System x3200
Types 4362 and 4363

Installation Guide

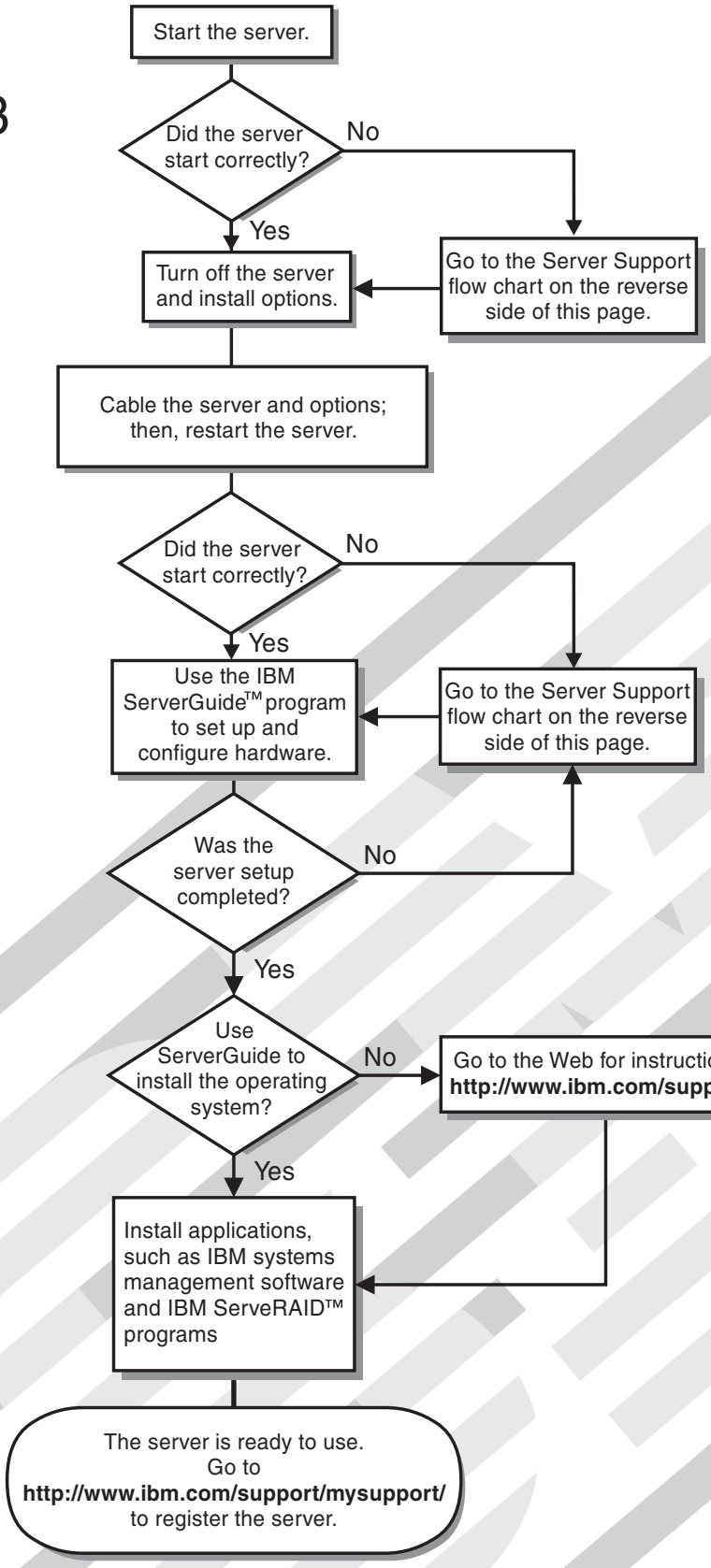
Welcome.

Thank you for buying an IBM server.

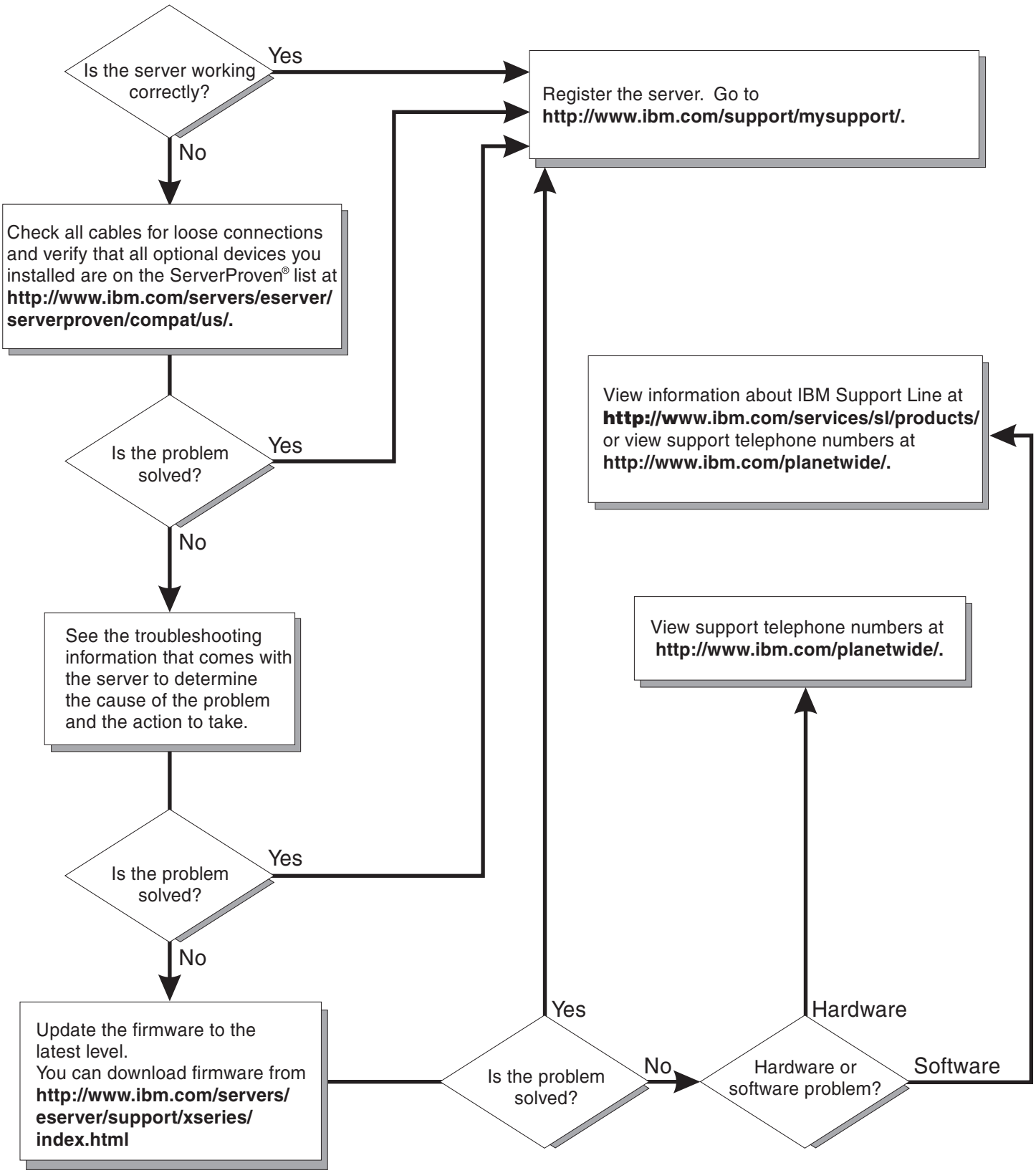
This server *Installation Guide* contains information for setting up and configuring your server.

For detailed information about your server, view the *User's Guide* on the Documentation CD.

You can also find the most current information about your server on the IBM Web site at: http://www.ibm.com/servers/eserver/support/xseries/index.html



Server Support



System x3200 Type 4362 and 4363

Installation Guide

Note:

Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 71, and the *Warranty and Support Information* document on the IBM *System x Documentation* CD.

First Edition (October 2006)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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 pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

Each caution and danger statement in this document begins with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *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 the blade 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:	**To Disconnect:**
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

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)

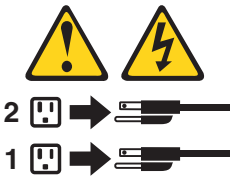
≥ 32 kg (70.5 lb)

≥ 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 12:

CAUTION:
The following label indicates a hot surface nearby.

Statement 13:

DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 15:

CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up the IBM System x3200 Machine Types 4362 and 4363 servers and basic instructions for installing some optional devices. More detailed instructions for installing optional devices are in the *User's Guide* on the IBM *System x™ 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 optional devices
- Solving problems

If firmware and documentation updates are available, you can download them from the IBM Web site. The server might have features that are not described in the documentation that comes with the server, and 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. To check for updates, go to http://www.ibm.com/servers/eserver/support/xseries/index.html, select **System 4362** or **4363** from the **Hardware** list, and click **Go**. For firmware updates, click the **Download** tab. For documentation updates, click the **Install and use tab**, and click **Product documentation**.

Note: Changes are made periodically to the IBM Web site. Procedures for locating firmware and documentation might vary slightly from what is described in this document.

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.

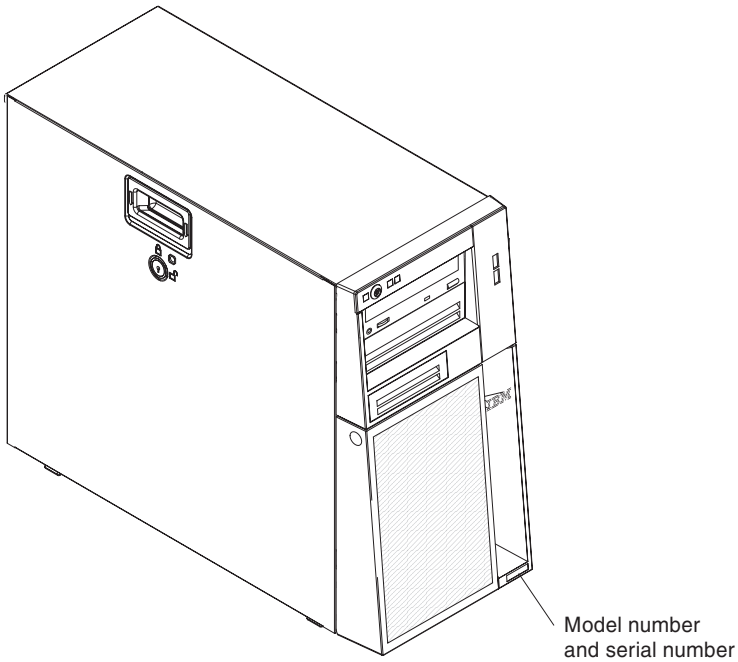
The server comes with a limited warranty. You can obtain up-to-date information about the server and other IBM server products at http://www.ibm.com/systems/x/.

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

Product name	IBM System x3200 server
Machine type	4362 or 4363
Model number	_____
Serial number	_____
Key serial number	_____
Key manufacturer	_____
Key phone number	_____

The model number and serial number are on the lower-right side of the bezel, as shown in the following illustrations. This illustration might differ slightly from your hardware.

Several models are available; for additional information, see the *User's Guide* on the IBM *System x Documentation* CD. The following illustration shows a hot-swap model.



Important: The server keys cannot be duplicated by a locksmith. If you lose them, order replacement keys from the key manufacturer. The key serial number and the telephone number of the manufacturer are on a tag that is attached to the keys.

If you plan to install the server in a rack, you must purchase a Tower-to-Rack Kit conversion kit. For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

The IBM System x Documentation CD

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

Hardware and software requirements

The IBM *System x 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 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 is displayed 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 Crtl+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 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 *System x 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:

- **Note:** 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.

Table 1. Features and specifications

Microprocessor:
- One Intel® Xeon™ 3000 sequence, or Pentium D Processor
- 2 MB or 4 MB Level-2 cache
- 800 or 1066 MHz front-side bus (FSB)

Memory:
- Minimum: 512 MB
- Maximum: 8 GB
- Types: PC2-5300 double-data-rate 2 (DDR2)
- Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved

Drives (depending on the model):
- Diskette (optional internal or external USB): 1.44 MB
- Hard disk drive: SAS or SATA
- One of the following optical IDE drives:
  - CD-ROM
  - DVD-ROM (optional)
  - DVD-ROM/CD-RW (optional)
  - Multiburner (optional)

Drive bays (depending on the model):
- Two 5.25 in. bays (one optical drive installed)
- One 3.5 in. removable-media drive bay
- Four 3.5 in. or 2.5 in. hard disk drive bays

PCI expansion slots (depending on the model):
- One PCI Express x8 slot
- One PCI Express x1 slot
- Three PCI 32-bit/33 MHz slots

Fans:
Three speed-controlled fans.

Power supply:
One of the following:
- Two redundant 430 watt (90-240 V ac)
- One nonredundant 400 watt (90-240 V ac)

Size:
- Height: 438 mm (17.25 in.)
- Depth: 540 mm (21.25 in.)
- Width: 216 mm (8.5 in.)
- Weight: 16.3 kg (36 lb) to 25.2 kg (56 lb) depending upon configuration

Integrated functions:
- Mini baseboard management controller (mini-BMC)
- Broadcom BCM5721 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet port
- Two serial ports
- One parallel port
- Four-port Serial ATA controller
- One internal SAS port (mini-PCI slot)
- Six Universal Serial Bus (USB) v2.0 ports (two on front and four on rear)
- Keyboard port
- Mouse port
- ATA-100 single-channel IDE controller (bus mastering)
- ATI ES1000 video controller
  - Compatible with SVGA and VGA
  - 16 MB SDRAM video memory

Diagnostic LEDs:
- Fans
- Memory
- Power supply

Acoustical noise emissions:
- Sound power, idling: 5.0 bel
- Sound power, operating: 5.3 bel

Environment:
- Air temperature:
  - Server on: 10° to 35°C (50° to 95°F) Altitude: 0 to 914 m (2998.0 ft)
  - Server off: -40° to 60°C (-40° to 140°F) Altitude: 0 to 2133 m (7000.0 ft)
- Humidity (operating and storage): 8% to 80%

Heat output:
Approximate heat output in British thermal units (Btu) per hour:
- Minimum configuration: 630 Btu per hour (185 watts)
- Maximum configuration: 1784 Btu per hour (523 watts)

Electrical input:
- Sine-wave input (50 or 60 Hz) required
- Input voltage and frequency ranges automatically selected
- Input voltage low range:
  - Minimum: 100 V ac
  - Maximum: 127 V ac
- Input voltage high range:
  - Minimum: 200 V ac
  - Maximum: 240 V ac
- Input kilovolt-amperes (kVA) approximately:
  - Minimum: 0.20 kVA (all models)
  - Maximum: 0.55 kVA

Notes:

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.

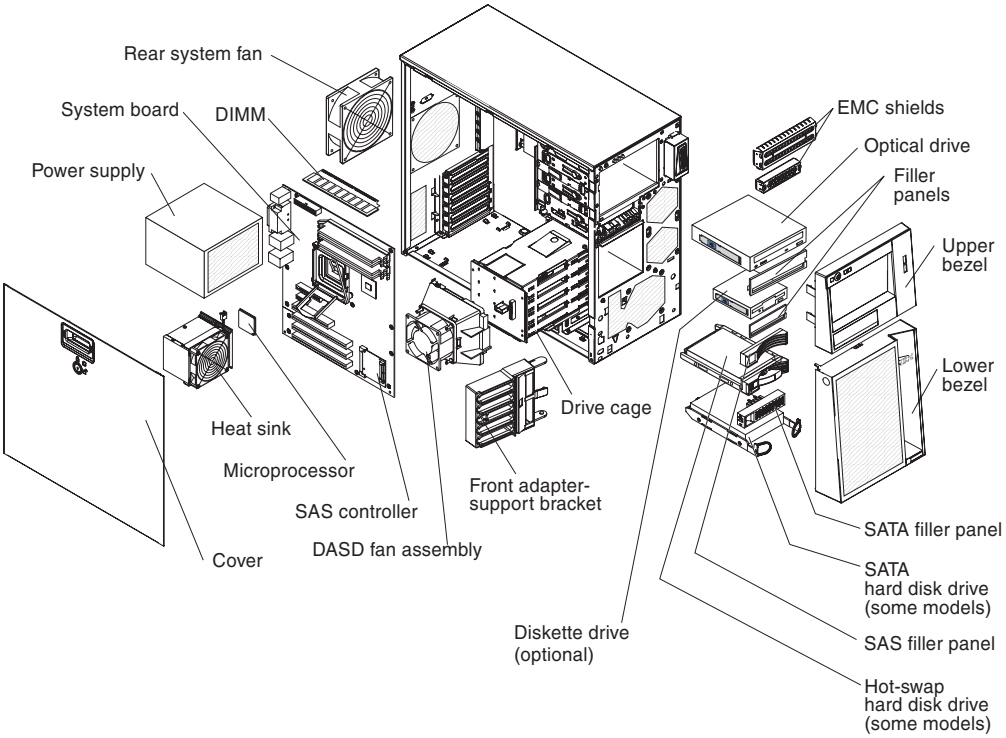
Major components of the server

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.

The following illustration shows the major components in the server.

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



Chapter 2. Installing optional devices

This chapter provides basic instructions for installing optional hardware devices 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 *User's Guide* on the IBM *System x Documentation* CD.

Installation guidelines

Before you install optional devices, read the following information:

- Read the safety information that begins on page v, the guidelines in "Working inside the server with the power on" on page 8, and "Handling static-sensitive devices" on page 9. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, go to http://www.ibm.com/servers/eserver/support/xseries/index.html/, select System 4362 or 4363 from the Hardware list, click Go, and then click the Download tab. For additional information about tools for updating, managing, and deploying firmware, see the System x and xSeries Tools Center at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp
- Before you install optional hardware devices, 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 Solving problems.
- 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, or hot-plug Universal Serial Bus (USB) devices.
- 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 and 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 have to access the inside of the server, you might find it easier to lay the server on its side. Before laying the server on its side, rotate the two front stabilizing feet a quarter turn inward toward the server, so that they do not break. Before returning the server to an upright position, rotate the front stabilizing feet a quarter turn outward from the server.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

System reliability guidelines

To help ensure proper system cooling and system reliability, make sure that the following requirements are met:

- 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 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.

  When installing the server in a rack, make sure that space is available around the server to enable the server cooling system to work properly. See the documentation that comes with the rack for additional information.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.

Working inside the server with the power on

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.

The server supports hot-plug, hot-add, and hot-swap devices and is designed to operate safely while it is turned on and the cover is removed. Follow these guidelines when you work inside a server that is turned on.

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, that could fall into the server as you lean over it.

- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

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.

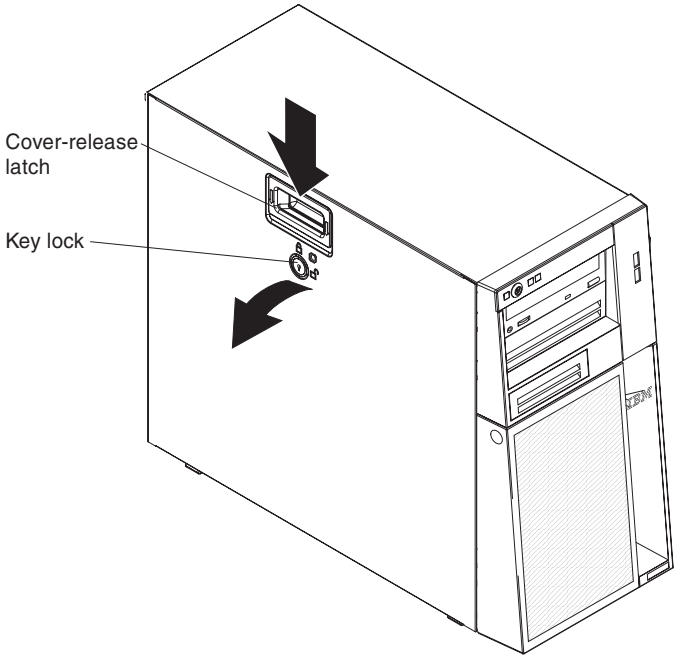
To reduce the possibility of electrostatic discharge, observe the following precautions:

- 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. Always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.
- 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 you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Removing the side cover

To remove the server side cover, complete the following steps:

1. Review the safety information that begins on page v and the “Installation guidelines” on page 7.
2. Turn off the server and all attached devices (see “Turning off the server” on page 37); then, disconnect all power cords and external cables.
3. Lay the server on its side.
4. Unlock the side cover; then, press the cover-release latch down, as indicated by the two arrows on the latch.



5. Lift the side cover off the server and set it aside.

To replace the side cover, see “Reinstalling the side cover” on page 30.

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

Removing the two-piece bezel

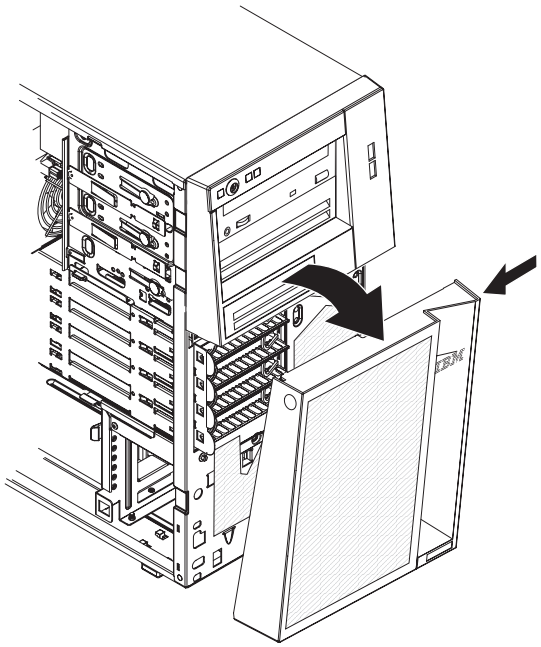
When working with some devices, such as drives in bays 1 through 7, you must first remove the two-piece bezel to access the devices.

Notes:

- Before you remove the upper bezel, you must unlock and remove the side cover and remove the lower bezel.
- If you are removing only the lower bezel, you do not have to remove the side cover. However, the side cover must be unlocked.

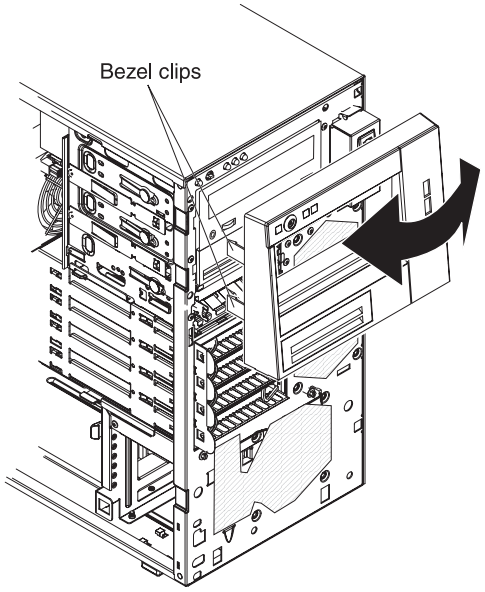
To remove the two-piece bezel, complete the following steps:

1. Unlock the side cover.
2. Remove the side cover (see “Removing the side cover” on page 10).
3. Press the round blue release button on the right side of the lower bezel and tilt the lower bezel forward to disengage it from the chassis.



4. Lift the lower bezel to disengage the two bottom tabs from the chassis. Set the lower bezel aside.

5. Carefully pull the two bezel clips on the left side of the upper bezel away from the chassis; then, rotate the upper bezel to the right side of the server to disengage the two right-side tabs from the chassis. Set the upper bezel aside.



For instructions for reinstalling the two-piece bezel, see “Reinstalling the two-piece bezel” on page 28.

Installing a memory module

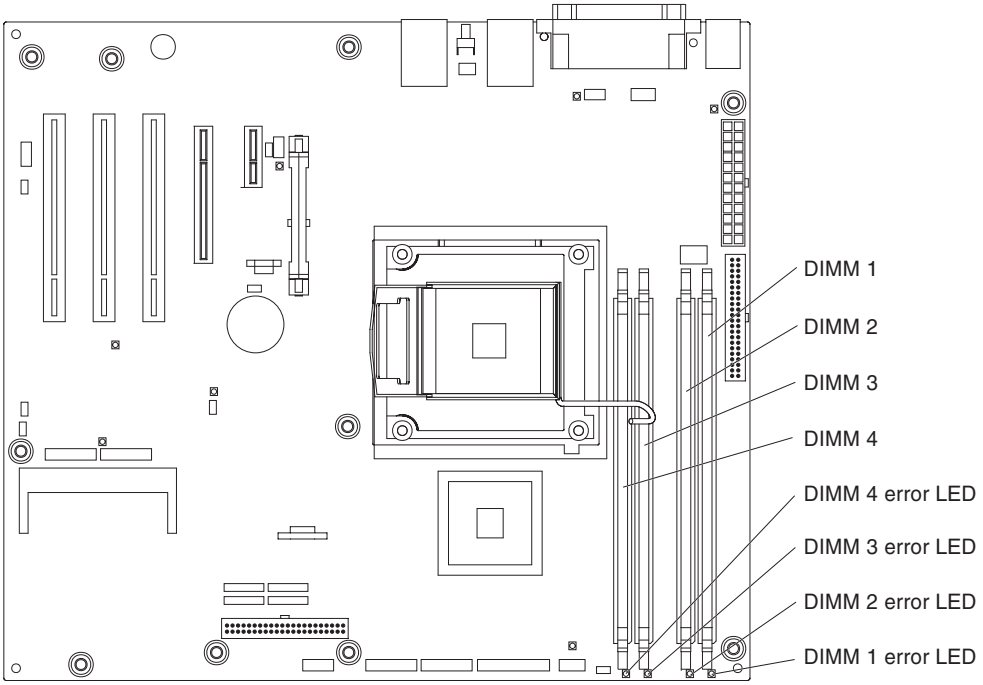
The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when you install DIMMs:

- The server supports industry-standard, 667 MHz, unbuffered PC2-5300, double-data-rate 2 (DDR2) dual inline memory modules (DIMMs) error correcting code (ECC) memory.
- The system board contains four DIMM connectors and supports two-way memory interleaving.
- The DIMM options that are available for the server are 512 MB, 1 GB, and 2 GB. The server supports a minimum of 512 MB and a maximum of 8 GB of system memory.
- The server comes with one 512 MB DIMM or two 512 MB DIMMs installed.
- The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Configuration/Setup Utility program and select **System Summary** from the menu. For additional information, see the *User's Guide* on the IBM *System x Documentation* CD.
- For two-way memory interleaving, DIMMs must be installed in matched pairs.

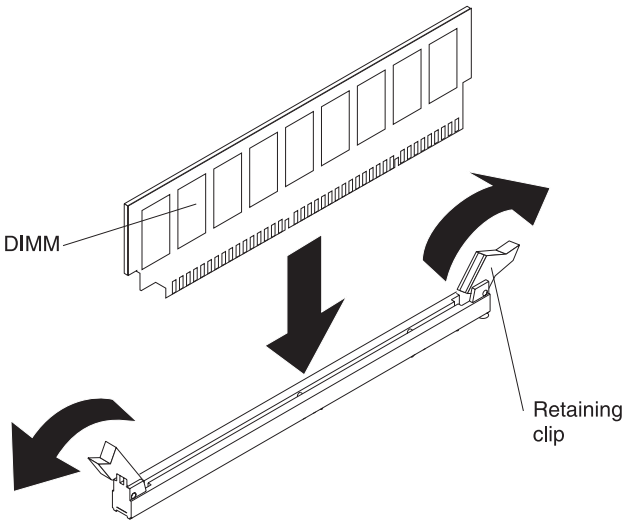
  If one DIMM is installed in the DIMM 1 connector, when you install an additional DIMM, it must be installed in the DIMM 3 connector, and it must be the same size, speed, type, and technology as the DIMM in the DIMM 1 connector. You can mix compatible DIMMs from various manufacturers.

  If you install a second pair of DIMMs in the DIMM 2 and DIMM 4 connectors, they do not have to be the same size, speed, type, and technology as the DIMMs in the DIMM 1 and DIMM 3 connectors. However, the size, speed, type, and technology of the DIMMs that you install in the DIMM 2 and DIMM 4 connectors must match each other.
- Install only 1.8 V, 184-pin, double-data-rate 2 (DDR2), 667 MHz, PC2-5300, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest DDR2 667 MHz SDRAM unbuffered DIMM specification. For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- When you restart the server after you add or remove a DIMM, the server displays a message that the memory configuration has changed.

The following illustration shows the dual inline memory module (DIMM) connectors and corresponding LEDs on the system board.



Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to stop, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.



To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 10).

4. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Install the DIMMs in the sequence shown in the following table.

Number of DIMMs	Installation sequence (connectors)
1	1
2 (interleaved configuration)	1, 3
3	Not supported
4 (interleaved configuration)	1, 3, 2, 4

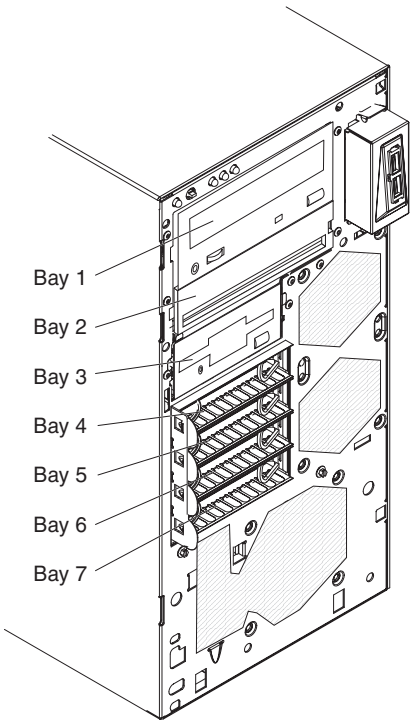
   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
5. Open the retaining clips and, if necessary, remove any existing DIMM.
6. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the new DIMM from the package.
7. Turn the DIMM so that the DIMM keys align correctly with the slot.
8. 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 installed. Open the retaining clips, remove the DIMM, and then reinsert it.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 27.

Installing a drive

Depending on the server model, a CD-ROM, CD-RW, DVD/CD-RW combo, or multiburner drive might be installed in the server.

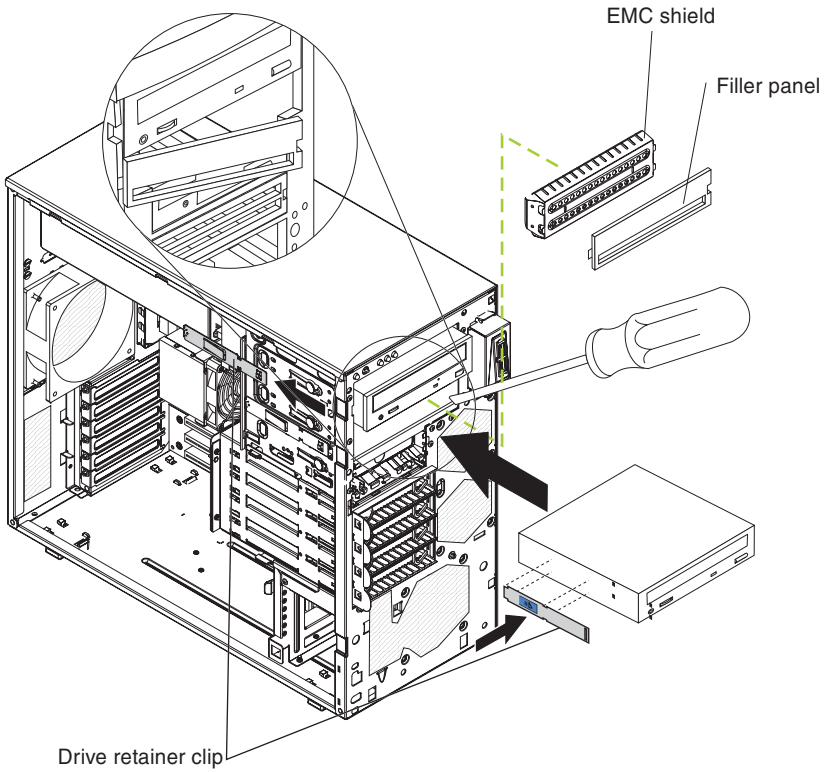
The following illustration shows the drive bays.



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

- Make sure that you have all the cables and other equipment specified that are in the documentation that comes with the drive.
- Select the bay in which you want to install the drive.
- Check the instructions that come with the drive to see whether you have to set any switches or jumpers on the drive. If you are installing a SAS or SATA device, be sure to set the SAS or SATA ID for that device.
- Optional external USB diskette drives, tape drives, CD drives, CD-RW drives, DVD/CD-RW combo, and multiburner drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, and 3 only.
- To install a 3.5 in. drive in a 5.25 in. bay, you must use the 5.25 in. conversion kit.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays, and PCI and PCI Express slots covered or occupied. When you install a drive, PCI, or PCI Express adapter, save the EMC shield and filler panel from the bay, or the PCI or PCI Express adapter slot cover in the event that you later remove the device.
- For a complete list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

Installing a CD or DVD drive



To install a CD or DVD drive, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 10).
4. Remove the two-piece bezel (see “Removing the two-piece bezel” on page 11).
5. Use a screwdriver to pry the filler panel and EMC shield away from the server.

   Note: If you are installing a drive that contains a laser, observe the following safety precaution.

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

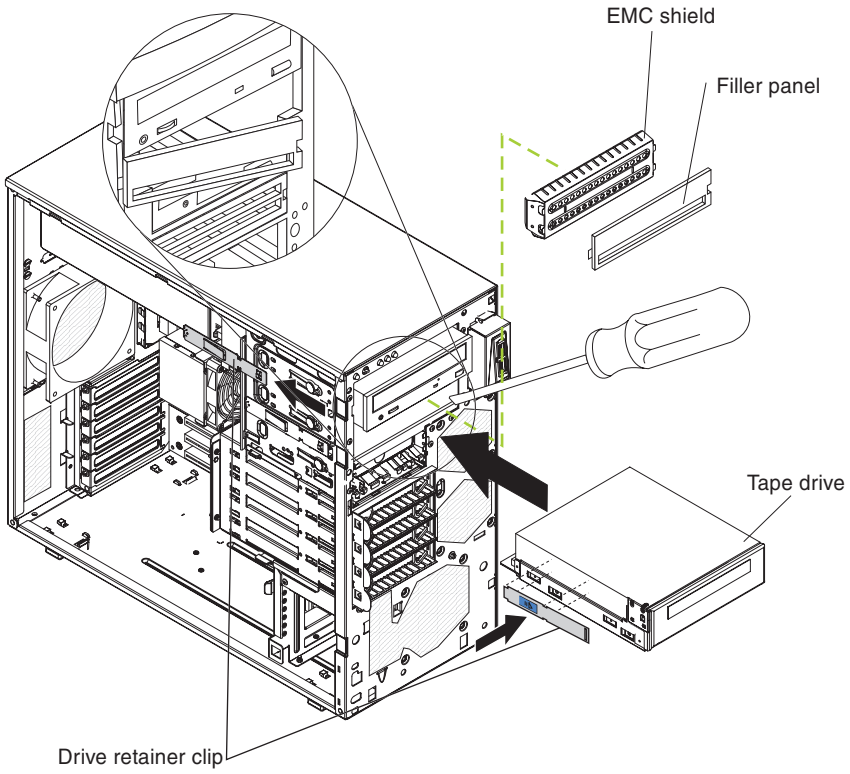
6. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
7. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

   Note: You might find it easier to install the new drive from the front and then attach the cables.
8. Remove the drive retainer clip from the side of the drive cage of bays 1 and 2 (see the illustration at the beginning of this section). Slide the drive retainer clip to the left to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive (the blue side of the drive retainer clip should be facing outward).
9. If you are installing a 5.25 in. drive in bay 2, push the drive into the bay. If you are installing a 3.5 in. drive in bay 2, you must attach the 5.25 in. conversion kit to the 3.5 in. drive.

10. Connect one end of the applicable signal cable into the rear of the drive and make sure that the other end of this cable is connected into the applicable IDE or SATA connector on the system board.
11. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and dual inline memory modules (DIMMs).
12. If you have another drive to install or remove, do so now.
13. Connect the power cable to the rear of the drive. The connectors are keyed and can be inserted only one way.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 27.

Installing a tape drive



To install a tape drive, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 10).
4. Remove the two-piece bezel (see “Removing the two-piece bezel” on page 11).
5. Use a screwdriver to pry the filler panel and EMC shield away from the server.
6. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
7. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

8. Remove the drive retainer clip from the side of the drive cage of bays 1 and 2 (see the illustration at the beginning of this section). Slide the drive retainer clip to the left to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive (the blue side of the drive retainer clip should be facing outward).
9. Push the drive into the bay.
10. Connect one end of the applicable signal cable into the rear of the drive and make sure that the other end of this cable is connected into the applicable connector on the system board.
11. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and dual inline memory modules (DIMMs).
12. If you have another drive to install or remove, do so now.
13. Connect the power cable to the rear of the drive. The connectors are keyed and can be inserted only one way.

If you have other devices to install or remove, do so now; otherwise, go to "Completing the installation" on page 27.

Installing a hot-swap SAS or hot-swap SATA hard disk drive

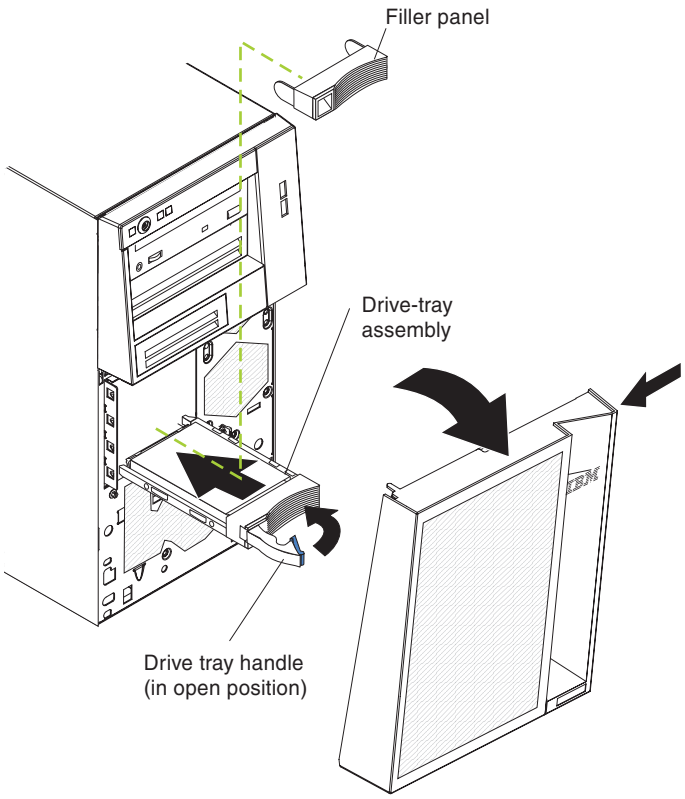
Some server models come with hot-swap SAS or hot-swap SATA hard disk drives. Before you install a hot-swap hard disk drive, read the following information:

- The hot-swap drives must be either all SAS hard disk drives or all SATA hard disk drives. Do not mix SAS and SATA drives
- Inspect the drive tray for signs of damage.
- Make sure that the drive is correctly installed in the tray.
- To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each drive bay.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays.

The server hot-swap bays are connected to a Hard disk drive backplane. This backplane, also known as the hot-swap-drive backplane, is the printed circuit board behind these bays.

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to stop, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.

Note: If you install the maximum number of hot-swap hard disk drives (four), remove the EMC shield that is attached inside the lower bezel.



To install a hot-swap SAS or hot-swap SATA hard disk drive, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 7.
2. Unlock the side cover.
3. Remove the side cover and lower bezel (see “Removing the side cover” on page 10 and “Removing the two-piece bezel” on page 11).
4. Install the hard disk drive in the hot-swap bay:
   a. Make sure that the drive tray handle is open.
   b. Align the drive assembly with the guide rails in the bay.
   c. Gently push the drive assembly into the bay until the drive stops.
   d. Push the tray handle to the closed (locked) position.
   e. Check the hard disk drive status indicator to make sure that the hard disk drive is operating correctly. (You might have to restart the server before the drive is recognized.) If the amber hard disk drive status LED for a drive is lit continuously, it indicates that the drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, this indicates that the drive is being accessed.

      Note: If the server is configured for RAID operation using an optional ServeRAID adapter, you might have to reconfigure your disk arrays after installing hard disk drives. See the ServeRAID documentation on the *IBM ServeRAID Support* CD for additional information about RAID operation and complete instructions for using ServeRAID Manager.
5. If you are installing additional hot-swap hard disk drives, do so now.

If you have other devices to install or remove, do so now; otherwise go to “Completing the installation” on page 27.

IDs for hot-swap hard disk drives

The hot-swap-drive backplane controls the IDs for the internal hot-swap drive bays. The following table lists the IDs for the hard disk drives and backplane that are connected to one channel in the hot-swap models. In the typical configuration, the standard hard disk drives and backplane are connected to channel A.

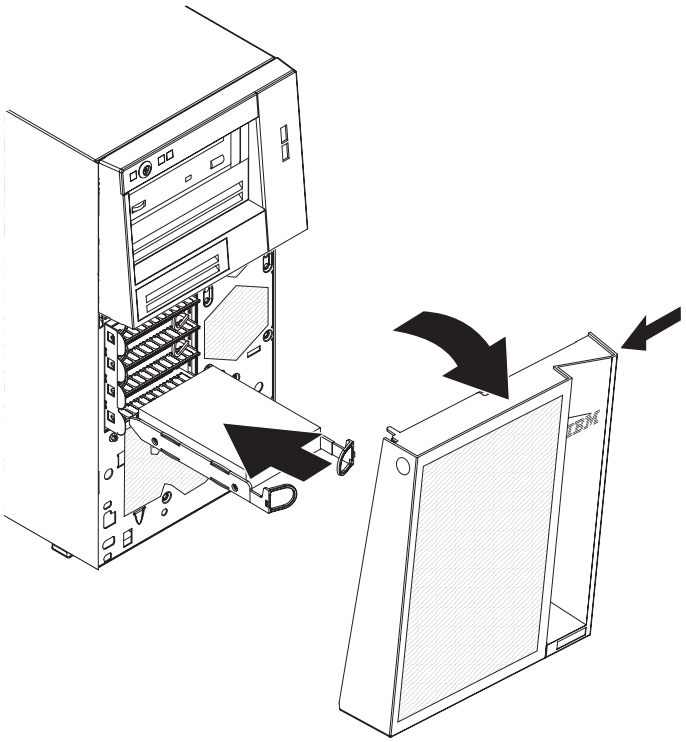
Device	ID
Drive bay 4	0
Drive bay 5	1
Drive bay 6	2
Drive bay 7	3

Installing a simple-swap SATA hard disk drive

Some server models come with simple-swap SATA hard disk drives, which are accessible from the front of the server. Before you install a simple-swap SATA hard disk drive, read the following information:

- You can install four simple-swap SATA hard disk drives in the server.
- Install the drives in ascending order by bay number.

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server before you remove or install a simple-swap hard disk drive.



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

1. Read the safety information that begins on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords.
3. Unlock the side cover (the bezel will not disengage from the server if the cover is locked).
4. Remove the side cover and lower bezel (see “Removing the side cover” on page 10 and “Removing the two-piece bezel” on page 11).
5. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
6. Align the drive assembly with the guide rails in the bay (the connector end of the drive goes in first).
7. Pull the loops of the drive assembly toward each other; then, carefully slide the drive assembly into the drive bay until it stops and release the loops.

   Note: Do not release the loops on the drive assembly until it is completely seated.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 27.

The simple-swap-drive backplate controls the IDs for the internal simple-swap drive bays. The following table lists the IDs for the hard disk drives and backplate that are connected to simple-swap models.

Table 2.

Device	**ID**
Drive bay 4	0
Drive bay 5	1
Drive bay 6	2
Drive bay 7	3

Power and signal cables for internal drives

The server uses cables to connect parallel IDE, simple-swap SATA, and SAS devices to the power supply and to the system board. (For the location of the system-board connectors, see the *User's Guide* on the IBM *System x Documentation* CD.) Review the following information before you connect power and signal cables to internal drives:

- The drives that are preinstalled in the server come with power and signal cables attached. If you replace any drives, remember which cable is attached to which drive.
- When you install a drive, make sure that one of the signal cable drive connectors is connected to the drive and that the connector at the other end of the signal cable is connected to the system board.
- If you have only one IDE device on a cable, it must be set as a master device.
- If two IDE devices are used on a single cable, one must be designated as the master device and the other as the subordinate device; otherwise, the server might not recognize some of the IDE devices. The master and subordinate designation is determined by switch or jumper settings on each IDE device.

The following cables are provided:

- **Power cables:** Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that can be attached to different drives; these connectors vary in size. Use either a four-wire power cable or SATA power cable with SATA drives, but do not use both at the same time (use one or the other).
- **Signal cables:** Signal cables are typically flat cables, also called ribbon cables, that connect parallel IDE, SATA, SAS, and diskette drives to the system board. Two or three types of signal cables come with the server:
  - **IDE:** The wider IDE signal cable has three connectors. One of these connectors is attached to the drive, one is a spare, and the third is attached to the primary or secondary IDE connector on the system board. The spare connector can be used to connect an additional IDE drive to the server.

    The CD-ROM drive is attached to an ATA 100 signal cable. ATA 100 signal cables are color-coded. The blue connector is attached to the system board. The black connector is attached to the master IDE device. The gray middle connector is attached to the subordinate IDE device.
  - **(Optional) Diskette drive:** The narrower signal cable has two connectors. One is attached to the diskette drive, and the other is connected to the connector (FDD1) on the system board.
  - **Simple-swap SATA:** Simple-swap SATA models come with four SATA cables that are already connected to the system board and the back panel at the rear of the simple-swap drives.
  - **Hot-swap SATA:** Hot-swap SATA models come with a single data cable that connects the SAS/SATA controller to the hot-swap backplane. This cable provides inherent connectivity for the four SATA drives that the server supports. Therefore, additional cabling is not required for these drives.
  - **SAS:** Hot-swap SAS models come with a single data cable that connects the SAS/SATA controller to the hot-swap backplane. This cable provides inherent connectivity for the four SAS drives that the server supports. Therefore, additional cabling is not required for these drives.

    For more information about the requirements for SAS cable and connecting SAS devices, see the documentation that comes with these devices.

For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

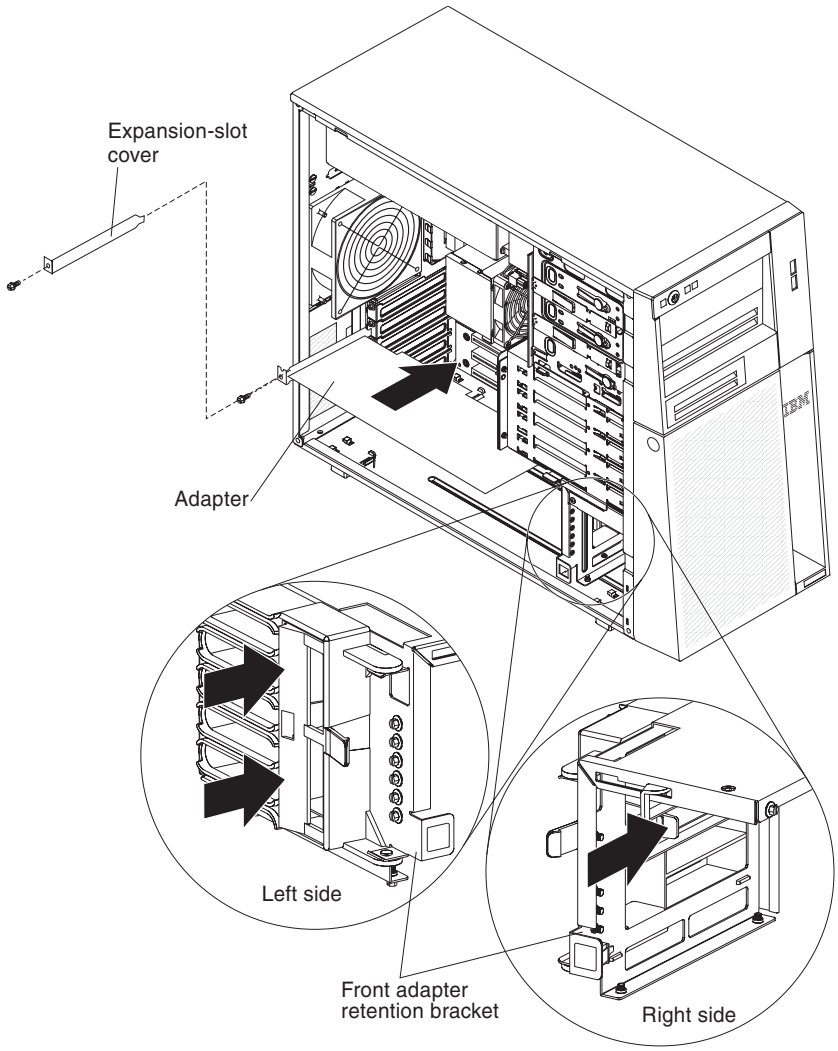
Installing an adapter

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

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you have to change the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.
- Read the documentation that comes with your operating system.
- The server comes with three PCI slots and two PCI Express slots.
- You can install full-length adapters that are included in the ServerProven list in slots 1 through 5 (depending on your model).
- The 32-bit slots 3, 4, and 5 support 5.0 V keyed PCI adapters; they do not support 3.3 V keyed adapters. Universal adapters are supported in slots 3, 4, and 5 if they are universally keyed.
- An optional IBM Remote Supervisor Adapter II SlimLine can be installed only in the dedicated connector on the system board. For additional information, see the documentation that comes with this adapter.
- When you start the server for the first time after you install a Remote Supervisor Adapter II SlimLine, the startup process will take several minutes longer than a typical startup.
- The optional ServeRAID-8s adapter can be installed only in PCI Express x8 slot 2.
- The server scans PCI Express x1 slot 1, PCI Express x8 slot 2, PCI slots 3, 4, and 5 to assign system resources. Then, the server starts the PCI devices in the following order, if you have not changed the default startup sequence: PCI Express x1 slot 1, PCI Express x8 slot 2, PCI slot 3, PCI slot 4, and PCI slot 5.
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

For the locations of the expansion slots on the system board, see the *User's Guide* on the IBM *System x Documentation* CD.

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to stop, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.

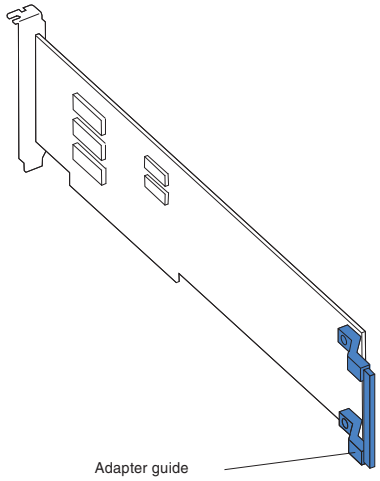


To install an adapter, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the side cover. See “Removing the side cover” on page 10.
3. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you install the adapter.
4. Follow the instructions that come with the adapter to set jumpers or switches, if any.
5. Rotate the rear adapter-retention bracket to the open (unlocked) position and remove it from the server.
6. Remove the screw that secures the expansion-slot cover to the chassis. Store the expansion-slot cover and screw in a safe place for future use.

   Note: Expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions standards of the server and ensures proper ventilation of server components.

7. Touch the static-protective package that contains the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.
8. If you are installing a full-length adapter, remove the blue adapter guide (if any) from the end of the adapter.



9. Carefully grasp the adapter by the top edge or upper corners, and align it with the expansion-slot guides; then, press the adapter *firmly* into the expansion slot. Move the adapter directly from the static-protective package to the expansion slot.

   Attention: Make sure that the adapter is correctly seated in the expansion slot before you turn on the server. Incomplete installation of an adapter might damage the system board or the adapter.
10. Install an expansion-slot screw at the rear of the adapter.
11. If you are installing a full-length adapter, press on the release lever on the right side of the front adapter-retention bracket to release the retaining tab on the left side of the bracket.
12. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans.
13. Reinstall the rear adapter-retention bracket; then, rotate the bracket to the closed (locked) position.

    Note: If any adapters in the server are large or have heavy cables attached to them, you can remove the rear adapter-retention bracket and secure all of the adapters with expansion-slot screws.

If you have other devices to install or remove, do so now; otherwise, go to "Completing the installation."

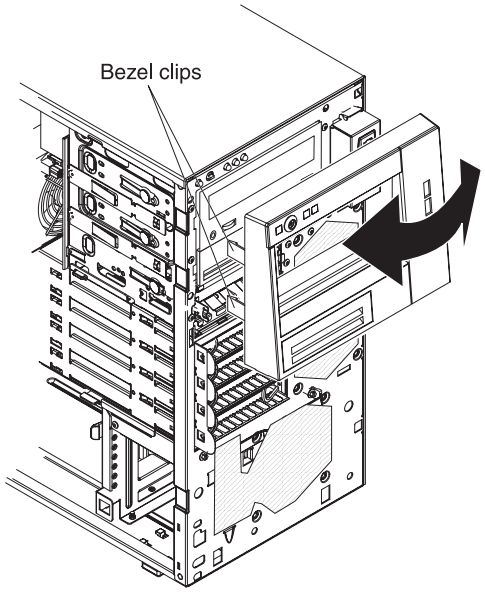
Completing the installation

To complete the installation, you must reinstall the two-piece bezel, reinstall the side cover, connect all the cables and, for some devices, run the Configuration/Setup Utility program. Follow the instructions in this section.

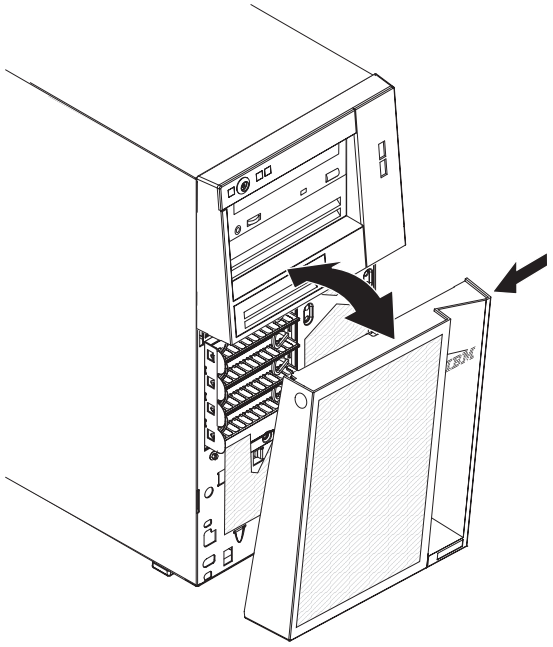
Reinstalling the two-piece bezel

To reinstall the two-piece bezel, complete the following steps:

1. Install the upper bezel on the front of the server chassis:
   a. Insert the two right-side tabs on the upper bezel into the matching holes on the right side of the chassis.
   b. Rotate the upper bezel to the left side of the chassis and press the bezel clips into the matching indentations on the left side of the chassis until the bezel clips snap into place.



2. Install the lower bezel on the front of the server chassis.



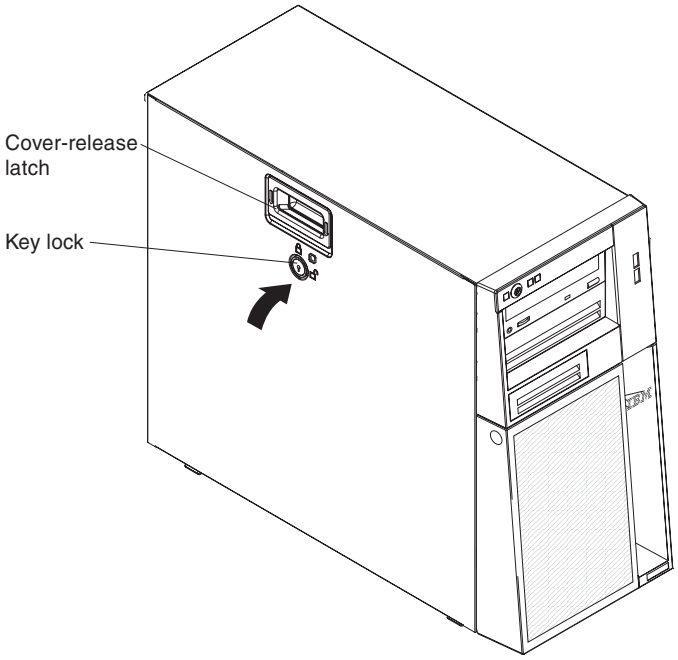
a. Insert the two bottom tabs on the lower bezel into the matching holes in the front of the chassis.

b. Tilt the top of the lower bezel into position on the chassis until the lower bezel locks securely into place.

Reinstalling the side cover

If you removed the bezel, reinstall it before you reinstall the side cover. See “Reinstalling the two-piece bezel” on page 28.

Note: The rear adapter-retention bracket rests against the server side cover. You might find it easier to lay the server on its side to reinstall the side cover.



To reinstall the side cover, complete the following steps:

1. Before you install the side cover, make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server. Also, make sure that all internal cables are correctly routed.

   Note: The cover-release latch must be in the unlocked (opened) position before you install the side cover.
2. Insert the tabs inside the cover into the slots on the server chassis.

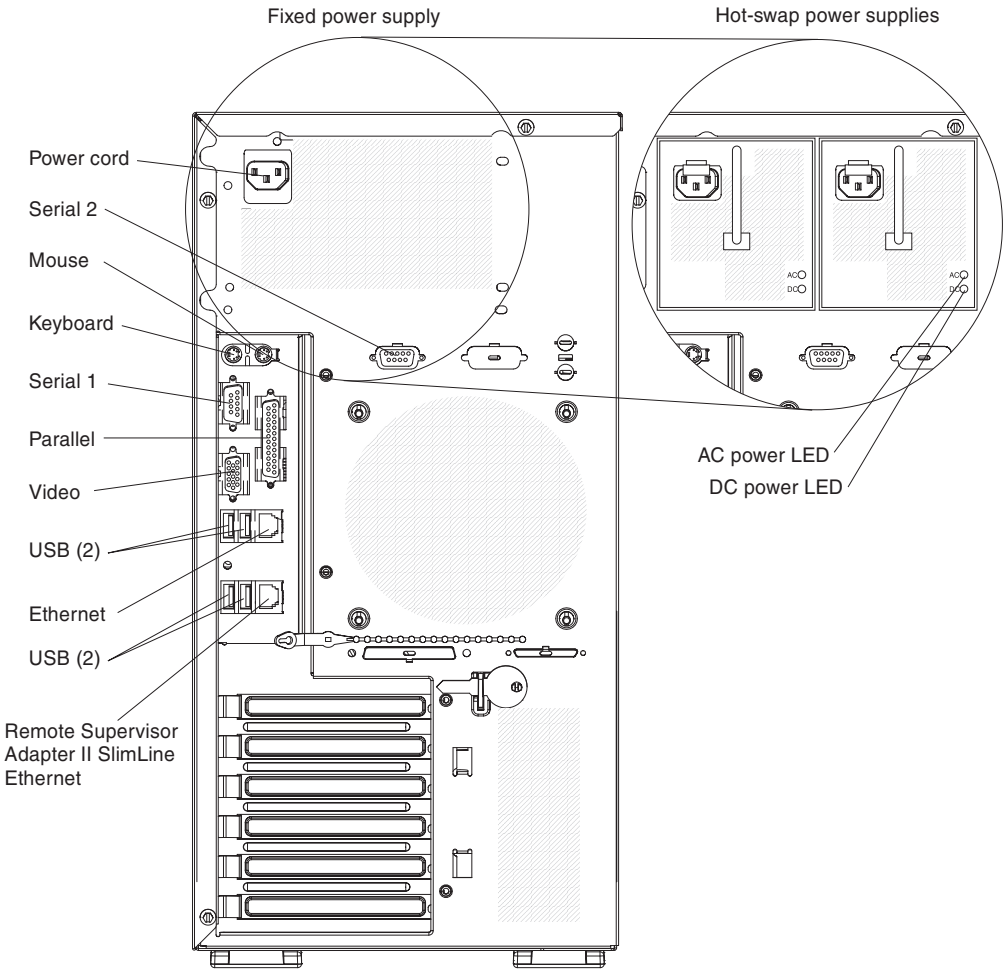
   Note: Make sure that each tab on the side cover is in its corresponding slot before you close the cover-release latch.
3. Close the cover-release latch to secure the side cover in place.
4. Lock the side cover.

Connecting the cables

Attention: To prevent damage to equipment, connect the power cords last.

If the server cables and connector panel have color-coded connectors, match the color of each cable end with the color of the connector. For example, match a blue cable end to a blue connector on the panel, a red cable end with a red connector, and so on.

The following illustration shows the input/output (I/O) connectors on the rear of the server.



Updating the server configuration

When you start the server for the first time after you add or remove an internal or external 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. See Chapter 4, “Configuring the server,” on page 39 for additional information.

Some devices have device drivers that you must install. For information about installing device drivers, see the documentation that comes with each device.

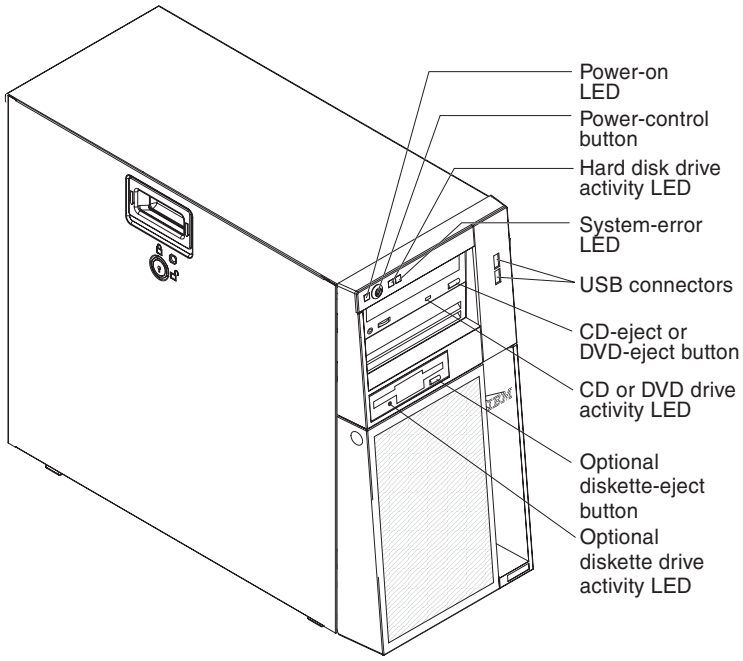
If the server has a ServeRAID adapter and you have installed or removed a hard disk drive, see the ServeRAID documentation that comes with the server for information about reconfiguring the disk arrays.

Chapter 3. Server controls, LEDs, and power

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

Front view

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



Power-on LED

When this LED is lit, it indicates that the server is turned on. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed. The LED will flash if the system is turned off and the power cord is still attached to 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 cords from the electrical outlets.

Power-control button

Press this button to turn the server on and off manually.

Hard disk drive activity LED

When this LED is flashing, it indicates that a hard disk drive is in use.

System-error LED

When this amber LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error. See Chapter 5, “Solving problems,” on page 43 for additional information. Detailed troubleshooting information is in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

USB connectors

Connect USB devices to these connectors.

CD-eject or DVD-eject button

Press this button to release a CD from the CD drive or a DVD from the DVD drive.

CD or DVD drive activity LED

When this LED is lit, it indicates that the CD drive or DVD drive is in use.

(Optional) External diskette-eject button

Press this button to release a diskette from the diskette drive.

(Optional) External diskette drive activity LED

When this LED is lit, it indicates that the diskette drive is in use.

Hot-swap hard disk drive activity LED (some models)

On some server models, each hot-swap drive has a hard disk drive activity LED. When this green LED is flashing, it indicates that the associated hard disk drive is in use.

When the drive is removed, this LED also is visible on the hard disk drive backplane, next to the drive connector. The backplane is the printed circuit board behind drive bays 4 through 7.

Hot-swap hard disk drive status LED (some models)

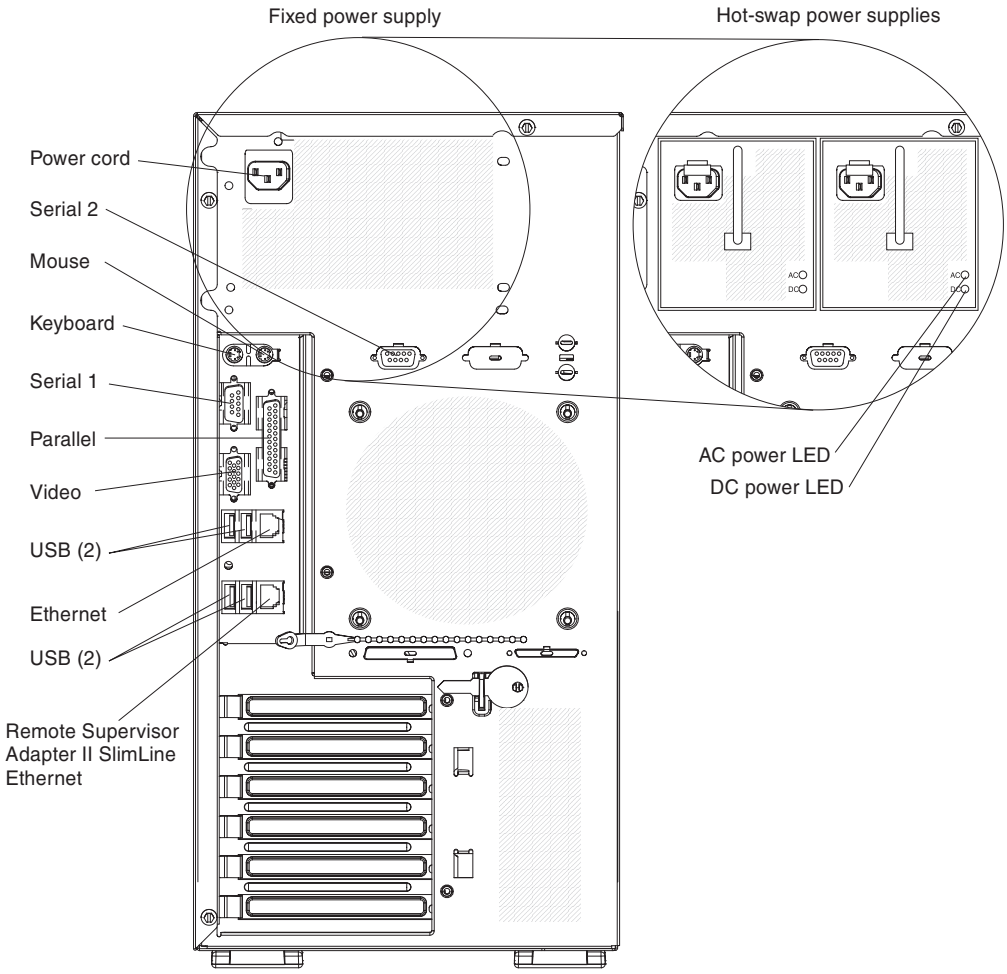
On some server models, each hot-swap hard disk drive has an amber status LED. If this amber status LED for a drive is lit, it indicates that the associated hard disk drive has failed.

If an optional ServeRAID adapter is installed in the server and the LED flashes slowly (one flash per second), the drive is being rebuilt. If the LED flashes rapidly (three flashes per second), the adapter is identifying the drive.

When the drive is removed, this LED also is visible on the hard disk drive backplane, below the hot-swap hard disk drive activity LED.

Rear view

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



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

Serial 2 connector
Connect a 9-pin serial device to this connector.

Mouse connector
Connect a mouse device to this connector.

Keyboard connector
Connect a keyboard to this connector.

Serial 1 connector
Connect a 9-pin serial device to this connector.

Parallel connector
Connect a parallel device to this connector.

Video connector
Connect a monitor to this connector.

USB connectors
Connect USB devices to these connectors.

Ethernet connector
Use this connector to connect the server to a network.

Ethernet transmit/receive activity LED
This LED is on the Ethernet connector on the rear of the server. When this LED is lit, it indicates that there is activity between the server and the network.

Ethernet link status LED
This LED is on the Ethernet connector on the rear of the server. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

Remote Supervisor Adapter II SlimLine Ethernet connector
Use this connector to connect the Remote Supervisor Adapter II SlimLine to a network.

AC power LED
On some server models, each hot-swap power supply has an ac power LED and a dc power LED. During typical operation, both the ac and dc power LEDs are lit.

DC power LED
On some server models, each hot-swap power supply has a dc power LED and an ac power LED. During typical operation, both the ac and dc power LEDs are lit.

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 is shut down; however, the server can respond to remote requests to turn on the server.

Turning on the server

Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active, and 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 your operating system supports the systems-management software for an optional Remote Supervisor Adapter II SlimLine, the systems-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.
- If an optional Remote Supervisor Adapter II SlimLine is installed in the server, the server can be turned on from the Remote Supervisor Adapter II SlimLine user interface.

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI optional devices.

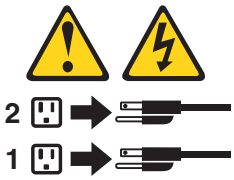
Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to remote requests to turn on the server. 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 SlimLine is installed in the server, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- The server can turn itself off as an automatic response to a critical system failure.

Chapter 4. Configuring the server

The following configuration programs are available to configure the server:

- **Configuration/Setup Utility program**

  The Configuration/Setup Utility program is part of the basic input/output system (BIOS) code in the server. You can use this program to configure serial port assignments, change interrupt request (IRQ) settings, change the device startup sequence, set the date and time, set passwords, and set the chassis intrusion detector. For information about using this utility program, see “Starting the Configuration/Setup Utility program.”
- **Boot Menu program**

  The Boot Menu program is part of the BIOS code in the server. Use it to temporarily assign a device to be first in the startup sequence, overriding the startup sequence that is set in the Configuration/Setup Utility program. For information about using this utility program, see “Using the Boot Menu program” on page 40.
- **Broadcom NetXtreme Gigabit Ethernet Boot Agent**

  The Broadcom NetXtreme Gigabit Ethernet Boot Agent is part of the BIOS. You can use it to configure the network as a startable device, and you can customize where the network Startup optional devices occurs in the startup sequence. Enable and disable the Broadcom NetXtreme Gigabit Ethernet Boot Agent from the Configuration/Setup Utility program. For information, see“Enabling the Broadcom NetXtreme Gigabit Ethernet Boot Agent” on page 40.
- **Broadcom NetXtreme Gigabit Ethernet controller configuration**

  To configure the integrated Gigabit Ethernet controller, see “Configuring the Broadcom NetXtreme Gigabit Ethernet controller” on page 40.
- **LSI Configuration Utility program**

  Use the LSI Configuration Utility program to configure the integrated SAS/SATA controller with RAID capabilities and the devices that are attached to it. For information about using this program, see “LSI Configuration Utility program” on page 41.

See the *User’s Guide* on the IBM *System x Documentation* CD for detailed instructions for using the configuration programs.

The following sections provide the instructions for starting the utility programs.

Starting the Configuration/Setup Utility program

Configuration/Setup is a menu-driven utility that is part of the BIOS. You can use it to:

- Configure serial connector assignments
- Change the startup sequence
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set an administrator password

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

1. Turn on the server. If the server is already on when you start this procedure, you must shut down the operating system, turn off the server, wait a few seconds until all in-use LEDs are turned off, and restart the server.
2. When the message `Press F1 for Configuration/Setup, Press F12 for Boot Menu` is displayed press F1. (This prompt is displayed on the screen for only a few seconds. You must press F1 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Configuration/Setup Utility menu.
3. Follow the instructions on the screen.

Using the Boot Menu program

The Boot Menu program is a built in, menu-driven configuration utility program that you can use to temporarily redefine the first startup device without changing settings in the Configuration/Setup Utility program.

To use the Boot Menu program, complete the following steps:

1. Restart the server.
2. Press F12.
3. Select the startup device.

The next time the server is started, it returns to the startup sequence that is set in the Configuration/Setup Utility program.

Enabling the Broadcom NetXtreme Gigabit Ethernet Boot Agent

The Broadcom NetXtreme Gigabit Ethernet Boot Agent is part of the BIOS. You can use it to configure the network as a startable device, and you can customize where the network Startup optional devices occurs in the startup sequence. Enable and disable the Broadcom NetXtreme Gigabit Ethernet Boot Agent from the Configuration/Setup Utility program.

To enable the Broadcom NetXtreme Gigabit Ethernet boot agent, complete the following steps:

1. From the Configuration/Setup Utility main menu, select **Startup Option** and press Enter.
2. Select **Planar Ethernet PXE/DHCP** and use the Right Arrow (→) key to set it to **Planar Ethernet**.
3. Under the **Startup Option→ Startup Sequence Options** menu choice, set the network-planar device as the first startup device.
4. Select **Save Settings** and press Enter.

Configuring the Broadcom NetXtreme Gigabit Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provides full duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet port in the server supports auto-negotiation, the controller detects the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operates at that rate and mode.

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. For device drivers and information about configuring the Ethernet controller, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the server. To find updated information about configuring the controller, 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/servers/eserver/support/xseries/index.html/
2. From the **Hardware** list, select **System x3200** and click **Go**.
3. Click the **Install and use tab**.
4. Click **Product documentation**.

LSI Configuration Utility program

Use the LSI Configuration Utility program 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 Configuration Utility program to:
  - Perform a low-level format on a SAS hard disk drive
  - Create an array of SAS hard disk drives with or without a hot-spare drive
  - Set SAS protocol parameters on SAS hard disk drives

The integrated SAS/SATA controller with RAID capabilities supports RAID arrays. You can use the LSI Configuration Utility program to configure RAID 1 (IM), RAID 1E (IME), and RAID 0 (IS) for a single pair of attached devices. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change SAS settings for attached devices.

In addition, an LSI command-line configuration program is available from http://www.ibm.com/servers/eserver/support/xseries/index.html/.

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

- The integrated SAS/SATA controller with RAID capabilities supports the following features:
  - Integrated Mirroring (IM) with hot-spare support (also known as RAID 1)

    Use this option to create an integrated array of two disks plus an optional hot spare. All data on the primary disk can be migrated.
  - Integrated Mirroring Enhanced (IME) with hot-spare support (also known as RAID 1E)

    Use this option to create an integrated mirror enhanced array of three to eight disks, including an optional hot spare.
  - Integrated Striping (IS) (also known as RAID 0)

    Use this option to create an integrated striping array of two to eight disks. All data on the array disk will be deleted.
- 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.

- If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID 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.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing SAS settings for attached devices.

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

1. Turn on the server.
2. When the message `<<< Press <CTRL-C> to start LSI Configuration Utility >>>` is displayed, 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. To change the settings of the selected items, follow the instructions on the screen. If you select **Raid Properties**, **SAS Topology**, or **Advanced Adapter Properties**, additional screens are displayed.

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

Chapter 5. Solving problems

This chapter provides basic troubleshooting information to help you solve some common problems that might occur while you are setting up the server.

If you cannot locate and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 69, the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD, and the “Server Support” flowchart in the front of this document.

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.

  For more information, see “POST beep codes” and the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

- **ServerGuide problems**

  This chart lists problem symptoms and steps to correct problems that occur when you are using the *ServerGuide Setup and Installation CD*. For more information, see “ServerGuide problems” on page 55.

- **Troubleshooting tables**

  These tables list problem symptoms and steps to correct the problems. For more information, see “Troubleshooting tables” on page 56.

- **Diagnostic programs and error messages**

  The diagnostic programs are the primary method of testing the major components of the server. These programs are on the IBM *Enhanced Diagnostics* CD that comes with the server. See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for more information.

- **System-board error LEDs**

  An LED on the system board might be lit to help isolate an error that is indicated by the system-error LED on the front of the server. For more information, see “System-board LEDs” on page 68.

POST beep codes

When POST is completed successfully, one short beep occurs. If POST detects a problem during startup, beep codes might occur. Use the following beep code descriptions to help diagnose and solve problems that are detected during startup.

Note: See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for more information about the POST beep codes.

Repeating long beeps

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

Other beep codes

See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for information about other beep codes.

POST error codes

The following table provides an abbreviated list of the error codes that might appear during POST. See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for more information about the POST error codes. To check for updated technical information, go to http://www.ibm.com/servers/eserver/support/xseries/index.html/, select **System x3200**, and click **Go**; then, click the **Install and use tab** and click **Product documentation**.

Table 3. Abbreviated list of POST error codes

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
062	Three consecutive boot failures using the default configuration.	1. Flash the system firmware to the latest level (see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). 2. (Trained service technician only) Replace the system board.
101	Tick timer internal interrupt failure.	(Trained service technician only) Replace the system board.
102	Internal timer channel 2 test failure.	(Trained service technician only) Replace the system board.
151	Real-time clock error.	1. Reseat the battery. 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. (Trained service technician only) System board
161	Real-time clock battery failure.	1. Reseat the battery. 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. (Trained service technician only) System board

Table 3. Abbreviated list of POST error codes (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
162	Invalid configuration information or CMOS random-access memory (RAM) checksum failure.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. Reseat the following components: a. Battery b. Failing device (if the device is a FRU, the device must be reseated by a trained service technician only) 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. Failing device (if the device is a FRU, the device must be replaced by a trained service technician only) c. (Trained service technician only) System board
163	Time of day not set.	1. Run the Configuration/Setup Utility program; then, exit, saving the configuration settings. 2. Reseat the DIMMs.
164	Memory size has changed.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, make sure that the date and time are correct, and save the settings. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. (Trained service technician only) System board

Table 3. Abbreviated list of POST error codes (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
175	Service processor flash code damaged or not loaded. **Note:** In this case, the service processor is the optional Remote Supervisor Adapter II SlimLine.	1. Update the Remote Supervisor Adapter II SlimLine firmware (see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). 2. Replace the Remote Supervisor Adapter II SlimLine.
184	Power-on password damaged.	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. (Trained service technician only) System board
187	VPD serial number not set.	1. Set the serial number by updating the BIOS code level (see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). 2. (Trained service technician only) Replace the system board.
189	Three attempts were made to access the server with an incorrect password.	Restart the server and enter the administrator password; then, run the Configuration/Setup Utility program and change the power-on password.
289	A DIMM has been disabled by the system.	1. Make sure that the DIMM is installed correctly (see "Installing a memory module" on page 13). 2. Replace the DIMM. 3. (Trained service technician only) Replace the system board.

Table 3. Abbreviated list of POST error codes (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
301	Keyboard or keyboard controller error.	1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. Reseat the keyboard cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Keyboard b. (Trained service technician only) System board
303	Keyboard controller failure.	1. Reseat the keyboard. 2. Replace the keyboard. 3. (Trained service technician only) Replace the system board.
602	Invalid diskette boot record	1. Replace the diskette. 2. Reseat the diskette drive cables. 3. Replace the diskette drive.
604	Internal diskette drive error	1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. Reseat the diskette drive signal cables. 3. Replace the diskette drive.
962	Parallel port configuration error	1. Run the Configuration/Setup Utility program and make sure that the parallel port setting is correct. 2. (Trained service technician only) Replace the system board.

Table 3. Abbreviated list of POST error codes (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
1162	Serial port error	1. Run the Configuration/Setup Utility program and make sure that the serial port settings are correct. 2. (Trained service technician only) Replace the system board.
178*x*	Fixed disk error. **Note:** *x* is the drive that has the error.	1. Run the hard disk drive diagnostic tests on drive *x* (see "Running the diagnostic programs" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). 2. Reseat the following components, depending on the server model: • Hot-swap models: Hard disk drive • Simple-swap models: a. Hard disk drive *x* b. Hard disk drive *x* cable 3. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: • Hot-swap models: a. Hard disk drive *x* b. Hard disk drive backplane • Simple-swap models: a. Hard disk drive *x* b. Hard disk drive *x* cable 4. (Trained service technician only) Replace the system board.

Table 3. Abbreviated list of POST error codes (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**		
Error code	**Description**	**Action**
1801	A PCI adapter has requested memory resources that are not available.	1. Make sure that no devices have been disabled in the Configuration/Setup Utility program. 2. Change the order of the adapters in the PCI, and PCI Express slots. Make sure that the startup (boot) device is positioned early in the scanning order. (For information about the scanning order, see the *User's Guide* on the IBM *System x Documentation* CD). 3. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. If the memory resource settings are not correct, change them. 4. If all memory resources are being used, remove an adapter to make memory available to the adapter. Disabling the BIOS on the adapter should correct the error. See the documentation that comes with the adapter.
1802	No more I/O space is available for a PCI adapter.	1. If the error code indicates a particular PCI or PCI-E slot or device, remove that device. 2. If the error remains, reseat the each adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing PCI adapter b. (Trained service technician only) System board

Table 3. Abbreviated list of POST error codes (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
1803	No more memory (above 1 MB for a PCI adapter).	1. If the error code indicates a particular PCI or PCI-E slot or device, remove that device. 2. If the error remains, reseat the each adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing PCI adapter b. (Trained service technician only) System board
1804	No more memory (below 1 MB for a PCI adapter).	1. Remove the failing adapter. 2. Reseat each adapter 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing PCI adapter b. (Trained service technician only) System board
1805	PCI option ROM checksum error.	1. Remove the failing adapter. 2. Reseat each adapter 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing PCI adapter b. (Trained service technician only) System board

Table 3. Abbreviated list of POST error codes (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**		
Error code	**Description**	**Action**
1806	PCI built in self-test failure.	1. If the error code indicates a particular PCI or PCI-E slot or device, remove that device. 2. Reseat the following components: a. Each adapter b. (Trained service technician only, if the specified board is a FRU) The board that is indicated in the error code. 3. Replace the components listed in step 2 one at a time, in the order shown above, restarting the server each time.
1807, 1808	General PCI error.	1. Make sure that no devices have been disabled in the Configuration/Setup Utility program. 2. Replace each adapter one at a time, restarting the server each time.

Table 3. Abbreviated list of POST error codes (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
1962	A drive does not contain a valid boot sector.	1. Make sure that a bootable operating system is installed. 2. Run the hard disk drive diagnostic tests (see "Running the diagnostic programs" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). 3. Reseat the following components, depending on the server model: • Hot-swap models: a. Hard disk drive b. Mini-SAS/SATA adapter cable c. Mini-SAS/SATA adapter • Simple-swap models: a. Hard disk drive b. Hard disk drive cable 4. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: • Hot-swap models: a. Hard disk drive b. Mini-SAS/SATA adapter cable c. Hard disk drive backplane d. Mini-SAS/SATA adapter • Simple-swap models: a. Hard disk drive b. Hard disk drive cable 5. (Trained service technician only) Replace the system board.

Table 3. Abbreviated list of POST error codes (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
5962	IDE DVD drive configuration error.	1. Run the Configuration/Setup Utility program and load the default settings (see "Starting the Configuration/Setup Utility program" on page 39). 2. Reseat the following components: a. DVD drive cable b. DVD drive c. System board 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
8603	Pointing-device error.	1. Reseat the pointing device. 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. Pointing device b. (Trained service technician only) System board
00012000	Processor machine check error.	1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board

Table 3. Abbreviated list of POST error codes (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
00019701	Microprocessor 1 failed the built in self-test (BIST).	1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
01298001	No update data for microprocessor 1.	1. Update the BIOS code again (see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.
01298101	Bad update data for processor 1.	1. Update the BIOS code again (see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.

Table 3. Abbreviated list of POST error codes (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**		
Error code	**Description**	**Action**
I9990301	Hard disk drive boot sector error.	1. Reseat the following components, depending on the server model: • Hot-swap models: a. Hard disk drive b. SAS/SATA controller • Simple-swap models: a. Hard disk drive b. Hard disk drive cable 2. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: • Hot-swap models: a. Hard disk drive b. Hard disk drive backplane c. SAS/SATA controller • Simple-swap models: a. Hard disk drive b. Hard disk drive cable 3. (Trained service technician only) Replace the system board.
I9990650	AC power has been restored.	1. Reseat the power cords. 2. Check for interruption of the external power. 3. Replace the power cords.

ServerGuide problems

The following table lists problem symptoms and suggested solutions.

Table 4. ServerGuide Setup and Installation CD

Symptom	Action
The *ServerGuide Setup and Installation* CD will not start.	• 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 changed, make sure that the CD or DVD drive is first in the startup sequence. • If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.

Table 4. ServerGuide Setup and Installation CD (continued)

Symptom	Action
The ServeRAID program cannot view all installed drives or the operating system cannot be installed.	• Make sure that there are no duplicate 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 *ServerGuide Setup and Installation* CD label for a list of supported operating-system versions.
The operating system cannot be installed; the option is not available.	Make sure that the operating-system CD is supported on the server. If the operating system is supported, no logical drive is defined (RAID servers). Run the ServerGuide program and make sure that setup is complete.

Troubleshooting tables

Use the following tables to find solutions to problems that have identifiable symptoms. See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for more detailed troubleshooting information. If you cannot find a problem in these tables, run the diagnostic programs (see “Running the diagnostic programs” in the *Problem Determination and Service Guide*).

If you have just added new software or a new optional device and the server is not working, complete the following steps before you use the troubleshooting tables:

1. Check the system-board LEDs or the LEDs on the front panel (see “System-board LEDs” on page 68).
2. Remove the software or device that you added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

CD or DVD drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The CD or DVD drive is not recognized.	1. Make sure that: • The IDE channel to which the CD or DVD drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. • All cables and jumpers are installed correctly. • The correct device driver is installed for the CD or DVD drive. 2. Run the CD or DVD drive diagnostic programs. 3. Reseat the CD or DVD drive cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. CD or DVD drive cable b. CD or DVD drive c. (Trained service technician only) System board
A CD or DVD is not working correctly.	1. Clean the CD or DVD. 2. Run the CD or DVD drive diagnostic programs. 3. Reseat the CD or DVD drive cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. CD or DVD drive cable b. CD or DVD drive
The CD or DVD drive tray is not working.	1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the CD or DVD drive cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. CD or DVD drive cable b. CD or DVD drive

Diskette drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	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: – 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 is inserted correctly in the drive. – The diskette contains the necessary files to start the server. – Your software program is working properly. • To prevent diskette drive read/write errors, make sure that the distance between monitors and diskette drives is at least 76 mm (3 in.). If the problem remains, replace the diskette drive (see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD).

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

Hard disk drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
Not all drives are recognized by the hard disk drive diagnostic test (the Fixed Disk Test or the SCSI Attached Disk test).	Remove the drive indicated on the diagnostic tests; then, run the hard disk drive diagnostic test again. If the remaining drives are recognized, replace the drive that you removed with a new one.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
The server stops responding during the hard disk drive diagnostic test.	Remove the hard disk drive that was being tested when the server stopped responding, and run the diagnostic test again. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.
A hard disk drive was not detected while the operating system was being started.	Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again.
A hard disk drive passes the diagnostic Fixed Disk Test but the problem remains.	Run the diagnostic SCSI Attached Disk test (see "Running the diagnostic programs" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). **Note:** Use the SCSI Attached Disk test for drives that are part of RAID arrays. Use the Fixed Disk test for SATA drives that are not part of RAID arrays

Intermittent problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
Symptom	**Action**
A problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • 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 fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. 2. Check the system/event error log (see "Error logs" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD).

Keyboard, mouse, or pointing-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
All or some keys on the keyboard do not work.	1. Make sure that: • The keyboard cable is securely connected. • For PS/2 keyboards, the keyboard and mouse cables are not reversed. • The server and the monitor are turned on. 2. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 3. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Keyboard b. (Trained service technician only) System board
The mouse or pointing device does not work.	1. Make sure that: • The mouse or pointing-device cable is securely connected to the server. • For PS/2 devices, the keyboard and mouse or pointing-device cables are not reversed. • The mouse or pointing-device drivers are installed correctly. • The server and the monitor are turned on. • The keyboardless operation and mouse optional devices are enabled in the Configuration/Setup Utility program. 2. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Mouse or pointing device b. (Trained service technician only) System board

Memory problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	1. Make sure that: • No error LEDs are lit on the front-panel assembly or on the system board. • The memory modules 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 DIMMs are enabled. The server might have automatically disabled a DIMM when it detected a problem. 2. Check the POST error log for error message 289: • If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. 3. Run memory diagnostics (see "Running the diagnostic programs" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). 4. Make sure that there is no memory mismatch when the server is over the minimum memory configuration (one 512 MB DIMM) and that you have installed the correct number of DIMMs (see the *User's Guide* on the IBM *System x Documentation* CD for information about installing optional memory modules). 5. Reseat the DIMMs. 6. Replace the following components one at a time, in the order shown, restarting the server each time: a. DIMMs b. (Trained service technician only) System board

Microprocessor problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	1. Make sure that the microprocessor is supported on this server. 2. (Trained service technician only) Reseat the microprocessor. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board

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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
Testing the monitor	1. Make sure that the monitor cables are firmly connected. 2. Try using a different monitor on the server, or try using the monitor that is being tested on a different server. 3. Run the diagnostic programs. If the monitor passes the diagnostic programs, the problem might be a video device driver. 4. (Trained service technician only) Replace the system board.
The screen is blank.	1. Make sure that: • The server is turned on. If there is no power to the server, see "Power problems" on page 65. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. • Other than a single beep, no beep codes sound when the server is turned on. 2. Make sure that the correct server is controlling the monitor, if applicable. 3. Make sure that damaged BIOS code is not affecting the video; see "Recovering from a BIOS update failure" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD. 4. See "Solving undetermined problems" in the *Problem Determination and Service Guide*.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	1. Make sure that: • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application. 2. Run video diagnostics (see "Running the diagnostic programs" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). • If the server passes the video diagnostics, the video is good; see "Solving undetermined problems" in the *Problem Determination and Service Guide*. • (Trained service technician only) If the server fails the video diagnostics, replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. 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. **Attention:** Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. **Notes:** a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) System board
Wrong characters appear on the screen.	1. Reseat the monitor cable. 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) System board

Optional-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
An IBM optional device that was just installed does not work.	1. Make sure that: • The device is designed for the server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/). • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or any other device is changed, you must update the configuration. 2. Reseat the device that you just installed. 3. Replace the device that you just installed.
An IBM optional device that used to work does not work now.	1. Make sure that all of the hardware and cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. Reseat the failing device. 4. Replace the failing device.

Power problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The power-control button does not work (the server does not start). **Note:** The power-control button will not function until 20 seconds after the server has been connected to ac power.	1. Make sure that the front-panel assembly power-control button is working correctly: a. Disconnect the server power cords. b. Reconnect the power cords. c. Press the power-control button. d. If the server does not start, bypass the front-panel assembly power-control button by using the force power-on jumper (see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD). If the server starts, reseat the front-panel assembly cable and repeat steps 1a through 1c. If the problem remains, replace the front-panel assembly. 2. Make sure that: • The power cords are correctly connected to the server and to a working electrical outlet. • The server contains the correct type of DIMMs. • The DIMMs are correctly seated. • The LEDs on the power supply do not indicate a problem. • The microprocessor is correctly installed. 3. Reseat the following components: a. DIMMs b. Power supply cables to all internal components c. Power supplies (hot-swap models) 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. DIMMs b. Power supplies (hot-swap models) c. (Trained service technician only) Power supply (non-hot swap models) 5. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports. 6. See "Solving undetermined problems" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.
The server does not turn off.	1. Determine whether you are using an Advanced Configuration and Power Management (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps: a. Press Ctrl+Alt+Delete. b. Turn off the server by holding the power-control button for 5 seconds. c. Restart the server. d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. 2. (Trained service technician only) If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The server unexpectedly shuts down, and the LEDs on the front-panel assembly are not lit.	See "Solving undetermined problems" in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

Serial port problems

For more information about the serial port, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	1. Make sure that: • Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports is disabled. • The serial-port (COM 2) cable connector is seated correctly. 2. Reseat the serial-port (COM 2) connector. 3. Replace the serial-port (COM 2). 4. (Trained service technician only) System board
A serial device does not work.	1. Make sure that: • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct connector. (For connector locations, see the *User's Guide* on the IBM *System x Documentation* CD.) 2. Reseat the following components: a. Failing serial device b. Serial cable c. Remote Supervisor Adapter II SlimLine (if one is present) 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing serial device b. Serial cable c. Remote Supervisor Adapter II SlimLine (if one is present) d. (Trained service technician only) System board

Software problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
You suspect a software problem.	1. To determine whether the problem is caused by the software, make sure that: • The server has the minimum memory that is 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 the server. • Other software works on the server. • The software works on another server. 2. 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. 3. Contact your place of purchase of the software.

Universal Serial Bus device problems

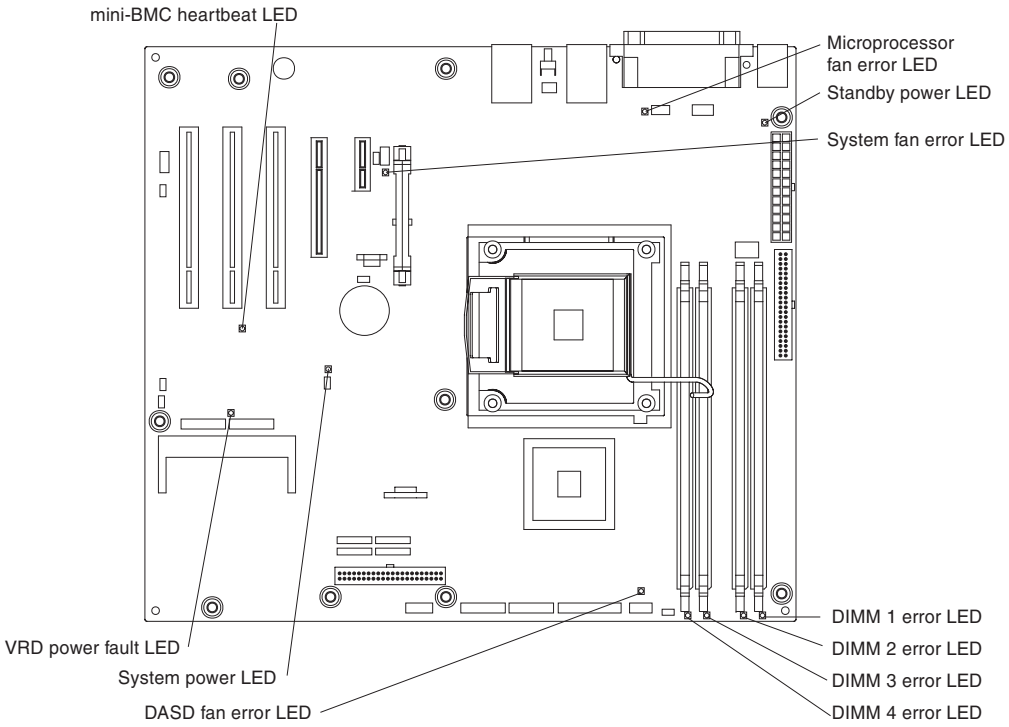
- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
A USB device does not work.	1. Make sure that: • The correct USB device driver is installed. • The operating system supports USB devices. • A standard PS/2 keyboard or mouse is not connected to the server. If it is, a USB keyboard or mouse will not work during POST. 2. Make sure that the USB configuration optional devices are set correctly in the Configuration/Setup Utility program menu. (For more information, see the *User's Guide* on the IBM *System x Documentation* CD.) 3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

System-board LEDs

The following illustration shows the LEDs on the system board. You might have to refer to this illustration when you are solving problems with the server.

Note: The server does not contain a light path diagnostics panel.



Use the system-board LEDs to diagnose system errors. An error LED is lit to indicate a problem with a specific component. After a problem is corrected, its LED will not be lit the next time that the server is restarted; if the problem remains, the LED will be lit again. For additional information, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system 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 x 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/servers/eserver/support/xseries/index.html 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 IBM systems also describes the diagnostic tests that you can perform. Most 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 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 x 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/servers/eserver/support/xseries/index.html 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 systems, optional devices, services, and support. The address for IBM System x and xSeries information is http://www.ibm.com/systems/x/. The address for IBM IntelliStation information is http://www.ibm.com/intellistation/.

You can find service information for IBM systems and optional devices at http://www.ibm.com/servers/eserver/support/xseries/index.html.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and 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 seehttp://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

Important: When you call for service, you will be asked to provide the four-digit machine type of your system, which is 4362 or 4363.

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.

IBM Taiwan product service

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

IBM Taiwan product service contact information:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd.
Taipei, Taiwan
Telephone: 0800-016-888

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 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.

Maximum memory may require replacement of the standard memory with an optional memory module.

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Some software may differ from its retail version (if available), and may not include user manuals or all program functionality.

Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at http://www.ibm.com/ibm/environment/products/prp.shtml.

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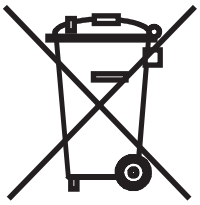

Notice: This mark applies only to countries within the European Union (EU) and Norway.

This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

Remarque : Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'etiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

Battery return program

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

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

For Taiwan: Please recycle batteries.

For the European Union:

For California: Perchlorate material – special handling may apply. See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/. The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

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

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

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

Taiwanese Class A warning statement

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

Chinese Class A warning statement

声　　明
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干扰采取切实可行的措施。

Japanese Voluntary Control Council for Interference (VCCI) statement

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