System x3100
Type 4348

Installation Guide

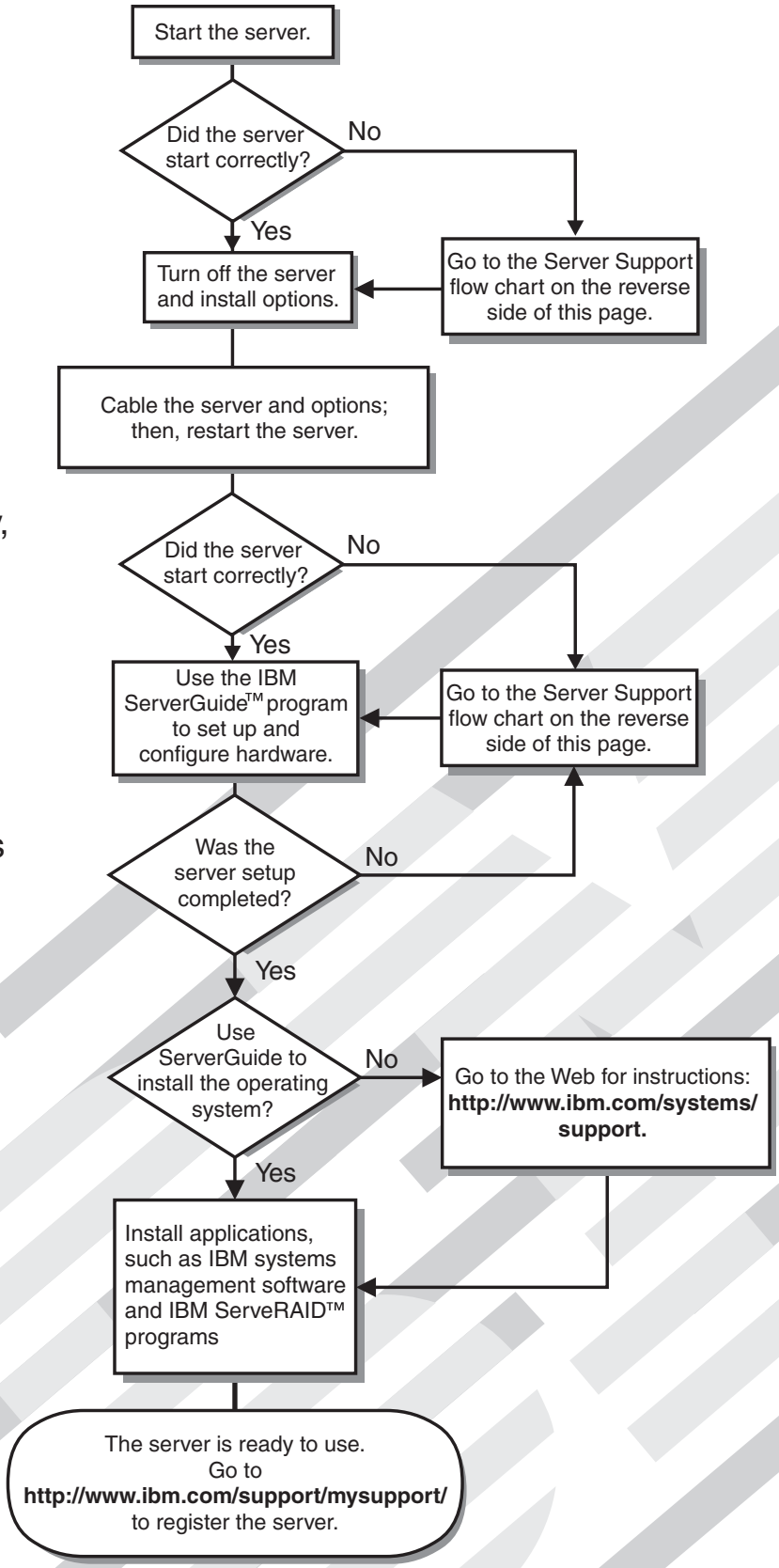
Welcome.

Thank you for buying an IBM server. Your server is based on the X-Architecture technology, and it features superior performance, availability, and affordability.

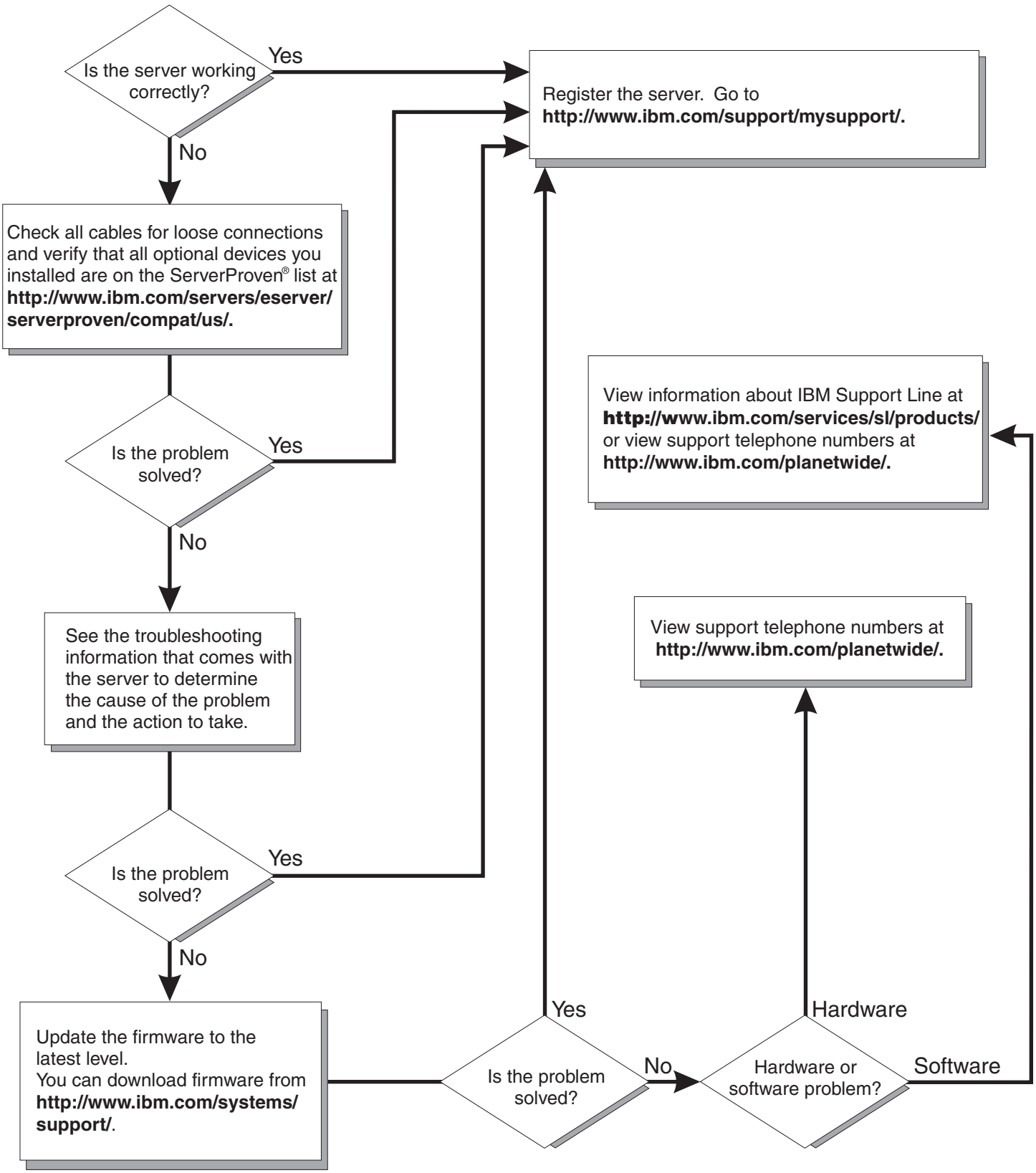
This server *Installation Guide* contains information for setting up and configuring your server.

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

You can also find the most current information about your server at http://www.ibm.com/systems/x/.



Server Support



System x3100 Type 4348

Installation Guide

Note:

Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 65 and the *Warranty and Support Information* document on the IBM *System x Documentation* CD.

First Edition (March 2008)

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.

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)

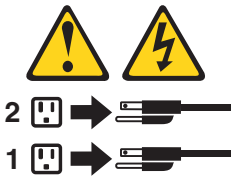
≥ 32 kg (70.5 lb)

≥ 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.

Important:

Each caution and danger statement in this document is labeled 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* document.

For example, if a caution statement is labeled ″Statement 1″, translations for that caution statement are in the *Safety Information* document under ″Statement 1″.

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

Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up your IBM® System x3100 Type 4348 server 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, complete the following steps.

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.

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers** for firmware updates, or click **Publications lookup** for documentation updates.

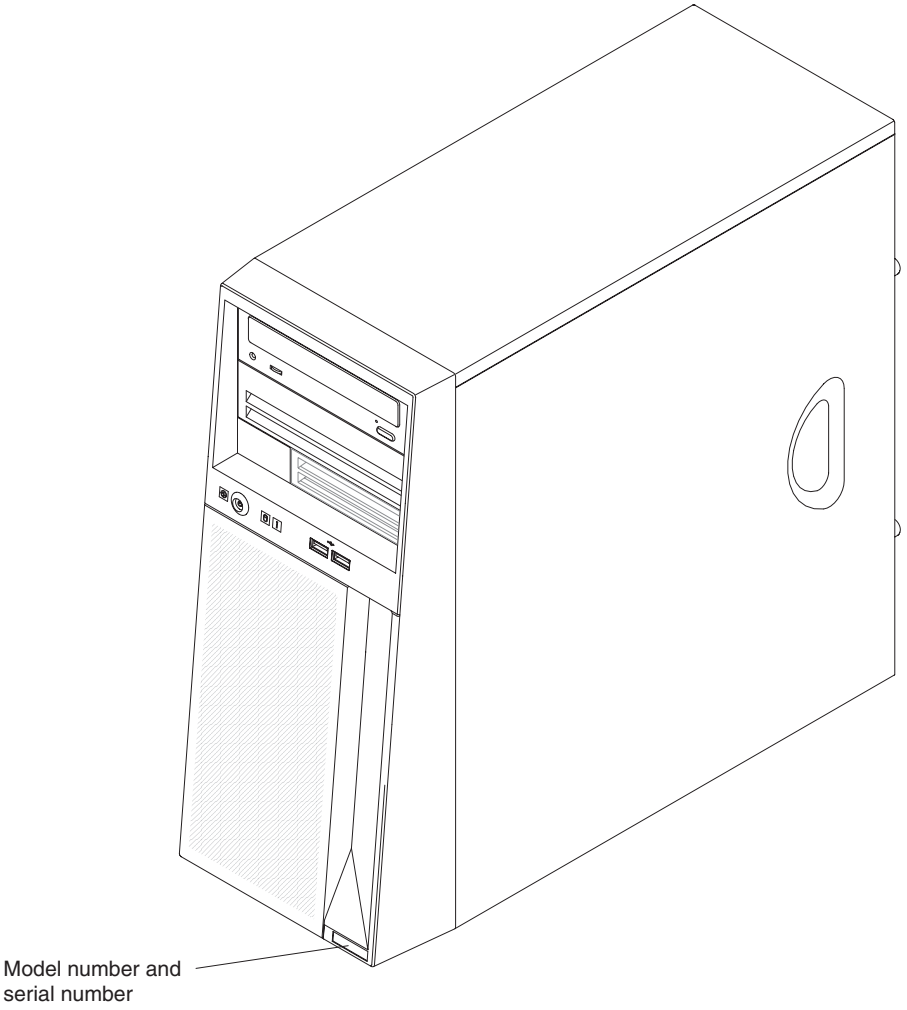
The server comes with an IBM *ServerGuide™ Setup and Installation* CD to help you configure the hardware, install device drivers, and install the operating system. If the *ServerGuide Setup and Installation* CD did not come with the server, to download the latest version, go to http://www.ibm.com/systems/management/serverguide/sub.html and click **IBM Service and Support Site**. To download the latest device drivers, go to http://www.ibm.com/systems/support/.

The server comes with a limited warranty. You can obtain up-to-date information about your 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 x3100 server
Machine type	4348
Model number	_____
Serial number	_____

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



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 XP, 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.

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 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 DVD 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 DVD 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 DVD drive; then, run the following command from the /mnt/cdrom directory:

    ```
    sh runlinux.sh
    ```

Select the server from the **Product** menu. The **Available Topics** list displays all the documents for the 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 press 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 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 might 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 LGA775 dual-core Xeon E2140 or 3065 series processor
- 2 MB, 3 MB, 4 MB, or 6 MB level-2 cache
- 1066 or 1333 MHz front side bus

Note: Use the Configuration/Setup Utility program to determine the type and speed of the microprocessor.

Memory:
- Minimum: 512 MB
- Maximum: 8 GB
- Types: Unbuffered PC2-5300 667 MHz or PC2-6400 800 MHz, double-data-rate 2 (DDR2) with ECC
- Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved

Drives: (depending on your model)
- Hard disk drive: SATA
- Optional tape drive: SATA
- One of the following SATA drives:
  - DVD-ROM
  - DVD-RW

Drive bays: (depending on your model)
- Two 5.25 in. bays (one DVD drive installed)
- One 3.5 in. removable-media drive bay; optional external tape drive
- Two 3.5 in. hard disk drive bays (one hard disk drive installed)

Expansion slots:
- Two PCI Express x8 slots
- Two PCI 33 MHz/32-bit slots

Video controller: ATI ES1000 video controller with 32 MB SDRAM video memory on the system board

Fans:
One speed-controlled fan

Power supply: One 310 watt (90 - 240 V ac)

Important: Make sure that the ac power-supply input voltage is set to the correct level (at 115 V ac or 230 V ac) for your geographic location before you turn on the server.

Size:
- Height: 420 mm (16.54 in.)
- Depth: 448 mm (17.64 in.)
- Width:175 mm (6.89 in.)
- Weight: 14 kg (30.86 lb) to 17 kg (37.48 lb) depending upon configuration

Integrated functions:
- Intel 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet port
- One serial port
- One parallel port
- Four-port Serial ATA II controller
- Six Universal Serial Bus (USB) v2.0 ports (two on front and four on rear)
- ATI ES1000 video
  - Compatible with SVGA and VGA
  - 32 MB DDR2 video memory

Diagnostic LEDs:
- Fans
- Memory

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

Environment:
- Air temperature:
  - Server on: 10° to 35°C (50.0° to 95.0°F) Altitude: 0 to 914.4 m (3000 ft)
  - Server on: 10° to 32°C (50.0° to 89.6°F) Altitude: 914.4 m (3000 ft) to 2133.6 m (7000 ft)
  - Server off: 10° to 43°C (50° to 109°F) Maximum altitude: 2133.6 m (7000 ft)
  - Shipping: -40° to 60°C (-40° to 140°F)
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%

Heat output:
Approximate heat output in British thermal units (Btu) per hour
- Minimum configuration: 185 Btu per hour (54 watts)
- Maximum configuration: 853 Btu per hour (250 watts)

Electrical input:
- Sine-wave input (50 or 60 Hz) required
- Input voltage and frequency ranges manually 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: 0.10 kVA (all models)
  - Maximum: 0.50 kVA

Notes:

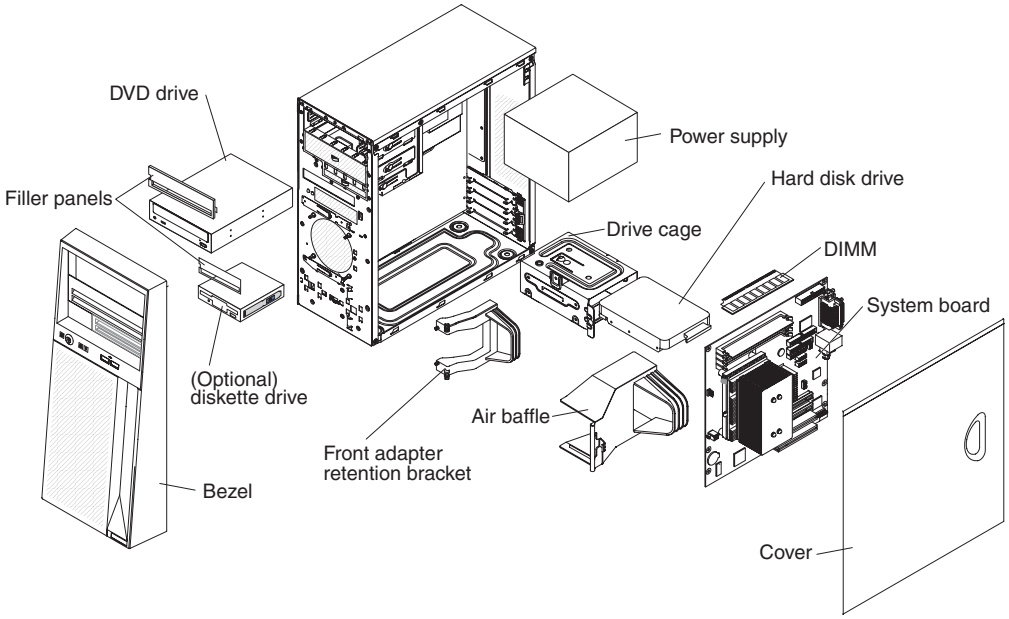
1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use.
2. These levels were measured in controlled acoustical environments according to the procedures that are specified by the American 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.

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 and the guidelines in "Handling static-sensitive devices" on page 9. This information will help you work safely.
- 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, complete the following steps.

  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.

  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers** for firmware updates.
  4. Click **IBM System x3100** to display the matrix of downloadable files for the server.

  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 Chapter 5, "Solving problems," on page 39 for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you 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.
- 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.
- When you have to access the inside of the server, you might find it easier to lay the server on its side.
- 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 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 (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You do not operate the server with a failed fan.
- You do not operate the server without the air baffle installed. Operating the server without the air baffle might cause the microprocessor to overheat.

Handling static-sensitive devices

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

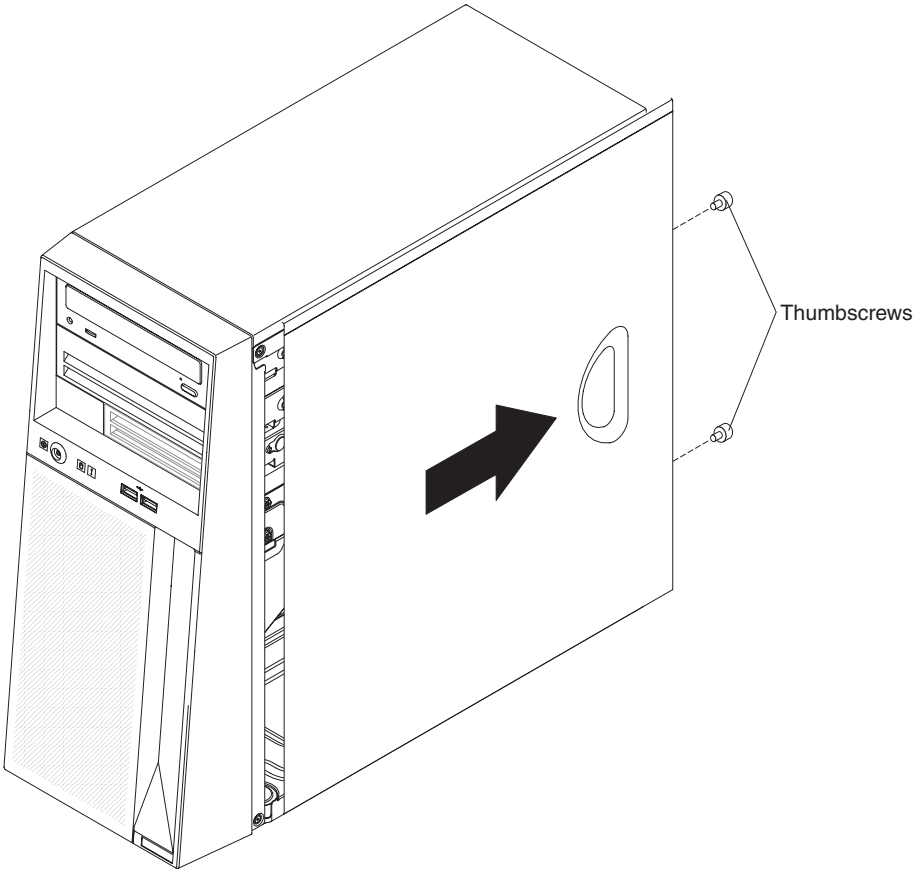
To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

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

Removing the side cover

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

1. Read 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 33); then, disconnect all power cords and external cables.
3. Lay the server on its side.
4. Remove the two thumbscrews from the rear of the server that secure the cover to the chassis. Slide the cover slightly toward the rear of the chassis, lift it off the server, and set it aside.



To replace the side cover, see “Installing the side cover” on page 26.

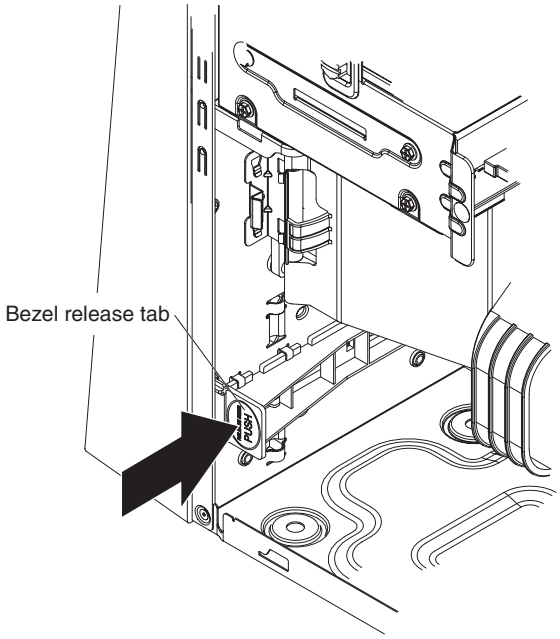
Attention: For proper cooling and airflow, replace the cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the cover removed might damage serve components.

Removing the bezel

When you work with some devices, such as additional optical drives, you must first remove the bezel to access the device.

To remove the bezel, complete the following steps:

1. Read 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 33); then, disconnect all power cords and external cables.
3. Remove the side cover (see “Removing the side cover” on page 10).
4. From inside the server, locate the bezel release tab at the bottom of the bezel.



5. Press down slightly on the bezel release tab and pull the bottom of the bezel away from the chassis; then, lift the bezel to disengage the top tabs.
6. Remove the bezel from the server; then set the bezel aside.

For instructions for replacing the bezel, see “Installing the bezel” on page 25.

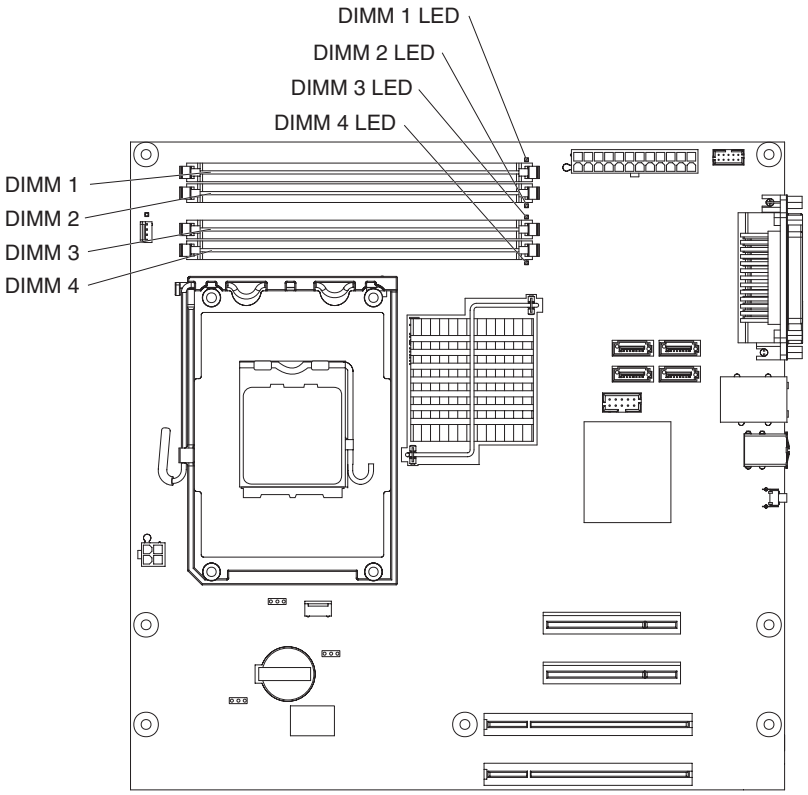
Installing a memory module

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

- Install only 1.8 V, 240-pin, double-data-rate 2 (DDR2), 667 or 800 MHz, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC2-5300 667 MHz or PC2-6400 800 MHz ,SDRAM unbuffered DIMM specification. For a list of supported DIMMs for your server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- 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 amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The system summary displays the total amount of installed memory and the amount of configured memory.
- When you restart the server after you add or remove a DIMM, the server displays a message that the memory configuration has changed.

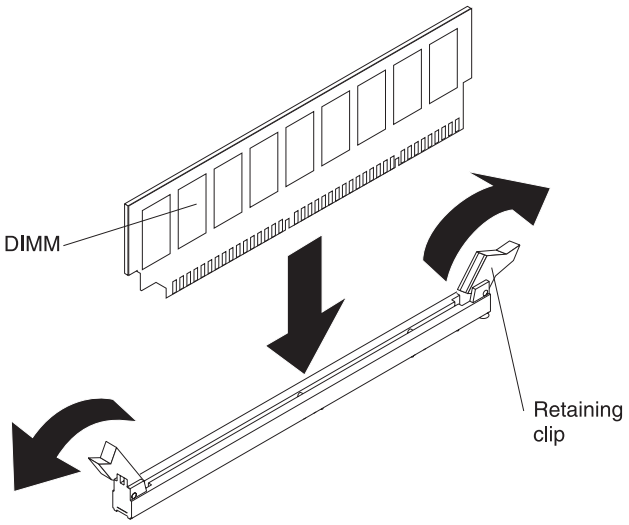
To install a DIMM, complete the following steps:

1. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs.



Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.

2. Open the retaining clips and, if necessary, remove any existing DIMM.
3. 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.
4. Turn the DIMM so that the DIMM keys align correctly with the slot.



5. 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.

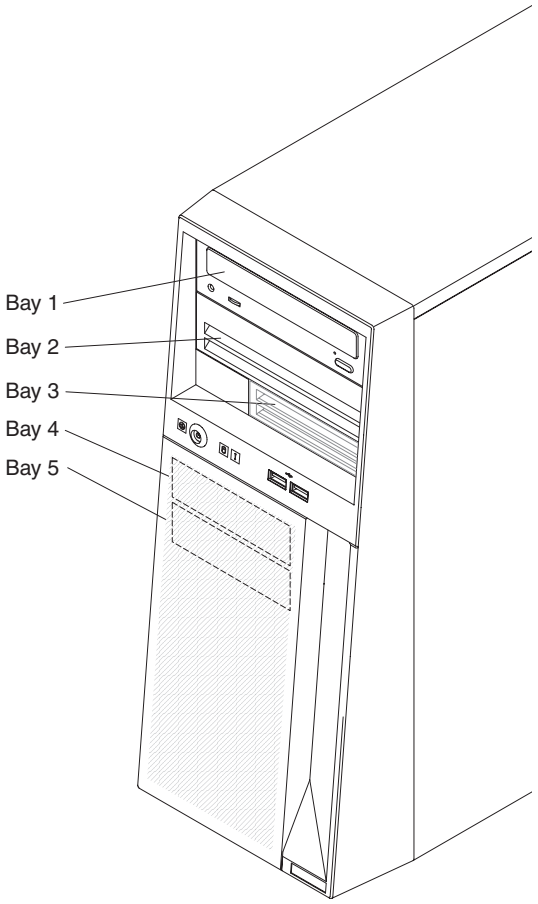
If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 25.

Installing a drive

Depending on the server model, one or more of the following drives might be installed in the server:

- Hard disk drive
- DVD-ROM or DVD/RW

The server might come with an SATA attached DVD drive in bay 1 and a 3.5-inch serial ATA (SATA) hard disk drive in bay 4.



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

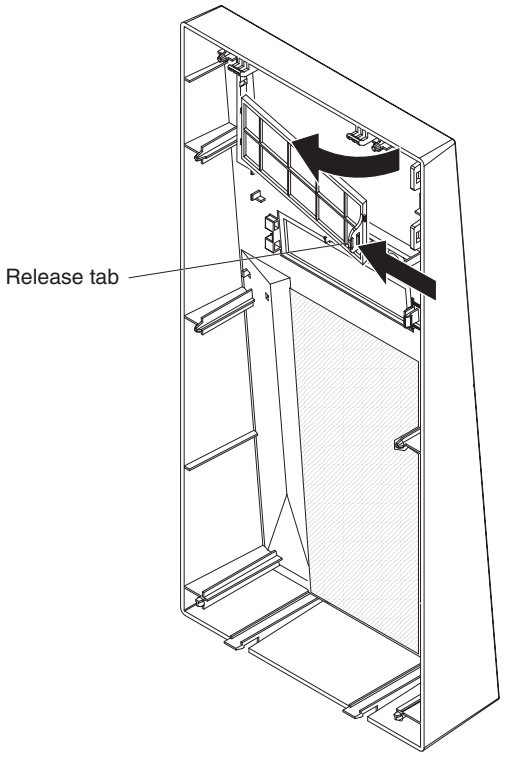
- Read the documentation that comes with the drive and make sure that you have all the cables and other equipment specified in the documentation that comes with the drive.
- The server supports a maximum configuration of two hard disk drives, four DIMMs, and one 5.25-inch device; or one hard disk drive, four DIMMs, and two 5.25-inch devices; or two hard disk drives, two DIMMS, and two 5.25-inch devices.
- External tape drives, DVD-ROM, and DVD/RW drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, and 3 only.
- You can install only an optional external USB diskette drive in bay 3. Other drives are not supported in bay 3.
- You can install SATA hard disk drives in bays 4 and 5 only.

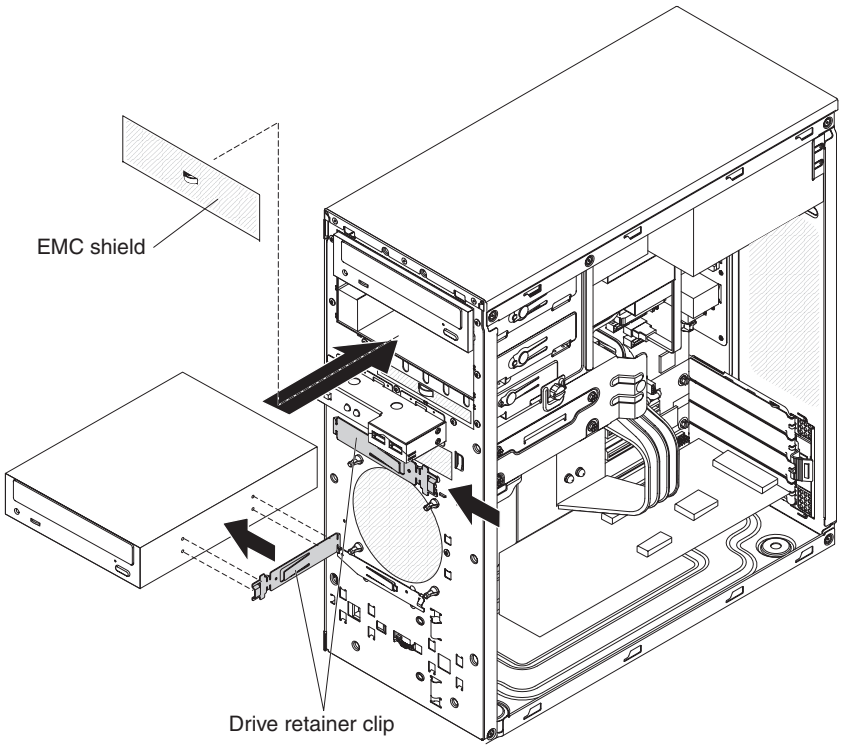
- SATA 0 and SATA 1 connectors are hard disk drives connectors and SATA 2 and SATA 3 connectors are optical drive connectors.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI or PCI Express slots covered or occupied. When you install a drive or 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 you later remove the drive or adapter.
- For a complete list of supported optional devices for the server, see http://www.ibm/com/servers/eserver/serverproven/compat/us/.

Installing a DVD drive

To install a DVD drive in bay 1 or 2, 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 bezel (see “Removing the bezel” on page 11).
5. Use your fingers to press in on the drive-bay filler panel release tab on the inside of the bezel and remove it from the bezel; then, pry the EMC shield away from the server. Store the filler panel and EMC shield in a safe place.





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

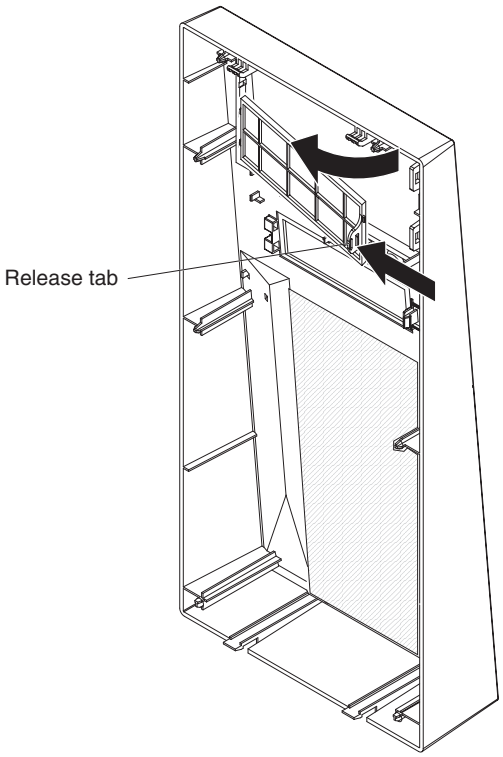
6. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
7. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
8. Remove the drive retainer clip (on the front of the chassis). Slide the clip to the right to remove it from the chassis; then, snap the clip into the screw holes on the side of the drive (the blue side of the drive clip should be facing outward).
9. Align the drive assembly with the guide rails in the bay. Push the drive into the bay.
10. Connect one end of the signal cable into the back of the drive and make sure that the other end of this cable is connected into the SATA connector on the system board. See ″System-board internal connectors″ in the *User's Guide* for the connector locations 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 DIMMs.
12. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.

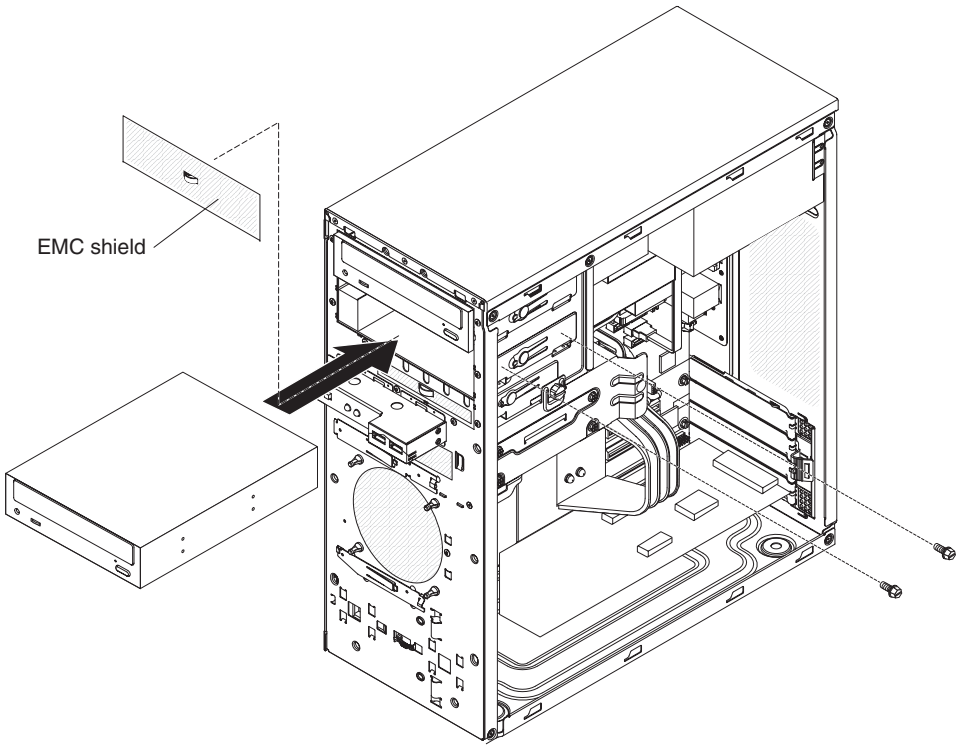
If you have other devices to install or remove, do so now; otherwise, go to "Completing the installation" on page 25.

Installing an optional tape drive

To install an optional 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 bezel (see “Removing the bezel” on page 11).
5. Use your fingers to press in on the drive-bay filler panel release tab on the inside of the bezel and remove it from the bezel; then, pry the EMC shield away from the server. Store the filler panel and EMC shield in a safe place.





6. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the tape drive from the package and place it on a static-protective surface.
7. Slide the tape drive into the drive cage from the front of the server; then, connect the SATA cable to the tape drive.
8. Secure the tape drive to the chassis with the supplied screws.
9. Connect the tape drive cable to the tape drive connector on the system board.

If you have other devices to install or remove, do so now; otherwise, go to "Completing the installation" on page 25.

Installing a SATA hard disk drive

The server comes with one Serial ATA (SATA) hard disk drive installed. Before you install a SATA hard disk drive, read the following information:

- Read the documentation that comes with the drive for cabling instructions.
- Route the cable before you install the drive. Do not block the airflow from the fan.
- The server supports two SATA hard disk drives.

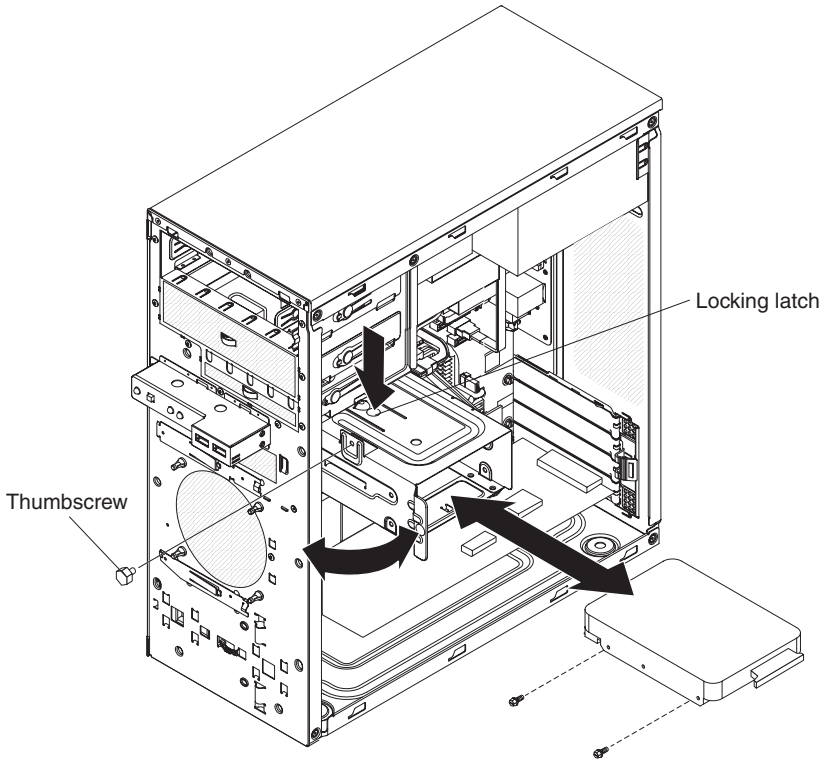
Note: Each SATA drive comes with a cable. If you install an additional SATA drive, you will need an additional cable.

To install a SATA hard disk drive in bay 4 or 5, complete the following steps:

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

4. Grasp the hard disk drive cage and rotate it up until it locks into place on the chassis.
5. Rotate the drive cage upward and out of the server until it snaps into the open position.

   Note: You can remove the drive cage from the server by lifting up and gently pulling it out of the server. It is not necessary to remove the drive cage to install the drive.



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.

   Note: If the hard disk drive comes attached to a drive tray, remove the drive from the drive tray before you install the drive in the drive bay.
7. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
8. Align the drive assembly with the guide rails in the bay (with the connector end of the drive facing you).
9. Gently slide the drive assembly into the drive bay as far as it will go.
10. Attach the hard disk drive to the drive cage with the four screws.
11. Press in on the locking latch and rotate the drive cage back into the server,
12. Secure the drive cage to the chassis with the blue thumbscrew that you removed earlier.
13. Connect one end of the signal cable into the back of the drive and make sure that the other end of the cable is connected into the connector on the system board. See “Power and signal cables for internal drives” on page 22 for additional information about cabling drives and “System-board internal connectors” in the *User’s Guide* for the location of the SATA connectors on the

system board. If there are open connectors on the cables that connect existing SATA drives, you can use these cables to connect the new drive.

14. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and DIMMs.
15. Connect the power cable to the back 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 25.

Power and signal cables for internal drives

The server uses cables to connect SATA attached, Serial ATA, and SCSI devices (such as tape drives) to the power supply and to the system board. (See the *User's Guide* for the location of system-board internal connectors.) 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.

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 Serial ATA power cable with Serial ATA 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 SATA attached, Serial ATA, and diskette drives to the system board. Two or three types of signal cables come with the server:
  - **Serial ATA (SATA):** The narrower, black signal cable has two connectors. One is connected to the Serial ATA drive, and the other is attached to the connector on the system board. Each Serial ATA drive comes with a cable. If you install an additional Serial ATA drive, you will need an additional cable.
  - **SCSI:** A SCSI cable connects external SCSI devices to an optional SCSI controller. For more information about connecting SCSI devices, see the SCSI documentation.

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 must change the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.
- Read the documentation that comes with the operating system.
- The server has two PCI Express slots and two PCI slots.
- You can install full-length adapters in PCI Express slots 1 and 2.
- You can install only 32-bit/33 MHz adapters in PCI slots 3 and 4.

- The 32-bit PCI slots 3 and 4 support 5.0 V signaling PCI adapters; they do not support 3.3 V keyed adapters. However, 64-bit adapters are supported if they are universal adapters.
- PCI Express x8 slots 1 and 2 support any PCI Express adapter that is on the ServerProven list.
- The server scans the PCI Express slots (slots 1 and 2), and PCI slots (slots 3 and 4) to assign system resources. Then, the server starts the PCI and PCI Express devices in the following order, if you have not changed the default startup : PCI Express slot 1, PCI Express slot 2, SATA or SCSI devices, and then PCI slots 3 and 4.
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

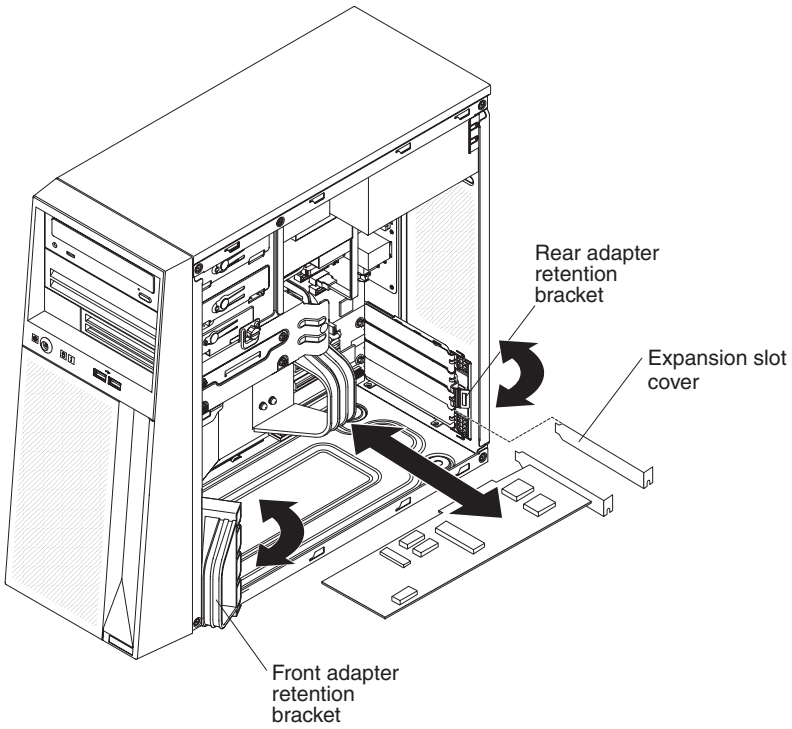
To install an adapter, complete the following steps:

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 instructions that come with the adapter for requirements, restrictions, or cabling instructions. It might be easier to route any cables before you install the adapter.
4. Lift up the front adapter retention bracket.
5. From inside the server, press down on the rear adapter retention bracket. The retention bracket springs open. Reach inside the server and remove the expansion-slot cover from the expansion slot. Store it 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.
6. 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.

   Attention: Avoid touching the components and gold-edge connectors on the adapter.
7. Follow the instructions that come with the adapter to set jumpers or switches, if any.
8. 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.



9. Close the adapter retainer bracket.
10. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fan. If you are installing an optional SCSI adapter, see “Cabling an optional SCSI adapter” on page 25 for additional information.

If you have other devices to install, do so now. Otherwise go to “Completing the installation” on page 25.

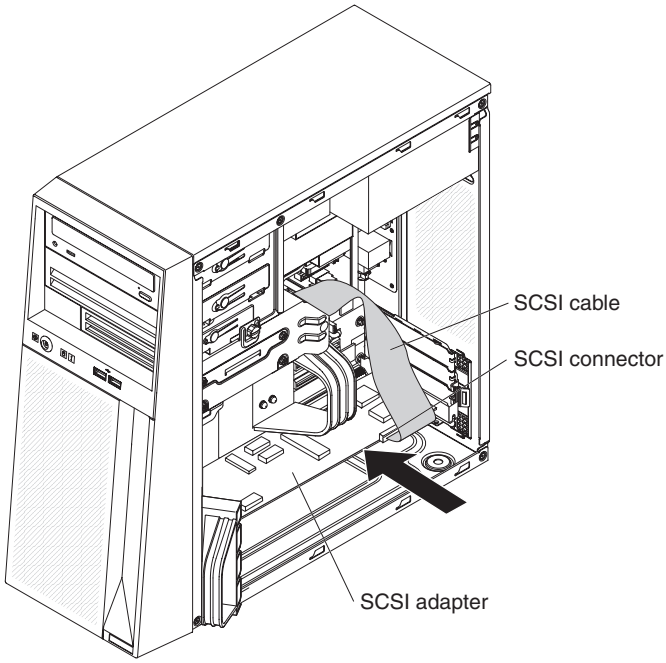
Cabling an optional SCSI adapter

You can install an optional SCSI adapter in the server to control an internal tape drive. You can also cable a SCSI adapter to external hard disk drives. See the SCSI adapter documentation for complete instructions for installing a SCSI adapter in the server and for additional information about SCSI adapters.

Note: A SCSI adapter and cable are required to connect external SCSI devices.

To cable an optional SCSI adapter, complete the following steps:

1. Install the SCSI adapter (see “Installing an adapter” on page 22).
2. Connect the SCSI signal cable to the adapter and to one or more of the connectors on the rear of the SCSI devices.



3. Complete the installation of the optional SCSI adapter (see “Installing an adapter” on page 22).

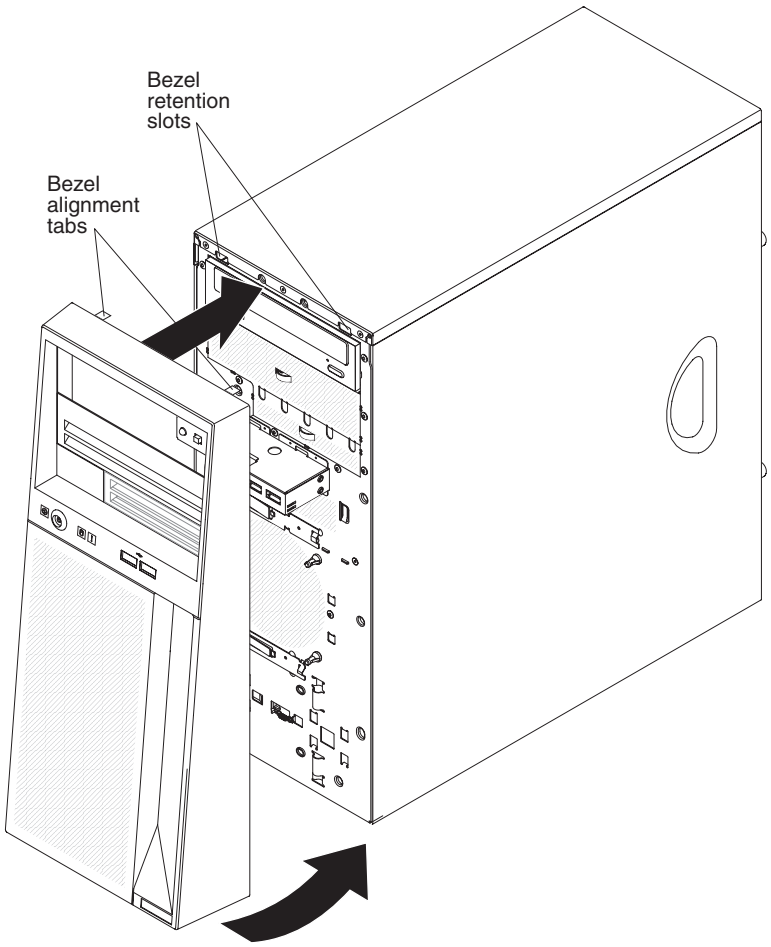
Completing the installation

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

Installing the bezel

To replace the bezel, complete the following steps:

1. Insert the two alignment tabs at the top of the bezel into the bezel retention slots at the top of the chassis.



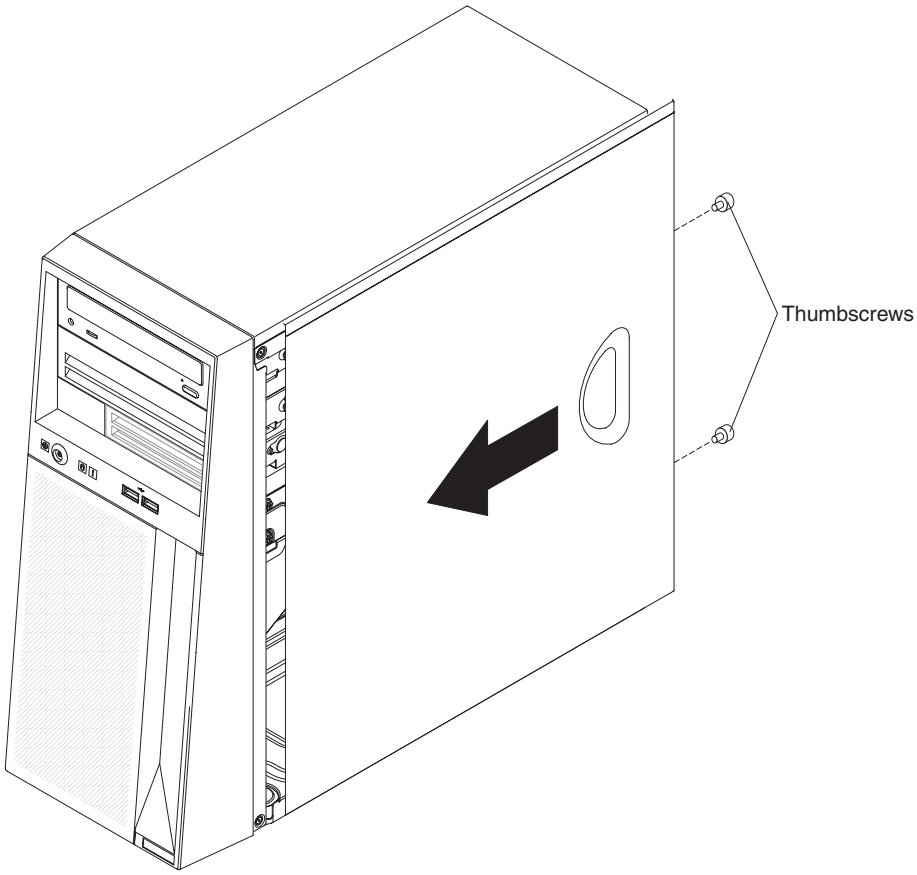
2. Push the bottom of the bezel toward the server until the bezel snaps into place.

Installing the side cover

Note: You might find it easier to lay the server on its side to replace the side cover.

To replace the side cover, complete the following steps:

1. 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.
2. Align the cover over the server (with the rear of the cover slightly hanging off the rear of the server) and slide the cover toward the front of the server until it is completely closed.



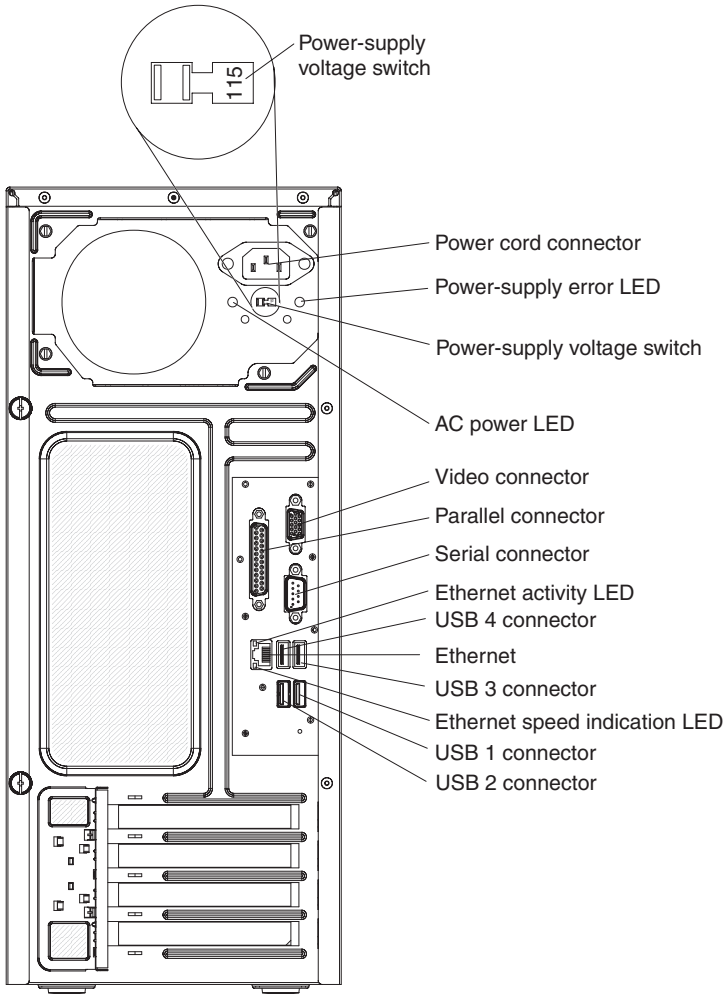
3. Use the two thumbscrews that you removed earlier to secure the cover to the server chassis.

Connecting the cables

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 with a blue connector on the connector panel, a red cable end with a red connector, and so on.

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

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 external SCSI device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. See Chapter 4, “Configuring the server,” on page 35 for additional information.

Some devices have device drivers that you must install. See the documentation that comes with each device for information about installing device drivers.

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

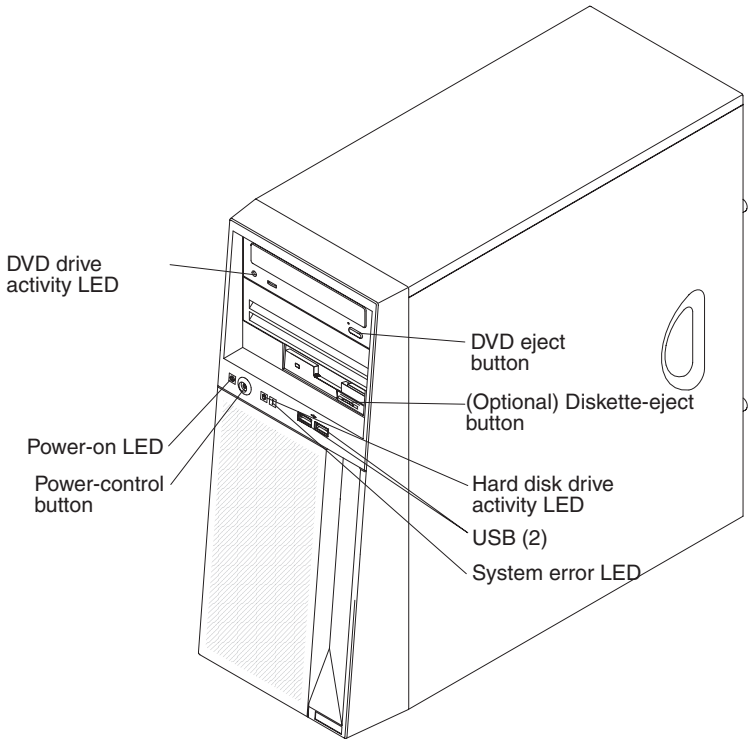
For information about configuring the integrated Gigabit Ethernet controller, see the *User’s Guide*.

Chapter 3. Server controls, LEDs, and power

This chapter 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.



DVD eject button

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

Hard disk drive activity LED

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

USB connectors

Connect a USB device to these connectors.

System-error LED

When this 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 39 for additional information. Detailed troubleshooting information is in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

Power-control button

Press this button to turn the server on and off manually. A power-control-button shield comes with 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. When this LED is blinking, it indicates that the system is in the ACPI s5 system status.

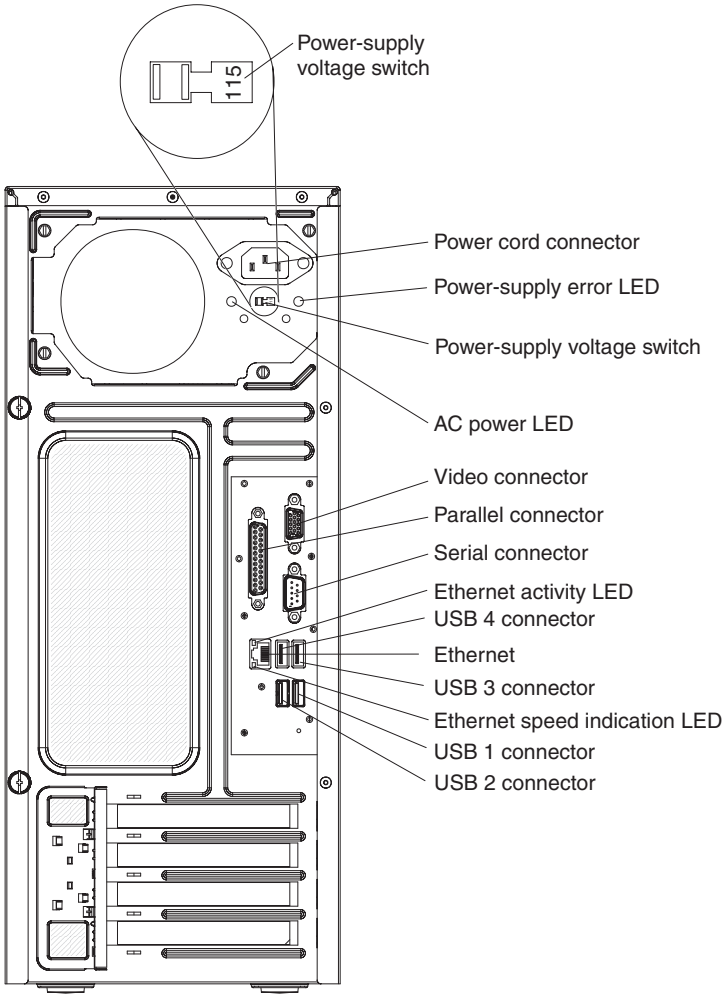
Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.

DVD drive activity LED

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

Rear view

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



Power-cord connector

Connect the power cord to this connector.

Power-supply error LED

When this amber LED is lit, it indicates that a power-supply error has occurred.

Power supply voltage switch

Use this switch to change the system ac power-supply input voltage for your geographic location. Set the input voltage to the correct level (115 volts ac or 230 volts ac) based on your power requirements before you turn on the server.

AC power LED

When this green LED is lit, it indicates that the server is connected to an ac power source.

Video connector

Connect a monitor to this connector.

Parallel connector

Connect a parallel device to this connector.

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

Ethernet activity LED
This LED is on the Ethernet connector on the rear of the server. When this LED is not lit, it indicates that there is no LAN connection established. When this LED is lit, it indicates that a LAN connection is established. When this LED is blinking, it indicates that a LAN connection is in process.

USB connectors
Connect USB devices to these connectors.

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

Ethernet speed indication LED
This LED is on the Ethernet connector on the rear of the server. When this LED is not lit, the data rate is set at 10 Mbps (mega bit per second). When this LED is lit and green, the data rate is set at 100 Mbps. When this LED is lit and yellow, the data rate is set at 1000 Mbps.

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 requests, such as a remote request to turn on the server. When the power LED is flashing it indicates that the server is connected to an ac power source but is not turned on.

Setting the power supply voltage

Before you turn on the server, make sure that you do the following:

1. Remove the label or tape (if present) from the ac power supply voltage switch on the rear of the server.
2. Set the power-supply voltage to the level required for your geography (115 volts ac or 230 volts ac).

Turning on the server

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

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

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 or PCI Express options.

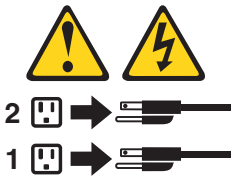
Turning off the server

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

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

Statement 5:

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



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

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If 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.
- You can turn off the server through a request from the service processor.

Chapter 4. Configuring the server

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are specifically designed for your IBM server. Use this CD during the initial installation of the server to configure basic hardware features and to simplify your operating system installation.

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

- Configuration/Setup Utility program
- Boot Menu program
- Intel Gigabit Ethernet Boot Agent
- Ethernet controller configuration

For more information about these programs, see "Configuring the server" in the *User's Guide* on the IBM *System x Documentation* CD.

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides programs to detect the server model and installed optional hardware devices, configure the server hardware, provide device drivers, and help you install the operating system. For information about the supported operating-system versions, see the label on the CD. If the *ServerGuide Setup and Installation* CD did not come with the server, to download the latest version, go to http://www.ibm.com/systems/management/serverguide/sub.html and click **IBM Service and Support Site**. To download the latest device drivers, go to http://www.ibm.com/systems/support/.

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.

To start the *ServerGuide Setup and Installation* CD, complete the following steps:

1. Insert the CD, and restart the server. If the CD does not start, see "ServerGuide problems" on page 58
2. Follow the instructions that appear on the screen to:
   a. Select your language.
   b. Select your keyboard layout and country.
   c. View the overview to learn about ServerGuide features.
   d. View the readme file to review installation tips about your operating system and adapter.
   e. Start the setup and hardware configuration programs.
   f. Start the operating system installation. You will need your operating-system CD.

Using the Configuration/Setup Utility program

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

- Change interrupt request (IRQ) settings
- Change the startup drive sequence

- Configure serial-port assignments
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set passwords and security settings

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

1. Turn on the server.
2. When the message `Press F1 for Configuration/Setup` is displayed, press F1. If an administrator password has been set, you must type the administrator password to access the full Configuration/Setup Utility menu.
3. Follow the instructions on the screen.

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

Using the Boot Menu program

The Boot Menu program is a built-in, menu-driven configuration 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. Turn off the server.
2. Restart the server.
3. Press F12.
4. 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 Intel Gigabit Ethernet Boot Agent program

The Intel Gigabit Ethernet Boot Agent program 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 option occurs in the startup sequence. Enable and disable the Intel Gigabit Ethernet Boot Agent from the Configuration/Setup Utility program.

To enable the Intel Gigabit Ethernet Boot Agent program, complete the following steps:

1. Turn on the server.
2. When the prompt `Press F1 for Configuration/Setup` is displayed during startup, press F1.
3. From the Configuration/Setup Utility main menu, select **Start Options** and press Enter.
4. Select **Planar Ethernet PXE/DHCP** and press the Right Arrow (→) key to set it to **Enabled**.
5. Select **Save Settings** and press Enter.

Configuring the Intel 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 controllers. However, you must install a device driver to enable the operating system to address the controllers. For device drivers and information about configuring the Ethernet controllers, see the *Intel Network Connection Software CD* that comes with the server. To find updated information about configuring the controllers, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers** for firmware updates.
4. Click **IBM System x3100** to display the matrix of downloadable files for the server.

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 diagnose and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 63, 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 (POST) codes indicate the detection of a problem.

  – One beep indicates successful completion of POST, with no errors.

  – More than one beep indicates that POST detected a problem. Error messages also appear during startup if POST detects a hardware-configuration problem.

  See “POST beep codes” in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for more information.

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 50 for more information.

- **Diagnostic programs and error messages**

  The system diagnostic programs are provided on the *System Diagnostics* CD. These programs test the major components of the server. See “POST beep codes” on page 40 and the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for more information.

- **System-board error LEDs**

  When the system-error LED on the front of the server is lit, an LED on the system board might also be lit to help isolate an erro. See “System-board error LEDs” on page 60 for more information.

POST beep codes

POST emits one beep to signal successful completion. If POST detects a problem during startup, other beep codes might occur. Use the following beep code descriptions to help 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. For additional information, see beep code 3-3-3 in the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

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, complete the following steps.

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.

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers** for firmware updates, or click **Publications lookup** for documentation updates.
4. From the **Product family** menu, select **System x3100** and click **Continue**.

- **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	The server failed to start on three consecutive boots using the default configuration.	1. Update the system firmware to the latest level. 2. (Trained service technician only) Replace the system board.
101, 102	A tick timer internal interrupt, internal timer channel 2 error occurred.	(Trained service technician only) 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.**

Error code	Description	Action
106	A diskette controller failure occurred.	1. Make sure that the Configuration/Setup Utility program correctly reflects the type of diskette drive. 2. Reseat the following components: a. Diskette drive cable b. Diskette drive 3. Replace the following components one at a time in the order shown, restarting the server each time: a. Diskette drive cable b. Diskette drive c. (Trained service technician only) System board
151	A real-time clock error occurred.	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	A real-time clock battery error occurred.	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
162	Device configuration error occurred.	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 replaced 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

- **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
163	A real-time clock error occurred.	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
164	Memory configuration changed.	1. Run the configuration/Setup Utility program, select **Load Default Settings**, and save the settings. 2. Reseat the DIMMs. 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
184	The power-on password is 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 is not set.	1. Run the Configuration/Setup Utility program, set the serial number, and save the configuration. 2. (Trained service technician only) Replace the system board.
189	An attempt was 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 user or by the system.	1. If the DIMM was disabled by the user, run the Configuration/Setup Utility program and enable the DIMM (see "Using the Configuration/Setup Utility program" on page 35). 2. Make sure that the DIMM is installed correctly. 3. Reseat the DIMM. 4. Replace the DIMM.

- **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	A keyboard or keyboard controller error occurred.	1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent this error message 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	A keyboard controller error occurred.	1. Reseat the keyboard cable. 2. 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
602	An invalid diskette boot record error occurred	1. Reseat the diskette drive cable. 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. Diskette drive cable b. Diskette drive c. (Trained service technician only) System board
604	An error occurred during a diskette drive test.	1. Make sure that the Configuration/Setup Utility program correctly reflects the type of diskette drive that is installed. 2. Reseat the diskette drive cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Diskette drive cable b. Diskette drive c. (Trained service technician only) 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.**

Error code	Description	Action
662	A diskette drive configuration error occurred.	1. Make sure that the Configuration/Setup Utility program correctly reflects the type of diskette drive. 2. Reseat the following components: a. Diskette drive cable b. Diskette drive 3. Replace the following components one at a time in the order shown, restarting the server each time: a. Diskette drive cable b. Diskette drive c. (Trained service technician only) System board
962	A parallel port configuration error occurred	1. If you changed an optional hardware device, make sure that the parallel port setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it and save the settings. 2. (Trained service technician only) Replace the system board.
1162	The serial port configuration conflicts with another device in the system.	1. Make sure that the interrupt request (IRQ) and I/O port assignments that are needed by the serial port are available. 2. If all interrupts are being used by adapters, remove an adapter to make an interrupt available to the serial port, or force other adapters to share an interrupt. 3. Make sure that the serial port setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it and save the settings. 4. (Trained service technician only) Replace the system board.
1762	A fixed disk configuration error occurred.	1. Run the Configuration/Setup Utility program and load the defaults. 2. Reseat the following components: a. Hard disk drive cables b. Hard disk drive c. (Trained service technician only) System board 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.

- **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
178x	A fixed disk error occurred.	1. Reseat the hard disk drive cable. 2. Replace the hard disk drive cable. 3. Run the hard disk drive diagnostic tests (see the *Problem Determination and Service Guide* for information about running the diagnostic tests). 4. Replace the following components one at a time, in the order shown, restarting the server each time. a. Hard disk drive b. (Trained service technician only) System board
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 or 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 might correct the error. See the documentation that comes with the adapter.
1802	No more I/O space is available for a PCI or PCI Express adapter.	1. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. 2. If the error code indicates a particular PCI or PCI Express slot or device, remove that device. 3. Reseat each adapter. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Adapter b. (Trained service technician only) 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.**

Error code	Description	Action
1803	No more memory (above 1 MB for a PCI or PCI Express adapter).	1. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. 2. If the error code indicates a particular PCI or PCI Express slot or device, remove that device. 3. Reseat each adapter. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Adapter b. (Trained service technician only) System board
1804	No more memory (below 1 MB for a PCI or PCI Express adapter).	1. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. 2. If the error code indicates a particular PCI or PCI Express slot or device, remove that device. 3. Reseat each adapter. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Adapter b. (Trained service technician only) System board
1805	PCI option ROM checksum error occurred.	1. Remove the failing adapter. 2. Reseat each adapter. 3. Replace the following components one at a time, in the order shown, restarting the sever each time: a. Adapter b. (Trained service technician only) System board
1806	PCI built-in self-test failure occurred.	1. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. 2. If the error code indicates a particular PCI or PCI Express slot or device, remove that device. 3. Reseat each adapter. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Adapter b. (Trained service technician only) 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.**

Error code	Description	Action
1807, 1808	General PCI error occurred.	1. Make sure that no devices have been disabled in the Configuration/Setup Utility program. 2. Reseat the failing adapter. **Note:** If an error LED is lit on an adapter, reseat that adapter first; if no LEDs are lit, reseat each adapter one at a time, restarting the server each time to isolate the failing adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Adapter b. (Trained service technician only) System board
1962	A hard disk 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 the *Problem Determination and Service Guide* for information about running the diagnostic tests). 3. Reseat the hard disk drive cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hard disk drive cable b. Hard disk drive c. (Trained service technician only) System board
5962	DVD drive configuration error occurred.	1. Run the Configuration/Setup Utility program and load the default settings. 2. Reseat the DVD drive cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time. a. DVD drive cable b. DVD drive c. (Trained service technician only) System board
8603	A pointing-device error occurred.	1. Reseat the pointing device cable. 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

- **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
00012000	A processor machine check error occurred.	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
00019701	Processor failed 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
01298101	A bad update data for processor error occurred.	1. Update the BIOS code (see ″Updating the firmware″ in the *Problem Determination and Service Guide*). 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.
I9990301	A hard disk drive boot sector error occurred.	1. Reseat the hard disk drive cable. 2. Reseat the hard disk drive. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hard disk drive cable b. Hard disk drive c. (Trained service technician only) 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.**

Error code	Description	Action
I9990305	An operating system was not found.	1. Make sure that a bootable operating system is installed. 2. Run the hard disk drive diagnostic tests (see the *Problem Determination and Service Guide* for information about running the diagnostic tests). 3. Reseat the following components: a. Hard disk drive cable b. DVD drive and cables drive. c. (Trained service technician only) System board 4. Replace the components listed in step 3 one at a time in the order shown, restarting the server each time.
19990650	The ac power has been restored.	1. Reseat the power cord. 2. Check for the interruption of external power source. 3. Replace the power cord.

Troubleshooting tables

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

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
DVD drive is not recognized.	1. Make sure that: • The SATA channel to which the 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 DVD drive. 2. Run the DVD drive diagnostic programs. 3. Reseat the following components: a. DVD drive b. DVD drive cable c. (Trained service technician only) System board 4. Replace the components listed in step 3 one at a time, in the order shown, restarting the server each time.
A DVD is not working correctly.	1. Clean the DVD. 2. Run the DVD drive diagnostic programs. 3. Reseat the DVD drive cable. 4. Reseat the DVD drive. 5. Replace the DVD drive
The 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 DVD drive. 4. Replace the DVD drive.

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 indicator 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).	Remove the drive that is indicated by 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.
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.

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 detect.	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. • Make sure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly.

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 to the server. • The server and the monitor are turned on. 2. Run the Configuration/Setup Utility program and enable keyboardless operation to prevent the 301 POST error message from being displayed during startup. 3. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard 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. • The mouse or pointing device drivers are installed correctly. • The server and the monitor are turned on. • The keyboardless operation and mouse options are enabled in the Configuration/Setup Utility program. 2. If you are using a USB mouse or pointing device and it is connected to a USB hub, disconnect the mouse or pointing 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 displayed is less than the amount of installed physical memory.	1. Make sure that: • No error LEDs are lit on the system board. • The memory modules are seated corrected. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program. • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check the POST error log for error message 289: • If the DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM. • If the DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM. 3. Run memory diagnostics (see ″Running the programs″ in the *Problem Determination and Service Guide*. 4. Make sure that there is no memory mismatch when the server is over the minimum memory configuration (one 512 MB DIMM: see the information about the minimum required configuration on page 12). 5. Reseat the following components: a. DIMM b. (Trained service technician only) System board 6. Replace the components listed in step 5 one at a time, in the order shown, restarting the server each time.

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 technicain 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. (Trained service technician only) Make sure that the microprocessor is seated correctly. 2. (Trained service technician only) Replace the microprocessor.

Monitor or video problems

Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the documentation that comes with the monitor for instructions for testing and adjusting the monitor.

- **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″ in the *Problem Determination and Service Guide*. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. • Other than the single beep, which indicates successful completion of POST, no beep codes sound when the server is turned on. **Important:** In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank monitor screen. If this occurs and the **Boot Fail Count** option in the **Start Options** of the Configuration/Setup Utility program is enabled (its default setting), you must restart the server three times to reset the configuration settings to the default configuration (the memory connector or bank of connectors enabled). 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" on page 61. 4. See ″Solving undetermined problems″ in the *Problem Determination and Service Guide.*
Only the cursor appears.	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 applications. 2. Run video diagnostics (see ″Running the diagnostic programs″ in the *Problem Determination and Service Guide*. • 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, reseat the system board. • (Trained service technician only) 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 jitters, or the screen image is wavy, unreadable, rolling, distorted.	1. If the monitor self-tests show that the monitor is working properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. **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 following components: a. Monitor b. Video adapter (if one is installed) c. (Trained service technician only) System board 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the BIOS code with the correct language. 2. Reseat the following components: a. Monitor b. Video adapter (if one is installed) c. (Trained service technician only) System board 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.

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/server/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 device 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 cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. If the failing device is a SCSI device, make sure that: • The cables for all external SCSI options are connected correctly. • The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI device is turned on. You must turn on an external SCSI device before turning on the server. 4. Reseat the failing device. 5. 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, and the reset 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 ac power-supply voltage switch on the rear of the server is set to the correct voltage for your geography. 2. Make sure that the power-control button is working correctly: a. Disconnect the server power cords. b. Reconnect the power cords. c. (Trained service technician) Reseat the operator information panel cables, and then repeat steps 2a and 2b. If the server starts, reseat the opertor panel. If the problem remains, replace the operator panel. 3. Make sure that the reset button is working correctly: a. Disconnect the server power cords. b. Reconnect the power cords. 4. Make sure that: • The power cords are correctly connected to the server and to a working electrical outlet. • The type of memory that is installed is correct. • The LEDs on the power supply do not indicate a problem. 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 Server Guide*.
The server does not turn off.	1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or 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 pressing 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 power cord for 20 seconds; then, reconnect the power cord and restart the server. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See ″Solving undetermined problems″ in the *Problem Determination and Server Guide.*

Serial port 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 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 adapter (if one is present) is seated correctly. 2. Reseat the serial port adapter. 3. Replace the failing serial port adapter.
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 (see "Connecting the cables" on page 27). 2. Reseat the following components: a. Failing serial device b. Serial cable c. (Trained service technician only) System board 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.

ServerGuide 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 *ServerGuide Setup and Installation* CD will not start.	1. Make sure that the server supports the ServerGuide program and has a startable (bootable) DVD drive. 2. If the startup (boot) sequence settings have been changed, make sure that the DVD drive is first in the startup sequence. 3. If more than one DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.
The ServeRAID™ Manager program cannot view all installed drives, or the operating system cannot be installed.	1. Make sure that the hard disk drive is connected correctly. 2. Make sure that the SAS hard disk drive cables are securely connected.
The operating-system installation program continuously loops.	Make more space available on the hard disk.

- **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 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 server supports the operating system. If it does, either no logical drive is defined (SCSI RAID servers), or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

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 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, you 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 while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact the place where you purchased the software.

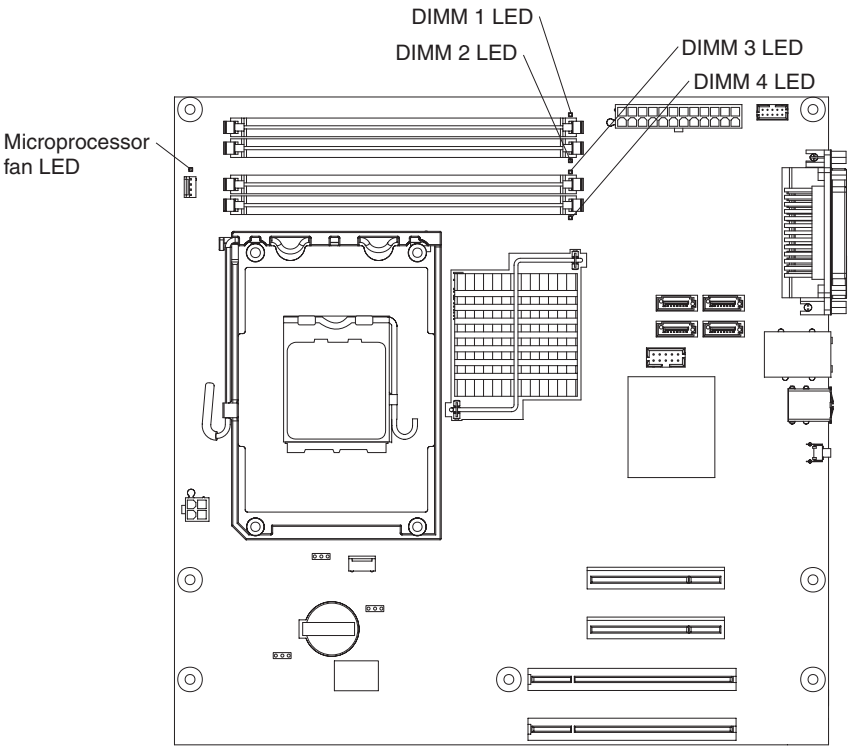
Universal Serial Bus (USB) port problems

- **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. 2. Make sure that the USB configuration options are set correctly in the Configuration/Setup Utility program (see the *User's Guide* for more information). 3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

System-board error LEDs

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



Each 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 the server is restarted; if the problem remains, the LED will be lit again. See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for additional information.

Recovering from a BIOS update failure

The server has an advanced recovery feature that will automatically switch to a backup BIOS page if the BIOS code in the server has become damaged, such as from a power failure during an update.

The flash memory of the server consists of a primary page and a backup page. If the BIOS code in the primary page is damaged, the baseboard management controller will detect the error and automatically switch to the backup page to start the server. If this happens, a POST message `Booted from backup POST/BIOS image` is displayed. The backup page version might not be the same as the primary page version.

You can then recover or restore the original primary page BIOS by using a BIOS flash diskette.

Note: To create and use a diskette, you must add an optional diskette drive to the server.

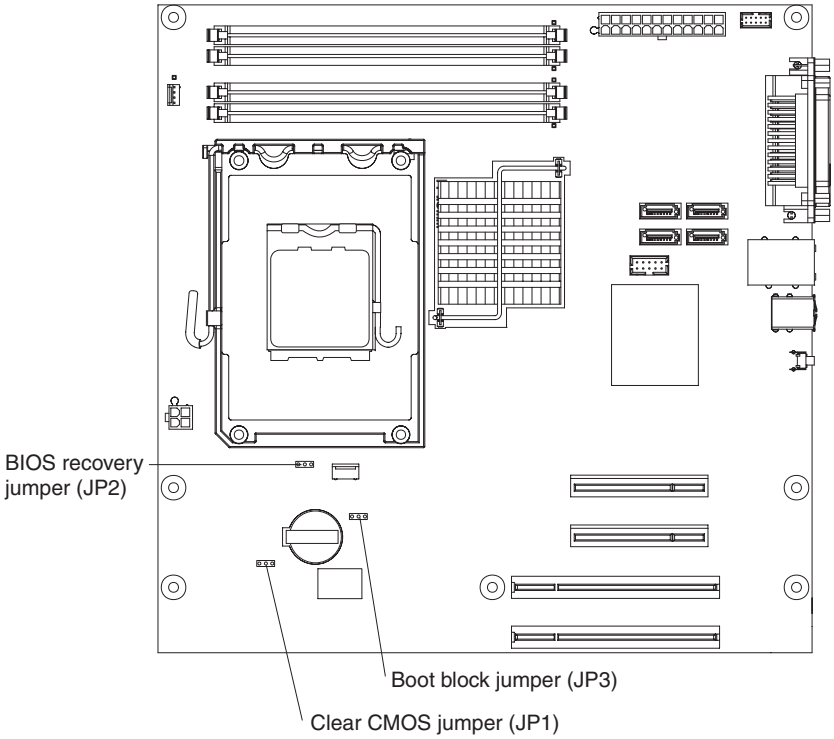
To recover the BIOS code and restore the server operation to the primary page, complete the following steps:

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support** , click **System x**.
3. Under **Popular links** list, click **Software and device drivers**.
4. Click **IBM System x3100** to display the matrix of downloadable files for the server.
5. Select the applicable file for your operating system and the file type for the medium you want to use; then, download the flash BIOS update.
6. Update the BIOS code, following the instructions that come with the update file that you downloaded. This automatically restores and updates the primary page.

   Note: Always reset the Configuration/Setup Utility program to the default values after you update the BIOS code.
7. Restart the server.

If that procedure fails, the server might not restart correctly or might not display video. To manually restore the BIOS code, complete the following steps:

1. Read the safety information that begins on page v and “Handling static-sensitive devices” on page 9.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover.
3. Locate the boot block jumper (JP3 on the system board).



4. Move the boot block recovery jumper to pins 2 and 3.
5. Wait 30 seconds; then, connect the server to the ac power source.
6. Insert the BIOS flash diskette into the external diskette drive.
7. Restart the server.
8. When POST starts, select **1 - Update POST/BIOS** from the menu that contains various flash (update) options.
9. When you are asked whether you want to save the current code to a diskette, type N.
10. Type 1 and press Enter to continue.

    Attention: Do not restart or turn off the server until the update is completed.
11. When the update is completed, turn off the server.
12. Remove ac power from the server.
13. Move the boot block jumper back to pins 1 and 2.
14. Wait 30 seconds; then, connect the server to the ac power source.
15. Replace the cover; then, restart the server.

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 section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the IBM *Documentation* CD that comes with your system.
- Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with 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 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/systems/support/ and follow the instructions. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM 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 BladeCenter® information is http://www.ibm.com/systems/bladecenter/. 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/systems/support/.

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 see http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

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

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

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

This publication was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

Active Memory	IBM	TechConnect
Active PCI	IBM (logo)	Tivoli
Active PCI-X	IntelliStation	Tivoli Enterprise
AIX	NetBAY	Update Connector
Alert on LAN	Netfinity	Wake on LAN

BladeCenter	Predictive Failure Analysis	XA-32
Chipkill	ServeRAID	XA-64
e-business logo	ServerGuide	X-Architecture
@server	ServerProven	XpandOnDemand
FlashCopy	System x	xSeries
i5/OS		

Lotus, Intel Xeon, Itanium, and Pentium are trademarks or registered trademaks of Intel Corporation or its subsidiaries in the United States and other countries.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Adaptec and HostRAID are trademarks or registered trademarks of Adaptec, Inc. in the United States, other countries, or both.

Linux is a trademark of Linus Torvalds in United States, other countries, or both.

Red Hat, Red Hat “Shadow Man” logo, and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc., in the United States and other countries.

Other company, product, or service names may be trademarks or service marks of others.

Important notes

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

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

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

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

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

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

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

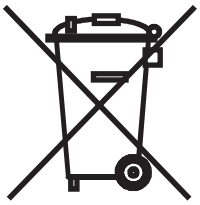
IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

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/index.shtml.

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. IBM recomienda a los propietarios de equipos de tecnología de la información (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean útiles. IBM dispone de una serie de programas y servicios de devolución de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar información sobre las ofertas de reciclado de productos de IBM en el sitio web de IBM http://www.ibm.com/ibm/environment/products/index.shtml.



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.

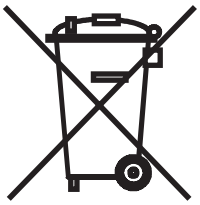
Battery return program

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/index.shtml or contact your local waste disposal facility.

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

For Taiwan: Please recycle batteries.

For the European Union:



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

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal

concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

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.

Chinese Class A warning statement

声　　明

此为 A 级产品。在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

Index

T

U

V

W

Part Number: 44W2350

Printed in USA

(1P) P/N: 44W2350