes with the server. You can also download the latest version of the diagnostic programs from <http://www.ibm.com/support/>.

The test log records data about system failures and other pertinent information. The following sections describe the diagnostic procedure for the diagnostics CD and the diagnostics diskette.

Using the diagnostics CD

To start the IBM Enhanced Diagnostics using the CD, complete the following steps:

1. Turn off the server and any peripheral devices.
2. Turn on all attached devices; then, turn the server on.
3. When you see Press F1 For Configuration/Setup, press the F1 key.
4. When the Configuration/Setup Utility menu appears, select **Start Options**.
5. From the Start Options menu, select **Startup Sequence**.
6. Note the device selected as the First Startup Device. Later, you must restore this setting.
7. Select **CD-ROM** as the First Startup Device.
8. Press Esc two times to return to the Configuration/Setup Utility menu.
9. Place the *IBM Enhanced Diagnostics* CD in the CD-ROM drive.
10. Select **Save & Exit Setup** and follow the prompts. The diagnostics will load. Follow the instructions on the screen to run the diagnostics.
11. When the tests have completed, you can view the Test Log by selecting **Utility** from the top of the screen. You can save the test log to a file on a diskette or to your hard disk drive.

Important: When you finish running the diagnostics and utilities, remove the CD from the CD-ROM drive and turn off the server. You must restore the First Startup Device to the original setting. Use steps 2 through 8 of this procedure to do this.

Note: The system maintains the test-log data while the system is powered on. When you turn off the power to the server, the test log is cleared.

Using the diagnostic diskette

Do the following to start the IBM Enhanced Diagnostics using the diagnostics diskette, do the following:

1. Turn off the server and any peripheral devices.
2. Insert the IBM Enhanced Diagnostics diskette into the external USB diskette drive.
3. Turn on all attached devices; then, turn on the server.
4. Follow the instructions on the screen.
5. When the tests have completed, you can view the Test Log by selecting **Utility** from the top of the screen. You can save the test log to a file on a diskette or to your hard disk drive.

Note: The system maintains the test-log data while the system is powered on. When you turn off the power to the server, the test log is cleared.

6. When you have completed the diagnostics procedure, remove the diagnostic diskette from the diskette drive before restarting the server.

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.

Diagnostic error message tables

For descriptions of the error messages that might appear when you run the diagnostic programs, see “Diagnostic error codes” on page 80.

Notes:

1. Depending on the configuration, some of the error messages might not appear when you run the diagnostic programs.
2. If diagnostic error messages appear that are not listed in the tables, make sure that the server has the latest level of BIOS code installed.

Error charts

You can use the error charts to find solutions to problems that have definite symptoms (see “Error symptoms” on page 84).

Important: If diagnostic error messages are displayed that are not listed, make sure that the system has the latest levels of BIOS code installed.

Small computer system interface (SCSI) messages (some models)

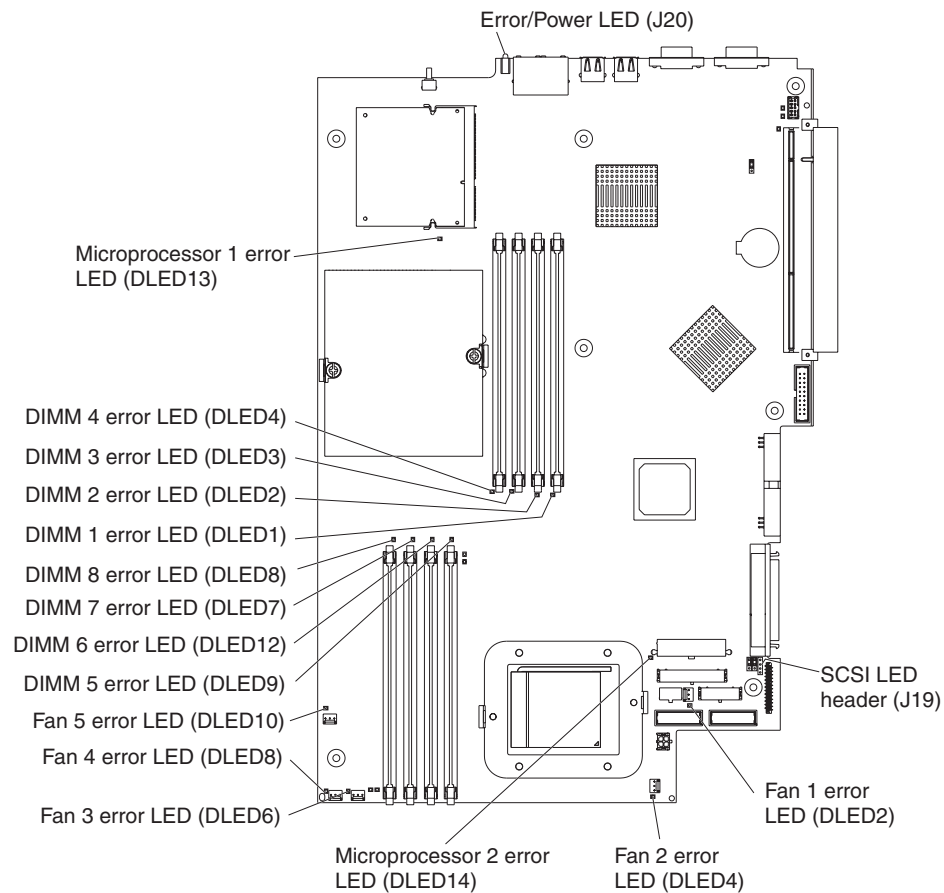
If the server has an Ultra320 SCSI adapter and you receive a SCSI error message, see “SCSI error codes” on page 96.

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

Error LEDs

The system-error LED on the front panel (see “Front view” on page 5) is lit to indicate that a system error has occurred. The system board has error LEDs for microprocessors, fans and memory that will help to locate the source of the error. Run the diagnostic programs (see “Starting the diagnostic programs and viewing the test log” on page 22) to find out the cause of the error.

Note: The illustrations in this document might differ slightly from your hardware.



Updating the BIOS code

Important: For correct server operation, be sure to update the baseboard management controller firmware before updating the BIOS code. For more information, see “Using the baseboard management controller firmware update program” on page 14.

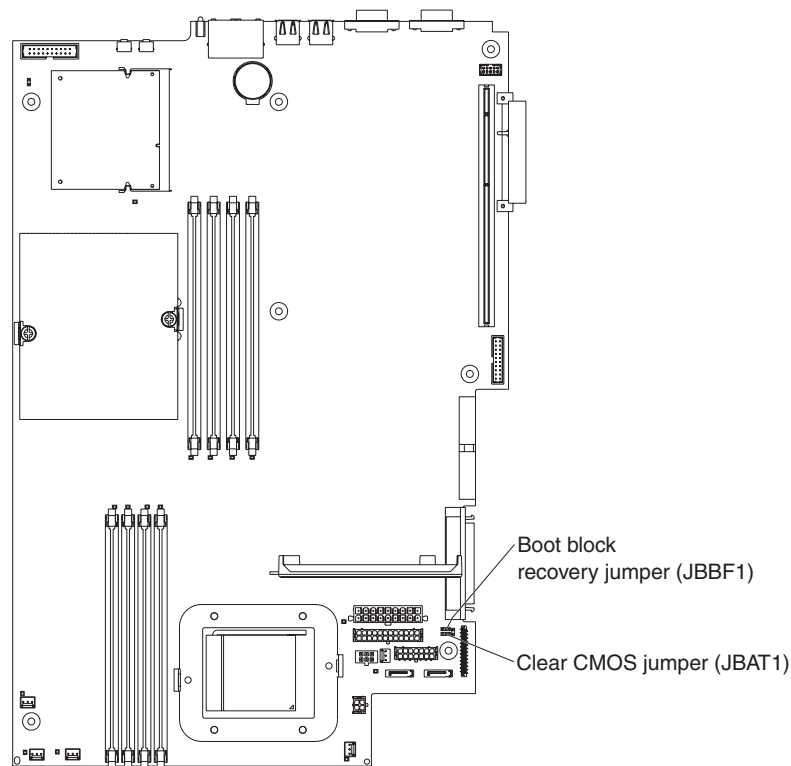
The most current level of BIOS code is available at <http://www.ibm.com/support/>. After you make sure that your server has the latest baseboard management controller firmware level, you can update the BIOS code on your server through one of the following methods:

- Downloading the latest BIOS code from this IBM Web site, creating an update diskette, and using an external USB diskette drive to install the BIOS code.
- Installing an update package for the Linux[®] or Microsoft[®] Windows[®] operating system, if available.

Recovering from a POST/BIOS update failure

If power to the server is interrupted while POST/BIOS code is being updated (flash update), the server might not restart (reboot) correctly or might not display video (no video). If this happens, you will need an IBM 326m System BIOS Crisis Recovery Diskette. You can download a file to create this diskette from <http://www.ibm.com/support/>. You will need an external diskette drive to create the diskette. When you have created the diskette, use the following recovery procedure using an external USB diskette drive:

1. Read “Safety information” on page 107, “Handling static-sensitive devices” on page 30, and “Installation guidelines” on page 29.
2. Turn off the server and all attached devices.
3. Unplug the power cord; then, disconnect all external cables.
4. Remove the cover (see “Removing the cover and bezel” on page 32).



5. Locate the boot block recovery jumper (JBBF1) on the system board.
6. Remove the boot block recovery jumper from pins 1 and 2; then, place the boot block recovery jumper onto pins 2 and 3.
7. Insert the IBM System BIOS Crisis Recovery Diskette for your server into the external USB floppy diskette drive A.
8. Replace the cover (see “Removing the cover and bezel” on page 32).
9. Connect the server to a power source, keyboard, monitor, and mouse.
10. The system will boot into a special recovery mode.

Note: There may be several minutes of apparent inactivity during this process.

11. After the recovery completes, turn off the server, monitor, and peripheral devices.
12. Disconnect all power cords and external cables; then, remove the cover.
13. Return the boot block recovery jumper to pins 1 and 2.

14. Reinstall the cover and remove the Crisis Recovery Diskette from the external USB diskette drive; then, reconnect all external cables and power cords and turn on the peripheral devices.
15. Turn on the server to restart the operating system.

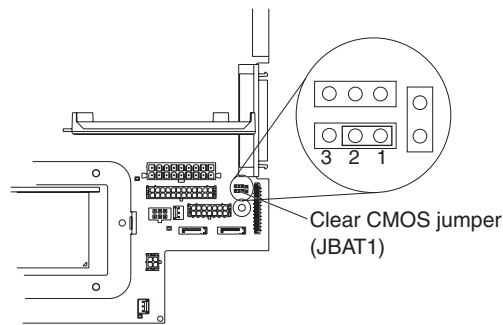
Resetting passwords

If you forget the user or supervisor password, you can change the position of the clear CMOS jumper (JBAT1) on the system board to bypass the user or supervisor password check. This enables you to reset these passwords. The jumper location is shown in the following illustration.

Attention: Before changing any switch settings or moving any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information beginning on page iii. Do not change settings or move jumpers on any system-board switch or jumper blocks that are not shown in this book.

To change the position of the clear CMOS jumper and reset the user and supervisor passwords, complete the following steps:

1. Review the safety information beginning on page iii.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables; then, remove the cover. See the section about removing the server cover and bezel in the *Option Installation Guide* on the IBM @server Documentation CD.
3. Move the jumper on JBAT1 from pins 1 and 2 (the default) to pins 2 and 3 to bypass the user and supervisor password check and to clear CMOS.



4. Replace the cover, connect the server to a monitor, and then connect it to a power source.
5. Turn on the server and wait until POST is completed.
6. Turn off the server and disconnect all power cords and external cables; then, remove the cover.
7. Move the jumper on JBAT1 from pins 2 and 3 to pins 1 and 2.
8. Replace the cover, connect the server to a USB keyboard, monitor, USB mouse, and peripheral devices; then, connect the server to a power source.
9. Reset the user and supervisor passwords:
 - a. Turn on the server and watch the monitor screen.
 - b. When the prompt Press F1 for Configuration/Setup appears, press F1.
 - c. Select **System Security** on the main menu.

Updating the BIOS code

Important: For correct server operation, be sure to update the baseboard management controller firmware before updating the BIOS code. For more information, see “Using the baseboard management controller firmware update program” on page 14.

The most current level of BIOS code is available at <http://www.ibm.com/support/>. After you make sure that your server has the latest baseboard management controller firmware level, you can update the BIOS code on your server through one of the following methods:

- Downloading the latest BIOS code from this IBM Web site, creating an update diskette, and using an external USB diskette drive to install the BIOS code.
- Installing an update package for the Linux or Microsoft Windows operating system, if available.

Power checkout

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

A general procedure for troubleshooting power problems is as follows:

1. Turn off the server, and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if there is a loose screw causing a short circuit on a circuit board.
3. Remove adapters and disconnect the cables and power connectors to all internal and external devices until the server is at the minimum configuration required to start the server (see “Minimum operating requirements” on page 97).
4. Reconnect all ac power cords and turn on the server. If the server starts successfully, replace adapters and devices one at a time until the problem is isolated. If the server does not start from the minimal configuration, replace FRUs of minimal configuration one at a time until the problem is isolated.

To use this method, you must know the minimum configuration that is required for the server to start (see page 97).

Chapter 4. Installing options

This chapter provides detailed instructions for installing hardware options in your server.

Installation guidelines

Before you begin installing options, read the following information:

- Read the safety information that begins on page iii and the guidelines in “Handling static-sensitive devices” on page 30. This information will help you work safely.
- Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 3, “Diagnostics,” on page 17.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
 - Make sure that you can stand safely without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before performing any steps that involve removing or installing adapter cables.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.

- For a list of supported options for the server, go to <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.
- You have replaced a hot-swap drive within 2 minutes of removal.

Handling static-sensitive devices

Attention: Static electricity can damage the server and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

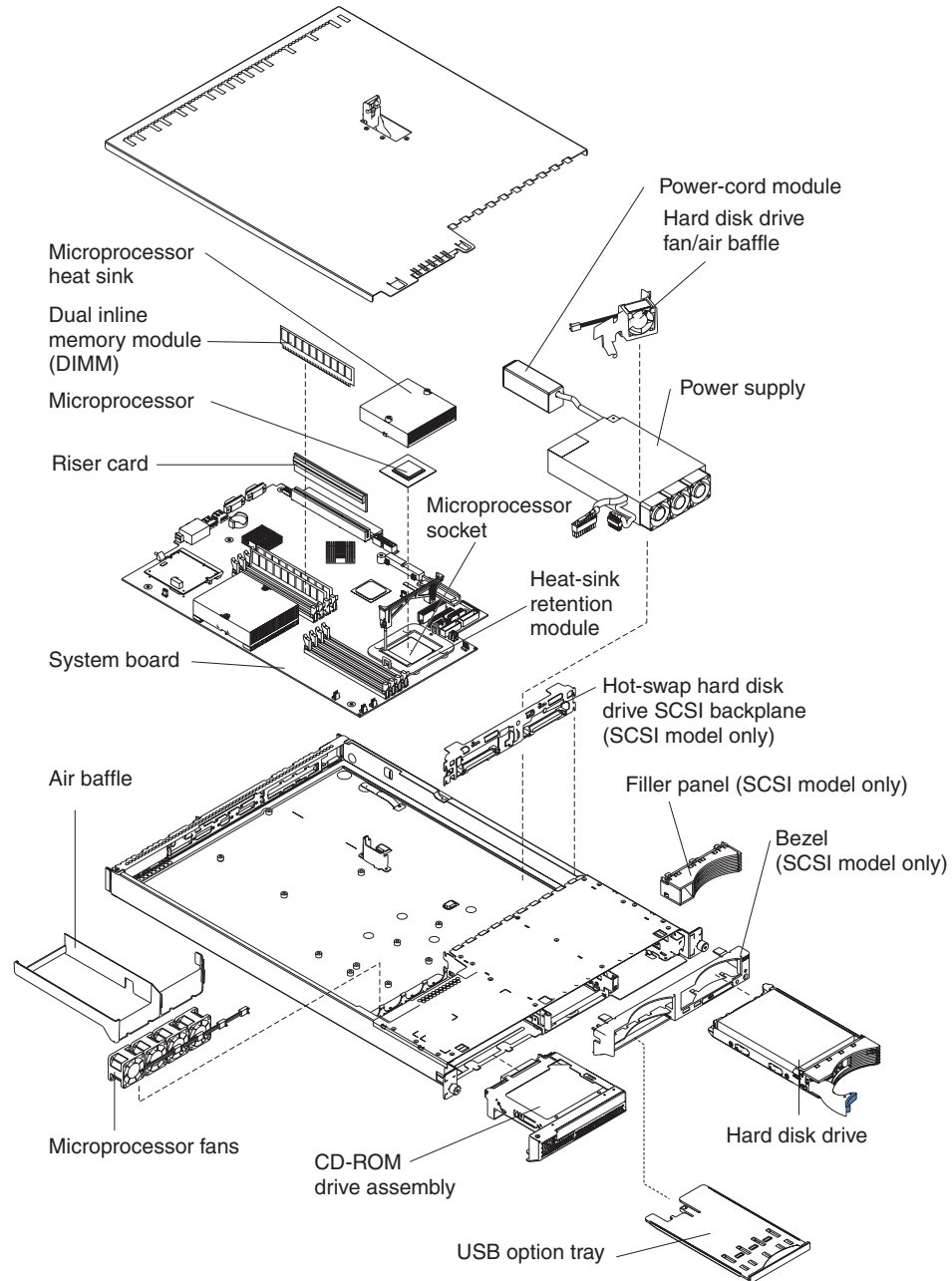
- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Major components of the 326m Type 7969 server

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

The following illustration shows the locations of major components in a small computer system interface (SCSI) hot-swap hard disk drive model server. A Serial ATA (SATA) non-hot-swap hard disk drive model is also available.

Note: The illustrations in this document might differ slightly from your hardware.

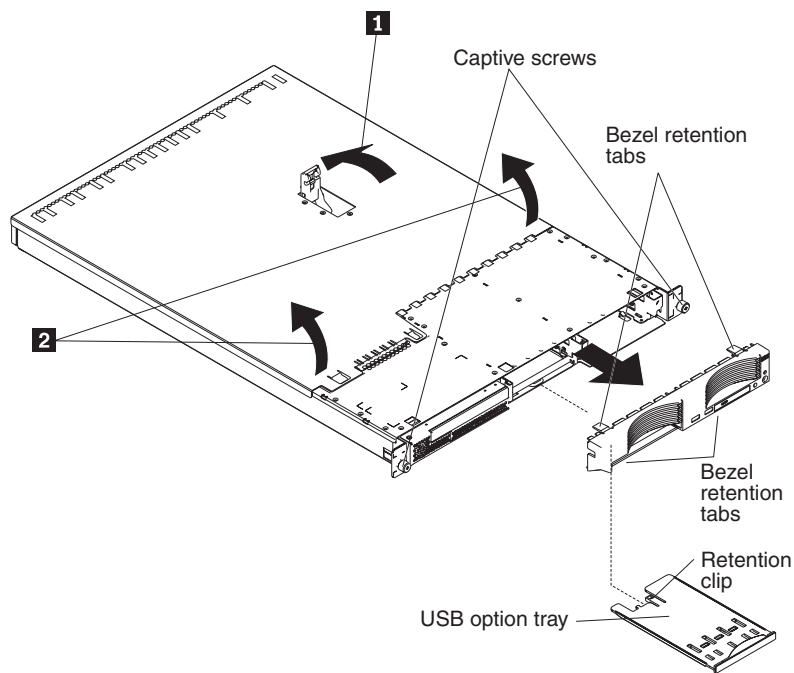


Removing the cover and bezel

Important: Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 3, “Diagnostics,” on page 17.

To remove the cover and bezel (with the server out of the rack), complete the following steps:

1. Read the safety information that begins on page iii and “Installation guidelines” on page 29.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack. Lift the cover release latch; the cover slides to the rear approximately 13 mm (0.5 inch).



4. Lift the cover off the server.
Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the cover removed might damage server components.
5. If you are installing a non-hot-swap hard disk drive, remove the USB option tray. Press in on the USB option tray (below hard disk drive bay 1) to release it and slide the tray out until it stops; then, press the retention clip at the bottom rear of the tray and remove the tray from the server.

Note: You need to remove the USB option tray and the bezel only if you are installing a non-hot-swap hard disk drive. It is not necessary if you are installing other options in the server.

6. Press on the bezel retention tabs on the top, right side and bottom of the server, and pull the bezel directly away from the server.

Installing an adapter

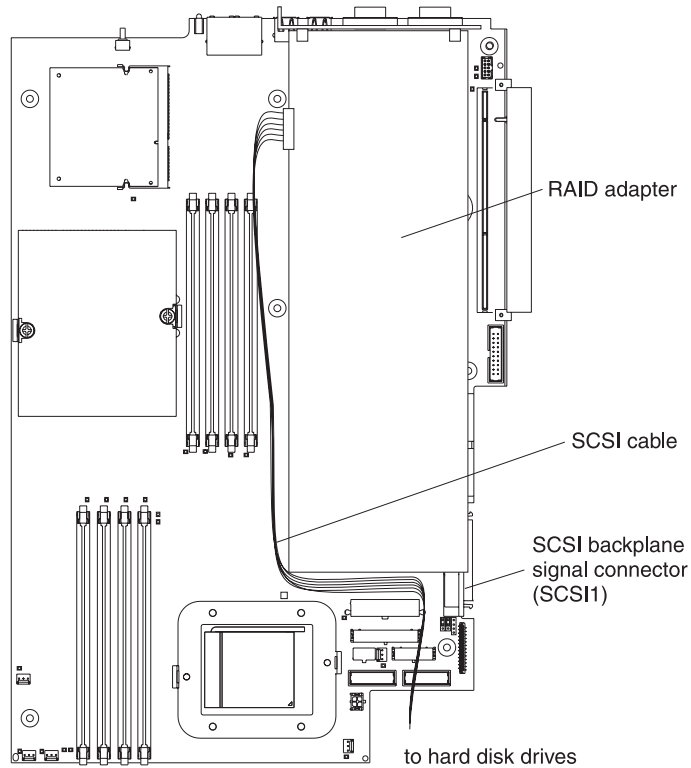
The following notes describe the types of adapters that the server supports and other information that you must consider when installing an adapter:

- Read the documentation that comes with your operating system.
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you need to change switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.
- The server comes with one 64-bit, 133 MHz peripheral component interconnect-extended (PCI-X) slot (full-length riser card) and one half-length PCI Express x8 slot. An optional PCI Express x8 slot can be added with a riser card if the PCI-X riser card is removed first.
- You can install a full-length or half-length adapter in slot 1. You can install only a half-length adapter in slot 2.
- The server is designed specifically for PCI-X adapter support, but it also supports PCI adapters.
- The server supports 3.3 V and universal PCI and PCI-X adapters; it does not support 5.0-V-only adapters.
- The integrated video controller is on PCI bus 1. The PCI-X expansion slot is on PCI-X bus 1. The integrated Ethernet controllers are on PCI-X bus 2. The integrated SCSI controller is on PCI-X bus 3. The PCI Express expansion slots are on PCI Express buses 1 and 2.
- The server scans PCI-X and PCI Express slots to assign system resources. By default, the server starts (boots) devices in the following order: system SCSI devices; PCI express and PCI-X devices; then, IDE and SATA devices.

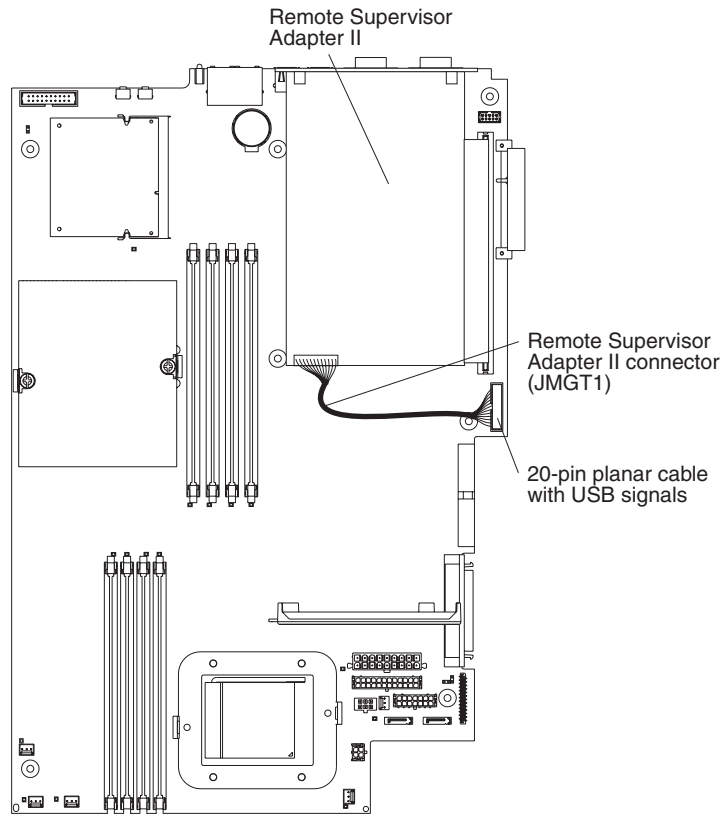
Note: To change the boot precedence for PCI and PCI-X devices, you must disable the devices through the Configuration/Setup Utility program. Start the Configuration/Setup Utility program and select **Startup** from the main menu. Then, select **Startup Sequence** and use the arrow keys to specify the startup order. For more information, see the *User's Guide* on the IBM @server Documentation CD.

- You can install either an optional SCSI adapter or an optional redundant array of independent disks (RAID) adapter in PCI-X slot 1 only. The server supports a variety of RAID adapters for both internal and external configurations. For the most current list of supported RAID adapters, go to <http://www.ibm.com/servers/eserver/serverproven/compat/us/>. For details about installing a RAID adapter, see the documentation that comes with the adapter.

- If you plan to use a RAID adapter to control internal hot-swap hard disk drives, disconnect the SCSI cable from the SCSI backplane signal connector (SCSI1) on the system board and connect it to the RAID adapter. The following illustration shows the cable routing if you are installing the RAID adapter in PCI-X slot 1. See the documentation that comes with the RAID adapter for any additional cabling instructions. That documentation also provides information about installing the RAID software and configuring the RAID adapter.

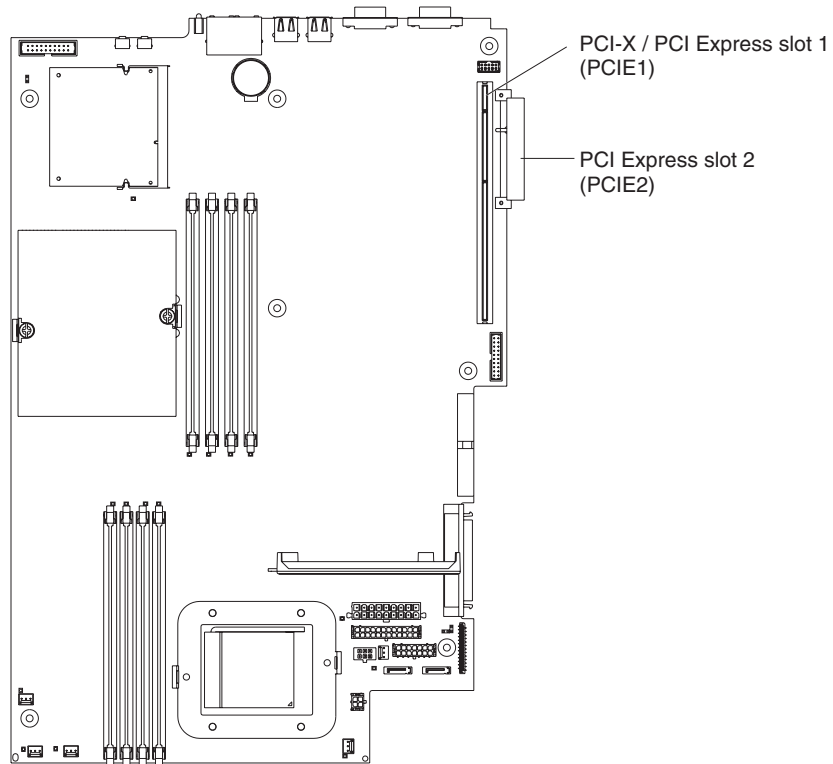


- The optional IBM Remote Supervisor Adapter II can be installed only in PCI-X slot 1. Use the 20-pin planar cable with USB signals that comes with the Remote Supervisor Adapter II to connect the 20-pin connector on the rear edge of the adapter to the Remote Supervisor Adapter II connector (JMGT1) on the system board. For details about installing a Remote Supervisor Adapter II, see the documentation that comes with the adapter. The following illustration shows the cable routing.

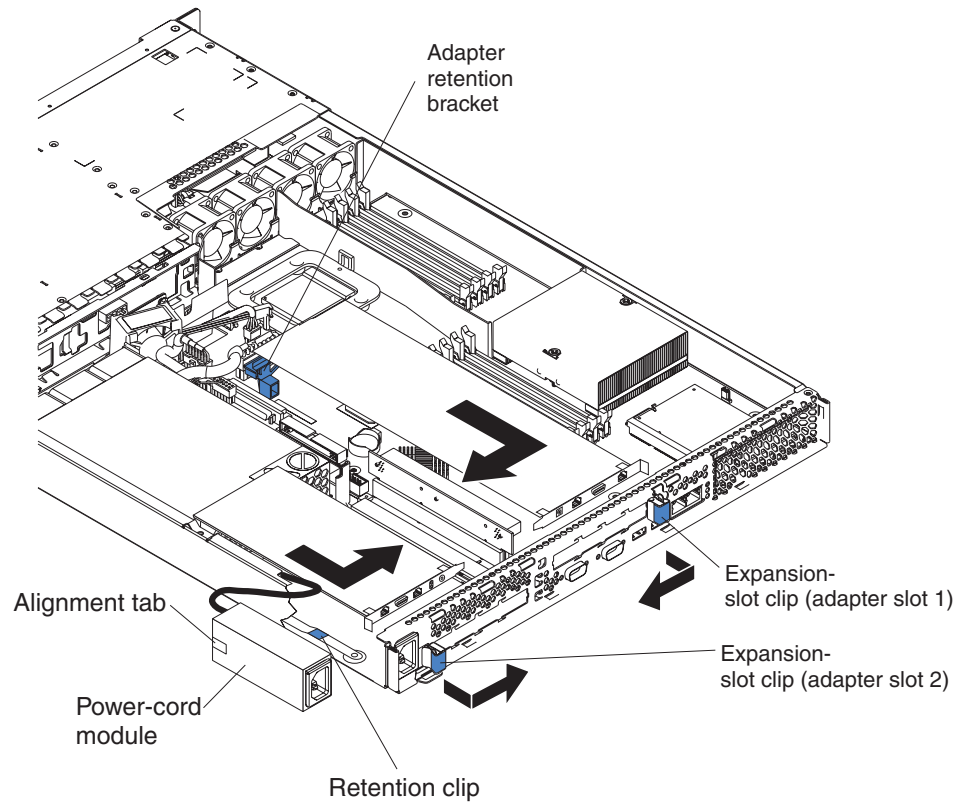


To install an adapter, complete the following steps:

1. Read the safety information that begins on page iii and “Installation guidelines” on page 29.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 32).
4. Determine which PCI slot you will use for the adapter.

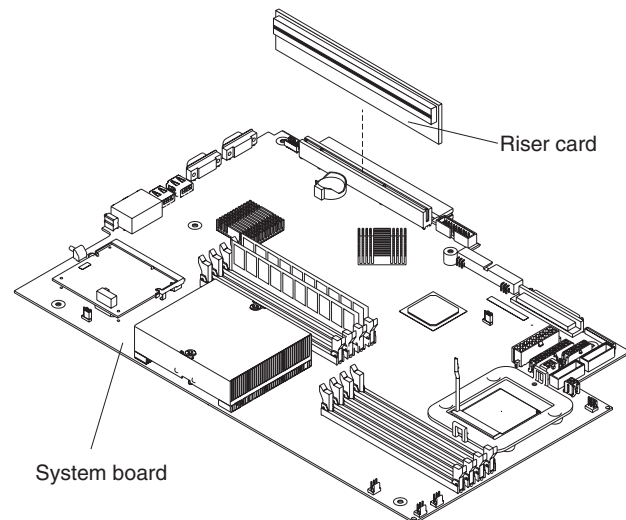


5. On the rear panel, squeeze the expansion-slot clip to unlock the clip; then, pull the clip out from the server until it stops and rotate the clip as shown in the following illustration. It remains loosely attached to the server.



Attention: Avoid touching the components and gold-edge connectors on the adapter. Ensure that the adapter is completely and correctly seated in the slot. Incomplete insertion might cause damage to the system board or to the adapter.

6. Remove the expansion slot cover from the slot.
7. To gain access to PCI-X slot 1, remove the PCI riser card from its connector.



8. To gain access to PCI Express slot 2, remove the power-cord module.
 - a. Press down on the retention clip at the front of the power-cord module and slide the module toward the front of the server until the alignment tab is free of the slot on the side of the server.
 - b. Lift and place the power-cord module out of the server as far as the power supply cable permits.
9. Install the adapter:

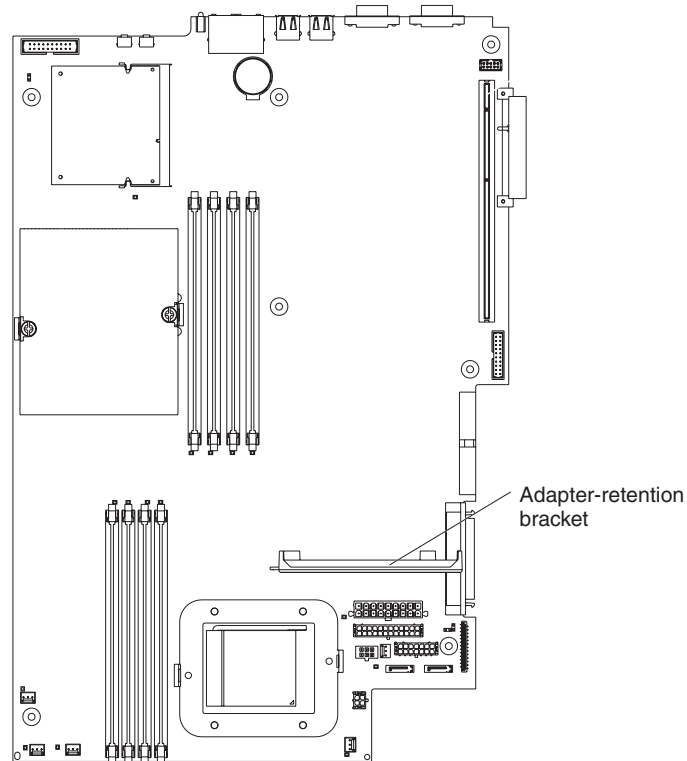
Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 30.

 - a. Remove the adapter from the static-protective package and set any jumpers or switches on the adapter as directed by the adapter manufacturer. If you are installing a full-length adapter, you might have to remove a plastic bracket secured to the adapter with 2 screws before installing the adapter.

Attention: When you install an adapter, make sure that the adapter is correctly seated in the connector before you turn on the server. Improperly seated adapters might cause damage to the system board, the riser card, or the adapter.
 - b. If you are installing an adapter in PCI-X slot 1, attach the PCI riser card to the adapter. Reinstall the PCI riser card with the adapter already attached to the PCI riser card.
 - c. Grasp the adapter by its top edge or upper corners, align it with the connector, and press it *firmly* into the connector.
10. Slide the expansion-slot clip toward the server until it snaps into place to secure the adapter in the adapter slot.
11. Connect any internal cables to the adapter. See the instructions that come with the adapter for details.

Attention: Make sure that the cables do not block the flow of air from the fans.
12. If you removed the power-cord module to install the adapter in PCI Express slot 2, install the module by reversing the procedure in step 8a. Ensure that the alignment tab is fully seated in the slot on the side of the server.

13. If you installed a full-length adapter in PCI-X slot 1, secure the adapter by flexing the adapter-retention bracket toward the front of the server and inserting the front corners of the adapter into the recesses in the latch.



14. Perform any configuration tasks required for the adapter.
If you installed a Remote Supervisor Adapter II, see the documentation that comes with the Remote Supervisor Adapter II for information about installing the Remote Supervisor Adapter II firmware and configuring the adapter. After you initially configure the adapter, create a backup copy of the configuration so that if you need to replace the adapter in the future, you can restore the configuration and resume normal operation more quickly.
15. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 53.

Installing a hard disk drive

The following notes describe the types of hard disk drives that your server supports and other information that you must consider when installing a hard disk drive:

- The server supports two 25.4-mm (1-inch), slim, 3.5-inch hard disk drives. SCSI server models come with a hot-swap SCSI backplane.
- The SCSI server models support low voltage differential (LVD) hot-swap drives. Each hot-swap drive is in a tray, which has a green activity LED and an amber status LED in the upper-right corner. These LEDs are lit if the drive is active and, in some cases, if the drive fails. Each hot-swap drive has a single-connector-attached (SCA) connector, which is connected directly into the hot-swap SCSI backplane. The backplane is attached to connector J12 on the system board and controls the SCSI IDs for the hot-swap drives.

Note: The drive in bay 1 is assigned SCSI ID 0; the drive in bay 2 is assigned SCSI ID 1.

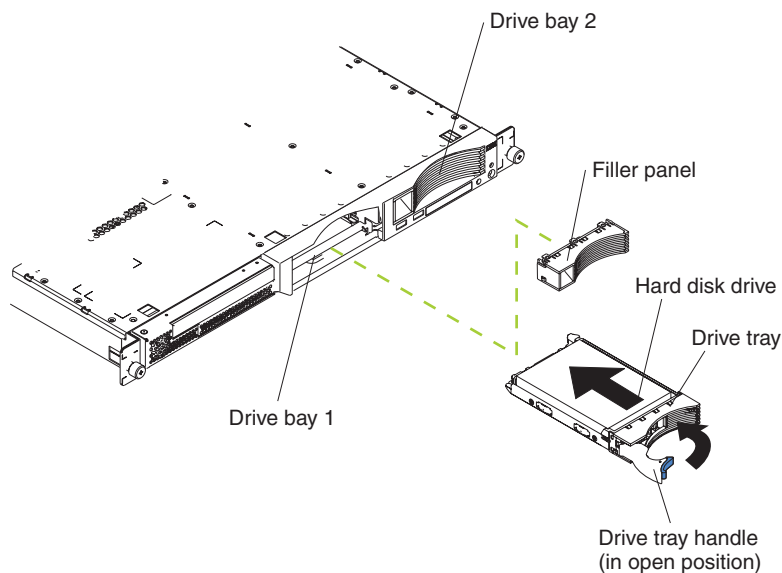
- A non-hot-swap hard disk drive does not require a backplane or tray and it does not have indicator LEDs. However, you must attach the blue rails that come with the drive before installing it in the server.
- A non-hot-swap hard disk drive has a jumper block on the rear. Install a jumper in the cable-selection position of the jumper block. For details, see the notes under step 4 on page 41, and the documentation that comes with the drive.
- If you install only one hard disk drive, for faster startup, install it in the primary startup device bay. For hot-swap SCSI drives, the drive in bay 1 is the primary startup device. For SATA drives, the drive in bay 2 is the primary startup device.
- If you are installing a hot-swap drive, continue with “Installing a hot-swap hard disk drive.” If you are installing a non-hot-swap drive, go to “Installing a non-hot-swap hard disk drive” on page 41.

Installing a hot-swap hard disk drive

Before you install a hot-swap hard disk drive, review the following information:

- Inspect the drive tray for any signs of damage.
- Ensure that the drive is installed in the tray correctly.
- If your server has an optional RAID adapter installed, see the documentation provided with the adapter for information about installing a hard disk drive.

To install a hot-swap SCSI hard disk drive, complete the following steps:



1. Read the safety information that begins on page iii and “Installation guidelines” on page 29.
2. Remove the filler panel from the applicable drive bay.

Note: To ensure adequate system cooling, do not operate the server for more than 2 minutes without either a hard disk drive or a filler panel installed in each bay.

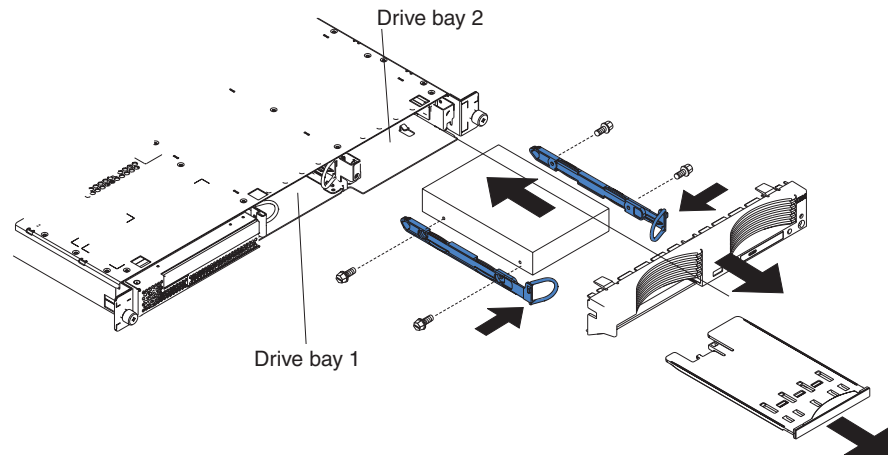
3. Install the new hard disk drive in the drive bay.
4. Check the hard disk drive status LED and activity LED to verify that the drive is operating correctly.
5. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 53.

Installing a non-hot-swap hard disk drive

Before you install a non-hot-swap hard disk drive, read the following information:

- See the documentation that comes with the drive for any cabling instructions.
- Route the cable *before* you install the drive. Do not block the airflow from the fans.

Complete the following steps to install a non-hot-swap hard disk drive:



1. Read the safety information that begins on page iii and “Installation guidelines” on page 29.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 32).
4. Press in on the USB option tray to release it and slide the tray out until it stops; then, press the retention clip at the bottom rear of the tray and remove the tray from the server. Press on the bezel retention tabs and pull the bezel directly away from the server.

Notes:

- a. If you have only one non-hot-swap hard disk drive, install it in the right-hand bay (bay 2) with a jumper installed in the cable-selection-enabled position of the jumper block on the rear of the drive.
 - b. If you have two drives and you want the server to determine the master drive and subordinate drive automatically, install jumpers in the cable-selection-enabled position of the jumper block on both drives.
 - c. If you want to assign master and subordinate drives manually, install a jumper in the master position for the drive in bay 2 and install a jumper in the subordinate position for the drive in bay 1.
5. Install the hard disk drive in the drive bay:
 - a. Attach the rails to the sides of the drive using 2 screws for each rail.
 - b. Slide the drive into the bay until the rail latches snap into place.
 - c. Connect the signal and power cables to the rear of the drive. Keep the cables clear of the airflow path of the fan behind the drive bays.
 6. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 53.

Installing a memory module

The following notes describe the types of dual inline memory modules (DIMMs) that your server supports and other information that you must consider when installing DIMMs:

- Your server uses interleaved dual inline memory modules (DIMMs), which you must add, remove, or replace in pairs. Each pair must be of the same type, capacity, and speed. The server comes with one pair of DIMMs installed in DIMM slots 1 and 2 on the system board.
- You can increase the amount of memory in the server by replacing the installed DIMMs with higher-capacity DIMMs or by installing additional pairs of DIMMs.
- To optimize system performance in a single-microprocessor configuration, install DIMMs in the following sequence:

DIMM pair	DIMM slots
1	1 and 2
2	3 and 4

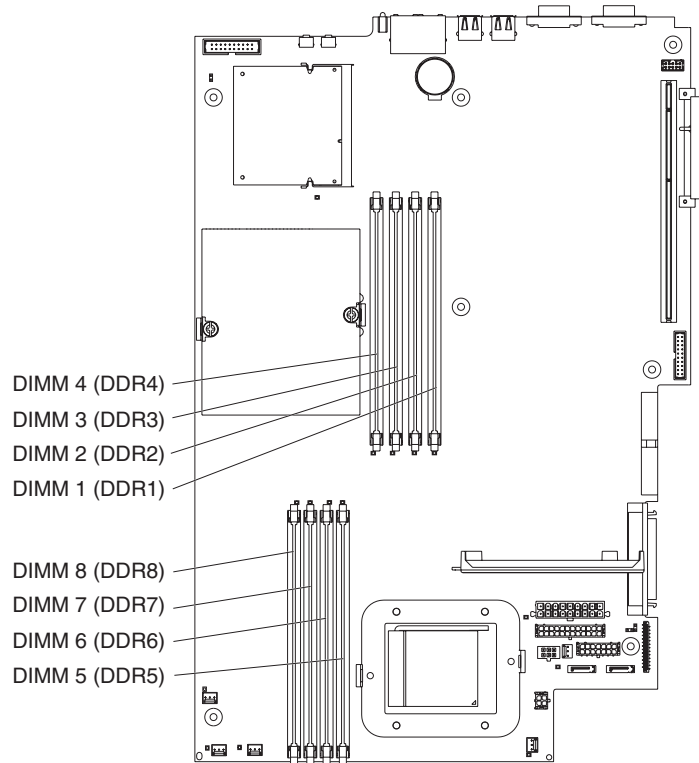
- To optimize system performance in a dual-microprocessor configuration, install DIMMs in the following sequence:

DIMM pair	DIMM slots
1	1 and 2
2	7 and 8
3	3 and 4
4	5 and 6

- The server supports 512 MB, 1 GB, and 2 GB DIMMs. The memory can be expanded to a maximum of 16 GB using PC3200 2 GB DIMMs. See the ServerProven[®] list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for a list of memory modules that the server supports.

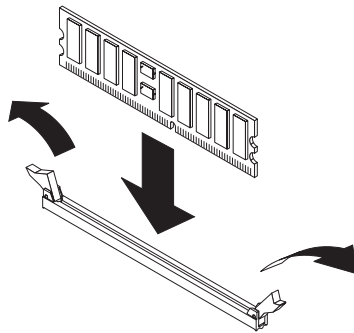
Important:The amount of memory installed must be the same for each microprocessor. For example, if you want to install four 1 GB DIMMs and four 512 MB DIMMs, install one pair of 1 GB DIMMs and one pair of 512 MB DIMMs for each microprocessor so that the total amount of memory for each microprocessor equals 3 GB of RAM.

The following illustration shows the memory slots on the system board.



To install DIMMs, complete the following steps:

1. Read the safety information that begins on page iii and “Installation guidelines” on page 29.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 32).
Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
4. Open the retaining clip on each end of the DIMM connector.
5. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
6. Turn the DIMM so that the DIMM keys align correctly with the slot.



7. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down

into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

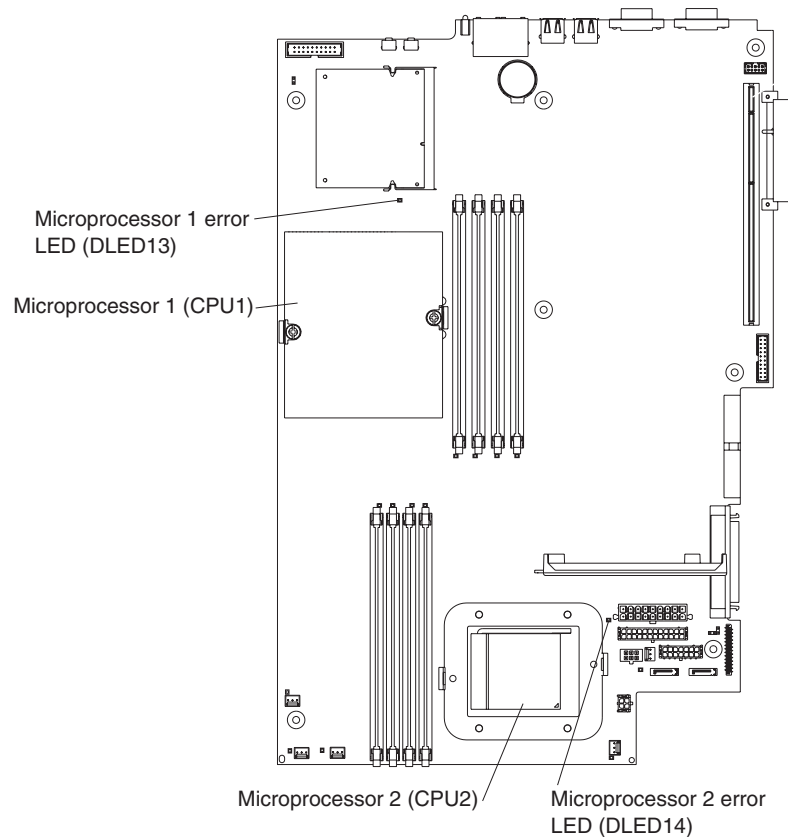
Important: In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank monitor screen. If this occurs and the **Boot Diagnostic Screen** or **QuickBoot Mode** feature on the **Start Options** menu of the Configuration/Setup Utility program is enabled (its default setting), you must restart the server three times to force the basic input/output system (BIOS) to reset the configuration to the default configuration (the memory connectors enabled).

8. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 53.

Installing an additional microprocessor

The following notes describe the type of microprocessor that your server supports and other information that you must consider when installing a microprocessor:

- The server comes with one microprocessor installed. The following illustration shows the two microprocessor sockets on the system board. The voltage regulator modules (VRMs) for microprocessors 1 and 2 are on the system board.



- If one microprocessor is installed, it is installed in microprocessor socket 1 (CPU1) and supports both the startup and application processes.
- If you install a second microprocessor in the server, the server operates as a symmetric multiprocessing (SMP) server, and operating-system 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. Microprocessor 2 is installed in socket 2 (CPU2).

- If one microprocessor and four DIMMs are installed in the server and you add a second microprocessor without adding more DIMMs, move the pair of DIMMs in memory slots 3 and 4 to memory slots 7 and 8.
- Read the documentation that comes with the microprocessor to determine whether you need to update the BIOS code. The most current level of BIOS code for the server is available at <http://www.ibm.com/support/>. For additional information, see the *User's Guide* on the IBM @server Documentation CD.
- To use SMP, obtain an SMP-capable operating system. For a list of supported operating systems, go to <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

Attention: To avoid damage and to ensure proper server operation, review the following information before you install a microprocessor:

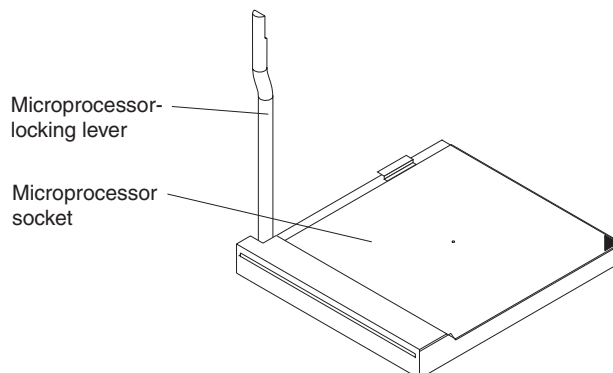
- Make sure that the microprocessors are the same type, have the same cache size, and have the same clock speed.
- See the ServerProven list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for a list of microprocessors that are supported by the server.

To install a microprocessor, complete the following steps:

1. Read the safety information that begins on page iii and “Installation guidelines” on page 29.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 32). Determine the socket where the microprocessor is to be installed.

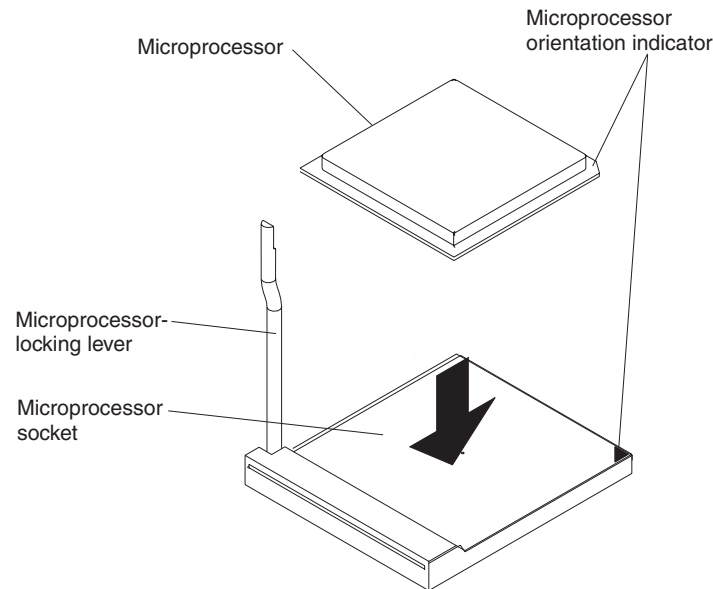
Attention:

- Avoid touching the components and gold-edge connectors on the microprocessor. Make sure that the microprocessor is completely and correctly seated in the socket. Incomplete insertion might cause damage to the system board or to the microprocessor.
 - When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 30.
4. If you are installing a microprocessor in the microprocessor 2 socket, lift the microprocessor-locking lever to the open position.



5. 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. Position the microprocessor over the microprocessor socket as shown in the following illustration. Carefully press the microprocessor into the socket.

Attention: To avoid bending the pins on the microprocessor, do not use excessive force when pressing it into the socket.



6. Close the microprocessor-locking lever to secure the microprocessor.

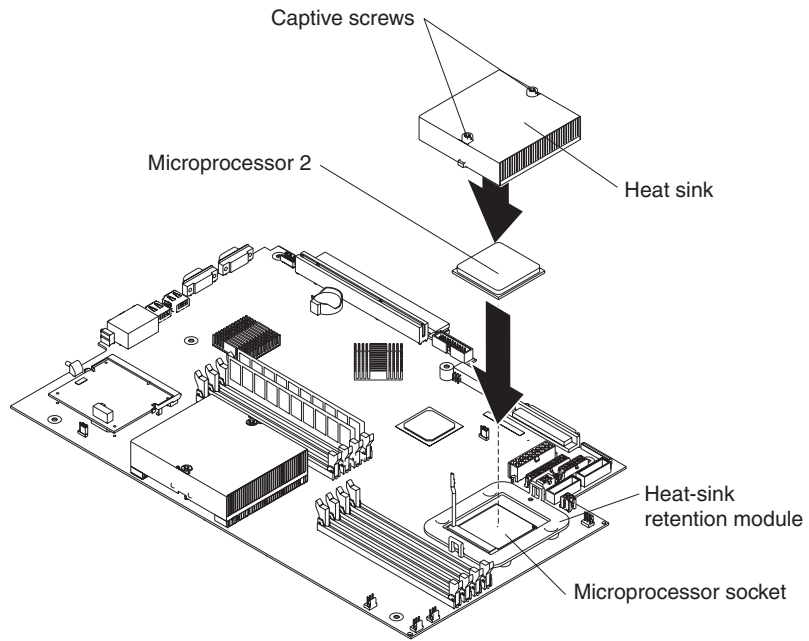
Note: A new microprocessor comes in a kit with a heat sink.

7. Install the heat sink.

Attention: Do not disturb or contaminate the thermal material on the bottom of the new heat sink. Doing so damages its heat-conducting capability and exposes the new microprocessor to overheating.

- a. Remove the heat sink from its package and remove the cover from the bottom of the heat sink.
- b. Make sure that the thermal material is still on the bottom of the heat sink, and position the heat sink on top of the microprocessor.
- c. Align the captive screws on the heat sink with the holes on the heat-sink retention module.
- d. Press firmly on the captive screws and tighten them, alternating between screws until they are tight. Do not overtighten the screws by using excessive force.

Attention: If you need to remove the heat sink after installing it, note that the thermal material might have formed a strong bond between the heat sink and the microprocessor. Do not force the heat sink and microprocessor apart; doing so can damage the microprocessor pins. Loosening one captive screw fully before loosening the other captive screw helps break the bond between the components without damaging them.



8. If you have other options to install, install them now. Otherwise, continue with “Completing the installation” on page 53.

Replacing the battery

When replacing the battery, you must replace it with a lithium battery of the same type, from the same manufacturer. To avoid possible danger, read and follow the safety statement below.

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.

Note: After you replace the battery, you must reconfigure your server and reset the system date and time.

Statement 2:



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: See “Battery return program” on page 151 for more information about battery disposal.

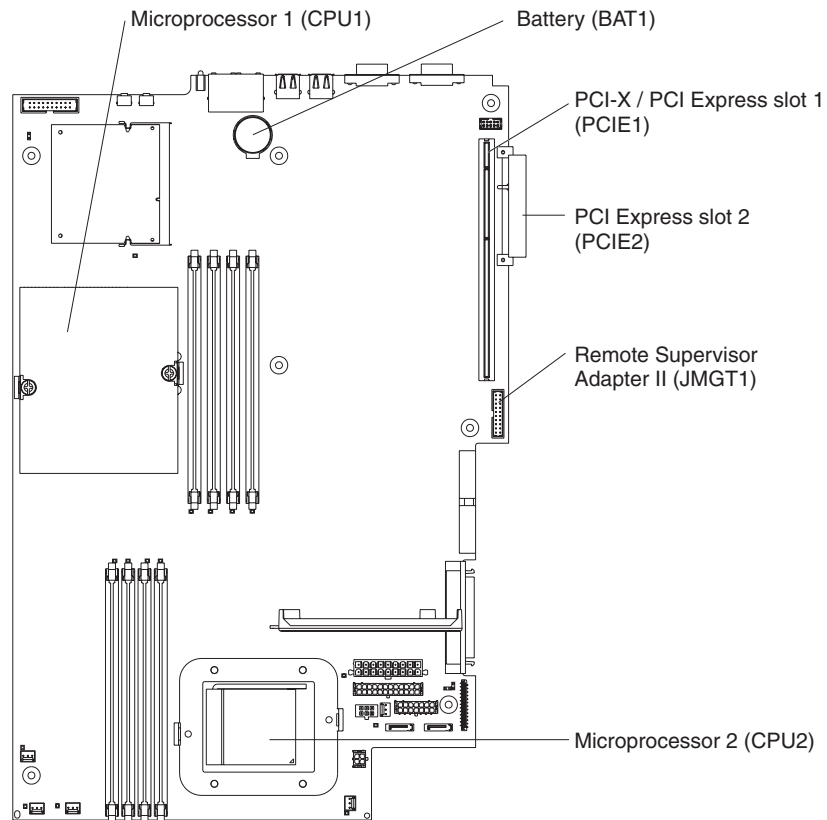
To replace the battery, complete the following steps:

1. Read the safety information that begins on page iii, “Installation guidelines” on page 29, and follow any special handling and installation instructions that come with the replacement battery.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 32).

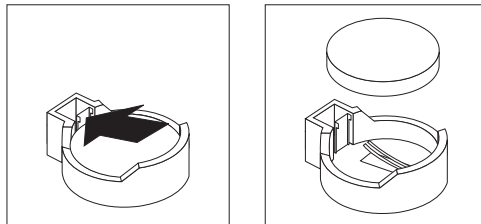
Attention: Do not remove the PCI adapter shield from the server.

4. Uncover the system board by pulling the PCI adapter shield to one side.

5. Locate the battery (connector BAT1) on the system board.

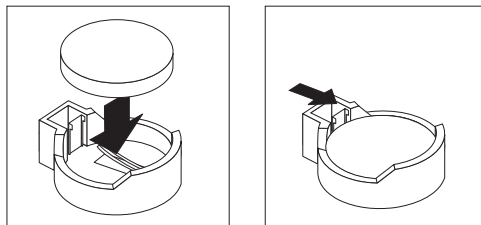


6. Remove the battery:
 - a. Use one finger to press on the tab that secures the battery to its housing.



- b. Use one finger to slide the battery up and out from its socket. The spring mechanism will push the battery out toward you as you slide it from the socket.
7. Insert the new battery:

- a. Hold the battery so that the larger side is facing up.



- b. Place the battery into its socket, and press the battery down until it snaps into place.

8. Put the PCI adapter shield back into place.
9. Reinstall the server cover, and connect the cables.
10. Turn on the server.
11. Start the Configuration/Setup Utility program and set configuration parameters.
 - Set the system date and time.
 - Set the user (power-on) password.
 - Reconfigure the server.

For information, see the section about using the Configuration/Setup Utility program in the *User's Guide* on the IBM @server Documentation CD.

Replacing a fan assembly

The server comes with five replaceable fans.

Complete the following steps to replace the fan assembly. Use this procedure to replace any fan in the server.

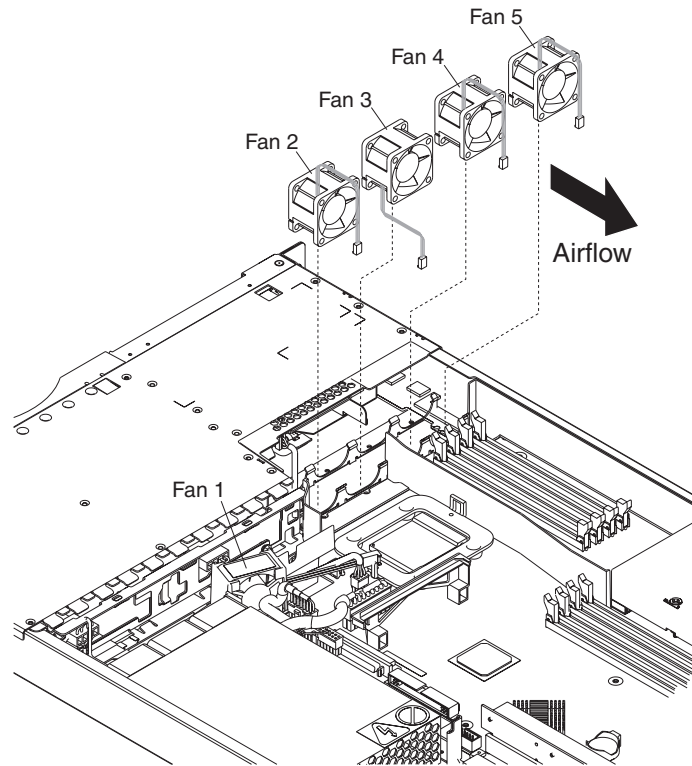
1. Read the safety information that begins on page iii and "Installation guidelines" on page 29.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see "Removing the cover and bezel" on page 32).

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see "Handling static-sensitive devices" on page 30.

4. Determine which fan to replace by checking the LED at each fan; a lit LED indicates the fan to replace.

Note: For more information about the LEDs, see the *Hardware Maintenance Manual and Troubleshooting Guide*.

5. Remove the fan from the server:
 - a. Disconnect the fan cable from the system board.
 - b. Lift the fan out of the server, noting its orientation in the server.



6. Position the replacement fan correctly:
 - a. The airflow arrow on the side of the fan must point toward the rear of the server.
 - b. Fans 2, 4, and 5 are positioned so that the fan cable exits from the fan near the top of the server.
 - c. Fan 3 is positioned so that the fan cable exits from the fan near the bottom of the server (a 180° difference from Fans 2, 4, and 5).

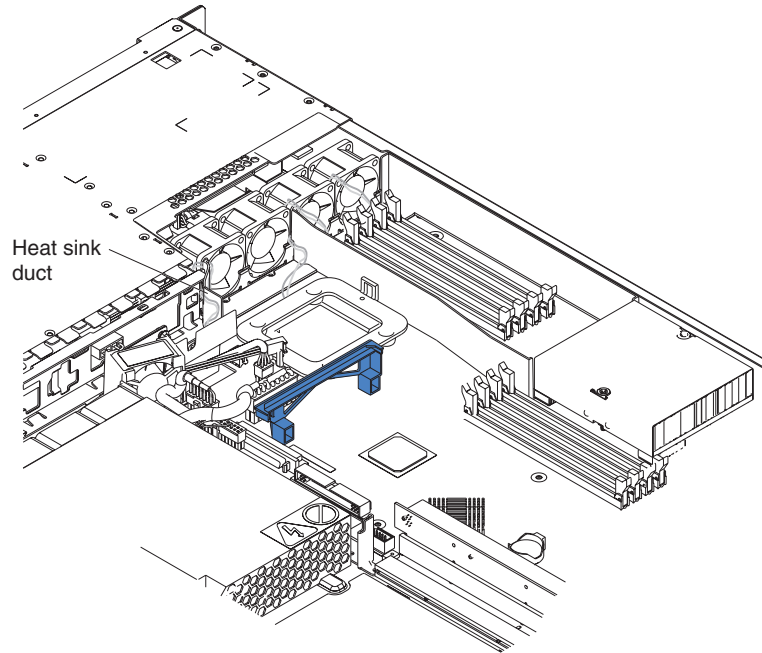
Note: Correct airflow is from the front to the rear of the server.

7. Connect the replacement fan cable to the system board.

Note: If you are replacing more than one fan, install all fans in the server before connecting the cables to the system board.

Attention: Improper routing of the fan cables can result in crimps or cuts of the fan cabling, which might jeopardize fan performance. When routing cables, make sure that:

- a. The cable for Fan 2 is routed up, and then through and around the heat sink duct, as shown in the following illustration.

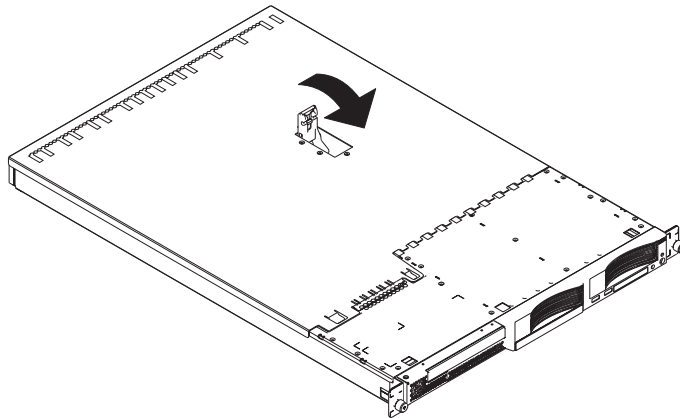


- b. The cables for Fans 3, 4, and 5 are routed up, and then over to the appropriate connectors on the system board.
 - c. The fan cables do not come into contact with the metal fan bracket when installation is completed.
8. Continue with “Completing the installation” on page 53.

Completing the installation

To complete the installation, complete the following steps:

1. Position the internal cables so they do not interfere with the cover installation.
Attention: Before sliding the cover forward, make sure that all the tabs on both the front and rear of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be very difficult to remove the cover later.
2. Position the cover on top of the server and slide it forward. Press down on the cover latch. The cover slides forward into position. Ensure that the cover engages the tabs at the front and rear of the server.



3. If you removed the bezel, position the bezel directly in front of the server and press it into place so that the retention tabs snap into the holes on the top, right side, and bottom of the server.
4. If you removed the USB option tray, insert it fully into the slot below hard disk drive bay 1.
5. Install the server in the rack. For details, see the *Rack Installation Instructions* that come with the server.

Note: Depending on the options that you installed, after cabling the server, you might need to run the Configuration/Setup Utility program to update the server configuration. For more information, see “Updating the server configuration” on page 54 and the *User’s Guide* on the IBM @server Documentation CD.

6. To attach peripheral devices and connect the power cord, continue with “Connecting the cables.”

Note: If you installed a SCSI drive, check the LEDs to verify proper operation after you reconnect the power cord.

Connecting the cables

This section provides basic information about attaching peripheral devices such as a keyboard and pointing device to the server.

For detailed information about external options and how to connect them to your server, see the documentation that comes with these options. For the location of external ports and connectors on the server, see the *User’s Guide* on the IBM @server Documentation CD.

To attach non-USB devices to the server, use the cables that come with the devices and connect the cables to the appropriate ports on the server (see Chapter 5, “I/O connectors,” on page 57).

To attach a USB device to the server, use the cable that comes with the device and connect the cable to one of the four USB ports on the server (see “Universal Serial Bus connectors” on page 58).

Important: If a Remote Supervisor Adapter II is installed in the server, the USB 1 connector is disabled.

- If you want to attach a keyboard or mouse to this server, you must use a USB keyboard or a USB mouse. For detailed information about the USB keyboard and how to connect it to your server, see the documentation that comes with the USB keyboard.
- The server supports keyboardless operation. If a USB keyboard is not connected to the server, when the server is turned on or restarted, error message 301 will appear during POST. No action is required. POST will continue within one minute.
- You might want to create update diskettes that contain the latest baseboard management controller firmware and BIOS code. Use an external USB diskette drive if you want to attach a diskette drive to this server. For information about updating the baseboard management controller firmware and BIOS code, see the *User's Guide* on the IBM @server Documentation CD.

Depending on the options that you installed, after cabling the server, you might need to run the Configuration/Setup Utility program to update the server configuration. For more information, see “Updating the server configuration” and the *User's Guide* on the IBM @server Documentation CD.

Updating the server configuration

When you start the 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. The Configuration/Setup Utility program automatically starts so that you can save the new configuration information. For more information, see the section about configuring the server in the *User's Guide* on the IBM @server Documentation CD.

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

The server comes with at least one microprocessor installed on the system board. If you have installed an additional microprocessor, the server can now operate as an SMP server. Therefore, you might need to upgrade the operating system to support SMP. For additional information, see the operating-system documentation.

If the server has an optional RAID adapter and you have installed or removed a hard disk drive, see the documentation that comes with the RAID adapter for information about configuring disk arrays.

To configure the integrated Gigabit Ethernet controllers, see the section about configuring the Gigabit Ethernet controllers in the *User's Guide* on the IBM @server Documentation CD.

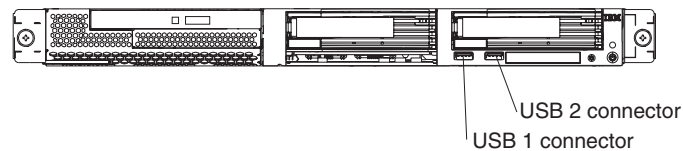
If you have just installed a Remote Supervisor Adapter II to manage the server from a remote location, see the documentation that comes with the adapter for information about setting up and configuring the adapter and using the adapter to manage the server remotely.

Chapter 5. I/O connectors

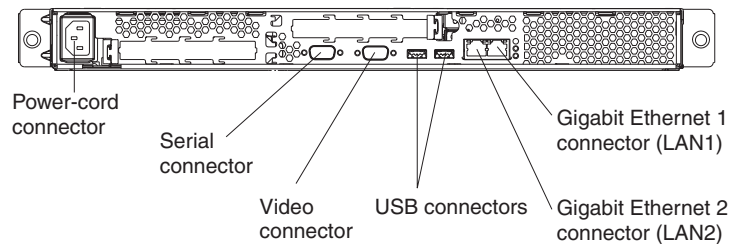
Your server has the following input/output (I/O) connectors:

- Two Ethernet (rear)
- One serial (rear)
- Four Universal Serial Bus (USB) (two front, two rear)
- One video (rear)

The following illustration shows the locations of the connectors on the front of the server.



The following illustration shows the locations of the connectors on the rear of the server.

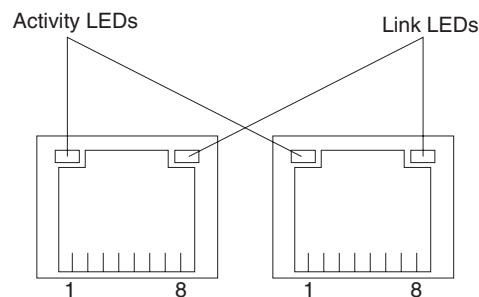


The following sections describe these connectors.

If an optional Remote Supervisor Adapter II (system-management adapter) installed in PCI-X slot 1, the adapter has an Ethernet connector, a serial connector, and an Advanced System Management (ASM) Interconnect connector. See the documentation that comes with the Remote Supervisor Adapter II for more information about these connectors and LEDs.

Ethernet (RJ-45) connectors

The following illustration shows two Ethernet connectors.

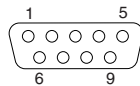


Connect Category 3, 4, or 5 unshielded twisted-pair cables to these connectors. The 100BASE-TX and 1000BASE-T Fast Ethernet standards require Category 5 or higher cabling.

For more information about the Ethernet controller, see the *User's Guide* on the IBM @server Documentation CD.

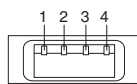
Serial connector

Use a serial connector to connect a serial device. The following illustration shows a serial connector.



Universal Serial Bus connectors

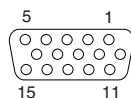
Use a Universal Serial Bus (USB) connector to connect a USB device. USB technology transfers data at up to 12 Mb per second (Mbps) with a maximum of 127 devices and a maximum signal distance of 5 meters (16 ft) per segment. Using Plug and Play technology, USB devices are configured automatically. The following illustration shows a USB connector.



Use a 4-pin cable to connect a device to a USB connector. If you need to connect more USB devices than the server has USB connectors for, use a USB hub to connect additional devices.

Video connector

Use this connector to connect a monitor to the server. The connector is dark blue to help you identify it. The following illustration shows a video connector.



Chapter 6. Service replaceable units

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This chapter describes the removal of server components.

Important: The field replaceable unit (FRU) procedures are intended for trained servicicers who are familiar with IBM @server products. See the parts listing in “System” on page 100 to determine if the component being replaced is a customer replaceable unit (CRU) or a FRU.

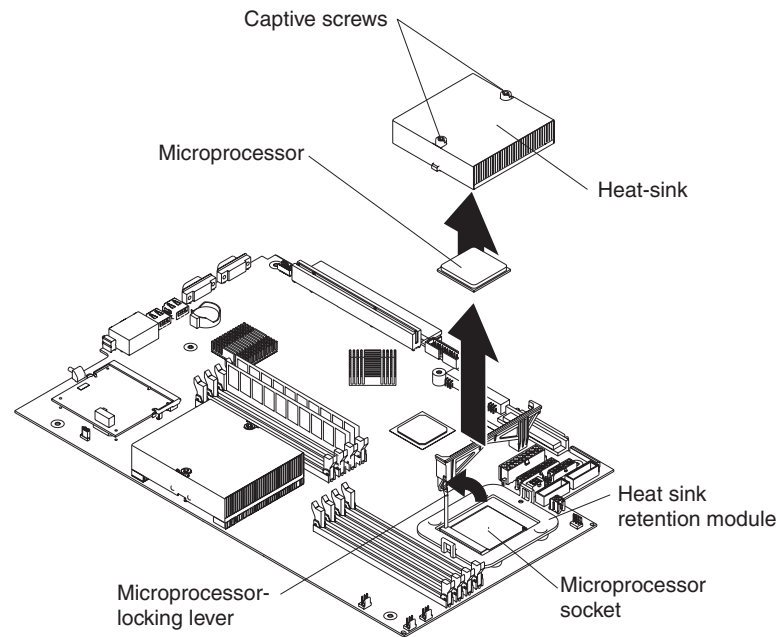
Removing a microprocessor

Complete the following steps to remove a microprocessor.

Note:

- Read “Installation guidelines” on page 29.
 - Read the safety notices at “Safety information” on page 107.
 - Read “Handling static-sensitive devices” on page 30.
1. Turn off the server and disconnect all power cords and external cables; then, remove the server cover (see “Removing the cover and bezel” on page 32).
 2. Identify the microprocessor to be removed.

Note: The illustrations in this document might differ slightly from your hardware.



3. Remove the heat sink:
 - a. Loosen one captive screw fully; then, loosen the other captive screw.
Attention: Loosening one screw fully before loosening the other screw will help to break the thermal bond that adheres the heat sink to the microprocessor.
 - b. Pull the heat sink off of the microprocessor.
4. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position.
5. Pull the microprocessor out of the socket.

To install a microprocessor, see “Installing an additional microprocessor” on page 44. To reuse the heat sink that was removed in step 3 above, see “Thermal grease” on page 61.

Thermal grease

This section contains information about removing and replacing the thermal grease between the heat sink and the microprocessor. The thermal grease must be replaced whenever the heat sink has been removed from the top of the microprocessor and is going to be reused or when debris is found in the grease.

Note:

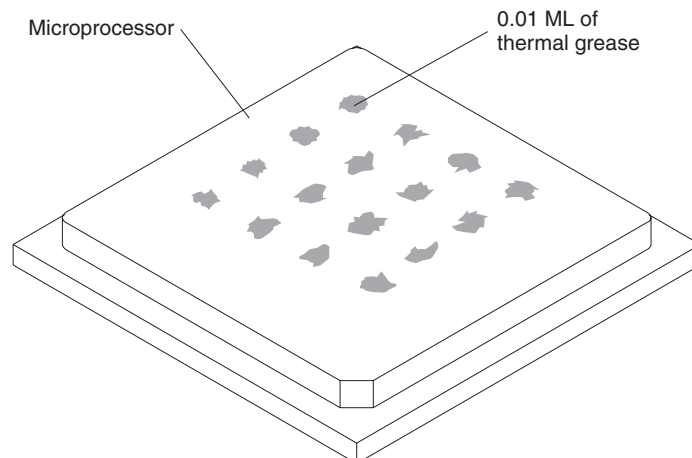
- Read “Installation guidelines” on page 29.
- Read the safety notices at “Safety information” on page 107.
- Read “Handling static-sensitive devices” on page 30.

Complete the following steps to replace damaged or contaminated thermal grease on the microprocessor and heat sink:

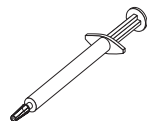
1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

Note: Make sure that all of the thermal grease is removed.

4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.



5. Use the thermal-grease syringe to place 16 uniformly spaced dots of 0.01 mL each on the top of the microprocessor.



Note: 0.01 mL is one tick mark on the syringe. If the grease is properly applied, approximately half of the grease will remain in the syringe.

6. Install the heat sink onto the microprocessor as described in “Installing an additional microprocessor” on page 44.

Power supply

Note:

- Read “Installation guidelines” on page 29.
- Read the safety notices at “Safety information” on page 107.

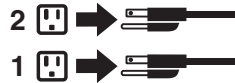
Complete the following steps to remove the non-hot-swap power supply.

Statement 5

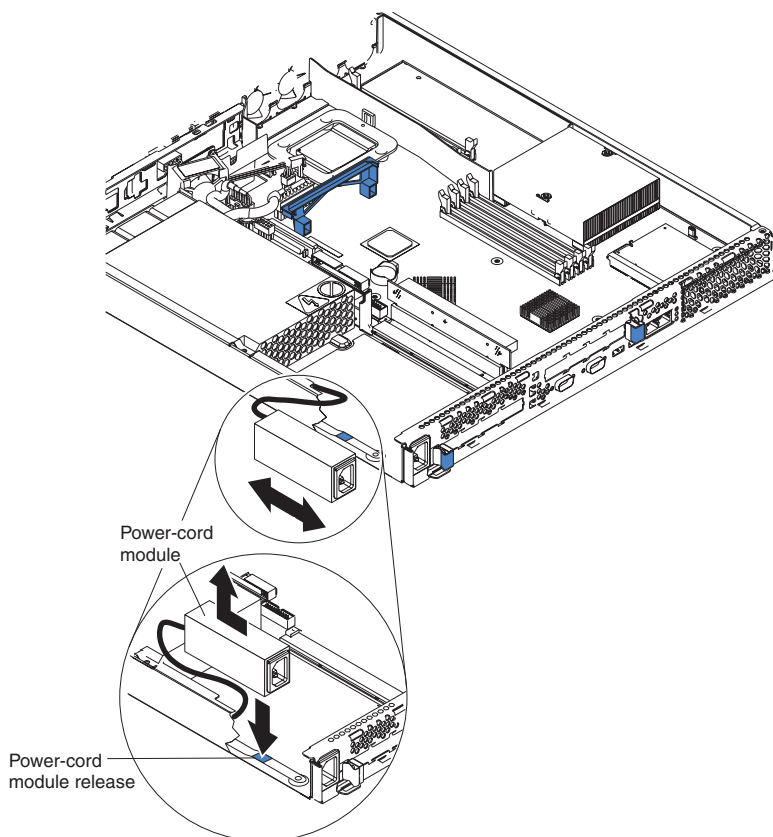


CAUTION:

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.



1. Turn off the server and all attached peripheral devices.
2. Disconnect all power cords and external cables from the back of the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 32) and take out the air baffle.
4. Remove the power-cord module.



- a. Press down on the retention clip at the front of the power-cord module and slide the module toward the front of the server until the alignment tab is free of the slot on the side of the server.
 - b. Lift the power-cord module out of the server as far as the power-supply cable permits and set it aside.
5. Remove the DASD fan duct assembly located near the power supply (see illustration in “Replacing a fan assembly” on page 50).
- Attention:** Before removing the power supply, make sure that the round USB cable and the flat ribbon cable are out of the way, to avoid damage.
6. Remove the power supply:
- a. Disconnect the cables on the power supply.
 - b. Remove the screw holding the power supply to the chassis and slide the power supply toward the front of the server until it disengages from the tabs on the floor of the chassis.

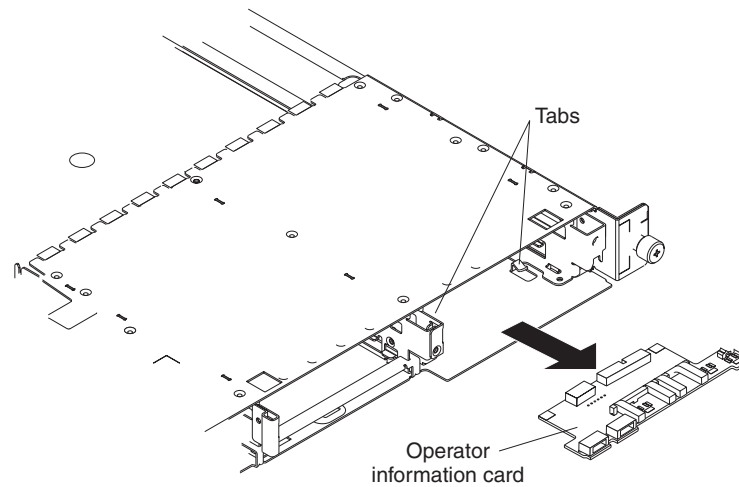
To install the new power supply, reverse this procedure, making sure that all cables are routed correctly and do not block the air flow from the fan.

Operator information card

Complete the following steps to remove the operator information card. This component is located in the front of the server.

Note:

- Read “Installation guidelines” on page 29.
 - Read the safety notices at “Safety information” on page 107.
 - Read “Handling static-sensitive devices” on page 30.
1. Turn off the server.
 2. Disconnect all power cords and external cables from the back of the server; then, remove the server from the rack.
 3. Remove the server cover and bezel (see “Removing the cover and bezel” on page 32).
 4. Remove the hard disk drive that is in the right-hand bay, if any (see “Installing a hard disk drive” on page 39).
 5. Disconnect the operator information card cables from the system board.



6. Gently pull the operator information card forward until it disengages from the two tabs on the chassis, making sure that any cables that are pulled slide smoothly.
7. Disconnect the cables from the rear of the operator information card.

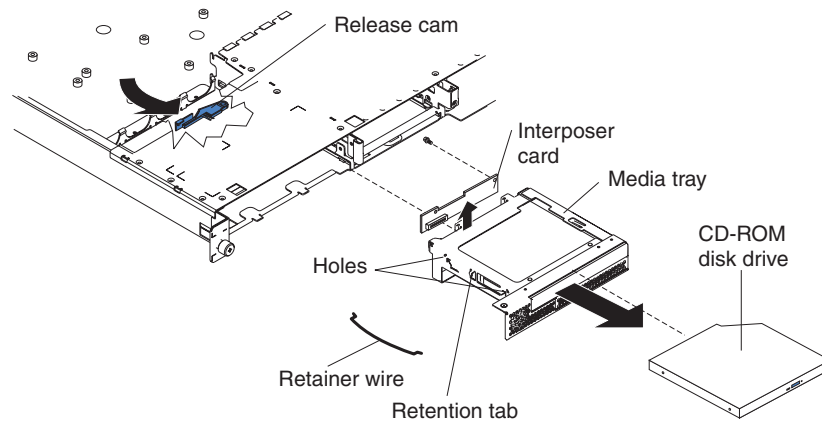
To replace the operator information card, connect the two cables to the rear of the card and slide it under the tabs on the chassis until it is firmly anchored.

CD-ROM drive

Complete the following steps to remove the CD-ROM drive.

Note:

- Read “Installation guidelines” on page 29.
 - Read the safety notices at “Safety information” on page 107.
 - Read “Handling static-sensitive devices” on page 30.
1. Turn off the server and all attached devices.
 2. Disconnect all power cords and external cables from the back of the server.
 3. Remove the server from the rack.
 4. Remove the server cover (see “Removing the cover and bezel” on page 32); then, take out the air baffle.
 5. Remove the four microprocessor fans, making note of their orientation for later replacement.
 6. Disconnect the CD-ROM drive power cable from the system board.
 7. Disconnect the IDE cable from the CD-ROM drive.
 8. Press the release cam until the media tray protrudes slightly from the front of the server.



9. Carefully pull the drive assembly out of the chassis.
10. Remove the retaining wires on the drive assembly.
11. To remove the CD-ROM drive from the media tray, pull gently on the drive and slide it out of the tray.
12. To remove the interposer card, remove the screw that secures it to the media tray and pull the card away from the media tray.

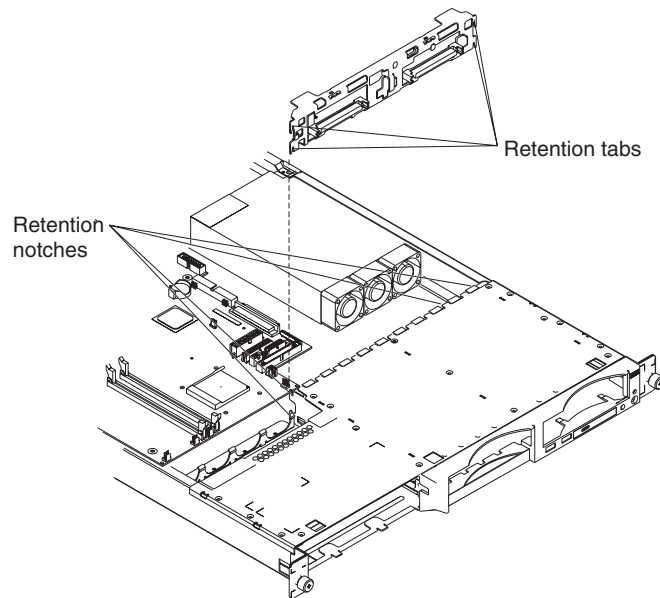
To replace the CD-ROM drive, reverse the previous steps.

SCSI backplane

Complete the following steps to remove the SCSI backplane. This component contains an “HDD BACKPLN” label.

Note:

- Read “Installation guidelines” on page 29.
 - Read the safety notices at “Safety information” on page 107.
 - Read “Handling static-sensitive devices” on page 30.
1. Turn off the server.
 2. Disconnect all power cords and external cables from the back of the server.
 3. Remove the server from the rack.
 4. Pull out the hard disk drives.
 5. Remove the server cover (see “Removing the cover and bezel” on page 32).
 6. Disconnect the cables from the SCSI backplane.



7. Gently pull up on the backplane until it is released from the server at the notches; then, pull the backplane out of the server.

To replace the SCSI backplane, reverse the previous steps, making sure to align the tabs and notches.

Riser card

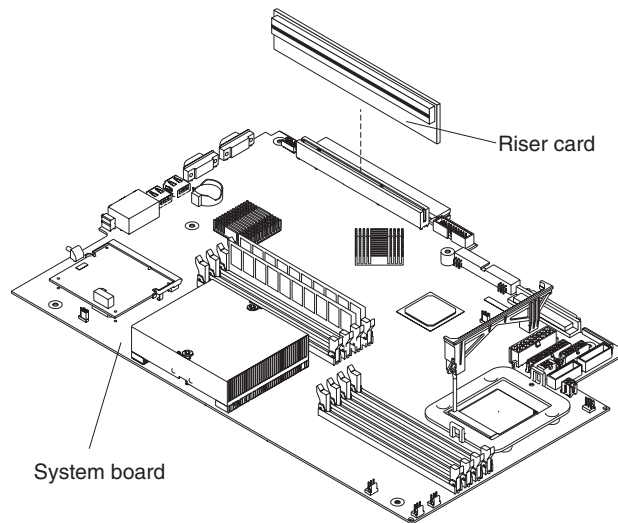
Complete the following steps to remove the riser card.

Note:

- Read “Installation guidelines” on page 29.
- Read the safety notices at “Safety information” on page 107.
- Read “Handling static-sensitive devices” on page 30.

1. Turn off the server and any attached devices.
2. Disconnect power cords and external cables from the back of the server.
3. Remove the server from the rack.
4. Remove the cover (see “Removing the cover and bezel” on page 32).
5. Remove adapters (see “Installing an adapter” on page 33).

Note: The illustrations in this document might differ slightly from your hardware.



6. Pull up gently on the riser card until it detaches from the server.

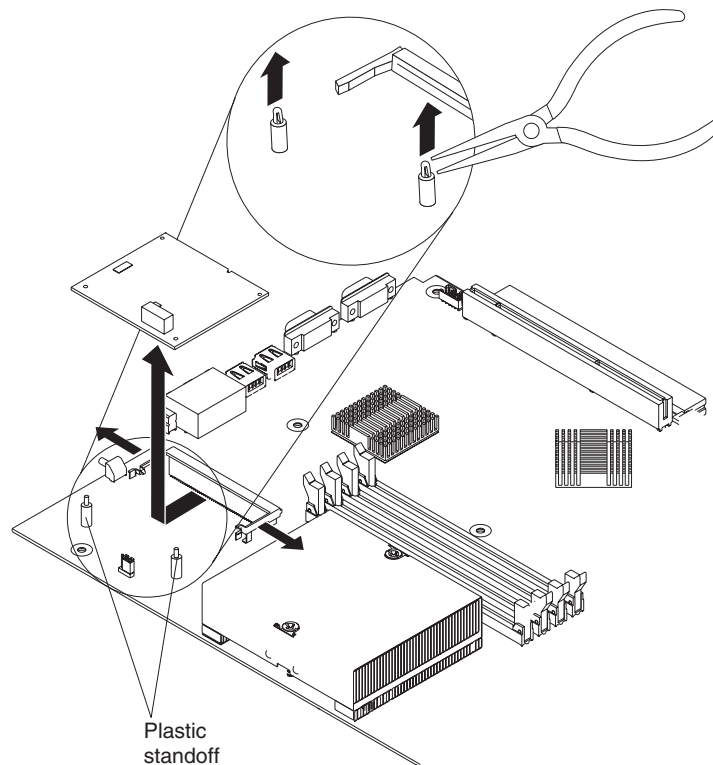
To replace the riser card, reverse the preceding steps.

Baseboard management controller

Complete the following steps to remove the baseboard management controller. This component is located in the rear of the server, on the same side as the power supply.

Note:

- Read “Installation guidelines” on page 29.
 - Read the safety notices at “Safety information” on page 107.
 - Read “Handling static-sensitive devices” on page 30.
1. Turn off the server and any attached devices.
 2. Disconnect power cords and external cables from the back of the server.
 3. Remove the server from the rack.
 4. Remove the cover (see “Removing the cover and bezel” on page 32).
 5. Locate the SO-DIMM connector (J16) on the system board (see “System-board option connectors” on page 73).
 6. Disengage the two retaining clips that secure the baseboard management controller to the system board.
 7. Gently grasp the baseboard management controller and pull it until it comes loose from the SO-DIMM connector (J16) on the system board.



8. Gently pull up on the baseboard management controller until it disengages from the plastic standoffs. If the standoffs come away from the system board with the baseboard management controller, gently pull them out of the baseboard management controller and push them back into their apertures on the system board.

Note: You can also gently pinch the top of each standoff using needle-nose pliers and then pull the baseboard management controller away.

9. Remove the new baseboard management controller from the static-protective package. Move the baseboard management controller directly from the static-protective package to the SO-DIMM connector (J16) on the system board. Avoid touching the components and gold-edge connectors on the baseboard management controller.
10. Turn the baseboard management controller so that the keys align correctly with the SO-DIMM connector (J16) on the system board.
Attention: To avoid breaking the retaining clips or damaging the connectors, handle the clips gently.

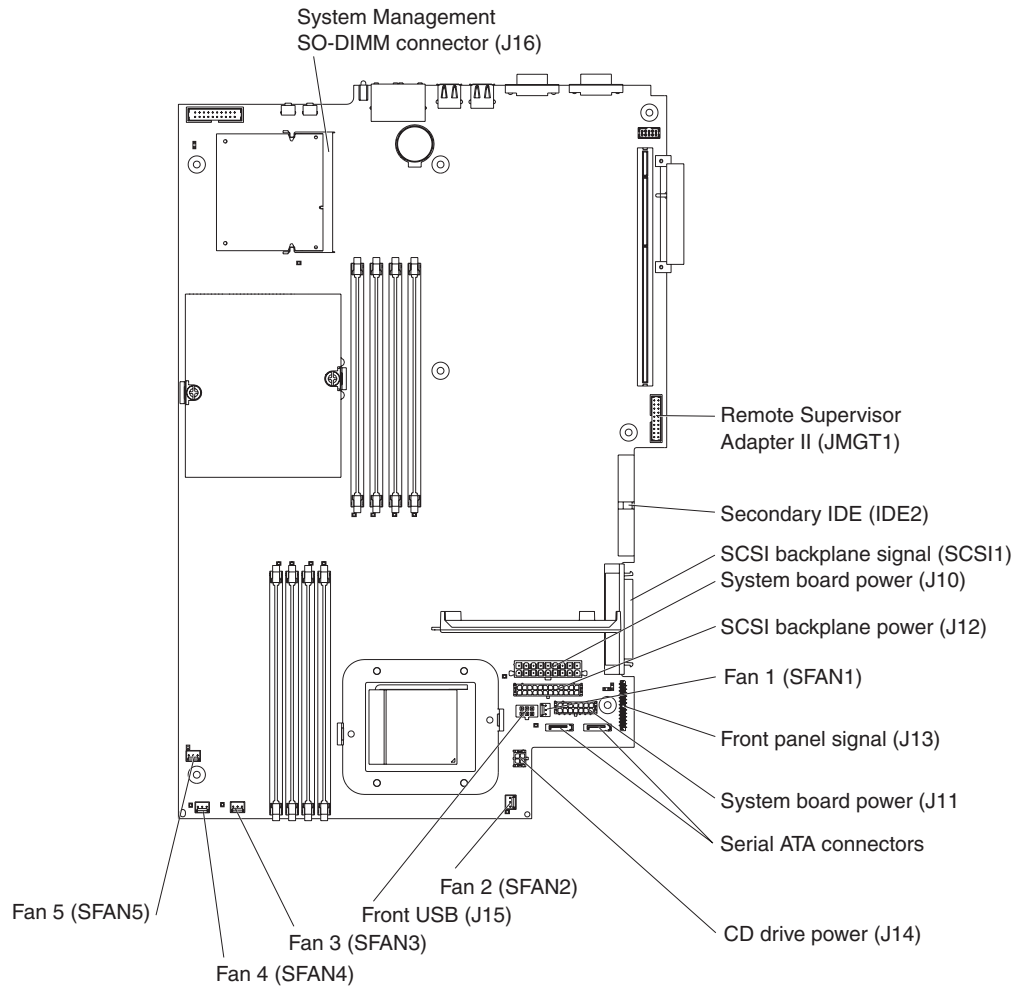
To replace the baseboard management controller, reverse the preceding steps.

System board

This section shows the locations of items on the system board and describes how to remove the system board.

System-board internal connectors

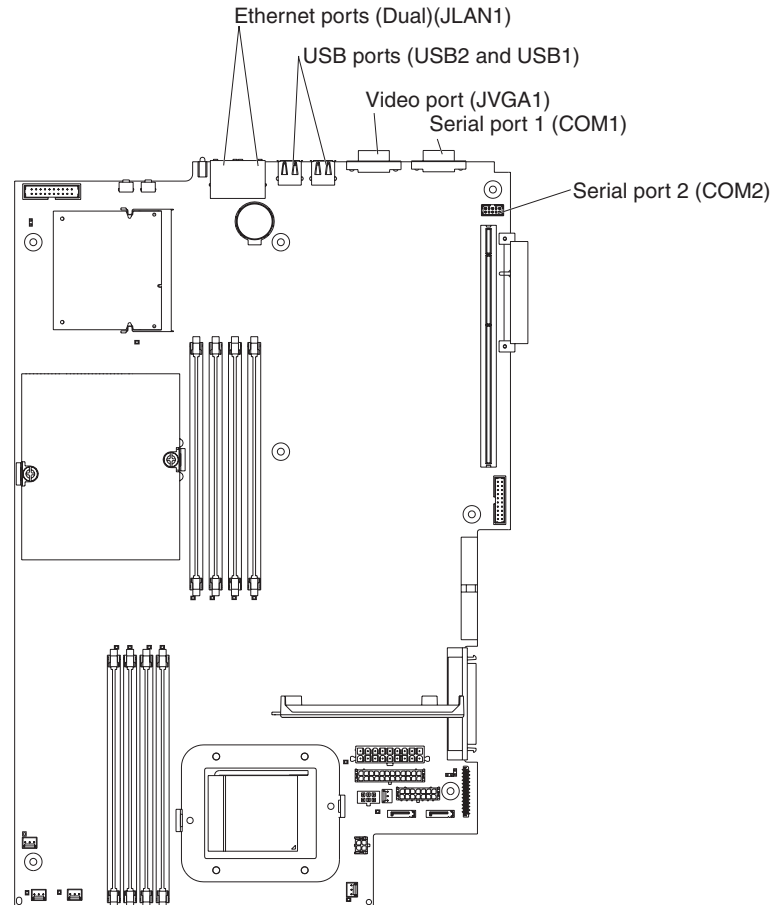
The following illustration shows the internal connectors on the system board.



System-board external connectors

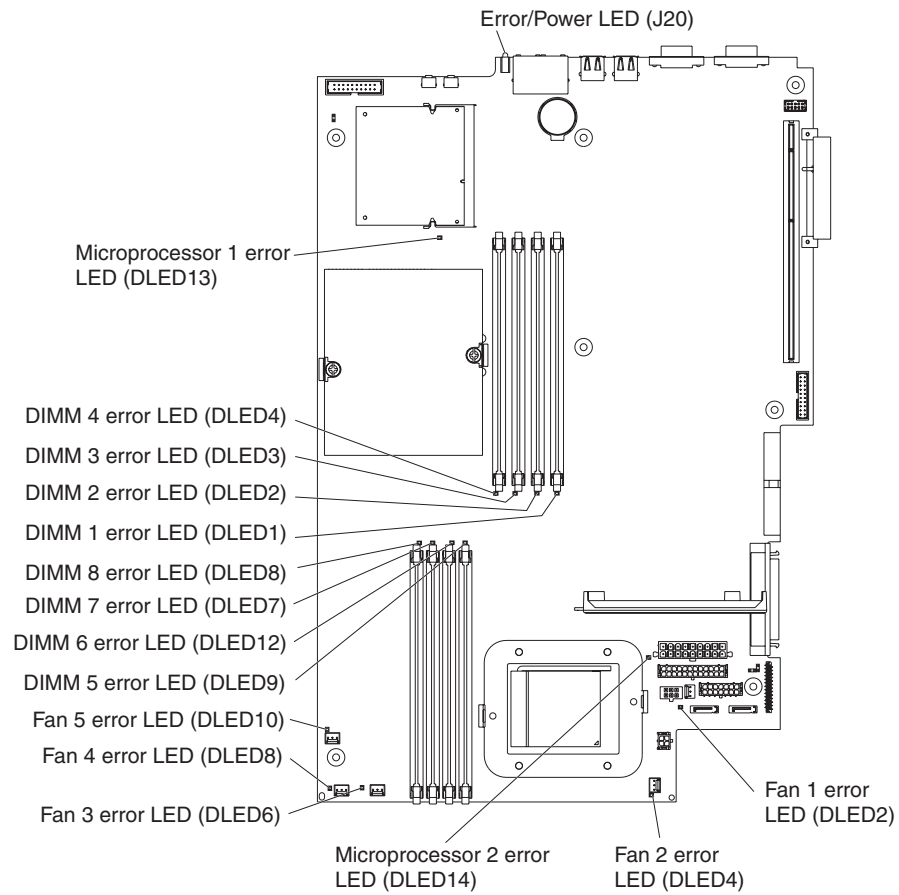
The following illustration shows the external input/output connectors (ports) on the system board.

Note: The illustrations in this document might differ slightly from your hardware.



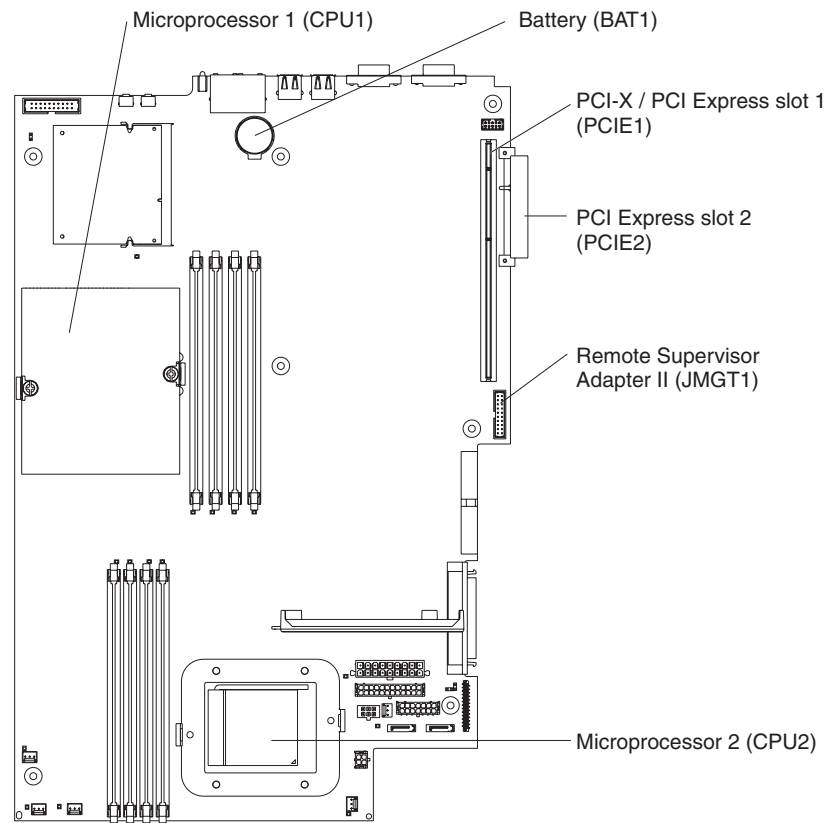
System-board LEDs

The following illustration shows the light-emitting diodes (LEDs) on the system board. For more information about the system-board LEDs, see the *Hardware Maintenance Manual and Troubleshooting Guide*.



System-board option connectors

The following illustration shows the connectors on the system board for user-installable options.

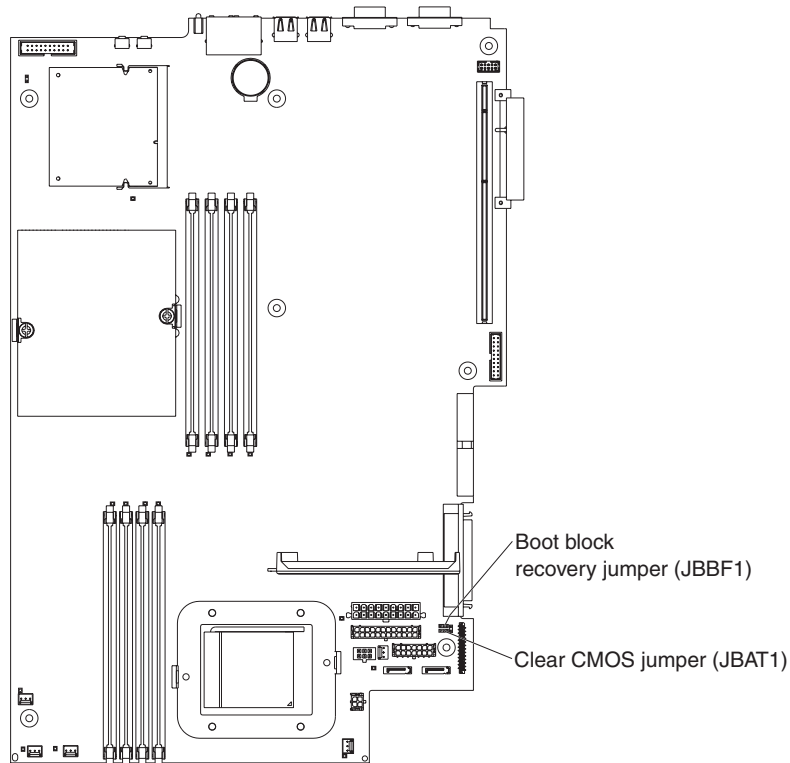


Note: The VRMs for the microprocessors are on the system board.

System-board switches and jumpers

The following illustration shows the switches and jumpers on the system board.

Any jumper blocks on the system board that are not shown in the illustration are reserved. See the section about recovering the basic input/output system (BIOS) code in the *Hardware Maintenance Manual and Troubleshooting Guide* for information about the boot block recovery jumper.



Removing the system board

Complete the following steps to remove the system board.

Note:

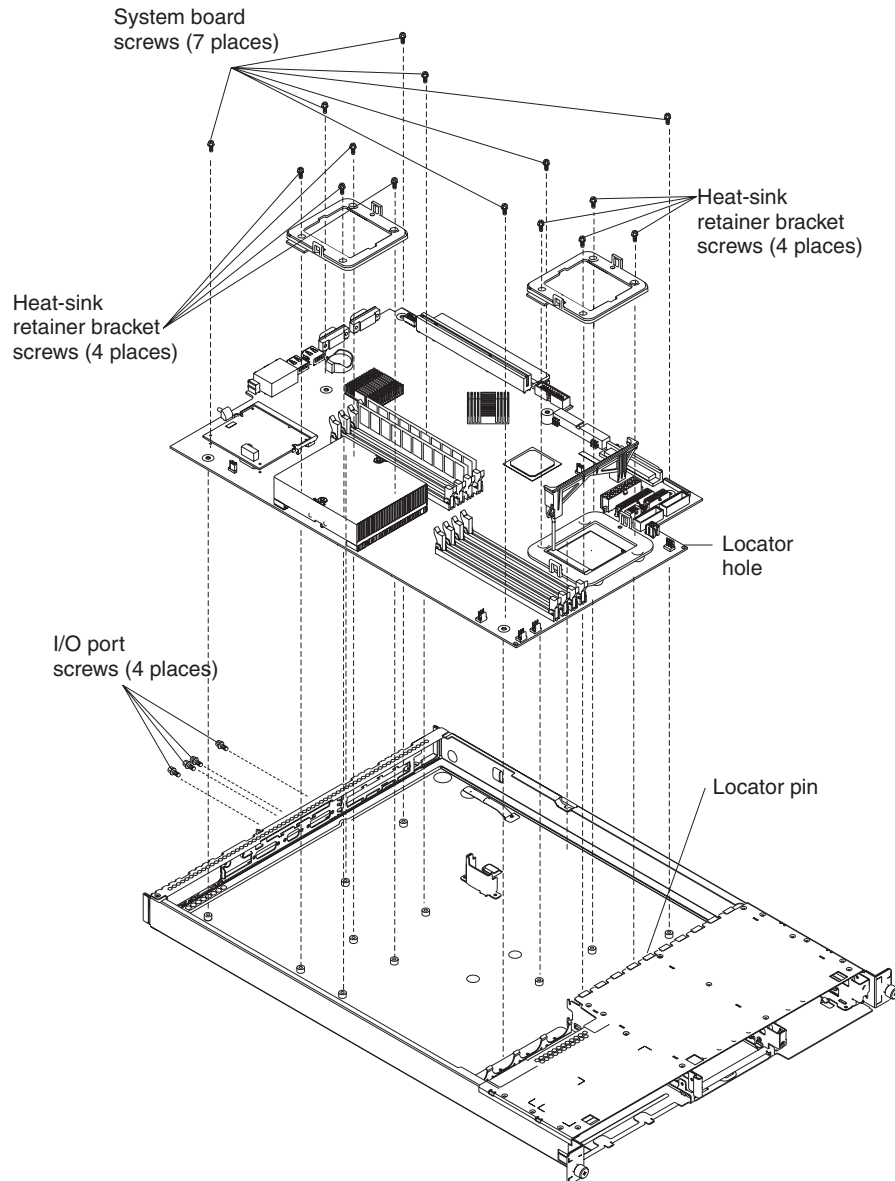
- Read “Installation guidelines” on page 29.
- Read the safety notices at “Safety information” on page 107.
- Read “Handling static-sensitive devices” on page 30.

1. Turn off the server and any attached devices.

Note: When replacing the system board, you must either update the server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

2. Disconnect power cords and external cables from the back of the server.
3. Remove the server from the rack.
4. Remove the cover (see “Removing the cover and bezel” on page 32).
5. Remove all adapters (see “Installing an adapter” on page 33).
6. Remove all fans (see “Replacing a fan assembly” on page 50).
7. Remove the air baffle.
8. Remove the riser card (see “Riser card” on page 67).
9. Remove the screw securing the PCI adapter shield in position, and remove the PCI adapter shield, making sure to put them in a safe place for reinstallation.
10. Remove the SCSI backplane (see “SCSI backplane” on page 66).
11. Disconnect all cables from the system board.
12. Remove the heat sinks from all the microprocessors and set them aside on a static-protected surface for reinstallation (see “Installing an additional microprocessor” on page 44).
13. Remove all microprocessors and set them aside on a static-protected surface for reinstallation (see “Installing an additional microprocessor” on page 44).
14. Remove the memory modules and set them aside on a static-protected surface for reinstallation (see “Installing a memory module” on page 42).

Note: The illustrations in this document might differ slightly from your hardware.



15. Remove the six I/O port screws at the rear of the server.
16. Remove the eight screws that secure the two heat-sink retention modules to the system board. These eight screws also secure the system board to the chassis.
17. Remove the remaining seven screws on the system board that secure the system board to the chassis.
18. Carefully pull the board out of the server, taking special care not to disturb any surrounding components.

To reinstall the board, place it carefully into position and ensure the locator pin engages the locator hole in the system board.

Reverse steps 5 on page 75 through 14 on page 75 to replace the components that were removed.

Note: When reassembling the components in the server, be sure to route all cables carefully so that they are not exposed to excessive pressure.

Chapter 7. Symptom-to-FRU index

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This index supports 326m servers.

The symptom-to-FRU index lists symptoms, errors, and the possible causes. The most likely cause is listed first. Use this symptom-to-FRU index to help you decide which FRUs to have available when servicing the computer.

Notes:

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. For IBM devices not supported by this index, refer to the manual for that device.
3. Always start with “General checkout” on page 17.
4. Some tables have more than two columns; in those instances, more than one column on the left is required to describe the error symptom. Take the action (or replace the FRU) suggested first in the list of the right-hand column, then try the server again to see if the problem has been corrected before taking further action.
5. Always try reseating a suspected component or reconnecting a cable before replacing the component.

The left-hand column of the tables in this index lists error codes or messages, and the right-hand column lists one or more suggested actions or FRUs to replace.

The POST BIOS code displays POST error codes and messages on the screen.

Beep symptoms

Beep symptoms are short tones or a series of short tones separated by pauses (intervals without sound). See the examples in the following table.

Beeps	Description
1-2-3	<ul style="list-style-type: none"> • One beep • A pause (or break) • Two beeps • A pause (or break) • Three beeps
4	Four continuous beeps

One beep after successfully completing POST indicates that the server is functioning correctly.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Beep/symptom	FRU/action
1-1-3 (CMOS write/read test failed)	<ol style="list-style-type: none"> 1. Battery 2. System board
1-1-4 (BIOS PROM checksum failed)	<ul style="list-style-type: none"> • System board
1-2-1 (Programmable Interval Timer failed)	<ul style="list-style-type: none"> • System board
1-2-2 (DMA initialization failed)	<ul style="list-style-type: none"> • System board
1-2-3 (DMA page register write/read failed)	<ul style="list-style-type: none"> • System board
1-3-1 (first 64K RAM test failed)	<ol style="list-style-type: none"> 1. DIMM 2. System board
2-1-1 (Secondary DMA register failed)	<ul style="list-style-type: none"> • System board
2-1-2 (Primary DMA register failed)	<ul style="list-style-type: none"> • System board
2-1-3 (Primary interrupt mask register failed)	<ul style="list-style-type: none"> • System board
2-1-4 (Secondary interrupt mask register failed)	<ul style="list-style-type: none"> • System board
2-2-2 (Keyboard controller failed)	<ol style="list-style-type: none"> 1. Keyboard 2. System board
2-2-3 (CMOS power failure and checksum checks failed)	<ol style="list-style-type: none"> 1. Battery 2. System board
2-4-1 (Video failed; system believed operable)	<ul style="list-style-type: none"> • System board

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Beep/symptom	FRU/action
3-1-1 (Timer tick interrupt failed)	• System board
3-1-2 (Interval timer channel 2 failed)	• System board
3-1-3 (RAM test failed above address OFFFFH))	1. DIMM 2. System board
3-1-4 (Time-of-Day clock failed)	1. Battery 2. System board
3-2-1 (Serial port failed)	• System board
3-2-2 (Parallel port failed)	• System board
3-2-3 (Math coprocessor test failed)	1. Optional microprocessor 2. Microprocessor 3. System board
3-2-4 (Failure comparing CMOS memory size against actual)	1. DIMM 2. Battery 3. System board
3-3-1 (Memory size mismatch occurred.)	1. DIMM 2. Battery 3. System board
3-3-2 (I2C bus error occurred)	• System board
3-3-3 (No memory installed)	1. Install or reseal the memory modules. 2. DIMMs. 3. System board.

No-beep symptoms

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

No-beep symptom	FRU/action
No beep during POST.	• System board

Diagnostic error codes

Note: In the following error codes, if XXX is 000, 195, or 197, do not replace a FRU. The description for these error codes are:

- 000** The test passed.
- 195** The Esc key was pressed to stop the test.
- 197** Warning; a hardware failure might not have occurred.

For all error codes, replace the FRU or take the action indicated.

Note: See "System" on page 100 to determine which components should be replaced by a field service technician.	
Error code/symptom	FRU/action
001-250-000 (Failed system board ECC)	• System board
001-250-001 (Failed system board ECC)	• System board
001-XXX-000 (Failed core tests)	• System board
001-XXX-001 (Failed core tests)	• System board
005-XXX-000 (Failed video test)	1. Video adapter (if installed) 2. System board
011-XXX-000 (Failed COM1 serial port test)	1. Check loopback plug connected to externalized serial port. 2. Check cable from externalized port to system board. 3. System board.
011-XXX-001 (Failed COM2 serial port test)	1. Check loopback plug connected to externalized serial port. 2. Check cable from externalized port to system board. 3. System board.
014-XXX-000 (Failed parallel port test)	• System board
015-XXX-001 (USB interface not found, board damaged)	1. System board
015-XXX-015 (Failed USB external loopback test)	1. Make sure the parallel port is not disabled. 2. Run the USB external loopback test again. 3. System board.
015-XXX-198 (Remote Supervisor Adapter II installed <i>or</i> USB device connected during USB test)	1. If Remote Supervisor Adapter II is installed as an option, remove it and rerun test. Note: If Remote Supervisor Adapter II is present as a standard installation, do not remove it; the test cannot be run. 2. Remove USB devices and rerun test. 3. System board.
020-XXX-000 (Failed PCI interface test)	• System board
030-XXX-00N (Failed SCSI interface test)	• If N=0, system board; if N>0, SCSI adapter in slot N.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
035-253-s99 (RAID adapter initialization failure)	<ol style="list-style-type: none"> 1. ServeRAID adapter in slot s is not configured properly. Obtain the basic and extended configuration status and see the <i>ServeRAID Hardware Maintenance Manual</i> for more information. 2. Cable. 3. Adapter.
035-XXX-099 (No adapters were found.)	<ul style="list-style-type: none"> • If adapter is installed re-check connection.
035-XXX-s99 (Failed RAID test on PCI slot s. s = number of failing PCI slot.)	<ol style="list-style-type: none"> 1. RAID adapter 2. Cable 3. System board
035-XXX-snn (s = number of failing PCI slot, nn = SCSI ID of failing fixed disk.)	<ul style="list-style-type: none"> • Hard disk drive with SCSI ID nn on RAID adapter in PCI slot s.
089-XXX-001 (Failed microprocessor test)	<ol style="list-style-type: none"> 1. Verify microprocessor 1 is installed and seated correctly. 2. Verify BIOS code is at latest level. 3. Microprocessor 1. 4. System board.
089-XXX-002 (Failed optional microprocessor test)	<ol style="list-style-type: none"> 1. Verify microprocessor 2 is installed and seated correctly. 2. Verify BIOS code is at latest level. 3. Microprocessor 2. 4. System board.
201-XXX-0nn (Failed memory test.)	<ol style="list-style-type: none"> 1. DIMM Location slots 1-6 where nn = DIMM location. Note: nn 1=DIMM 1; 2=DIMM 2; 3=DIMM 3; 4=DIMM 4; 5=DIMM 5; 6=DIMM 6. 2. System board.
201-XXX-999 (Multiple DIMM failure, see error text)	<ol style="list-style-type: none"> 1. See error text for failing DIMMs. 2. System board.
202-XXX-001 (Failed system cache test)	<ol style="list-style-type: none"> 1. Verify microprocessor 1 is installed and seated correctly. 2. Verify BIOS code is at latest level. 3. Microprocessor 1. 4. System board.
202-XXX-002 (Failed system cache test)	<ol style="list-style-type: none"> 1. Verify microprocessor 2 is installed and seated correctly. 2. Verify BIOS code is at latest level. 3. Microprocessor 2. 4. System board.
206-XXX-000 (Failed diskette drive test)	<ol style="list-style-type: none"> 1. Rerun the test using another diskette. 2. Cable. 3. Diskette drive. 4. System board.
215-XXX-000 (Failed IDE CD-ROM drive test)	<ol style="list-style-type: none"> 1. Rerun the test using another CD-ROM. 2. CD-ROM drive cables. 3. CD-ROM drive. 4. System board.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
217-198-XXX (Could not establish drive parameters)	<ol style="list-style-type: none"> 1. Check cable and termination. 2. SCSI backplane. 3. Hard disk drive.
217-XXX-000 (Failed BIOS hard disk drive test) Note: If RAID is configured, the hard disk drive number refers to the RAID logical array.	<ol style="list-style-type: none"> 1. Hard disk drive 1 2. System board
217-XXX-001 (Failed BIOS hard disk drive test) Note: If RAID is configured, the hard disk drive number refers to the RAID logical array.	<ol style="list-style-type: none"> 1. Hard disk drive 2 2. System board
301-XXX-000 (Failed keyboard test)	<ul style="list-style-type: none"> • Keyboard • System board
302-XXX-000 (Failed mouse test)	<ul style="list-style-type: none"> • Mouse • System board
405-XXX-000 (Failed Ethernet test on controller on the system board)	<ol style="list-style-type: none"> 1. Verify that Ethernet is not disabled in BIOS. 2. System board.
405-XXX-00n (Failed Ethernet test on adapter in PCI slot n)	<ol style="list-style-type: none"> 1. For n=0, system board 2. For n>0, adapter in PCI slot n 3. System board
405-XXX-a0n (Failed Ethernet test on adapter in PCI slot a)	<ol style="list-style-type: none"> 1. For a = 0, system board 2. For a > 0, adapter in PCI slot a
415-XXX-000 (Failed Modem test)	<ol style="list-style-type: none"> 1. Cable Note: Ensure modem is present and attached to server. 2. Modem 3. System board

SMI handler messages

SMI handler is special system code that provides system monitoring functions.

When the SMI handler detects a microprocessor error, the SMI handler message identifies the affected processor using a ProclD number or an APICID number. The following table provides a cross reference between the physical microprocessor number, the ProclD and the APICID.

Physical Microprocessor Number ¹	ProclD	APICID
1	01	0000 or 0001
2	02	0002 or 0003

¹ See "System-board option connectors" on page 73 to find the physical microprocessor numbering

Following is an example of an SMI handler message:

```

-----
Date/Time: 2002/05/08 03:35:30
DMI Type: 00
Source: SMI Hd1r
Error Code: 00150700 PERR: Slave signaled parity error
Error Code:
Error Data: Bus = 02, Slot = 01, VendID = 1014, DevID = 0302
Error Data:
-----

```

This message indicates that a PCI Bus 02 parity error occurred at the recorded time. All of the SMI handler message codes are listed in the following table.

Note: The message codes in the following table do not include leading or trailing zeros.

Note: See "System" on page 100 to determine which components should be replaced by a field service technician.	
SMI message code	Suggested action
1501 (Uncorrectable memory error)	• Run memory diagnostic programs; then, replace indicated memory DIMM.
1502 (Address of special cycle data parity error)	• Slot/device.
1503 (Received target abort)	• Slot/device.
1504 (Device generated SERR)	• Slot/device.
1505 (Master read data parity error)	• Slot/device.
1506 (Master read data parity error)	• Slot/device.
1507 (Primary bus target signaled PERR)	• Slot/device.
1508 (Unknown source of SERR)	• N/A.
1509 (Unknown source of SERR)	• N/A.
1510 (Device signaled target abort)	• Slot/device.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.	
SMI message code	Suggested action
1511 (Recoverable MCA detected)	• Microprocessor.
1512 (Unrecoverable MCA detected)	• Microprocessor.
1513 (Excessive recoverable MCAs detected)	• Microprocessor.

Error symptoms

You can use the error symptom table to find solutions to problems that have definite symptoms.

If you cannot find the problem in the error symptom charts, go to “Starting the diagnostic programs and viewing the test log” on page 22 to test the server.

If you have just added new software or a new option and your server is not working, use the following procedures before using the error symptom charts:

- Remove the software or device that you just added.
- Run the diagnostic tests to determine whether the server is running correctly.
- Reinstall the new software or new device.

In the following table, if the entry in the FRU/action column is a suggested action, perform that action; if it is the name of a component, reseal the component and replace it if necessary. The most likely cause of the symptom is listed first.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.	
CD-ROM drive problems	
Symptom	FRU/action
CD-ROM drive is not recognized.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The IDE channel to which the CD-ROM drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. • All cables and jumpers are installed correctly. • The correct device driver is installed for the CD-ROM drive. 2. Run CD-ROM drive diagnostics. 3. CD-ROM drive.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.	
Expansion enclosure problems	
Symptom	FRU/action
The SCSI expansion enclosure used to work but does not work now.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. 2. For more information, see your SCSI expansion enclosure documentation.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.	
Hard disk drive problems	
Symptom	FRU/action
Not all drives are recognized by the hard disk drive diagnostic test (Fixed Disk test).	<ol style="list-style-type: none"> 1. Remove the first drive not recognized and try the hard disk drive diagnostic test again. 2. If the remaining drives are recognized, replace the drive you removed with a new one.
System stops responding during hard disk drive diagnostic test.	<ol style="list-style-type: none"> 1. Remove the hard disk drive being tested when the server stopped responding and try the diagnostic test again. 2. If the hard disk drive diagnostic test runs successfully, replace the drive you removed with a new one.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.	
General problems	
Symptom	FRU/action
Problems such as broken cover locks or indicator LEDs not working	<ul style="list-style-type: none"> • Broken CRU/FRU

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.	
Intermittent problems	
Symptom	FRU/action
A problem occurs only occasionally and is difficult to detect.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached options. • When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no airflow, the fan is not working. This causes the server to overheat and shut down. • Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. 2. Check the system error log.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.	
Keyboard, mouse, or pointing-device problems	
Symptom	FRU/action
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The keyboard cable is securely connected to the system, and the keyboard and mouse cables are not reversed. • The server and the monitor are turned on. 2. Keyboard. 3. System board.
The mouse or pointing device does not work.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The mouse or pointing-device cable is securely connected, and that the keyboard and mouse cables are not reversed. • The mouse device drivers are installed correctly. 2. Mouse or pointing device. 3. System board.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Memory problems	
Symptom	FRU/action
The amount of system memory displayed is less than the amount of physical memory installed.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The memory modules are seated properly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. • All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. 2. Check POST error log for error message 289: <ul style="list-style-type: none"> • If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If the DIMM was disabled by the user or by POST: <ol style="list-style-type: none"> a. Start the Configuration/Setup Utility program. b. Enable the DIMM. c. Save the configuration and restart the server. 3. DIMM. 4. System board.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Microprocessor problems	
Symptom	FRU/action
The server emits a continuous tone during POST. (The startup (boot) microprocessor is not working properly.)	<ol style="list-style-type: none"> 1. Verify that the startup microprocessor is seated properly. 2. Startup microprocessor.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Monitor problems	
Symptom	FRU/action
Testing the monitor.	<ul style="list-style-type: none"> • See the information that comes with the monitor for adjusting and testing instructions. (Some IBM monitors have their own self-tests.)

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Monitor problems	
Symptom	FRU/action
The screen is blank.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The server power cord is plugged into the server and a working electrical outlet. • The monitor cables are connected properly. • The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. • If the servers are C2T chained together, verify that: <ul style="list-style-type: none"> – The C2T chain cables are securely connected to the servers. – The C2T breakout cable is connected properly. – A server that is turned on is selected. <p>Important: In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the Boot Fail Count feature in the Start Options of the Configuration/Setup Utility program is set to Enabled (its default setting), you must restart the server three times to force the system BIOS to reset the CMOS values to the default configuration (memory connector or bank of connectors enabled).</p> <ol style="list-style-type: none"> 2. Make sure that damaged BIOS code is not affecting the video; see “Recovering from a POST/BIOS update failure” on page 25. 3. If you have verified these items and the screen remains blank, replace: <ol style="list-style-type: none"> a. Monitor b. Video adapter, if installed c. System board
Only the cursor appears.	<ul style="list-style-type: none"> • See “Undetermined problems” on page 97.
The monitor works when you turn on the server but goes blank when you start some application programs.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The application program is not setting a display mode higher than the capability of the monitor. • The primary monitor cable is connected to the C2T device breakout cable. • You installed the necessary device drivers for the applications. 2. If you have verified these items and the screen remains blank, replace the monitor.
The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	<ol style="list-style-type: none"> 1. If the monitor self-tests show the monitor is working properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. <p>Notes:</p> <ol style="list-style-type: none"> a. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. c. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative. 2. Video adapter, if installed. 3. System board.

Note: See "System" on page 100 to determine which components should be replaced by a field service technician.	
Monitor problems	
Symptom	FRU/action
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the BIOS code with the correct language. 2. Video adapter, if installed. 3. System board.

Note: See "System" on page 100 to determine which components should be replaced by a field service technician.	
Option problems	
Symptom	FRU/action
An IBM option that was just installed does not work.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The option is designed for the server (see the ServerProven list at http://www.ibm.com/pc/compat/). • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. 2. Option you just installed.
An IBM option that used to work does not work now.	<ol style="list-style-type: none"> 1. Verify that all of the option hardware and cable connections are secure. 2. If the option comes with its own test instructions, use those instructions to test the option. 3. If the failing option is a SCSI option, verify that: <ul style="list-style-type: none"> • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. 4. Failing option.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Power problems	
Symptom	FRU/action
The server does not turn on.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The power cables are properly connected to the server. • The electrical outlet functions properly. • The type of memory installed is correct. • If you just installed an option, remove it, and restart the server. If the server now turns on, you might have installed more options than the power supply supports. 2. If LEDs for microprocessors or VRMs are on, verify that: <ol style="list-style-type: none"> a. A VRM is installed if a second microprocessor is present. b. All microprocessors have the same speed. 3. Override front panel power button: <ol style="list-style-type: none"> a. Disconnect server power cords. b. Install a jumper on the force power-on jumper (JPWR1). c. Reconnect power cords. <p>If server turns on:</p> <ol style="list-style-type: none"> a. Service processor (baseboard management controller) error. b. Operator information card. <p>If server does not turn on:</p> <ul style="list-style-type: none"> • System board 4. See “Undetermined problems” on page 97.
The server does not turn off.	<ol style="list-style-type: none"> 1. Verify whether you are using an ACPI or non-ACPI operating system. If you are using a non-ACPI operating system: <ol style="list-style-type: none"> a. Press Ctrl+Alt+Delete. b. Turn off the system by holding the power-control button for 4 seconds. c. If server fails during BIOS POST and power-control button does not work, remove the AC power cord. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Serial port problems	
Symptom	FRU/action
The number of serial ports identified by the operating system is less than the number of serial ports installed.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports is disabled. • The serial-port adapter, if you installed one, is seated properly. 2. Failing serial port adapter.
A serial device does not work.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct port (see Chapter 5, “I/O connectors,” on page 57). 2. Failing serial device. 3. Serial adapter, if installed. 4. System board.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Software problem	
Symptom	FRU/action
Suspected software problem.	<ol style="list-style-type: none"> To determine if problems are caused by the software, verify that: <ul style="list-style-type: none"> Your server has the minimum memory needed to use the software. For memory requirements, see the information that comes with the software. <p>Note: If you have just installed an adapter or memory, you might have a memory address conflict.</p> The software is designed to operate on your server. Other software works on your server. The software that you are using works on another system. <p>If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and suggested solutions to the problem.</p> If you have verified these items and the problem remains, contact your place of purchase.

POST error codes

In the following error codes, x can be any number or letter.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
062 (Three consecutive startup failures using the default configuration.)	<ol style="list-style-type: none"> Run the Configuration/Setup Utility program. Battery. System board. Microprocessor.
101, 102 (System and processor error)	<ul style="list-style-type: none"> System board
106 (System and processor error)	<ul style="list-style-type: none"> System board
151 (Real time clock error)	<ol style="list-style-type: none"> Run diagnostics. Battery. System board.
161 (Real time clock battery error)	<ol style="list-style-type: none"> Run the Configuration/Setup Utility program. Battery. System board.
162 (Device configuration error) Note: Be sure to load the default settings and any additional desired settings; then, save the configuration.	<ol style="list-style-type: none"> Run the Configuration/Setup Utility program. Battery. Failing device. System board.
163 (Real-time clock error)	<ol style="list-style-type: none"> Run the Configuration/Setup Utility program. Battery. System board.
164 (Memory configuration changed.)	<ol style="list-style-type: none"> Run the Configuration/Setup Utility program. DIMM. System board.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
175 (Hardware error)	<ul style="list-style-type: none"> • System board
184 (Power-on password damaged)	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program. 2. System board.
187 (VPD serial number not set.)	<ol style="list-style-type: none"> 1. Set serial number in the Configuration/Setup Utility program. 2. System board.
188 (Bad EEPROM CRC #2)	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program. 2. System board.
189 (An attempt was made to access the server with invalid passwords)	<ul style="list-style-type: none"> • Run the Configuration/Setup Utility program, and enter the administrator password.
201 (Memory test error.) If the server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again.	<ol style="list-style-type: none"> 1. DIMM 2. System board
289 (DIMM disabled by POST or user)	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, if the DIMM was disabled by the user. 2. Disabled DIMM, if not disabled by user. 3. System board
301 (Keyboard or keyboard controller error)	<ol style="list-style-type: none"> 1. Keyboard 2. System board
303 (Keyboard controller error)	<ul style="list-style-type: none"> • System board
602 (Invalid diskette boot record)	<ol style="list-style-type: none"> 1. Diskette 2. Diskette drive 3. Cable 4. System board
662 (Diskette drive configuration error)	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and diagnostics. 2. Diskette drive. 3. Drive cable. 4. System board.
962 (Parallel port error)	<ol style="list-style-type: none"> 1. Disconnect the external cable on the parallel port. 2. Run the Configuration/Setup Utility program. 3. System board.
1162 (Serial port configuration conflicts)	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and ensure that the IRQ and I/O port assignments needed by the serial port are available. 2. If all interrupts are being used by adapters, remove an adapter or force other adapters to share an interrupt.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
1762 (Hard disk configuration error)	<ol style="list-style-type: none"> 1. Hard disk drive. 2. Hard disk drive cables. 3. Run the Configuration/Setup Utility program. 4. SCSI backplane. 5. System board.
1801 (No room for PCI option ROM)	<ol style="list-style-type: none"> 1. Adapter configuration. 2. Hard disk drive cables. 3. Failing adapter. 4. System board.
1803 (No memory above 1MB for PCI adapter)	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and diagnostics. 2. Failing adapter. 3. System board.
1962 (Drive does not contain a valid boot sector)	<ol style="list-style-type: none"> 1. Verify that a startable operating system is installed. 2. Run diagnostics. 3. Hard disk drive. 4. SCSI backplane. 5. Cable. 6. System board.
2462 (Video memory configuration error)	<ol style="list-style-type: none"> 1. Video adapter (if installed) 2. System board
5962 (IDE CD-ROM drive configuration error)	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program. 2. CD-ROM drive. 3. CD-ROM power cable. 4. IDE cable. 5. System board. 6. Battery.
8603 (Pointing-device error)	<ol style="list-style-type: none"> 1. Pointing device 2. System board
0001200 (Machine check architecture error)	<ol style="list-style-type: none"> 1. Microprocessor 1. 2. Optional microprocessor 2. 3. System board.
00012000 (Microprocessor machine check)	<ol style="list-style-type: none"> 1. Microprocessor. 2. System board.
00180700 (Planar PCI device not responding)	<ul style="list-style-type: none"> • System board.
01298001 (No update data for processor 1)	<ul style="list-style-type: none"> • Microprocessor 1.
01298002 (No update data for processor 2)	<ul style="list-style-type: none"> • Microprocessor 2.
01298200 (Microprocessor speed mismatch)	<ul style="list-style-type: none"> • Microprocessor.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
I9990650 (AC power has been restored)	<ol style="list-style-type: none"> 1. Check cable. 2. Check for interruption of power. 3. Power cable.

Service processor error codes

When viewed from POST, service processor (baseboard management controller) error codes will appear in hexadecimal form (generally beginning with A2, A3, A4, A5, A6, A7, AD, AE, or E1), unless a Remote Supervisor Adapter is installed. However, when viewed from the System Error Log, the messages will appear as text. To determine a possible error condition for the service processor, see the System Error log (see “Starting the diagnostic programs and viewing the test log” on page 22).

ServeRAID error codes

In the following error codes, x can be any number or letter.

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.

Error code/symptom	FRU/action
1xxx (Microcode checksum error)	<ol style="list-style-type: none"> 1. ServeRAID controller
2xxx (Code DRAM error)	<ol style="list-style-type: none"> 1. Install download jumpers, flash latest level BIOS and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3000-31xx(Code DRAM error)	<ol style="list-style-type: none"> 1. Install download jumpers, flash latest level BIOS and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3200 (Code DRAM error)	<ol style="list-style-type: none"> 1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3300 (ServeRAID-5i only)	<ol style="list-style-type: none"> 1. Install ServeRAID-5i controller in an extended PCI expansion slot. See the documentation that came with the server for more information.
3E20 (ServeRAID-5i only)	<ol style="list-style-type: none"> 1. Remove the ServeRAID-5i controller from its slot and install it in the proper PCI option slot. 2. Verify that the ServeRAID-5i controller is supported in this server. 3. ServeRAID-5i controller. 4. System board.
3E2x	<ol style="list-style-type: none"> 1. Reseat the ServeRAID controller. 2. Flash latest level of BIOS code and firmware for controller. 3. ServeRAID-5i controller. 4. Integrated RAID controller on serve).

Note: See “System” on page 100 to determine which components should be replaced by a field service technician.	
Error code/symptom	FRU/action
4xxx thru 5xxx (Code DRAM error)	<ol style="list-style-type: none"> 1. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers. 2. ServeRAID controller.
6xxx (Cache DRAM error) (ServeRAID-4H only)	<ol style="list-style-type: none"> 1. Reseat daughter card. 2. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers. 3. ServeRAID controller.
7xxx thru 8xxx (Host/local PCI bus interface error)	<ol style="list-style-type: none"> 1. Flash latest level of BIOS code and firmware for controller. 2. If ServeRAID-4x controller, replace controller. 3. If ServeRAID-5i controller, integrated RAID controller on the server.
9003	<ol style="list-style-type: none"> 1. Flash latest level of BIOS code and firmware for controller. 2. Confirm that this controller is a supported option for this system. 3. ServeRAID controller. 4. Integrated RAID controller on the server).
9xxx thru BZxx (SCSI bus error caused by cables, termination, defective drives, etc.). Z refers to the specific channel or channels that cause the error.	<ol style="list-style-type: none"> 1. Follow indications at “POST (ISPR) error procedures.” Follow those instructions before continuing with the next steps listed in this index. 2. SCSI cable. 3. SCSI backplane. 4. Hard disk drive. 5. ServeRAID controller.
EF FE (Firmware code corrupt or download jumpers are in place)	<ol style="list-style-type: none"> 1. Flash latest level BIOS and firmware for controller; then, remove jumpers. 2. ServeRAID controller.
FFFF or other code not listed	<ol style="list-style-type: none"> 1. Follow indications at “POST (ISPR) error procedures.” 2. SCSI cable. 3. SCSI backplane. 4. Hard disk drive. 5. ServeRAID controller.

POST (ISPR) error procedures

Use the ISPR error procedures to help you solve ServeRAID problems. A complete list of error codes is listed at “ServeRAID error codes” on page 93.

Note: Where the ISPR error procedures refer to a SCSI backplane, see the chapter of this document that concerns service replaceable units.

EF10 (Default ISPR)

1. No ISPR error present.

9Zxx thru BZxx (SCSI bus error caused by cables, termination, defective drives, or similar problem)

1. Isolate between SCSI subsystem and controller by disconnecting all SCSI cables from suspect card, and restart.

Attention: Do not press F5. Doing so changes the server configuration.

If an ISPR error is still present, perform the following actions until the error is no longer present:

- a. Reseat the controller
- b. Replace the controller

Notes:

- a. SCSI channel cable details, if any, appear elsewhere in this document.
- b. The adapter/controller detects a configuration change. *Do not* select **Save Changes**. Instead, press F10 to bypass any options to this effect.

2. If ISPR error is **EF10** after disconnecting cables:

- a. Identify which channel is causing the error by the second digit (Z) of the original ISPR code as indicated in the following table.

Note: ServeRAID-4H controllers have 4 channels; ServeRAID-4L and -4Lx controllers have only one channel; and ServeRAID-4M and -4Mx controllers have 2 channels. ServeRAID-5i controllers have no channels. The ServeRAID-5i uses the channel connectors of the onboard integrated SCSI controller.

Table 2. SCSI identifier

SCSI Channel Code (z)	Descriptions
1	Channel 1
2	Channel 2
3	Channel 1 and 2
4	Channel 3
5	Channel 1 and 3
6	Channel 2 and 3
7	Channel 1, 2, and 3
8	Channel 4
9	Channel 1 and 4
A	Channel 2 and 4
B	Channel 1, 2, and 4
C	Channel 3 and 4
D	Channel 1, 3, and 4
E	Channel 2, 3, and 4
F	Channel 1, 2, 3, and 4

- b. Confirm that the channels identified from the error in step 2a are the cause of the error by verifying that the error presents itself *only* when the offending channel is reconnected.
- c. Check termination of identified channel.

Note: SCSI channel termination details, if any, appear elsewhere in this document.

- d. Check for proper backplane jumper configuration.

Note: SCSI channel jumper details, if any, appear elsewhere in this document.

- e. Check for proper cabling configuration in systems that use DASD status cables. Reconnect all cables removed in step 1 on page 95.
- f. Disconnect one drive at a time attached to the channel identified in step 2a on page 95; then, restart to determine which drive is causing the error.
- g. Replace SCSI cable.
- h. Replace SCSI backplane.

FFFF or other code not listed

1. Place download jumpers on the controller and try to flash the firmware code to the card.
2. Isolate between SCSI subsystem and controller by disconnecting all SCSI cables attached to the suspect card, and restart.

Attention: Do not press F5. Doing so changes the server configuration.

If ISPR code is **EF10** after disconnecting cables, follow these steps until the error is eliminated:

- a. Identify which channel is causing the error by reconnecting cables one at a time and restarting until the error returns.
- b. Check termination of identified channel in step 2a.

Note: SCSI channel termination details, if any, appear elsewhere in this document.

- c. Disconnect one drive at a time attached to channel identified in step 2a and restart each time to determine which drive is causing the problem.
- d. Replace SCSI cable attached to channel identified in step 2a.
- e. Replace backplane attached to channel identified in step 2a.
3. If original ISPR code is still present after disconnecting all SCSI cables and restarting, perform the following actions until the error is no longer present:
 - Reseat the controller
 - Replace the controller

SCSI error codes

Error code	FRU/action
<p>All SCSI Errors One or more of the following might be causing the problem:</p> <ul style="list-style-type: none"> • A failing SCSI device (adapter, drive, controller) • An improper SCSI configuration or SCSI termination jumper setting • Duplicate SCSI IDs in the same SCSI chain • A missing or improperly installed SCSI terminator • A defective SCSI terminator • An improperly installed cable • A defective cable 	<ol style="list-style-type: none"> 1. External SCSI devices must be turned on before you turn on the server. 2. Make sure that the cables for all external SCSI devices are connected correctly. 3. If you have attached an external SCSI device to the server, make sure the external SCSI termination is set to automatic. 4. Make sure that the last device in each SCSI chain is terminated correctly. 5. Make sure that the SCSI devices are configured correctly.

Undetermined problems

Use the information in this section if the diagnostic tests did not diagnose the failure, the devices list is incorrect, or the server is inoperative.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the password override jumper to override the power-on password and clear the CMOS memory; see “Resetting passwords” on page 26. If you suspect that the BIOS code is damaged, see “Recovering from a POST/BIOS update failure” on page 25.

Check the LEDs on all the power supplies. If the LEDs indicate the power supplies are working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices (one at a time) until you find the failure (turn on the server and reconfigure each time):
 - Any external devices
 - Surge suppressor device (on the server)
 - Modem, printer, mouse, or non-IBM devices
 - Each adapter
 - Drives
 - Memory modules (minimum requirement = two 512 MB DIMMs)

Note: Minimum operating requirements are:

- a. Power supply
 - b. System board
 - c. One microprocessor
 - d. Memory (with a minimum of two 512 MB DIMMs)
4. Turn on the server. If the problem remains, suspect the following FRUs in the order listed:
 - Power supply
 - System board

Notes:

1. If the problem goes away when you remove an adapter from the system and replacing that adapter does not correct the problem, suspect the system board.
2. If you suspect a networking problem and all the system tests pass, suspect a network cabling problem external to the system.

Problem determination tips

Because of the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Microprocessor or hard disk upgrades
- Failure symptom
 - Do diagnostics fail?
 - What, when, where, single, or multiple servers?
 - Is the failure repeatable?
 - Has this configuration ever worked?
 - If it has been working, what changes were made before it failed?
 - Is this the original reported failure?
- Diagnostics version
 - Type and version level
- Hardware configuration
 - Print (print screen) configuration currently in use
 - BIOS level
- Operating system software
 - Type and version level

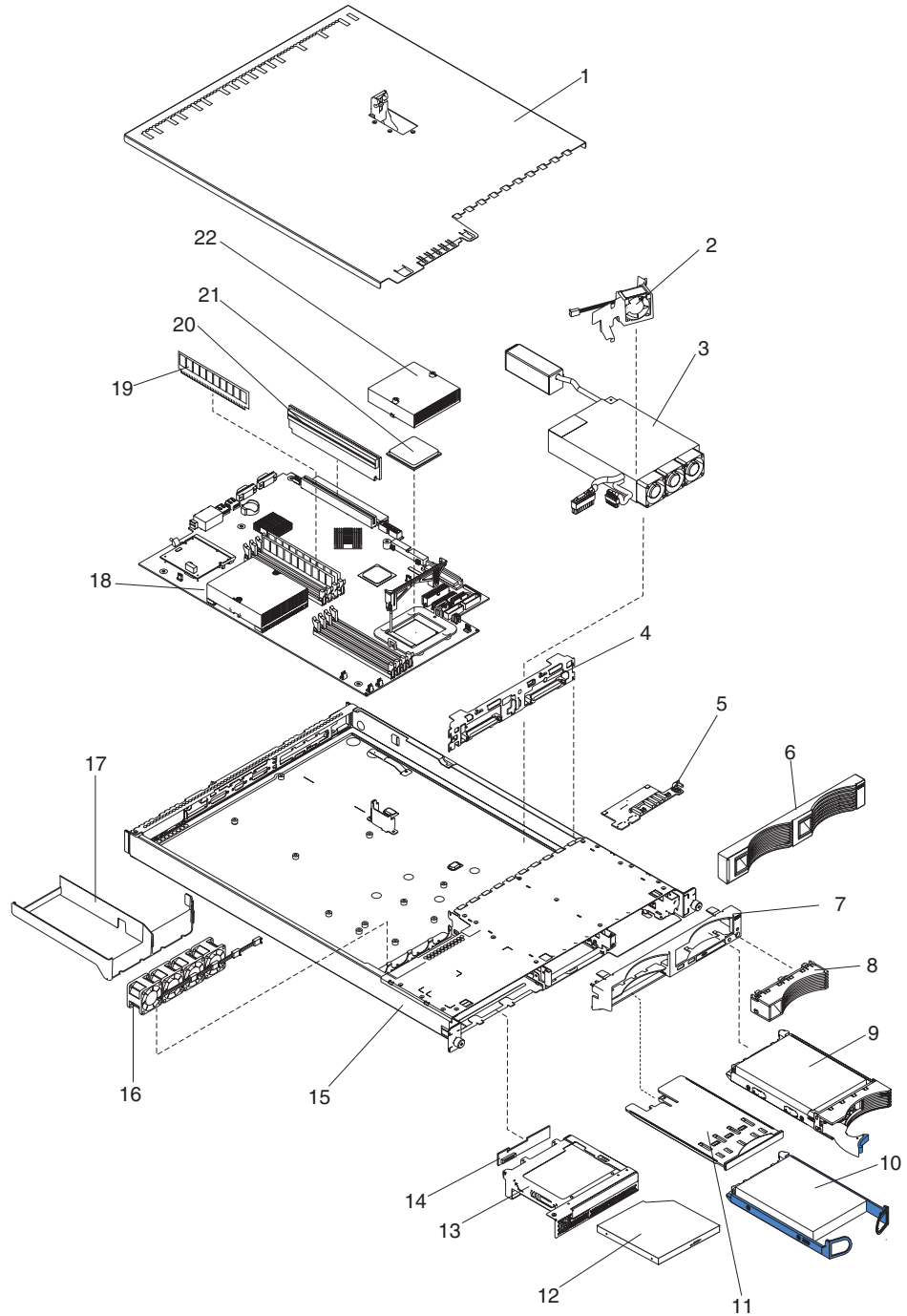
Note: To eliminate confusion, identical systems are considered identical only if they:

- Are the exact machine type and models
- Have the same BIOS level
- Have the same adapters/attachments in the same locations
- Have the same address jumpers/terminators/cabling
- Have the same software versions and levels
- Have the same diagnostics code (version)
- Have the same configuration options set in the system
- Have the same setup for the operation system control files

Comparing the configuration and software setup between working and non-working servers will often lead to problem resolution.

Chapter 8. Parts listing, Type 7969

The following parts information is for the 326m, Type 7969 servers.



System

Index	System (Type 7969, models 46x, 55x, 56x, 65x, 66x, 67x, 68x, 75x, 76x, 81x, 82x, 91x, 92x)	FRU No.	CRU/FRU
1	Cover, top (all models)	24P0708	CRU
2	Fan assembly, duct, 40X20 (all models)	24P0892	CRU
3	Power supply, 411W (all models)	74P4349	FRU
4	Hot-swap SCSI backplane (models 55x, 56x, 65x, 66x, 67x, 68x, 81x, 91x)	32P1932	FRU
5	Operator information panel card (all models)	48P9086	FRU
6	Bezel filler, hard disk drive (models 55x, 56x, 65x, 66x, 68x, 81x, 91x)	06P6245	CRU
7	Bezel, non-hot-swap trim (models 46x, 82x, 92x)	74P4945	CRU
8	Bezel, hot-swap hard disk drive trim (models 55x, 65x, 67x, 81x, 91x)	74P4949	CRU
9	Hard disk drive, SCSI, 36.4 GB 10K RPM CRU (model 67x)	32P0729	CRU
10	Hard disk drive, 80GB SATA, 7200 RPM (models 46x, 56x, 66x, 68x, 82x, 92x)	13M7742	CRU
11	Tray assembly, USB (all models)	32P0580	CRU
12	CD drive, 24x (all models)	39M3505	CRU
12	CD drive, 24x (optional)	26K5423	CRU
13	Bracket, CD/diskette drive carrier (all models)	13N2153	CRU
13	Bracket, CD drive carrier (all models)	32P1925	CRU
14	Interposer card (all models)	39R8542	FRU
15	Chassis (all models)	74P4875	FRU
16	Fan assembly, 40x40x28 (all models)	39M2859	FRU
17	Air duct, heat sink (all models)	25R5633	CRU
18	System board assembly (all models)	25R9537	FRU
19	Memory, 1GB PC3200 ECC (models 67x, 68x)	73P3237	CRU
19	Memory, 512 PC3200 ECC (all models except models 67x, 68x)	73P3236	CRU
20	Riser assembly, 3.5V (all models)	25P3359	CRU
20	PC-X Riser assembly (all models except 56x, 66x, 67x, 68x)	25R9533	CRU
20	PC-E Riser assembly (optional)	25R9535	CRU
21	Microprocessor, 1.8 GHz-1M (model 46x)	32R2021	FRU
21	Microprocessor, 2.0 GHz-1M (models 55x, 56x)	32R2022	FRU
21	Microprocessor, 2.2 GHz-1M (models 65x, 66x, 67x, 68x)	32R2023	FRU
21	Microprocessor, 2.4 Opteron (models 75x, 76x)	32R2345	FRU
21	Microprocessor, 2.6 GHz-1M (models 81x, 82x)	13M8185	FRU
21	Microprocessor, 2.8 GHz Opteron (models 91x, 92x)	32R2215	FRU
22	Heat sink (all models)	25R5612	FRU
	DVD drive, 8/24X (optional)	26K5393	CRU
	Battery, 3.0V (all models)	33F8354	CRU
	Cable, CD drive power (all models)	24P0867	CRU
	Cable, CD drive signal (all models)	24P0851	FRU
	Cable, hard disk drive backplane to system board (models 55x, 56x, 65x, 66x, 67x, 68x, 81x, 91x)	00N6988	FRU
	Cable, hard disk drive power, fixed, 2-drop (optional)	24P0865	FRU
	Cable, hot-swap SCSI assembly (models 55x, 56x, 65x, 66x, 67x, 68x, 81x, 91x)	24P0786	CRU
	Cable assembly, IDE (optional)	24P0788	CRU
	Cable, switch and USB (all models)	24P0853	FRU
	Cable, SATA power (models 46x, 82x, 92x)	25R5565	FRU
	Cable, SATA signal (models 46x, 82x, 92x)	25R5567	FRU
	Fan, 15K 28x28x40 (all models)	25R5563	FRU
	Fan, 40X40X20 (all models)	39M2870	FRU
	Fan bracket, 40X20 (all models)	39M2938	FRU
	Heat sink duct (all models)	26K4133	FRU
	Insulator, PCI card (all models)	23K4883	FRU

Index	System (Type 7969, models 46x, 55x, 56x, 65x, 66x, 67x, 68x, 75x, 76x, 81x, 82x, 91x, 92x)	FRU No.	CRU/FRU
	Jumper cord (all models)	36L8886	CRU
	Miscellaneous parts kit (all models):	32P1926	FRU
	• CD spring rod (1)		
	• CD drive blank bezel (1)		
	• CD/diskette drive bracket (1)		
	• Diskette drive blank bezel (1)		
	• Diskette drive spring rod (1)		
	• eServer xSeries plate (1)		
	• Fan/duct bracket 40x20 (1)		
	• I/O bracket (2)		
	• Icon light pipe (1)		
	• Light box mechanical assembly (1)		
	• PCI card support bracket (1)		
	• Power light pipe (1)		
	• Rear light pipe (1)		
	• Screws (10)		
	• Screws, slotted, M3.5 (18)		
	• System board rubber feet support (4)		
	• System board shield (1)		
	Nameplate (all models)	25R5578	CRU
	Rail kit, non-hot-swap hard disk drive (models 46x, 82x, 92x)	32P1928	CRU
	Rack mounting kit, 1U (all models)	24P1121	CRU
	Service label (all models)	25R5576	CRU
	Service label with FRU list (all models)	25R5575	CRU
	Baseboard management controller card (all models)	26K3093	CRU
	Power cord, see "Power cord CRUs" on page 102 (all models)	6952300	CRU

Power cord CRUs

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
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Maceo, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe

IBM power cord part number	Used in these countries and regions
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
- Go to the IBM Support Web site at <http://www.ibm.com/support/> to check for technical information, hints, tips, and new device drivers.
- Use an IBM discussion forum on the IBM Web site to ask questions.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documents that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation® systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/support/> and follow the instructions. Also, you can order documents through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

You can find service information for your IBM products, including supported options, at <http://www.ibm.com/support/>.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with xSeries servers, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, go to <http://www.ibm.com/services/>, or go to <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to <http://www.ibm.com/planetwide/> for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

Appendix B. Related service information

Note: The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that are familiar with the computers, functions, terminology, and service information provided in this manual.

Safety information

The following section contains the safety information that you need to be familiar with before servicing an IBM computer.

General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
 1. Ensure you can stand safely without slipping.
 2. Distribute the weight of the object equally between your feet.
 3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety



CAUTION:

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

Observe the following rules when working on electrical equipment.

Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
 - Ensure that another person, familiar with the power-off controls, is near you.
Remember: Another person must be there to switch off the power, if necessary.
 - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
 - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.

- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators
 and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
 - Use caution; do not become a victim yourself.
 - Switch off power.
 - Send another person to get medical aid.

Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Turn off the computer. Disconnect the power cord.
3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
 - b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.

8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the server, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD-protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those in the following list, to provide protection that meets the specific service requirement.

Note: The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Safety notices (multilingual translations)

The caution and danger safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Italian
- Japanese
- Korean
- Spanish

Important: All caution and danger statements in this IBM documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in this section.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in this section under statement 1.

Be sure to read all caution and danger statements before performing any of the instructions.

Statement 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
<ol style="list-style-type: none">1. Turn everything OFF.2. First, attach all cables to devices.3. Attach signal cables to connectors.4. Attach power cords to outlet.5. Turn device ON.	<ol style="list-style-type: none">1. Turn everything OFF.2. First, remove power cords from outlet.3. Remove signal cables from connectors.4. Remove all cables from devices.

Statement 2



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.

Statement 3



CAUTION:

When laser products (such as CD-ROMs, DVD-ROM 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.

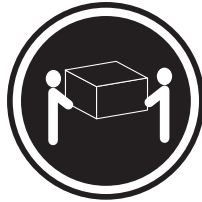


DANGER

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.

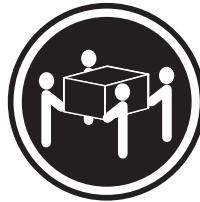
Statement 4



≥18 kg (39.7 lb)



≥32 kg (70.5 lb)



≥55 kg (121.2 lb)

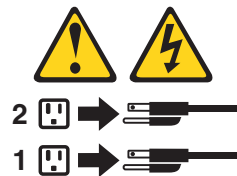
CAUTION:
Use safe practices when lifting.

Statement 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.



Statement 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.

Statement 10

CAUTION:

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



Importante:

Todas as instruções de cuidado e perigo da IBM documentation começam com um número. Este número é utilizado para fazer referência cruzada de uma instrução de cuidado ou perigo no idioma inglês com as versões traduzidas das instruções de cuidado ou perigo encontradas nesta seção.

Por exemplo, se uma instrução de cuidado é iniciada com o número 1, as traduções para aquela instrução de cuidado aparecem nesta seção sob a instrução 1.

Certifique-se de ler todas as instruções de cuidado e perigo antes de executar qualquer operação.

Instrução 1



PERIGO

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicações é perigosa.

Para evitar risco de choque:

- Não conecte ou desconecte cabos e não realize instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.
- Conecte todos os cabos de alimentação a tomadas elétricas corretamente instaladas e aterradas.
- Conecte todos os equipamentos ao qual esse produto será conectado a tomadas corretamente instaladas.
- Sempre que possível, utilize apenas uma das mãos para conectar ou desconectar cabos de sinal.
- Nunca ligue qualquer equipamento quando existir evidência de danos por fogo, água ou na estrutura.
- Desconecte cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas dos dispositivos, a menos que especificado de maneira diferente nos procedimentos de instalação e configuração.
- Conecte e desconecte cabos conforme descrito na seguinte tabela, ao instalar ou movimentar este produto ou os dispositivos conectados, ou ao abrir suas tampas.

Para Conectar:	Para Desconectar:
<ol style="list-style-type: none">1. DESLIGUE Tudo.2. Primeiramente, conecte todos os cabos aos dispositivos.3. Conecte os cabos de sinal aos conectores.4. Conecte os cabos de alimentação às tomadas.5. LIGUE os dispositivos.	<ol style="list-style-type: none">1. DESLIGUE Tudo.2. Primeiramente, remova os cabos de alimentação das tomadas.3. Remova os cabos de sinal dos conectores.4. Remova todos os cabos dos dispositivos.

Instrução 2



CUIDADO:

Ao substituir a bateria de lítio, utilize apenas uma bateria IBM, Número de Peça 33F8354 ou uma bateria de tipo equivalente, recomendada pelo fabricante. Se o seu sistema possui um módulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de módulo, do mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de maneira correta.

Não:

- Jogue ou coloque na água
- Aqueça a mais de 100°C (212°F)
- Conserte nem desmonte

Para descartar a bateria, entre em contato com a área de atendimento a clientes IBM, pelo telefone (011) 889-8986, para obter informações sobre como enviar a bateria pelo correio para a IBM.

Instrução 3



PRECAUCIÓN:

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ótica, transmissores, etc.) estiverem instalados, observe o seguinte:

- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

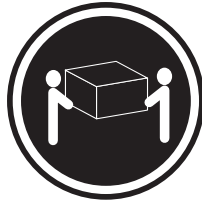


PERIGO

Alguns produtos a laser contêm um diodo laser da Classe 3A ou Classe 3B embutido. Observe o seguinte:

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos óticos, e evite exposição direta ao raio.

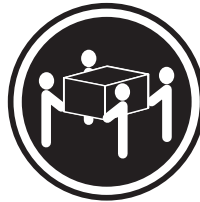
Instrução 4



≥18 kg (39.7 lb)



≥32 kg (70.5 lb)



≥55 kg (121.2 lb)

CUIDADO:

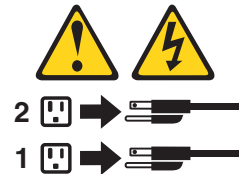
Ao levantar a máquina, faça-o com segurança.

Instrução 5



CUIDADO:

Os botões Liga/Desliga localizados no dispositivo e na fonte de alimentação não desligam a corrente elétrica fornecida ao dispositivo. O dispositivo também pode ter mais de um cabo de alimentação. Para remover toda a corrente elétrica do dispositivo, assegure que todos os cabos de alimentação estejam desconectados da fonte de energia elétrica.



Instrução 8



CUIDADO:

Nunca remova a tampa de uma fonte de alimentação ou de qualquer peça que tenha esta etiqueta afixada.



Níveis perigosos de voltagem, corrente e energia estão presentes em qualquer componente que tenha esta etiqueta afixada. Nenhuma peça localizada no interior desses componentes pode ser consertada. Se você suspeitar de algum problema em alguma dessas peças, entre em contato com um técnico IBM.

Instrução 10

CUIDADO:

Não coloque nenhum objeto com peso superior a 82 kg (180 lbs.) sobre dispositivos montados em rack.



重要:

Server Library 中的所有提醒和危险条款前都有一个数字标识。该数字是用来交叉引用一个英文的提醒和危险条款及本部分中的与之对应的已翻译成其它文字的提醒和危险条款。

例如, 如果一个提醒条款前的数字为 1, 则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前, 请确保您已经阅读了全部提醒和危险条款。

声明 1



危险

电源、电话和通信电缆中带有危险电流。
为避免电击:
雷电期间不要拆接电缆或安装、维修及重新配置本产品。
将所有电源线连接至正确布线并已安全接地的电源插座上。
将与本产品连接的所有设备连接至正确布线的插座上。
尽量只使用单手拆接信号电缆。
有水、火及结构损坏迹象时, 请勿打开任何设备。
除非在安装配置过程中有明确指示, 否则, 打开设备机盖前应先断开与电源线、远程通信系统、网络和调制解调器的所有连接。
安装、移动或打开本产品及其附带设备的机盖时, 应按下表所述连接和断开电缆。

连接时:	断开连接时:
1. 关闭所有设备。	1. 关闭所有设备。
2. 首先将所有电缆连接至设备。	2. 首先从插座中拔出电源线。
3. 将信号电缆连接至接口。	3. 从接口上拔下信号电缆。
4. 将电源线连接至插座。	

声明 2



警告:

更换锂电池时，只能使用 IBM 产品号 33F8354 或者是厂商推荐的等同类型的电池。

如果系统模块中含有锂电池，则只能使用同一厂商制造的同一类型的模块进行更换。电池中含有锂，如果使用、拿放或处理不当，可能会发生爆炸。

请勿对电池进行下列操作：
扔入或浸入水电
加热超过 100 (212 F)
进行修理或分解
请按本地法规要求处理电池。

声明 3



警告:

安装激光产品（如 CD-ROM、DVD 驱动器、光纤设备或送话器）时，应注意以下事项：

不要拆除外盖。拆除激光产品的外盖可能会导致激光辐射的危险，本设备中没有用户可维修的部件。

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。



危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束，避免直接暴露于光束之下。

声明 4



≥18 kg (37 磅)



≥32 kg (70.5 磅)



≥55 kg (121.2 磅)

警告：
抬起时请采用安全操作方法。

声明 5



警告：

使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。
另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确
保所有电源线均已与电源断开连接。



2



1



声明 6



警告：

如果在电源线连接设备的一端安装了固定松紧夹，则必须将电源线的另一端连接至
使用方便的电源。

声明 7



警告:

如果设备带有外门，则在移动或抬起设备前应将其拆除或固定以避免造成人员伤害。外门支撑不了设备的重量。

声明 8



警告:

不要拆除电源外盖或贴有下列标签的任何部件。



贴有此标签的组件内部存在高电压、高电流的危险。这些组件中没有用户可维修的部件。如果怀疑其中的部件存在问题，应与服务技术人员联系。

声明 9



警告:

为避免人员伤害，拆除设备上的风扇前应拨下热插拔风扇电缆。

声明 10



警告:

机柜安装的设备上面不能放置重于 82kg (180 磅) 的物品。



> 82 kg (180 磅)

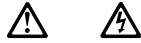
重要資訊：

Server Library 中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在本節的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1



危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

- 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
- 請將電源線接至接線及接地正確的電源插座。
- 請將本產品隨附的設備連接至接線正確的插座。
- 儘可能使用單手來連接或切斷信號電纜線。
- 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啓該設備的電源。
- 在安裝及架構之時，若非非常熟悉，在開啓裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
- 在安裝、移動本產品或附加裝置，或開啓其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：

1. 關閉所有開關。
2. 先將所有電纜線接上裝置。
3. 將信號電纜接上接頭。
4. 再將電源線接上電源插座。
5. 開啓裝置的電源。

切斷：

1. 關閉所有開關。
2. 先自電源插座拔掉電源線。
3. 拔掉接頭上的所有信號電纜。
4. 再拔掉裝置上的所有電纜線。

聲明 2



注意：

更換鋰電池時，只可使用 IBM 零件編號 33F8354 的電池，或製造商建議之相當類型的電池。若系統中具有包含鋰電池的模組，在更換此模組時，請使用相同廠商製造的相同模組類型。如未正確使用、處理或丟棄含有鋰的電池時，可能會引發爆炸。

請勿將電池：

- 丟入或浸入水中
- 加熱超過 100 °C (212 °F)
- 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3



注意：

安裝雷射產品 (如 CD-ROM、DVD 光碟機、光纖裝置或發射器) 時，請注意下列事項：

- 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。裝置中沒有需要維修的組件。
- 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。



危險

有些雷射產品含有內嵌式 Class 3A 或 Class 3B 雷射二極體。請注意下列事項：

開啓時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀察，且應避免直接暴露在光束下。

聲明 4



≥ 18 公斤 (37 磅) ≥ 32 公斤 (70.5 磅) ≥ 55 公斤 (121.2 磅)

注意：

抬起裝置時，請注意安全措施。

聲明 5



注意：

裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。

本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所有電源線已與電源分離。



聲明 8



注意：
嚴禁移除電源供應器的蓋子，或任何貼有下列標籤的組件。



貼有此標籤的元件內均有危險的電壓、電流及能源。這些元件中沒有需要維修的組件。若察覺問題發生在上述組件時，請與服務人員聯絡。

聲明 10



注意：
請勿將任何重量超過 82 公斤 (180 磅) 的物品置於已安裝機架的裝置上方。



>82 公斤 (180 磅)

Important:

Toutes les consignes Attention et Danger indiquées dans la bibliothèque IBM documentation sont précédées d'un numéro. Ce dernier permet de mettre en correspondance la consigne en anglais avec ses versions traduites dans la présente section.

Par exemple, si une consigne de type Attention est précédée du chiffre 1, ses traductions sont également précédées du chiffre 1 dans la présente section.

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Notice n° 1



DANGER

Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux.

Pour éviter tout risque de choc électrique:

- Ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.
- Branchez tous les cordons d'alimentation sur un socle de prise de courant correctement câblé et mis à la terre.
- Branchez sur des socles de prise de courant correctement câblés tout équipement connecté à ce produit.
- Lorsque cela est possible, n'utilisez qu'une seule main pour connecter ou déconnecter les câbles d'interface.
- Ne mettez jamais un équipement sous tension en cas d'incendie ou d'inondation, ou en présence de dommages matériels.
- Avant de retirer les carters de l'unité, mettez celle-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui la relient aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).
- Lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.

Connexion	Déconnexion
<ol style="list-style-type: none">1. Mettez les unités hors tension.2. Commencez par brancher tous les cordons sur les unités.3. Branchez les câbles d'interface sur des connecteurs.4. Branchez les cordons d'alimentation sur des prises.5. Mettez les unités sous tension.	<ol style="list-style-type: none">1. Mettez les unités hors tension.2. Débranchez les cordons d'alimentation des prises.3. Débranchez les câbles d'interface des connecteurs.4. Débranchez tous les câbles des unités.

Notice n° 2



ATTENTION:

Remplacez la pile au lithium usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

- Ne la jetez pas à l'eau.
- Ne l'exposez pas à une température supérieure à 100 °C.
- Ne cherchez pas à la réparer ou à la démonter.

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.

Notice n° 3



ATTENTION:

Si des produits laser sont installés (tels que des unités de CD-ROM ou de DVD, des périphériques contenant des fibres optiques ou des émetteurs-récepteurs), prenez connaissance des informations suivantes:

- N'ouvrez pas ces produits pour éviter une exposition directe au rayon laser. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.
- Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.

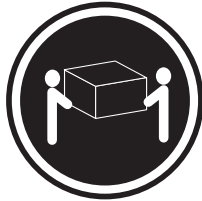


DANGER

Certains produits laser contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes:

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. évitez une exposition directe au rayon.

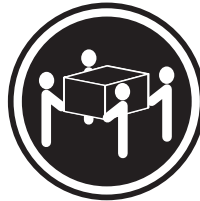
Notice n° 4



≥18 kg (39.7 lb)



≥32 kg (70.5 lb)



≥55 kg (121.2 lb)

ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5



ATTENTION:

Le bouton de mise sous tension/hors tension de l'unité et l'interrupteur d'alimentation du bloc d'alimentation ne coupent pas l'arrivée de courant électrique à l'intérieur de la machine. Il se peut que votre unité dispose de plusieurs cordons d'alimentation. Pour isoler totalement l'unité du réseau électrique, débranchez tous les cordons d'alimentation des socles de prise de courant.



Notice n° 8



ATTENTION:

N'ouvrez jamais le bloc d'alimentation ou tout élément sur lequel est apposée l'étiquette ci-dessous.



Des tensions et des courants dangereux sont présents à l'intérieur de tout composant sur lequel est apposée cette étiquette. Ces éléments ne peuvent pas être réparés. Si vous pensez qu'ils peuvent être à l'origine d'un incident, prenez contact avec un technicien de maintenance.

Notice n° 10

ATTENTION:

Ne posez pas d'objet dont le poids dépasse 82 kg sur les unités montées en armoire.



Wichtig:

Alle Sicherheitshinweise in dieser IBM documentation beginnen mit einer Nummer. Diese Nummer verweist auf einen englischen Sicherheitshinweis mit den übersetzten Versionen dieses Hinweises in diesem Abschnitt.

Wenn z. B. ein Sicherheitshinweis mit der Nummer 1 beginnt, so erscheint die Übersetzung für diesen Sicherheitshinweis in diesem Abschnitt unter dem Hinweis 1.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1



VORSICHT

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich.

Aus Sicherheitsgründen:

- Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.
- Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Signalkabel möglichst einhändig anschließen oder lösen.
- Keine Geräte einschalten, wenn die Gefahr einer Beschädigung durch Feuer, Wasser oder andere Einflüsse besteht.
- Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem Öffnen des Gehäuses zu unterbrechen. Es sei denn, dies ist in den zugehörigen Installations- und Konfigurationsprozeduren anders angegeben.
- Nur nach den nachfolgend aufgeführten Anweisungen arbeiten, die für Installation, Transport oder Öffnen von Gehäusen von Personal Computern oder angeschlossenen Einheiten gelten.

Kabel anschließen:	Kabel lösen:
<ol style="list-style-type: none">1. Alle Geräte ausschalten und Netzstecker ziehen.2. Zuerst alle Kabel an Einheiten anschließen.3. Signalkabel an Anschlußbuchsen anschließen.4. Netzstecker an Steckdose anschließen.5. Gerät einschalten.	<ol style="list-style-type: none">1. Alle Geräte ausschalten.2. Zuerst Netzstecker von Steckdose lösen.3. Signalkabel von Anschlußbuchsen lösen.4. Alle Kabel von Einheiten lösen.

Hinweis 2



ACHTUNG:

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:

- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3



ACHTUNG:

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.

- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

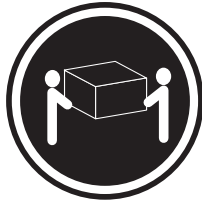


VORSICHT

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.

Hinweis 4



≥18 kg



≥32 kg



≥55 kg

ACHTUNG:

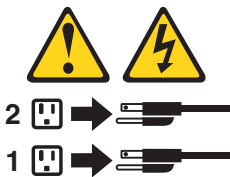
Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5



ACHTUNG:

Mit dem Betriebsspannungsschalter an der Vorderseite des Servers und dem Betriebsspannungsschalter am Netzteil wird die Stromversorgung für den Server nicht unterbrochen. Der Server könnte auch mehr als ein Netzkabel aufweisen. Um die gesamte Stromversorgung des Servers auszuschalten, muß sichergestellt werden, daß alle Netzkabel aus den Netzsteckdosen herausgezogen wurden.



Hinweis 8



ACHTUNG:

Die Abdeckung oder eine Komponente eines Netzteils, die wie nachfolgend aufgeführt gekennzeichnet ist, darf keinesfalls entfernt werden.



In Komponenten, die so gekennzeichnet sind, können gefährliche Spannungen anliegen. In diesen Komponenten sind keine Teile vorhanden, die vom Benutzer gewartet werden müssen. Besteht der Verdacht, dass an einem dieser Teile ein Fehler aufgetreten ist, ist ein IBM Kundendiensttechniker zu verständigen.

Hinweis 10

ACHTUNG:

Keine Gegenstände, die mehr als 82 kg wiegen, auf Rack-Einheiten ablegen.



Importante:

Tutti gli avvisi di attenzione e di pericolo riportati nella pubblicazione IBM documentation iniziano con un numero. Questo numero viene utilizzato per confrontare avvisi di attenzione o di pericolo in inglese con le versioni tradotte riportate in questa sezione.

Ad esempio, se un avviso di attenzione inizia con il numero 1, la relativa versione tradotta è presente in questa sezione con la stessa numerazione.

Prima di eseguire una qualsiasi istruzione, accertarsi di leggere tutti gli avvisi di attenzione e di pericolo.

Avviso 1



PERICOLO

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa.

Per evitare il pericolo di scosse elettriche:

- Non collegare o scollegare i cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto durante i temporali.
- Collegare tutti i cavi di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Quando possibile, collegare o scollegare i cavi di segnale con una sola mano.
- Non accendere qualsiasi apparecchiatura in presenza di fuoco, acqua o se sono presenti danni all'apparecchiatura stessa.
- Scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e i modem prima di aprire i coperchi delle unità, se non diversamente indicato nelle procedure di installazione e configurazione.
- Collegare e scollegare i cavi come descritto nella seguente tabella quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o delle unità collegate.

Per collegare:	Per scollegare:
<ol style="list-style-type: none">1. SPEGNERE tutti i dispositivi.2. Collegare prima tutti i cavi alle unità.3. Collegare i cavi di segnale ai connettori.4. Collegare i cavi di alimentazione alle prese elettriche.5. ACCENDERE le unità.	<ol style="list-style-type: none">1. SPEGNERE tutti i dispositivi.2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.3. Rimuovere i cavi di segnale dai connettori.4. Rimuovere tutti i cavi dalle unità.

Avviso 2



ATTENZIONE:

Quando si sostituisce la batteria al litio, utilizzare solo una batteria IBM con numero parte 33F8354 o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:

- Gettarla o immergerla in acqua
- Riscaldarla ad una temperatura superiore ai 100°C
- Cercare di ripararla o smontarla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/9) e successive disposizioni nazionali e locali.

Avviso 3



ATTENZIONE:

Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:

- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

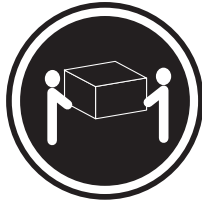


PERICOLO

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

Aperto l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

Avviso 4



≥18 kg



≥32 kg



≥55 kg

ATTENZIONE:

Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5



ATTENZIONE:

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.



Avviso 8



ATTENZIONE:

Non togliere mai il coperchio di un alimentatore o qualsiasi parte su cui è posta la seguente etichetta.



Tensioni pericolose, corrente e livelli di energia sono presenti all'interno del componente su cui è posta questa etichetta. All'interno di questi componenti non vi sono parti su cui effettuare l'assistenza tecnica. Se si sospetta un problema in una di queste parti, rivolgersi ad un tecnico di manutenzione.

Avviso 10

ATTENZIONE:

Non poggiare oggetti che pesano più di 82 kg sulla parte superiore delle unità montate in rack.



重要:

Netfinity Server ライブラリーにあるすべての注意および危険の記述は数字で始まります。この数字は、英語版の注意および危険の記述と翻訳された注意および危険の記述を相互参照するために使用します。

例えば、もし注意の記述が数字の1で始まっている場合は、その注意の翻訳は、記述1の下にあります。

手順を実施する前に、すべての注意:

・記述 1

⚠ 危険

感電を防止するため、雷の発生時には、いかなるケーブルの取り付けまたは取り外しも行わないでください。また導入、保守、再構成などの作業も行わないでください。

感電を防止するため:

- 電源コードは正しく接地および配線が行われている電源に接続してください。
- 本製品が接続されるすべての装置もまた正しく配線された電源に接続されている必要があります。

できれば、信号ケーブルに取り付けまたは取り外しのときは片方の手のみで行うようにしてください。これにより、電位差がある二つの表面に触ることによる感電を防ぐことができます。

電源コード、電話ケーブル、通信ケーブルからの電流は身体に危険を及ぼします。設置、移動、または製品のカバーを開けたり装置を接続したりするときには、以下のようにケーブルの接続、取り外しを行ってください。

接続するには	取り外すには
1. すべての電源を切る	1. すべての電源を切る
2. まず、装置にすべてのケーブルを接続する。	2. まず、電源コンセントから電源コードを取り外す
3. 次に、通信ケーブルをコネクタに接続する	3. 次に、通信ケーブルをコネクタから取り外す。
4. その後、電源コンセントに電源コードを接続する	4. その後、装置からすべてのケーブルを取り外す
5. 装置の電源を入れる。	

・記述 2

⚠ 注意

本製品には、システム・ボード上にリチウム電池が使用されています。電池の交換方法や取り扱いを誤ると、発熱、発火、破裂のおそれがあります。

電池の交換には、IBM部品番号33F8354の電池またはメーカー推奨の同等の電池を使用してください。

交換用電池の購入については、お買い求めの販売店または弊社の営業担当までお問い合わせください。

電池は幼児の手の届かない所に置いてください。

万一、幼児が電池を飲み込んだときは、直ちに医師に相談してください。

以下の行為は絶対にしないでください。

- 水にぬらすこと
- 100度C以上の過熱や焼却
- 分解や充電
- ショート

電池を廃棄する場合、および保存する場合にはテープなどで絶縁してください。他の金属や電池と混ざると発火、破裂の原因となります。電池は地方自治体の条例、または規則に従って廃棄してください。ごみ廃棄場で処分されるごみの中に捨てないでください。

・記述 3

⚠ 注意

レーザー製品 (CD-ROM、DVD、または光ファイバー装置または送信器など) が組み込まれている場合は、下記に御注意ください。

- ここに記載されている制御方法、調整方法、または性能を超えて使用すると、危険な放射線を浴びる可能性があります。
- ドライブのカバーを開けると、危険な放射線を浴びる可能性があります。ドライブの内部に修理のために交換可能な部品はありません。カバーを開けないでください。

⚠ 危険

一部 CD-ROM ドライブは、Class 3A または Class 3B レーザーダイオードを使用しています。次の点に注意してください。

CD-ROM ドライブのカバーを開けるとレーザーが放射されます。光線を見つめたり、光学器械を使って直接見たりしないでください。また直接光線を浴びないようにしてください。

・記述 4

⚠ 注意



18kg 以上



32kg 以上



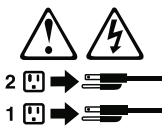
55kg 以上

装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

・記述 5

⚠ 注意 ⚡

サーバーの前面にある電源制御ボタンは、サーバーに供給された電流を遮断しません。サーバーには、複数の電源コードが接続されているかもしれません。サーバーから電流を完全に遮断するために、すべての電源コードが電源から取り外されていることを確認してください。



・記述 8

⚠ 注意

この機器のなかにある電源のカバーは取り外さないでください。また、下記のラベルが貼られているいかなる部品 (電源のバックプレーンおよび AC ボックス) も取り外さないでください。



電源、電源のバックプレーンおよび AC ボックスの内部には危険な電圧、電流およびエネルギーがあり危険です。電源、電源のバックプレーンおよび AC ボックスの内部には保守部品はありません。これらの部品に問題があるときは販売店または保守サービス会社にご連絡ください。

・記述 10

注意

ラック・モデルのサーバーの上に 82 Kg 以上の物を置かないでください。



중요:

본 *Server Library*에 있는 모든 주의 및 위험 경고문은 번호로 시작합니다. 이 번호는 영문 주의 혹은 위험 경고문과 이 절에 나오는 번역된 버전의 주의 혹은 위험 경고문을 상호 참조하는 데 사용됩니다.

예를 들어, 주의 경고문이 번호 1로 시작하면, 번역된 해당 주의 경고문을 본 절의 경고문 1에서 찾아볼 수 있습니다.

모든 지시사항을 수행하기 전에 반드시 모든 주의 및 위험 경고문을 읽으십시오.

경고문 1



위험

전원, 전황 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의 설치, 유지보수 또는 재구성을 하지 마십시오.
- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.
- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에 연결하십시오.
- 가능한 신호 케이블을 한 손으로 연결하거나 끊으십시오.
- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 꺼지 마십시오.
- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를 열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크 및 모뎀을 끊어 주십시오.
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<p>연결하려면:</p> <ol style="list-style-type: none"> 1. 모든 스위치를 끕니다. 2. 먼저 모든 케이블을 장치에 연결합니다. 3. 신호 케이블을 커넥터에 연결합니다. 4. 콘센트에 전원 코드를 연결합니다. 5. 장치 스위치를 켭니다. 	<p>연결을 끊으려면:</p> <ol style="list-style-type: none"> 1. 모든 스위치를 끕니다. 2. 먼저 콘센트에서 전원 코드를 뽑습니다. 3. 신호 케이블을 커넥터에서 제거합니다. 4. 장치에서 모든 케이블을 제거합니다.
---	---

경고문 2



주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서 권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈 유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음은 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100°C(212°F) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:
레이저 제품(CD-ROMs, DVD 드라이브, 광 장치 또는 트랜스미터 등과 같은)이 설치되어 있을 경우 다음을 유의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우 위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를 받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한 레이저 광선에 노출될 수 있습니다.



위험

일부 레이저 제품에는 클래스 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4



≥18 kg (37 lbs)



≥ 32 kg (70.5 lbs)



≥ 55 kg (121.2 lbs)

주의:

기계를 들 때는 안전하게 들어 올리십시오.

경고문 5



주의:
장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는지 확인하십시오.



경고문 8



주의:
다음 레이블이 붙어 있는 전원 공급기나 부품의 덮개를 제거하지 마십시오.



이 레이블이 부착되어 있는 컴포넌트 안에는 위험한 전압, 전류 및 에너지 레벨이 있습니다. 이 컴포넌트 안에는 서비스 받을 수 있는 부품이 없습니다. 이들 부품에 문제가 있을 경우 서비스 기술자에게 문의하십시오.

경고문 10



주의:
서랍형 모델의 장치 상단에 82 kg(180 lbs.)이 넘는 물체를 올려
놓지 마십시오.



>82 kg (180 lbs)

Importante:

Todas las declaraciones de precaución de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaración de precaución o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta sección.

Por ejemplo, si una declaración de peligro empieza con el número 1, las traducciones de esta declaración de precaución aparecen en esta sección bajo Declaración 1.

Lea atentamente todas las declaraciones de precaución y peligro antes de llevar a cabo cualquier operación.

Declaración 1



PELIGRO

La corriente eléctrica de los cables telefónicos, de alimentación y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:

- No conecte ni desconecte ningún cable ni realice las operaciones de instalación, mantenimiento o reconfiguración de este producto durante una tormenta.
- Conecte cada cable de alimentación a una toma de alimentación eléctrica con conexión a tierra y cableado correctos.
- Conecte a tomas de alimentación con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.
- Si es posible, utilice una sola mano cuando conecte o desconecte los cables de señal.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundación o de daños estructurales.
- Desconecte los cables de alimentación, sistemas de telecomunicaciones, redes y módems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalación y configuración.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operación de instalación, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexión:	Para la desconexión:
<ol style="list-style-type: none">1. APÁGUELO todo.2. En primer lugar, conecte los cables a los dispositivos.3. Conecte los cables de señal a los conectores.4. Conecte cada cable de alimentación a la toma de alimentación.5. ENCIENDA el dispositivo.	<ol style="list-style-type: none">1. APÁGUELO todo.2. En primer lugar, retire cada cable de alimentación de la toma de alimentación.3. Retire los cables de señal de los conectores.4. Retire los cables de los dispositivos.

Declaración 2



PRECAUCIÓN:

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislación local.

Declaración 3



PRECAUCIÓN:

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra óptica o transmisores), tenga en cuenta las advertencias siguientes:

- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiación láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realización de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposición perjudicial a las radiaciones.

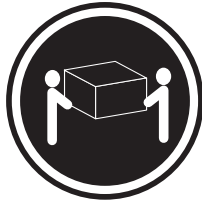


PELIGRO

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiación láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ópticos; evite la exposición directa al rayo.

Declaración 4



≥18 kg



≥32 kg



≥55 kg

PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5



PRECAUCIÓN:

El botón de control de alimentación del dispositivo y el interruptor de alimentación de la fuente de alimentación no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentación. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentación de la fuente de alimentación.



Declaración 8



PRECAUCIÓN:

No retire nunca la cubierta de una fuente de alimentación ni ninguna pieza que tenga adherida la etiqueta siguiente.



Existen niveles perjudiciales de energía, corriente y voltaje en los componentes que tienen adherida esta etiqueta. Dentro de estos componentes no existe ninguna pieza que requiera mantenimiento. Si sospecha que alguna de estas piezas tiene un problema, póngase en contacto con un técnico de servicio.

Declaración 10

PRECAUCIÓN:

No coloque ningún objeto que pese más de 82 kg (180 libras) encima de los dispositivos montados en bastidor.



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Important notes

Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

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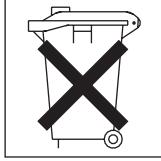
This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. Information on product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.

Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to <http://www.ibm.com/ibm/environment/products/batteryrecycle.shtml> or contact your local waste disposal facility.

In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

In the Netherlands, the following applies.



Electronic emission notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwanese Class A warning statement

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Chinese Class A warning statement

聲 明
此為 A 級產品。在生活環境中，該產品可能會造成無線電干擾。在這種情況下，可能需要用戶對其干擾採取切實可行的措施。

Japanese Voluntary Control Council for Interference (VCCI) statement

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