



@server

326m Type 7969

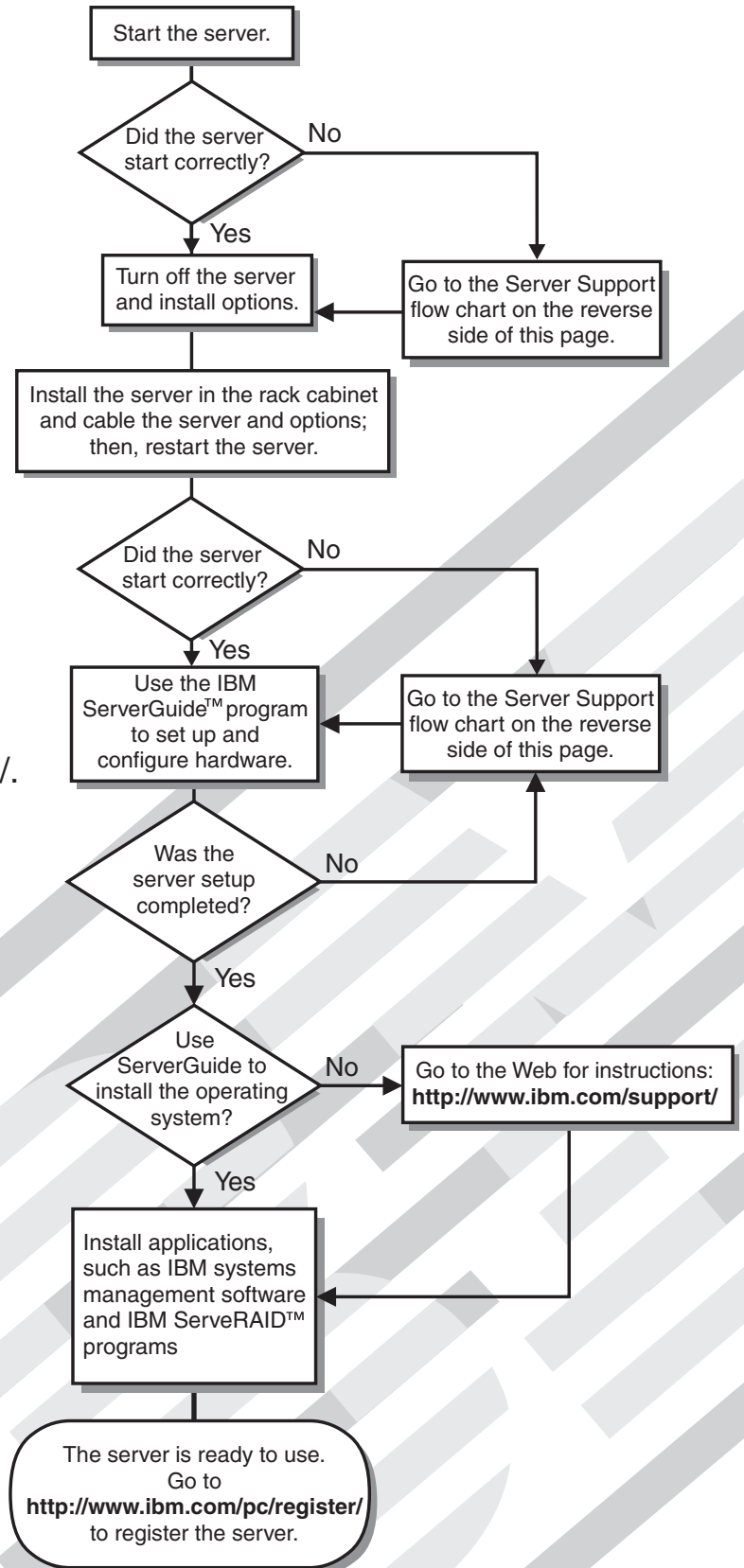
Installation Guide

Welcome.

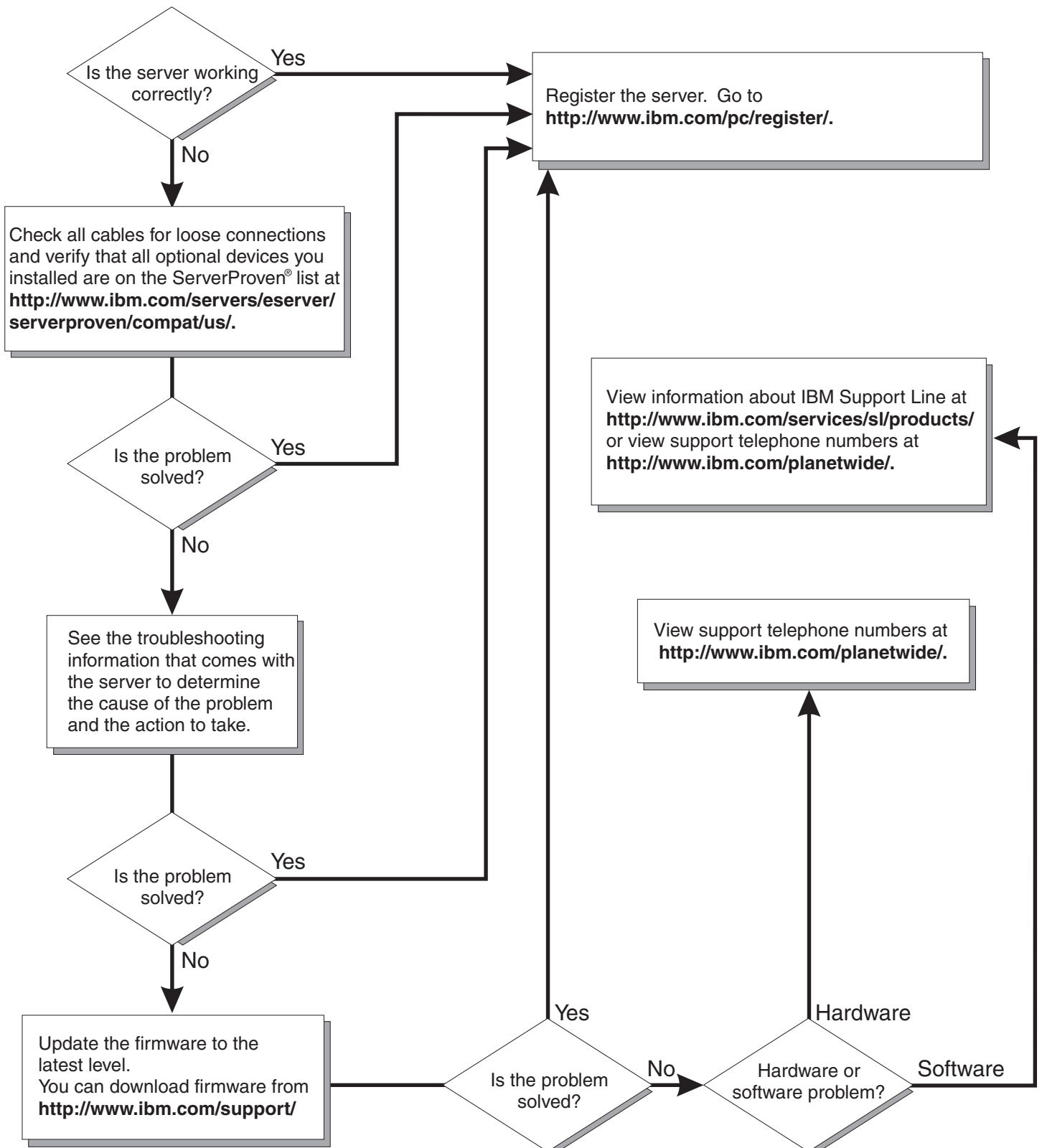
This server *Installation Guide* contains information for setting up and configuring your server.

For detailed information about your server, view the publications on the Documentation CD.

You can also find the most current information about your server at <http://www.ibm.com/support/>.



Server Support



eServer 326m Type 7969



Installation Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 55., and the *Warranty and Support Information* document on the IBM @server *Documentation* CD.

Second Edition (November 2005)

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

All caution and danger statements in this 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 the *IBM Safety Information* book.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in the *IBM Safety Information* book under statement 1.

Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with your server or optional device before you install the device.

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:

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.

To Disconnect:

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 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.



Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

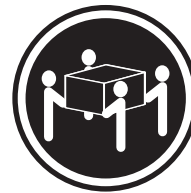
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

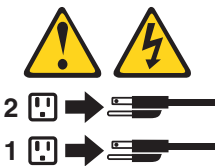
Use safe practices when lifting.

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 lb) on top of rack-mounted devices.



>82 kg (180 lb)

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 cáncer y de defectos congénitos, además de otros riesgos reproductivos. ***Lávese las manos después de usar el producto.***

Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up your IBM® @server™ 326m Type 7969 server and basic instructions for installing some options. More detailed instructions for installing options are in the *Option Installation Guide* on the IBM @server Documentation CD, which comes with the server. This document contains information about:

- Setting up and cabling the server
- Starting and configuring the server
- Installing some options
- Solving problems

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. To check for updated documentation and technical updates, 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**.

The server comes with an IBM *ServerGuide™ Setup and Installation* CD to help you configure the hardware, install device drivers, and install the operating system.

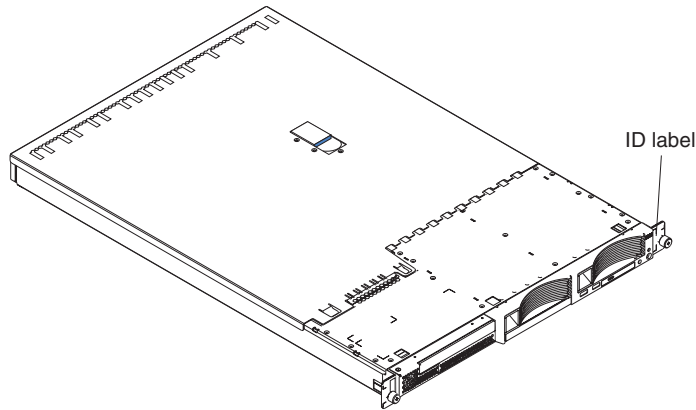
The server comes with a limited warranty (see the *IBM Warranty and Support Information* document on the IBM @server Documentation CD). You can obtain up-to-date information about the server at <http://www.ibm.com/pc/us/eserver/opteron/>. You can obtain information about other IBM server products at <http://www.ibm.com/eserver/xseries/>.

Record information about the server in the following table. You will need this information when you register the server with IBM.

| | |
|----------------------|-------------------------|
| Product name | IBM @server 326m server |
| Machine type | 7969 |
| Model number | _____ |
| Serial number | _____ |

The model number and serial number are on the ID label on the right mounting bracket on the server, as shown in the following illustration.

Note: This illustration shows a small computer system interface (SCSI) model server. A Serial ATA (SATA) non-hot-swap hard disk drive model is also available. This illustration might differ slightly from your hardware.



See the *Rack Installation Instructions* document for complete rack installation and removal instructions.

The IBM @server Documentation CD

The IBM @server *Documentation* CD contains documentation for your server in Portable Document Format (PDF) and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

The IBM @server *Documentation* CD requires the following minimum hardware and software:

- Microsoft Windows NT 4.0 (with Service Pack 3 or later), Windows 2000, or Red Hat Linux.
- 100 MHz microprocessor.
- 32 MB of RAM.
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems. Acrobat Reader software is included on the CD, and you can install it when you run the Documentation Browser.

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in use in your server and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into the CD-ROM drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
 - If you are using a Windows operating system, insert the CD into the CD drive and click **Start --> Run**. In the **Open** field, type
`e:\win32.bat`

where *e* is the drive letter of the CD drive, and click **OK**.
 - If you are using Red Hat Linux, insert the CD into the CD drive; then, run the following command from the `/mnt/cdrom` directory:
`sh runlinux.sh`

Select your server from the **Product** menu. The **Available Topics** list displays all the documents for your server. Some documents might be in folders. A plus sign (+) indicates each folder or document that has additional documents under it. Click the plus sign to display the additional documents.

When you select a document, a description of the document appears under **Topic Description**. To select more than one document, press and hold the Ctrl key while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

To search all the documents, type a word or word string in the **Search** field and click **Search**. The documents in which the word or word string appears are listed in order of the most occurrences. Click a document to view it, and press Ctrl+F to use the Acrobat search function or Alt+F to use the xpdf search function within the document.

Click **Help** for detailed information about using the Documentation Browser.

Notices and statements used in this document

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

The following notices and statements are used in this document:

- **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.

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. |
|--|--|--|

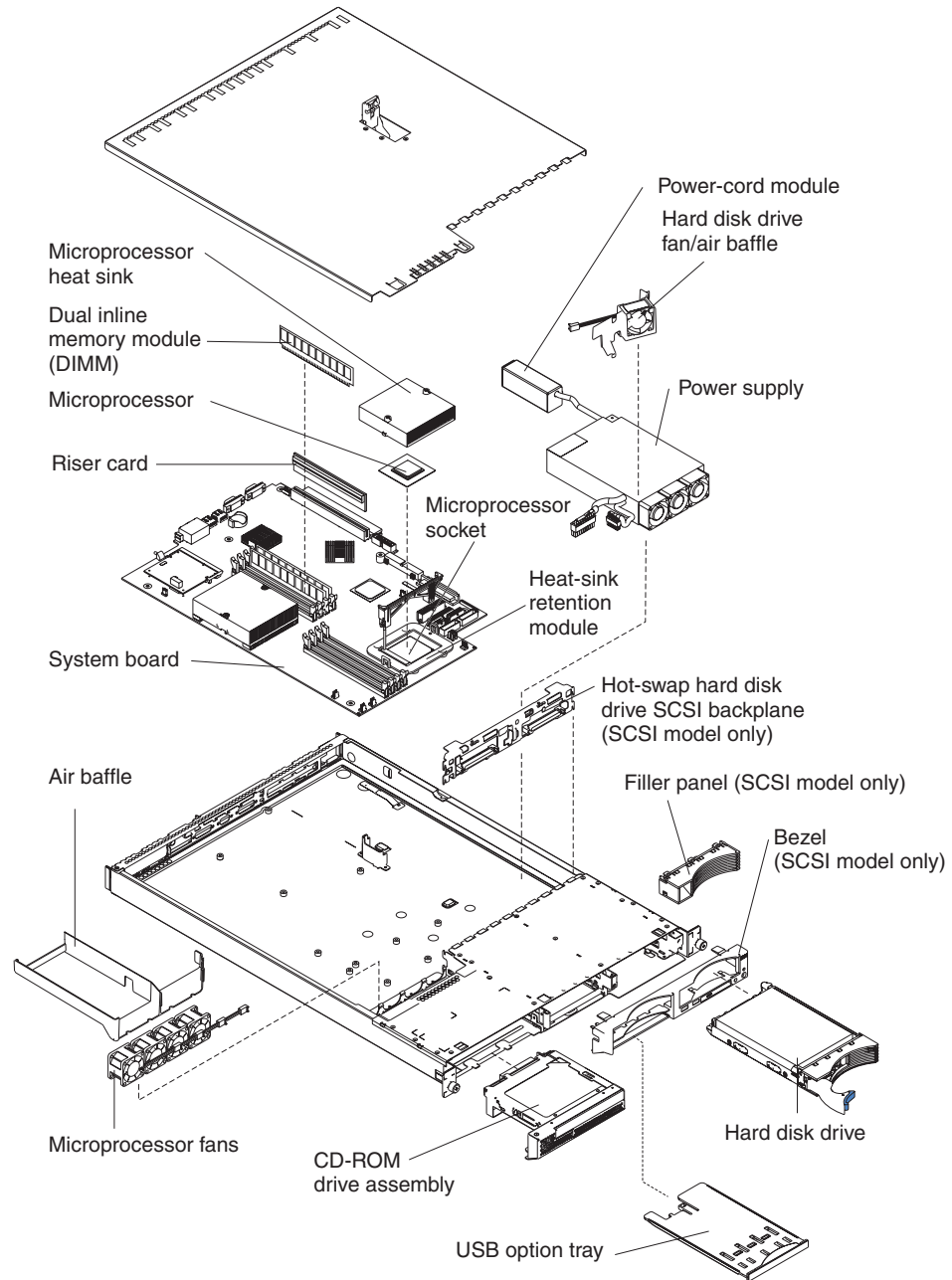
Major components of the @server 326m Type 7969 server

Blue on a component indicates touch points, where you can grip the component to remove 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.

The following illustration shows the locations of major components in a SCSI hot-swap hard disk drive model server. A SATA non-hot-swap hard disk drive model is also available.

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



Chapter 2. Installing options

This chapter provides basic instructions for installing hardware options in the server. These instructions are intended for users who are experienced with setting up IBM server hardware. If you need more detailed instructions, see the *Option Installation Guide* on the IBM @server *Documentation CD*.

Installation guidelines

Before you install, read the following information:

- Read the safety information that begins on page v, and the guidelines in “Handling static-sensitive devices” on page 10. 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 the *Hardware Maintenance Manual and Troubleshooting Guide* for diagnostic information.
- 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:

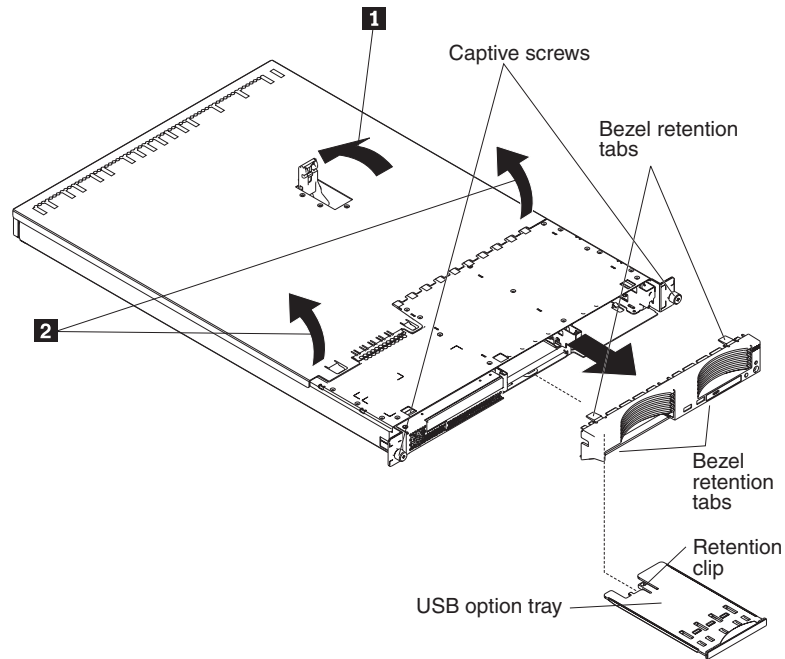
- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder 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.

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 the *Hardware Maintenance Manual and Troubleshooting Guide* for diagnostic information.

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 v, and “Installation guidelines” on page 9.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Lift the cover release latch; the cover slides toward the rear.



4. Slide the cover back, and lift the cover off the server.
5. 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.

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.

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:

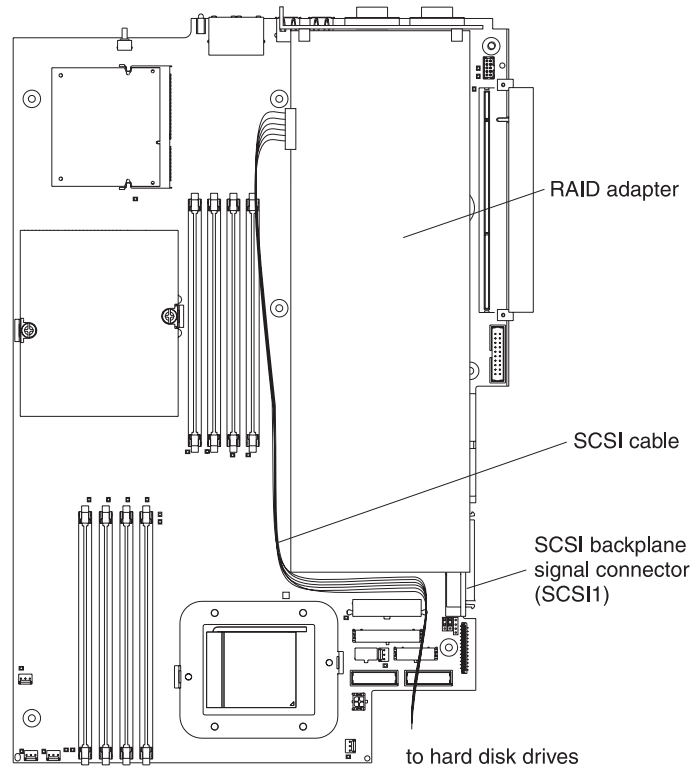
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you must change the switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.

- 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 adapter in slot 1. You can install 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.

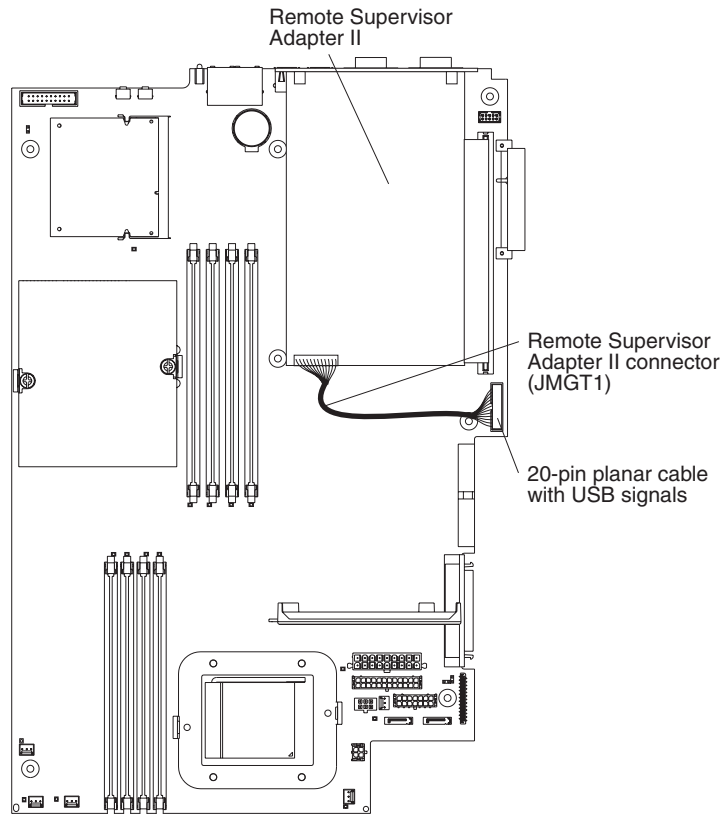
Note: To change the boot precedence for PCI and PCI-X devices, you must disable the devices through the Configuration/Setup Utility program. Start the Configuration/Setup Utility program and select **Startup** from the main menu. Then, select **Startup Sequence** and use the arrow keys to specify the startup order. For more information, see “Using the Configuration/Setup Utility program” on page 36 and 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 only in PCI-X slot 1. The server supports a variety of RAID adapters for both internal and external configurations. For the most current list of supported RAID adapters, see <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.

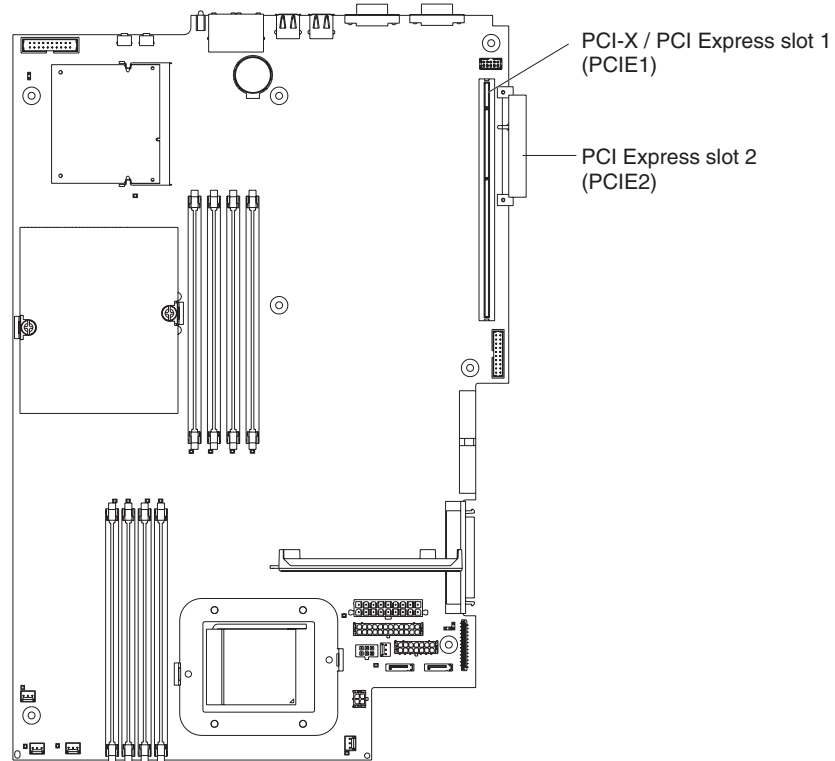


- The optional IBM Remote Supervisor Adapter II can be installed only in PCI-X slot 1. Use the 20-pin planar cable with USB signals that comes with the Remote Supervisor Adapter II to connect the 20-pin connector on the rear edge of the adapter to the Remote Supervisor Adapter II connector (JMGT1) on 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.

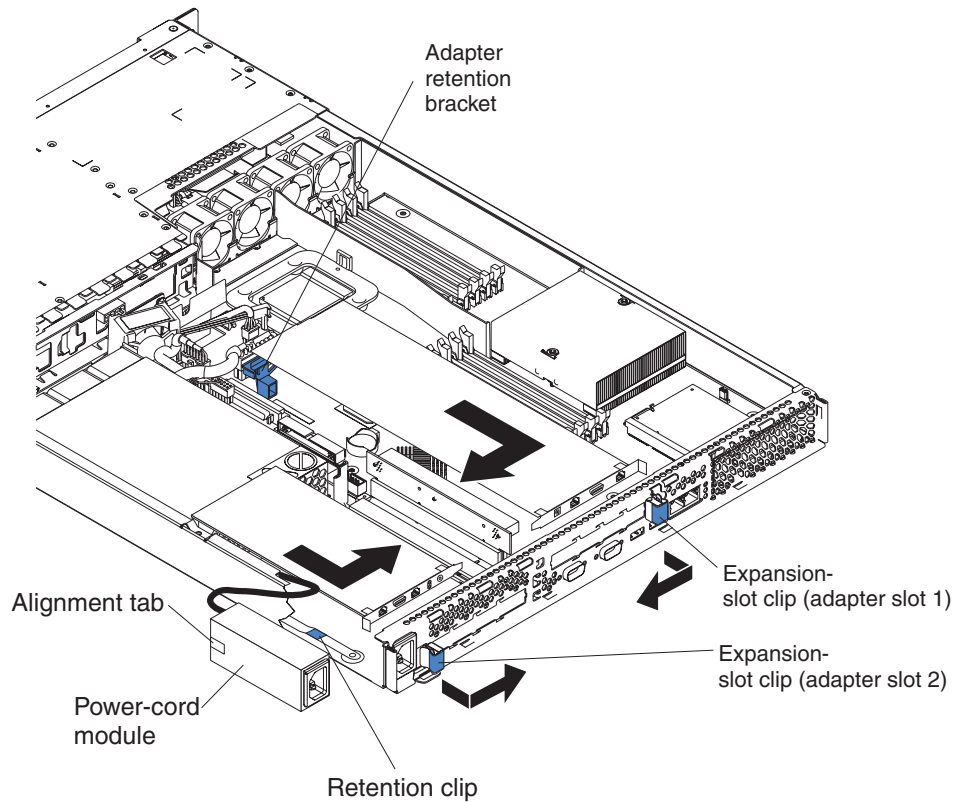


To install an adapter, complete the following steps:

1. Read the safety information that begins on page v, and “Installation guidelines” on page 9.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover (see “Removing the cover and bezel” on page 10).
4. Determine which PCI slot you will use for the adapter.

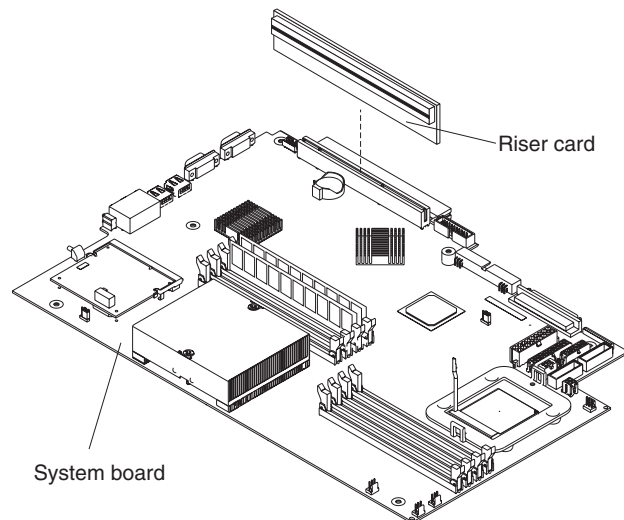


5. On the rear panel, squeeze the expansion-slot clip to unlock the clip; then, pull the clip out from the server until it stops and rotate the clip as shown in the following illustration. It remains loosely attached to the server.



Attention: Avoid touching the components and gold-edge connectors on the adapter. Make sure 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 10.

 - 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 two 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. Make sure 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 26.

Installing a hard disk drive

The following notes describe the types of hard disk drives that the 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.

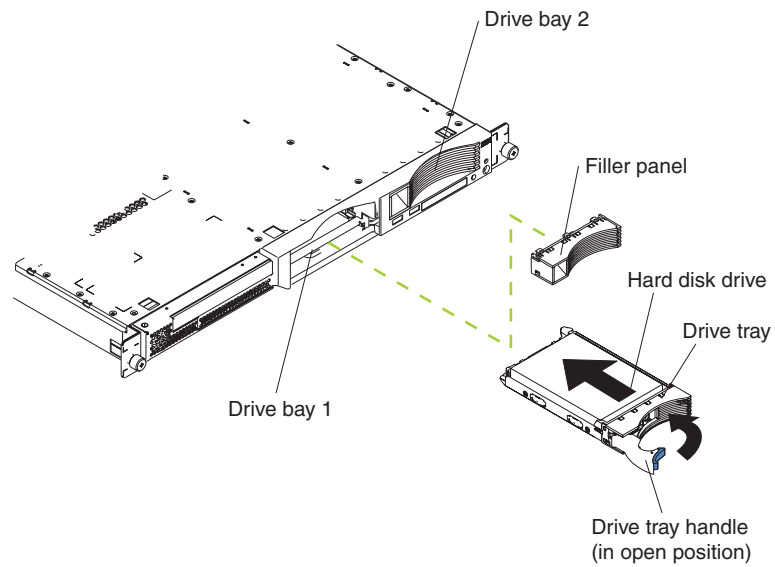
- A non-hot-swap hard disk drive does not require a backplane or tray and it does not have indicator LEDs. However, you must attach the blue rails that come with the drive before installing it in the server.
- A non-hot-swap hard disk drive has a jumper block on the rear. Install a jumper in the cable-selection position of the jumper block. For details, see the notes under step 4 on page 20, 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 20.

Installing a hot-swap hard disk drive

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

- Inspect the drive tray for signs of damage.
- Make sure that the drive is correctly installed in the tray.
- If the server has an optional RAID adapter, see the documentation that comes with the adapter for instructions for 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 v, and “Installation guidelines” on page 9.
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.

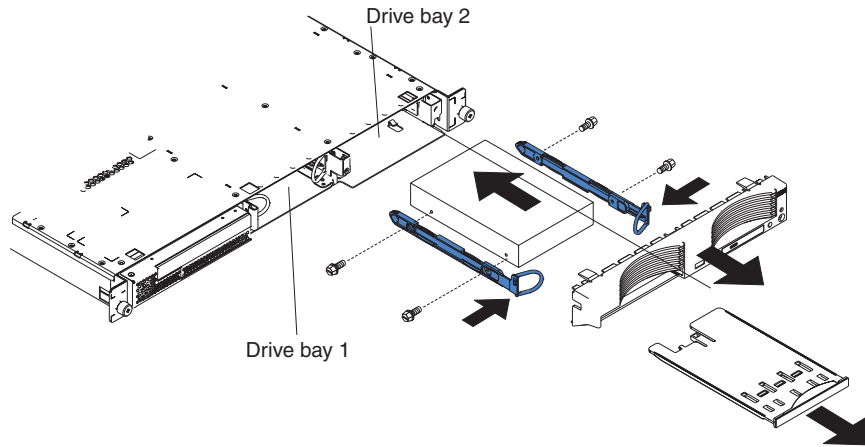
3. Install the new hard disk drive in the drive bay.
4. Check the hard disk drive status LED and activity LED to verify that the drive is operating correctly.
5. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 26.

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 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 v, and “Installation guidelines” on page 9.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover (see “Removing the cover and bezel” on page 10).
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 two 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 26.

Installing a memory module

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

- The server uses interleaved 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 |

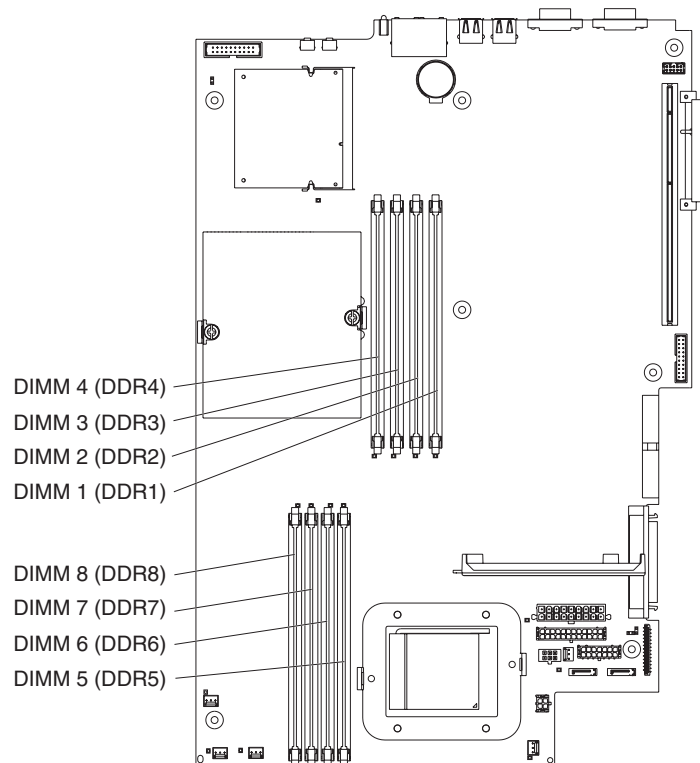
- To optimize system performance in a dual-microprocessor configuration, install DIMMs in the following sequence:

| 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.

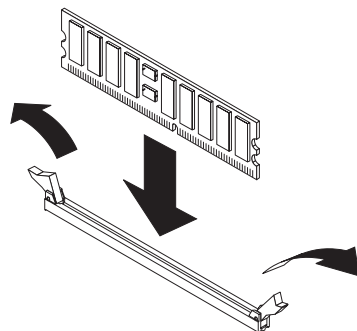
Important: The amount of memory installed must be the same for each microprocessor. For example, if you want to install four 1 GB DIMMs and four 512 MB DIMMs, install one pair of 1 GB DIMMs and one pair of 512 MB DIMMs for each microprocessor so that the total amount of memory for each microprocessor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

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



To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v, and “Installation guidelines” on page 9.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover (see “Removing the cover and bezel” on page 10).
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.

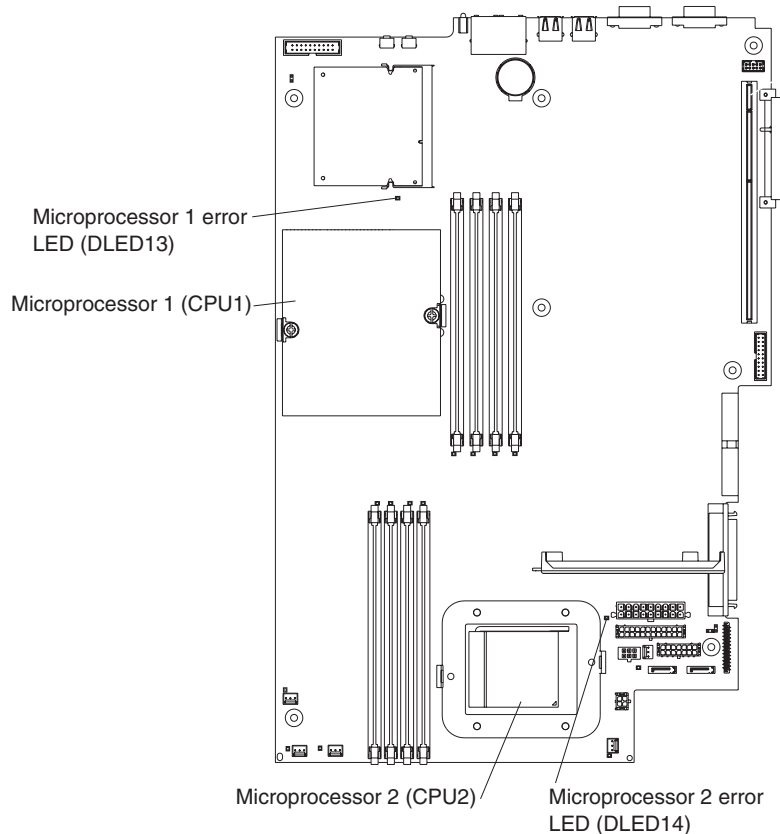
Important: In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank monitor screen. If this occurs and the **Boot Diagnostic Screen** or **QuickBoot Mode** feature on the **Startup Options** menu of the Configuration/Setup Utility program is enabled (its default 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 26.

Installing an additional microprocessor

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

- For a list of microprocessors that the server supports, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.
- 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).

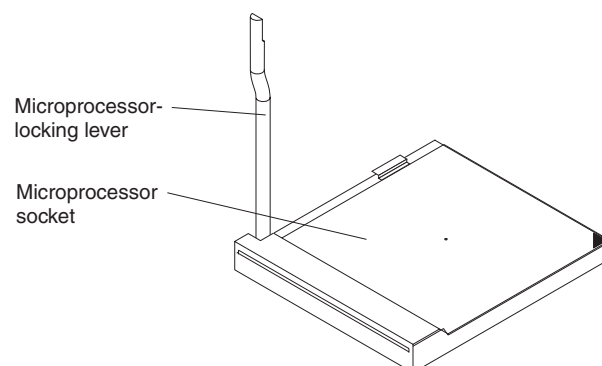
- If one microprocessor and four DIMMs are installed in the server and you add a second microprocessor without adding more DIMMs, move the pair of DIMMs in memory slots 3 and 4 to memory slots 7 and 8.
- Read the documentation that comes with the microprocessor to determine whether you need to update the BIOS code in the server. To download the most current level of BIOS code for your server go to <http://www.ibm.com/support/> and click **Downloads and drivers**.
- (Optional) Obtain an SMP-capable operating system. For a list of supported operating systems, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.
- Make sure that the microprocessors are the same type, have the same cache size, and have the same clock speed.

To install a microprocessor, complete the following steps:

1. Read the safety information that begins on page v, and “Installation guidelines” on page 9.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover (see “Removing the cover and bezel” on page 10); then, determine the socket where the microprocessor is to be installed.

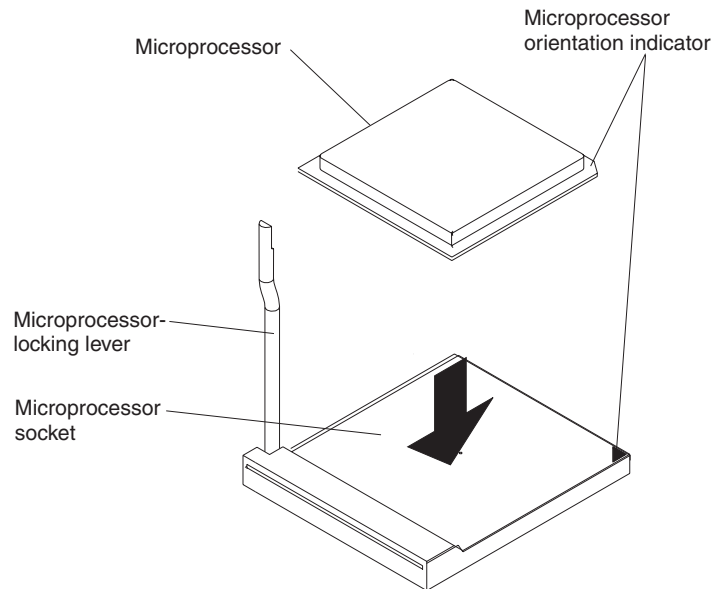
Attention:

- 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 10.
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 outside of 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.

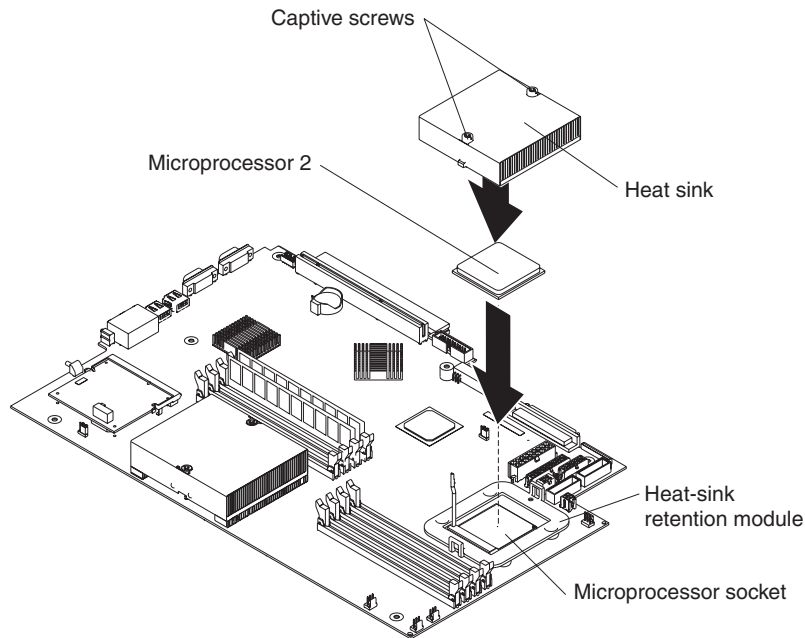
Note: A new microprocessor comes in a kit with a heat sink.

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.



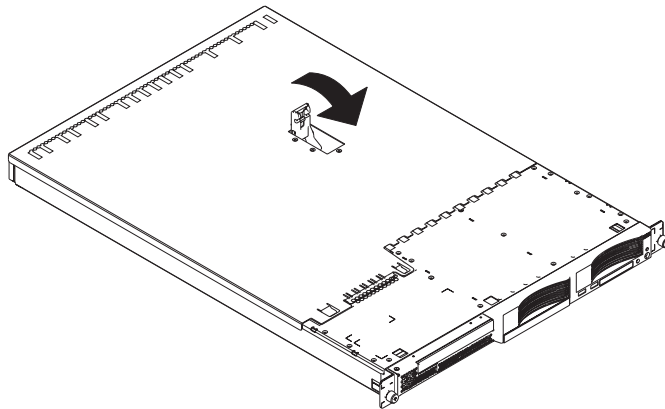
8. If you have other options to install, install them now. Otherwise, continue with “Completing the installation.”

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. Make sure 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.

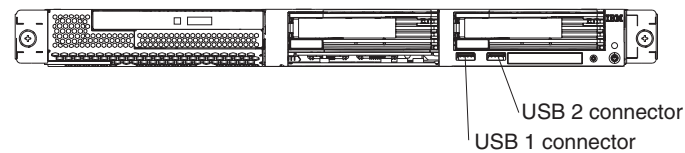
5. Install the server in the rack. For details, see the *Rack Installation Instructions* that come with the server.
6. To attach peripheral devices and connect the power cord, continue with “Connecting the cables.”

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

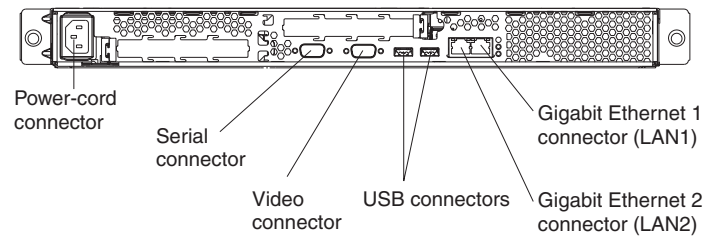
Connecting the cables

The following illustrations show the input and output connectors on the front and rear of the server.

Front



Rear



For detailed information about external options and how to connect them to the server, see the documentation that comes with these options.

Depending on the options that you install, 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 28 and 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.

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 connectors on the server.

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 the 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, see “Using the baseboard management controller firmware update program” on page 37. For information about updating the BIOS code, see 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 external SCSI device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. 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 must install. See the documentation that comes with each option for information about installing device drivers.

The server comes with at least one microprocessor. If more than one microprocessor is installed, the server can operate as an SMP server. You might have to upgrade the operating system to support SMP. For more information, see the section about using the *ServerGuide Setup and Installation* CD in the *User's Guide* and 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.

If you have installed a Remote Supervisor Adapter II to manage the server remotely, see the *Remote Supervisor Adapter II Installation Guide* and the *User's Guide* that comes with the adapter for information about setting up, configuring, and using the adapter.

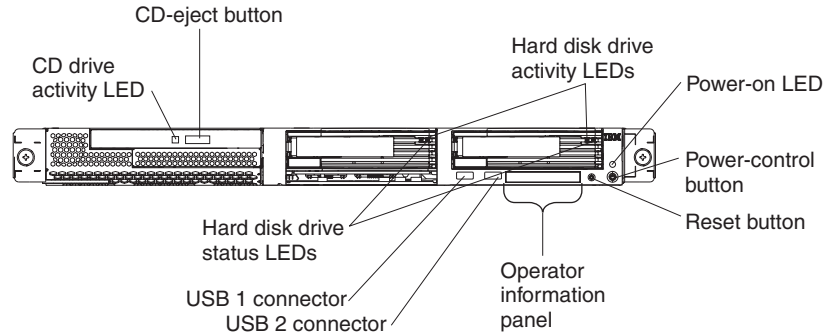
For information about configuring the integrated Gigabit Ethernet controllers, see the *User's Guide* on the IBM @server Documentation CD.

Chapter 3. Server controls, LEDs, and power

This chapter describes the controls, light-emitting diodes (LEDs), and connectors 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.

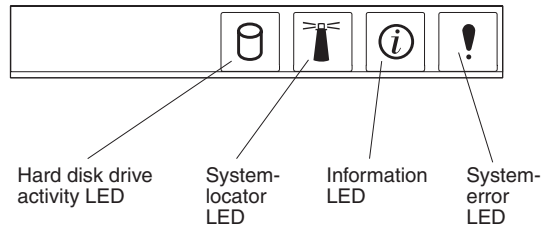
Power-on LED: When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the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

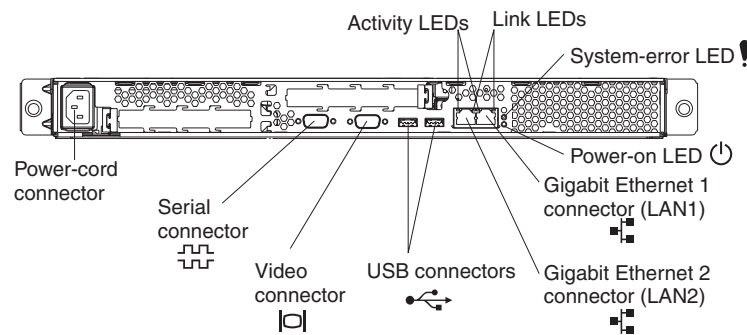
Important: If a Remote Supervisor Adapter II is installed in the server, the USB 1 connector is disabled.

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 4. Configuring the server

The *ServerGuide Setup and Installation CD* provides software setup tools and installation tools that are specifically designed for your IBM server. Use this CD during the initial installation of the server to configure basic hardware features and to simplify your operating-system installation. (See “Using the ServerGuide Setup and Installation CD” for more information.)

Note: If you are installing a Linux operating system on your server, you can use ServerGuide to set up and configure your hardware; then, install a Linux operating system using the procedure in “Installing your operating system without using ServerGuide” on page 36.

In addition to the *ServerGuide Setup and Installation CD*, you can use the following configuration programs to customize the server hardware:

- Configuration/Setup Utility program
- Baseboard management controller firmware update program
- RAID configuration programs
 - LSI Logic Configuration Utility program
 - ServeRAID Manager

For more information about these programs, see “Configuring your server” in the *User’s Guide* on the IBM @server *Documentation CD*.

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation CD* provides state-of-the-art programs to detect the server model and installed hardware options, configure the server hardware, provide device drivers, and help you install your operating system. For information about the supported operating-system versions, see the label on the CD. If the *ServerGuide Setup and Installation CD* did not come with your server, you can download the latest version from <http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html>.

Complete the following steps to start the *ServerGuide Setup and Installation CD*:

1. Insert the CD, and restart the server. If the CD does not start, see “ServerGuide problems” on page 46.
2. Follow the instructions on the screen to:
 - a. Select your language.
 - b. Select your keyboard layout and country.
 - c. View the overview to learn about ServerGuide features.
 - d. View the readme file to review installation tips about your operating system and adapter.
 - e. Start the setup and hardware configuration programs.
 - f. Start the operating-system installation. You will need your operating-system CD.

Installing your operating system without using ServerGuide

If you have already configured the server hardware and you are not using the ServerGuide program to install your operating system, complete the following steps to download the latest operating-system installation instructions from the IBM Web site.

Note: If you are installing a 32-bit Windows operating system on your server, you can install your operating system using the *ServerGuide Setup and Installation* CD that comes with your server (see “Using the ServerGuide Setup and Installation CD” on page 35.)

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 7969, and click **Search**.
3. Select the installation instructions for your operating system.

Using the Configuration/Setup Utility program

The Configuration/Setup Utility program is part of the BIOS. You can use it to:

- Change interrupt request (IRQ) settings
- Change the startup drive sequence
- Configure serial-port assignments
- Resolve configuration conflicts
- Set advanced hardware features
- Set the date and time
- Set passwords and security settings
- Set power-management features

To start the Configuration/Setup Utility program, complete the following steps:

1. Turn on the server and watch the monitor screen.
2. When the prompt Press F1 for Configuration/Setup appears, press F1. If a supervisor (administrator) password has been set, you must type the supervisor password to access the full Configuration/Setup Utility menu.
3. Follow the instructions on the screen.

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.

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 document.

- 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 the RAID configuration and associated devices
 - Monitor operation of your RAID controllers

In addition, an LSI command-line configuration program (CFG1030) is available from <http://www.ibm.com/support/>.

Consider the following information when using the LSI Logic Configuration Utility program and ServeRAID Manager to configure and manage arrays:

- The integrated SCSI controller with RAID capabilities in the server supports only RAID level-1 with a hot-spare drive installed. Installing an optional ServeRAID controller provides additional RAID levels.
- When you create a RAID level-1 (mirrored) pair, all drives must be on the same channel.
- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- To help ensure signal quality, do not use drives with different speeds and data rates in the array.
- You can set up a mirror after the operating system is installed on the primary drive only if you are using an integrated SCSI controller with RAID capabilities. You must make sure that the primary drive has the lower SCSI ID (for example, 0).

Important: If you use an integrated SCSI controller with RAID capabilities to configure a RAID level-1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.

- To update the firmware and BIOS codes for an optional ServeRAID controller, you must use the IBM *ServeRAID Support* CD that comes with the controller.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing SCSI settings for attached devices.

Using 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 message <<< Press <CTRL><C> to start LSI Logic Configuration Utility >>> appears, press Ctrl+C. If an administrator password has been set, you are prompted to type the password.
3. Use the arrow keys to select a controller (channel) from the list of adapters; then, press Enter.
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter. If you select **Device Properties** or **Mirroring Properties**, additional screens are displayed.

See the *User's Guide* on the IBM *@server Documentation* CD for more information about the LSI Logic Configuration Utility program.

Using ServeRAID Manager

Use ServeRAID Manager, which is on the *IBM ServeRAID Support* CD, to:

- Configure a redundant array of independent disks (RAID) array
- Restore a SCSI hard disk drive to the factory-default settings, erasing all data from the disk
- View the RAID configuration and associated devices
- Monitor the operation of the RAID controllers

To perform some tasks, you can run ServeRAID Manager as an installed program. However, to configure the integrated SCSI controller with RAID capabilities and perform an initial RAID configuration on the server, you must run ServeRAID Manager in Startable CD mode, as described in the instructions in this section. If you install a different type of RAID adapter in the server, use the configuration method described in the instructions that come with that adapter to view or change SCSI settings for attached devices.

See the ServeRAID documentation on the *IBM ServeRAID Support CD* for additional information about RAID technology and instructions for using ServeRAID Manager to configure the integrated SCSI controller with RAID capabilities. Additional information about ServeRAID Manager is also available from the **Help** menu. For information about a specific object in the ServeRAID Manager tree, select the object and click **Actions** → **Hints and tips**.

Configuring the controller

By running ServeRAID Manager in Startable CD mode, you can configure the controller before you install the operating system. The information in this section assumes that you are running ServeRAID Manager in Startable CD mode.


To run ServeRAID Manager in Startable CD mode, turn on the server; then, insert the CD into the CD drive. If ServeRAID Manager detects an unconfigured controller and ready drives, the Configuration wizard starts.


In the Configuration wizard, you can select express configuration or custom configuration. Express configuration automatically configures the controller by grouping the first two physical drives in the ServeRAID Manager tree into an array and creating a RAID level-1 logical drive. If you select custom configuration, you can select the two physical drives that you want to group into an array and create a hot-spare drive.

Using express configuration: To use express configuration, complete the following steps:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Express configuration**.
3. Click **Next**. The “Configuration summary” window opens.
4. Review the information in the “Configuration summary” window. To change the configuration, click **Modify arrays**.
5. Click **Apply**; then, click **Yes** when asked if you want to apply the new configuration. The configuration is saved in the controller and in the physical drives.
6. Exit from ServeRAID Manager and remove the CD from the CD drive.
7. Restart the server.

Using custom configuration: To use custom configuration, complete the following steps:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Custom configuration**.
3. Click **Next**. The “Create arrays” window opens.
4. From the list of ready drives, select the two drives that you want to group into the array.
5. Click  >> (Add selected drives) to add the drives to the array.

6. If you want to configure a hot-spare drive, complete the following steps:
 - a. Click the **Spares** tab.
 - b. Select the physical drive that you want to designate as the hot-spare drive, and click  >> (Add selected drives).
7. Click **Next**. The “Configuration summary” window opens.
8. Review the information in the “Configuration summary” window. To change the configuration, click **Back**.
9. Click **Apply**; then, click **Yes** when asked if you want to apply the new configuration. The configuration is saved in the controller and in the physical drives.
10. Exit from ServeRAID Manager and remove the CD from the CD drive.
11. Restart the server.

Viewing the configuration

You can use ServeRAID Manager to view information about RAID controllers and the RAID subsystem (such as arrays, logical drives, hot-spare drives, and physical drives). When you click an object in the ServeRAID Manager tree, information about that object appears in the right pane. To display a list of available actions for an object, click the object and click **Actions**.

Using the ServeRAID configuration programs

A ServeRAID adapter enables you to configure multiple physical SCSI hard disk drives to operate as logical drives in a disk array. The adapter comes with a CD containing the ServeRAID Manager program and the ServeRAID Mini-Configuration program, which you can use to configure the ServeRAID controller. For information about these programs, see the documentation that comes with the ServeRAID adapter and the *User's Guide* on the IBM *@server Documentation* CD. If your server comes with an operating system installed, such as Microsoft Windows 2000 Datacenter Server, see the software documentation that comes with the server for configuration information.

Chapter 5. Solving problems

This chapter provides basic troubleshooting information to help you resolve some common problems that might occur while you are setting up your 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 53, the *Hardware Maintenance Manual and Troubleshooting Guide*, and the “Server Support” flowchart in the front of this book.

Diagnostic tools overview

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

- **POST beep codes**

The power-on self-test beep codes indicate the detection of a problem.

- One beep indicates successful completion of POST, with no errors.
- More than one beep indicates that POST detected a problem. Error messages also appear during startup if POST detects a hardware-configuration problem.

See “POST beep code descriptions” and the *Hardware Maintenance Manual and Troubleshooting Guide* for more information.

- **Troubleshooting charts**

These charts list problem symptoms and steps to correct the problems. See “Troubleshooting charts” on page 47 for more information.

- **Diagnostic programs and error messages**

The server-diagnostic programs are provided on the *IBM Enhanced Diagnostics* CD that comes with your server. These programs test the major components of your server. See the *Hardware Maintenance Manual and Troubleshooting Guide* for more information.

POST beep code descriptions

POST emits one beep to signal successful completion. If POST detects a problem during startup, other beep codes might occur. Use the following beep code descriptions to help identify and solve problems that are detected during startup.

Note: See the *Hardware Maintenance Manual and Troubleshooting Guide* for more information about the POST beep codes.

One beep

POST was completed successfully.

Repeating long beeps

A memory error has occurred. Make sure that all DIMMs are correctly installed.

One long beep and two short beeps

A video error has occurred, and the BIOS code cannot initialize the monitor screen to display additional information.

Other beep codes

Additional beep codes are listed in the following table.

Table 2. POST beep code descriptions

| Beep code | Description | Action |
|-----------------|---|---|
| None | Undetermined error. | Call for service. |
| 1 beep | POST was completed successfully. One beep also occurs after POST if you type an incorrect password. | None required. |
| 2 beeps | Undetermined error. | Follow the instructions on the screen. |
| Repeating beeps | The system board might contain a failing component. | <ul style="list-style-type: none">• Make sure that the keyboard and pointing devices are connected correctly.• Make sure that nothing is resting on the keyboard.• Disconnect the pointing device; then, restart the server. If the problem goes away, replace the pointing device. If the problem remains, call for service. |
| 1-1-2 | Microprocessor register test has failed. | Call for service. |
| 1-1-3 | Complementary metal oxide semiconductor (CMOS) write/read test has failed. | |
| 1-1-4 | BIOS read-only memory (ROM) checksum has failed. | |
| 1-2-1 | Programmable Interval Timer test has failed. | |
| 1-2-2 | Direct memory access (DMA) initialization has failed. | |
| 1-2-3 | DMA page register write/read test has failed. | |
| 1-2-4 | Random-access memory (RAM) refresh verification has failed. | |
| 1-3-1 | First 64 Kb RAM test has failed. | Reseat the memory modules or install a memory module. If the problem remains, call for service. |
| 1-3-2 | First 64 Kb RAM parity test has failed. | |

Table 2. POST beep code descriptions (continued)

| Beep code | Description | Action |
|-----------|---|---|
| 1-4-3 | Interrupt vector loading test has failed. | Call for service. |
| 2-1-1 | Secondary DMA register test has failed. | |
| 2-1-2 | Primary DMA register test has failed. | |
| 2-1-3 | Primary interrupt mask register test has failed. | |
| 2-1-4 | Secondary interrupt mask register test has failed. | |
| 2-2-1 | Interrupt vector loading has failed. | |
| 2-2-2 | Keyboard controller test has failed. | |
| 2-2-3 | CMOS power failure and checksum checks have failed. | |
| 2-2-4 | CMOS configuration information validation has failed. | |
| 2-3-1 | Screen initialization has failed. | |
| 2-3-2 | Screen memory test has failed. | Call for service. |
| 2-3-3 | Screen retrace tests have failed. | |
| 2-3-4 | Search for video ROM has failed. | |
| 2-4-1 | Screen test indicates the screen is operable. | |
| 3-1-1 | Timer tick interrupt test has failed. | |
| 3-1-2 | Interval timer channel 2 test has failed. | |
| 3-1-3 | RAM test has failed above address hex 0FFFF. | |
| 3-1-4 | Time-of-Day clock test has failed. | |
| 3-2-1 | Serial port test has failed. | |
| 3-2-2 | Parallel port test has failed. | |
| 3-2-4 | Comparison of CMOS memory size against actual has failed. | Reseat the memory modules or install a memory module. If the problem remains, call for service. |
| 3-3-1 | A memory size mismatch has occurred. | |
| 3-3-2 | I ² C bus has failed. | Turn off the server, disconnect all power cords, and reconnect all power cords; then, restart the server. If the problem remains, call for service. |

Table 2. POST beep code descriptions (continued)

| Beep code | Description | Action |
|-----------|--|--|
| 3-3-3 | No memory has been detected in the server. | <p>Reseat the memory modules or install a memory module. If the problem remains, call for service.</p> <p>Note: 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 BIOS to reset the configuration to the default configuration (the memory connectors enabled).</p> |

POST error messages

The following table provides an abbreviated list of the error messages that might appear during POST. See the *Hardware Maintenance Manual and Troubleshooting Guide* for more information about the POST error messages.

Table 3. Abbreviated list of POST error messages

| POST message | Failing device or problem found | Suggested action |
|----------------------|--|--|
| 161 | The real-time clock battery has failed. | Replace the battery or call for service. |
| 162 | A device configuration has changed. | <ul style="list-style-type: none">• Run the Configuration/Setup Utility program; then, exit, saving the configuration settings.• Make sure that optional devices are turned on and installed correctly. |
| 163 | The time of day has not been set. | Set the date and time. |
| 201 | The memory configuration has changed. | Make sure that DIMMs are fully seated and installed correctly. |
| 289 | A failing DIMM was disabled. | Make sure that DIMMs are supported by your server and that they are installed correctly. |
| 301, 303 | Keyboard and keyboard controller | Make sure that the keyboard cable is connected and that nothing is resting on the keyboard keys. |
| 962 | Parallel port configuration error | Run the Configuration/Setup Utility program and make sure that the parallel port setting is correct. |
| 1162 | Serial port configuration conflict | Run the Configuration/Setup Utility program and make sure that the IRQ and I/O port assignments needed by the serial port are available. |
| 00019xxx | Microprocessor <i>x</i> is not functioning or failed the built-in self-test. | Make sure that microprocessor <i>x</i> is installed correctly. If the problem remains, replace microprocessor <i>x</i> . |
| 00180xxx | A PCI adapter requested a resource that is not available. | Run the Configuration/Setup Utility program and make sure that the resources needed by the PCI adapter are available. |
| 012980xx 012981xx | Data for microprocessor <i>x</i> | Download and install the latest level of BIOS code. |
| I9990305 | POST could not find an operating system. | Install an operating system. |

ServerGuide problems

The following table lists problem symptoms and suggested solutions.

Table 4. *ServerGuide Setup and Installation CD*

| Symptom | Suggested action |
|--|--|
| The <i>ServerGuide Setup and Installation CD</i> will not start. | <ul style="list-style-type: none">• Make sure that the server supports the ServerGuide program and has a startable (bootable) CD (or DVD) drive.• If the startup (boot) sequence settings have been altered, make sure that the CD drive is first in the startup sequence.• If more than one CD drive is installed, ensure that only one drive is set as the primary drive. Start the CD from the primary drive. |
| The SCSI RAID program cannot view all installed drives, or the operating system cannot be installed. | <ul style="list-style-type: none">• Make sure that there are no duplicate SCSI IDs or IRQ assignments.• Make sure that the hard disk drive is connected correctly. |
| The operating-system installation program continuously loops. | Make more space available on the hard disk. |
| The ServerGuide program will not start the operating-system CD. | Make sure that the operating-system CD is supported by the ServerGuide program. See the <i>ServerGuide Setup and Installation CD</i> label for a list of operating-system versions that support the ServerGuide program. |
| The operating system cannot be installed; the option is not available. | Make sure that the operating system is supported on your server. If the operating system is supported, there is no logical drive defined (SCSI RAID systems). Run the ServerGuide program and make sure that setup is complete. |

Troubleshooting charts

The following tables list problem symptoms and suggested solutions. See the *Hardware Maintenance Manual and Troubleshooting Guide* for more detailed troubleshooting charts. If you cannot find the problem in the troubleshooting charts, run the diagnostic programs. If you have run the diagnostic test programs, or if running the tests does not reveal the problem, call for service.

CD drive problems

| Symptom | Suggested action |
|---------------------------------|--|
| The CD drive is not recognized. | Make sure that: <ul style="list-style-type: none">• The IDE channel to which the CD drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. If the server has a single IDE channel, only the primary channel can be used.• All cables and jumpers are installed correctly.• The correct device driver is installed for the CD drive. |

Diskette drive problems

| Symptom | Suggested action |
|---|--|
| The diskette drive activity LED stays lit, or the server bypasses the diskette drive. | If there is a diskette in the drive, make sure that: <ul style="list-style-type: none">• The diskette drive cables are correctly and securely connected.• The diskette drive is enabled in the Configuration/Setup Utility program.• The diskette is good and not damaged. (Try another diskette if you have one.)• The diskette contains the necessary files to start the server.• Your software program is working properly. If the problem remains, call for service. |

Expansion enclosure problems

| Symptom | Suggested action |
|--|---|
| The SCSI expansion enclosure used to work but does not work now. | Make sure that: <ul style="list-style-type: none">• The cables for all external SCSI options are connected correctly.• The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly.• Any external SCSI devices are turned on. You must turn on external SCSI devices before turning on the server. For more information, see your SCSI expansion enclosure documentation. |

General problems

| Symptom | Suggested action |
|---|-------------------|
| A cover lock is broken, an LED is not working, or a similar problem has occurred. | Call for service. |

Hard disk drive problems

| Symptom | Suggested action |
|---|---|
| Not all drives are recognized by the hard disk drive diagnostic test (the Fixed Disk test). | <ol style="list-style-type: none">1. Remove the first drive that is not recognized and try the hard disk drive diagnostic test again.2. If the remaining drives are recognized, replace the drive that you removed with a new one. |
| The server stops responding during the hard disk drive diagnostic test. | <ol style="list-style-type: none">1. Remove the hard disk drive that was 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 that you removed with a new one. |

Intermittent problems

| Symptom | Suggested action |
|--|---|
| A problem occurs only occasionally and is difficult to diagnose. | <p>Make sure that:</p> <ul style="list-style-type: none">• All cables and cords are connected securely to the rear of the server and attached devices.• When the server is turned on, air is flowing from the rear of the server at the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down.• The SCSI bus and devices are configured correctly and the last external device in each SCSI chain is terminated correctly. <p>If the problem remains, call for service.</p> |

Keyboard, mouse, or pointing-device problems

| Symptom | Suggested action |
|---|--|
| All or some keys on the keyboard do not work. | <ul style="list-style-type: none">• Make sure that the keyboard cable is securely connected to the server and that the keyboard and mouse cables are not reversed.• Make sure that the server and the monitor are turned on.• Make sure that the operating system supports USB devices.• Try using another keyboard. <p>If the problem remains, call for service.</p> |
| The mouse or pointing device does not work. | <ul style="list-style-type: none">• Make sure that the mouse or pointing-device cable is securely connected to the server and that the keyboard and mouse cables are not reversed.• Make sure that the mouse device drivers are installed correctly.• Make sure that the operating system supports USB devices.• Try using another mouse or pointing device. <p>If the problem remains, call for service.</p> |

Memory problems

| Symptom | Suggested action |
|---|---|
| The amount of system memory displayed is less than the amount of physical memory installed. | <p>Make sure that:</p> <ul style="list-style-type: none"> The DIMMs are seated correctly. You have installed the correct type of memory. If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program. All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. <p>Look in the POST error log for error message 289:</p> <ul style="list-style-type: none"> If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. If this error remains, replace the DIMM. <p>If the problem remains, call for service.</p> |

Microprocessor problems

| Symptom | Suggested action |
|---|--|
| The server emits a continuous tone during POST. | <p>The startup (boot) microprocessor is not working correctly. Verify that the startup microprocessor is seated correctly. If it is, replace the startup microprocessor.</p> <p>Note: If only one microprocessor is installed, it must be in socket 1 (connector U1). For socket location and installation instructions, see “Installing an additional microprocessor” on page 23.</p> <p>If the problem remains, call for service.</p> |

Monitor problems

Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the information that comes with the monitor for instructions for testing and adjusting the monitor. If you cannot diagnose the problem, call for service.

| Symptom | Suggested action |
|--|---|
| The screen is blank. | <p>Make sure that:</p> <ul style="list-style-type: none"> The server power cord is connected to the server and a working electrical outlet. The monitor cables are connected correctly. The monitor is turned on and the brightness and contrast controls are adjusted correctly. <p>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 BIOS to reset the configuration to the default configuration (the memory connectors enabled).</p> <p>If the problem remains, call for service.</p> |
| Only the cursor appears. | <p>Call for service.</p> |
| The monitor works when you turn on the server, but the screen goes blank when you start some application programs. | <p>Make sure that:</p> <ul style="list-style-type: none"> The primary monitor cable is connected to the video connector. You have installed the necessary device drivers for the application programs. <p>If the problem remains, call for service.</p> |

| Symptom | Suggested action |
|--|--|
| The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted. | <p>If the monitor self-tests show that the monitor is working correctly, 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.</p> <p>Attention: Moving a color monitor while it is turned on might cause screen discoloration.</p> <p>Move the device and the monitor at least 300 mm (12 in.) apart, and turn on the monitor.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. To prevent diskette drive read/write errors, make sure that the distance between the monitor and diskette drives is at least 75 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM marketing representative or authorized reseller. <p>If the problem remains, call for service.</p> |
| Wrong characters appear on the screen. | <p>If the wrong language is displayed, update the BIOS code with the correct language.</p> <p>If the problem remains, call for service.</p> |

Option problems

| Symptom | Suggested action |
|--|---|
| An IBM option that was just installed does not work. | <p>Make sure that:</p> <ul style="list-style-type: none"> • The option is designed for the server. See the “Server Support” flowchart for information about obtaining ServerProven compatibility information from the World Wide Web. • You followed the installation instructions that come with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You have updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. <p>If the problem remains, call for service.</p> |
| An IBM option that used to work does not work now. | <ul style="list-style-type: none"> • Make sure that all of the option hardware and cable connections are secure. • If the option comes with test instructions, use those instructions to test the option. • If the failing option is a SCSI device, make sure that: <ul style="list-style-type: none"> – The cables for all external SCSI options are connected correctly. – The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly. – Any external SCSI devices are turned on. You must turn on external SCSI devices before turning on the server. <p>If the problem remains, call for service.</p> |

Power problems

| Symptom | Suggested action |
|-------------------------------|---|
| The server does not turn on. | <ul style="list-style-type: none"> • Make sure that the server power cord is connected to the server and a working electrical outlet. • Make sure that the type of memory that is installed is supported by your server. • 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. <p>If the problem remains, call for service.</p> |
| The server does not turn off. | <p>Determine whether you are using an ACPI or non-ACPI operating system.</p> <p>If you are using a non-ACPI operating system, complete the following steps:</p> <ol style="list-style-type: none"> 1. Press Ctrl+Alt+Delete. 2. Turn off the server by using the power-control button. You might need to press and hold the power-control button for 5 seconds to force the server to turn off. <p>If the problem remains or if you are using an ACPI operating system, call for service.</p> |

Serial port problems

For more information about the serial port, see the *Option Installation Guide* on the IBM @server Documentation CD.

| Symptom | Suggested action |
|---|--|
| The number of serial ports identified by the operating system is less than the number of serial ports that are installed. | <p>Make sure that:</p> <ul style="list-style-type: none"> • Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports are disabled. • The serial port adapter, if you installed one, is seated correctly. <p>If the problem remains, call for service.</p> |
| A serial device does not work. | <p>Make sure that:</p> <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 serial port and the serial port is connected to serial connector (COM1) on the system board. <p>If the problem remains, call for service.</p> |

Software problems

| Symptom | Suggested action |
|---------------------------------|--|
| You suspect a software problem. | <p>To determine whether the problem is caused by the software, make sure that:</p> <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. If you have just installed an adapter or memory, the server might have a memory-address conflict. • The software is designed to operate on your server. • Other software works on your server. • The software that you are using works on another server. <p>If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.</p> <p>If the problem remains, contact your place of purchase of the software.</p> |

Universal Serial Bus device problems

| Symptom | Suggested action |
|-----------------------------|---|
| A USB device does not work. | Make sure that: <ul style="list-style-type: none">• The correct USB device driver is installed.• Your operating system supports USB devices. If the problem remains, call for service. |

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 @server[®] or IntelliStation[®] system or optional device, 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 and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.

Note: For some IntelliStation models, the *Hardware Maintenance Manual and Troubleshooting Guide* is available only from the IBM support Web site.

- Go to the IBM support Web site at <http://www.ibm.com/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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

Using the documentation

Information about your IBM @server or IntelliStation system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, 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, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

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 eServer and IntelliStation systems, optional devices, services, and support. The address for IBM xSeries® and BladeCenter® information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/us/intellistation/>.

You can find service information for IBM systems and optional devices 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, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/>, or see <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 Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See <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. Notices

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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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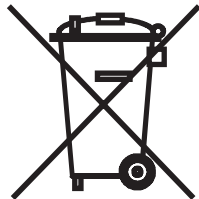
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Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment 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.

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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.

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聲 明
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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.

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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, Macao, 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 |
| 14F0051 | Liechtenstein, Switzerland |
| 14F0069 | Chile, Italy, Libyan Arab Jamahiriya |

| IBM power cord part number | Used in these countries and regions |
|-----------------------------------|---|
| 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 |

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