



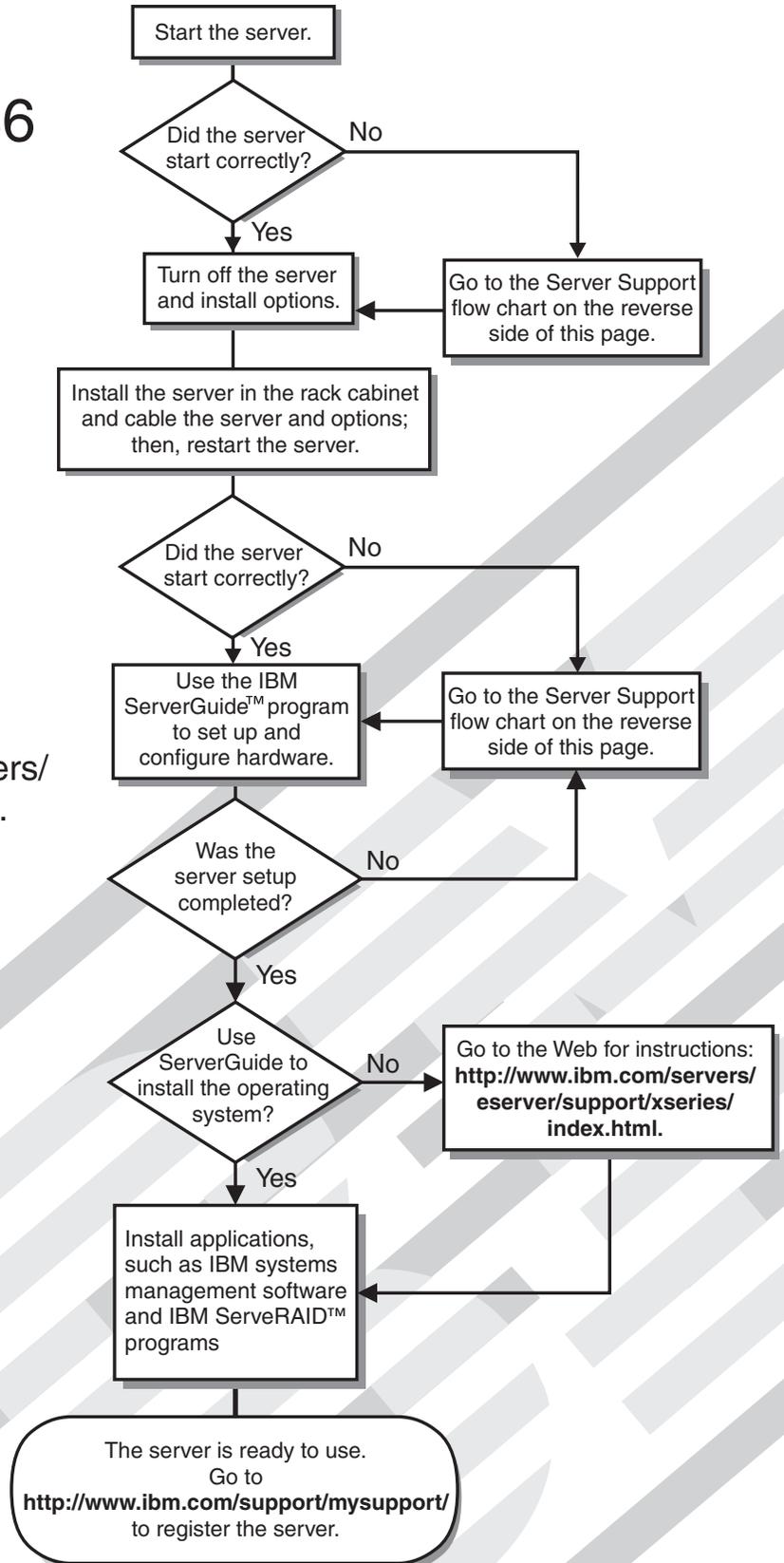
System x3455 Types 7984 and 7986 Installation Guide

Welcome.

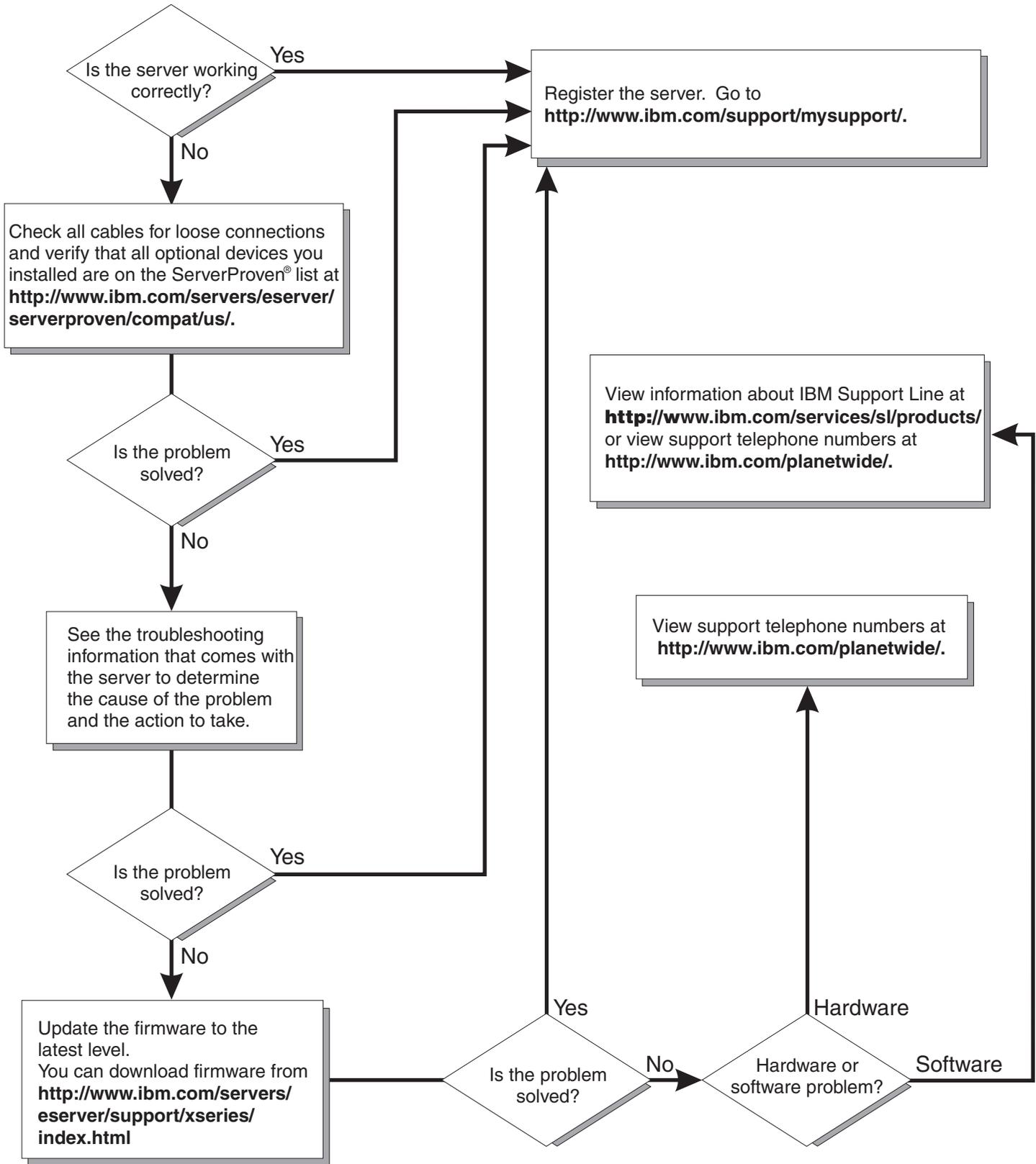
This server *Installation Guide* contains information for setting up and configuring your server.

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

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



Server Support



System x3455 Types 7984 and 7986



Installation Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 73, and the *Warranty and Support Information* document on the IBM *System x Documentation* CD.

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

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

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

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

Statement 1:



DANGER

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

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

Statement 2:



CAUTION:

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Statement 3:



CAUTION:

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

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



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

Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Statement 5:



CAUTION:

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



Statement 8:



CAUTION:

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



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

Statement 26:



CAUTION:

Do not place any object on top of rack-mounted devices.



Statement 27:



CAUTION:

Hazardous moving parts are nearby.



Statement 28:



CAUTION:

The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call.

Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up your IBM® System x3455 Type 7984 or 7986 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 that comes with the server. This document contains information about:

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

If firmware and documentation updates are available, you can download them from the IBM Web site. The server might have features that are not described in the documentation that comes with the server, and the documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. To check for updates, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>, select **System x3455** from the **Hardware** list, click **Go**, and then click the **Download** tab. For firmware updates, click the **Download** tab. For documentation updates, click the **Install and use** tab, and click **Product documentation**.

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

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

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

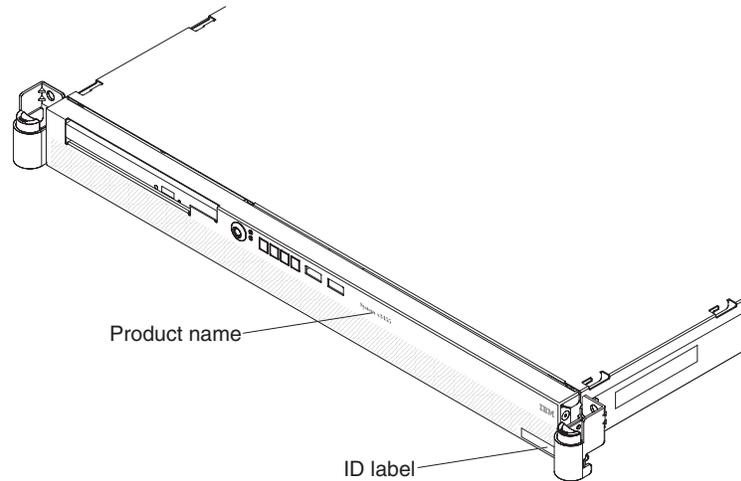
Record information about the server in the following table. You will need this information when you register the server with IBM. You can register the server at <http://www.ibm.com/support/mysupport/>.

Product name	IBM System x3455 server
Machine type	7984 or 7986
Model identifier	_____
Serial number	_____

The product name is on the bezel surface, near the Universal Serial Bus (USB) connectors. The machine type, model identifier, and serial number are on the ID label on the right side of the server bezel. On the ID label, the hyphenated seven-digit code indicates the machine type and model identifier. The first four digits represent the machine type (for example, 7984), and the last three digits represent the model identifier. The serial number is below the machine type and model

identifier. The serial number is indicated by the letters “S/N” followed by an alphanumeric code. The following illustration shows the locations of the product name and the ID label.

Note: 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/>.

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

The IBM System x Documentation CD

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

Hardware and software requirements

The IBM *System x Documentation* CD requires the following minimum hardware and software:

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

Using the Documentation Browser

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

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

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

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

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

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

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

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

Notices and statements 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 could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.

- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Features and specifications

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

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

Table 1. Features and specifications

<p>Microprocessors:</p> <ul style="list-style-type: none"> • Up to two dual-core AMD Opteron™ processors (one standard on all models) • 1 MB Level-2 cache per core <p>Note: Use the Configuration/Setup Utility program to determine the speed of the microprocessors.</p> <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 1024 MB • Maximum: 48 GB • Type: PC2-5300 error-correcting code (ECC), double-data-rate 2 (DDR2) SDRAM, registered DIMMs with Chipkill™ memory protection • Sizes: 512 MB, 1 GB, 2 GB, or 4 GB DIMMs in pairs <p>Note: Chipkill memory protection is not supported on 512 MB DIMMs.</p> <ul style="list-style-type: none"> • Six interleaved slots with the standard microprocessor • Six additional interleaved slots with an optional microprocessor • Standard: One pair of matching DIMMs 	<p>Drives:</p> <ul style="list-style-type: none"> • CD-RW/DVD: Ultrabay Enhanced IDE (standard only on some models) • Non-hot-swap hard disk drives: <ul style="list-style-type: none"> – One standard – Slim-high 3.5-inch drives – Serial Advanced Technology Attachment (SATA) <p>Note: Drive capacity and speed vary with model.</p> – Serial Attached SCSI (SAS) drives are supported if an optional SAS adapter is installed. – Maximum: Two SATA or two SAS drives <p>Expansion slots:</p> <ul style="list-style-type: none"> • Two, used in either of the following configurations: <ul style="list-style-type: none"> – One full-height, half-length Hyper Transport (HTX) riser card and one half-length PCI Express x16 riser card – One full-height, half-length PCI Express x8 and one half-length PCI Express x16 riser card • Each riser card supports one adapter • Server supports a maximum of two adapters 	<p>Video controller:</p> <ul style="list-style-type: none"> • ATI RN50b video controller on the system board • Compatible with SVGA • 16 MB DDR1 video memory <p>Power supply:</p> <p>One 650 watt (115 - 230 V ac)</p> <p>Cooling:</p> <ul style="list-style-type: none"> • Three nonredundant, non-hot-swappable fans with system-board connectors • Two air baffles on the system board • Two fans built into the power supply <p>Size:</p> <ul style="list-style-type: none"> • Height: 43 mm (1.7 in.) • Depth: <ul style="list-style-type: none"> – 660.5 mm (26.0 in.) with bezel – 643.5 mm (25.3 in.) without bezel • Width: 440 mm (17.3 in.) • Weight: approximately 11.9 kg (26.2 lb) when fully configured <p>Integrated functions:</p> <ul style="list-style-type: none"> • Baseboard management controller • One SATA controller • Two Broadcom 10/100/1000 Ethernet controllers (dual-port design) with Wake on LAN® support • Six Universal Serial Bus (USB) ports <ul style="list-style-type: none"> – Two on the front of the server – Four on the rear of the server • One serial port • One video port
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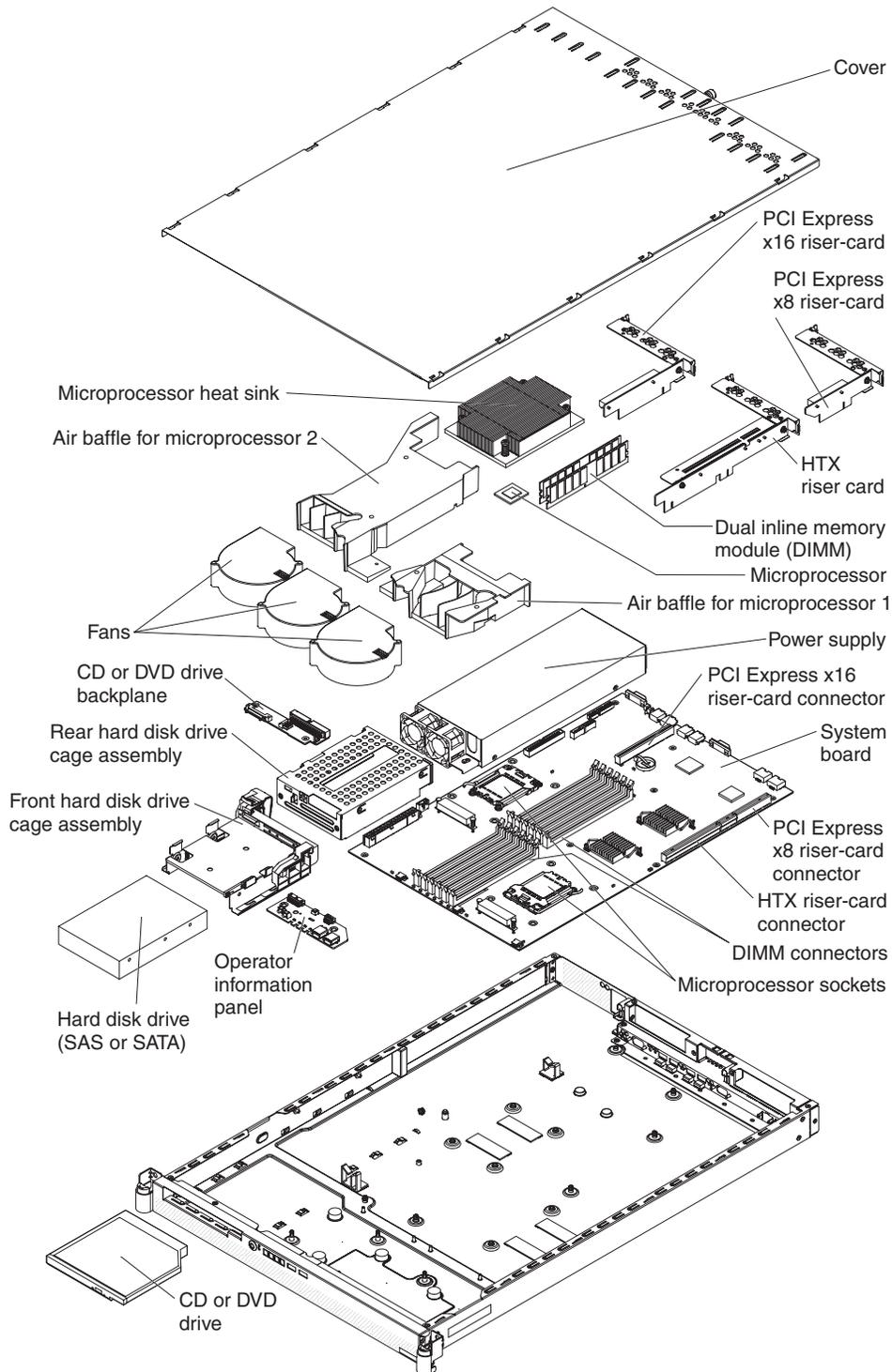
Table 1. Features and specifications (continued)

<p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Declared sound power, idling: 6.5 bels • Declared sound power, operating: 6.5 bels <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Server on: 10° to 35°C (50.0° to 95.0°F). Altitude: 0 to 914 m (2998.7 ft) – Server on: 10° to 32°C (50.0° to 89.6°F). Altitude: 914 m (2998.7 ft) to 2133 m (6998.0 ft) – Server off: 10° to 43°C (50.0° to 109.4°F). Maximum altitude: 2133 m (6998.0 ft) • Humidity: <ul style="list-style-type: none"> – Server on: 8% to 80% – Server off: 8% to 80% • Airflow rates: <ul style="list-style-type: none"> – Minimum: 34 CFM – Maximum: 74 CFM 	<p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour for dual multiprocessor configurations:</p> <ul style="list-style-type: none"> • Minimum configuration: 430 Btu (126 watts) • Maximum configuration: 1707 Btu (500 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50-60 Hz) required • Input voltage low range: <ul style="list-style-type: none"> – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: <ul style="list-style-type: none"> – Minimum: 200 V ac – Maximum: 240 V ac • Input kilovolt-amperes (kVA), approximately: <ul style="list-style-type: none"> – Minimum: 0.126 kVA – Maximum: 0.500 kVA 	<p>Notes:</p> <ol style="list-style-type: none"> 1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use. 2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.
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Major components of the System x3455 Types 7984 and 7986 server

Blue on a component indicates touch points, where you can grip the component to remove it in the server, open or close a latch, and so on.

The following illustration shows the major components in the server. 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 8. 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, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>, select **System x3455** from the **Hardware** list, click **Go**, and then click the **Download** tab. For additional information about tools for updating, managing, and deploying firmware, see the System x and xSeries® Tools Center at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.
- Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 1962 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see the *Problem Determination and Service Guide* on the *IBM System x Documentation CD* for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Make sure that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
 - Make sure that you can stand safely without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- 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:

- The CD or DVD drive bay 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 left and right sides of the server. Leave approximately 166 mm (6.54 in.) of open space around the rear of the server. Do not place objects in front of the fans or air baffles. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- All fans are operating correctly.
- You do not operate the server without the air baffles installed. Operating the server without the air baffles might cause the microprocessors or other components to overheat.
- Microprocessor socket 1 always contains a microprocessor and heat sink.
Important: The server will not start if microprocessor socket 1 is empty.
- Microprocessor socket 2 always contains either a microprocessor baffle or a microprocessor and heat sink.
- No dual inline memory modules (DIMMs) are installed in connectors 7 through 12 if microprocessor socket 2 (system-board identifier CPU2) is empty. The server does not support this configuration.
- Each installed adapter is of the same type (PCI Express or Hyper Transport) as the riser-card assembly in which it is installed. Operating the server with an unsupported adapter in a connector on the riser-card assembly might cause unpredictable results. For a list of supported adapters for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>
- You do not install a graphics adapter. Operating the server with an unsupported graphics adapter might cause unpredictable results.

Handling static-sensitive devices

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

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

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

- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Removing the cover

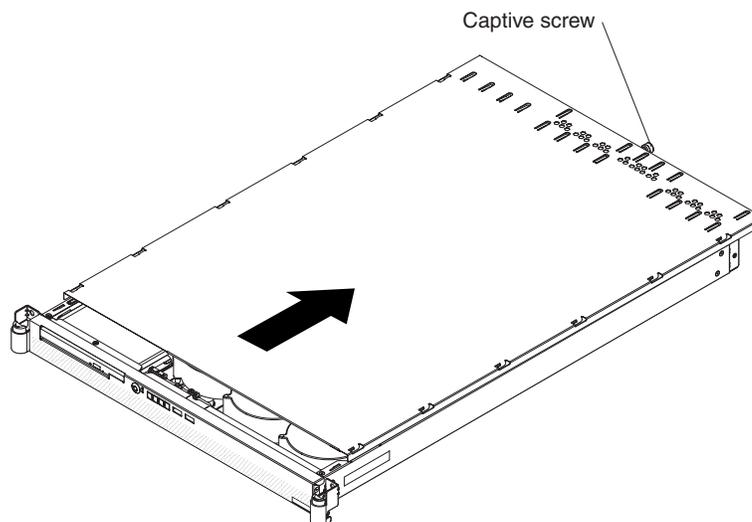
Important: Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 1962 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 6, “Solving problems,” on page 45 for diagnostic information.

Attention:

- For proper cooling and airflow, replace the cover before you turn on the server. Operating the server for extended periods of time with the cover removed might damage server components.
- Do *not* remove the server cover with the power on.

To remove the cover (with the server out of the rack), complete the following steps.

1. Read the safety information that begins on page v, and “Installation guidelines” on page 7.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the cover from the server:



- a. Loosen the captive screw on the back of the cover.
- b. Disengage the tabs on the sides of the cover from the matching slots on the sides of the chassis.

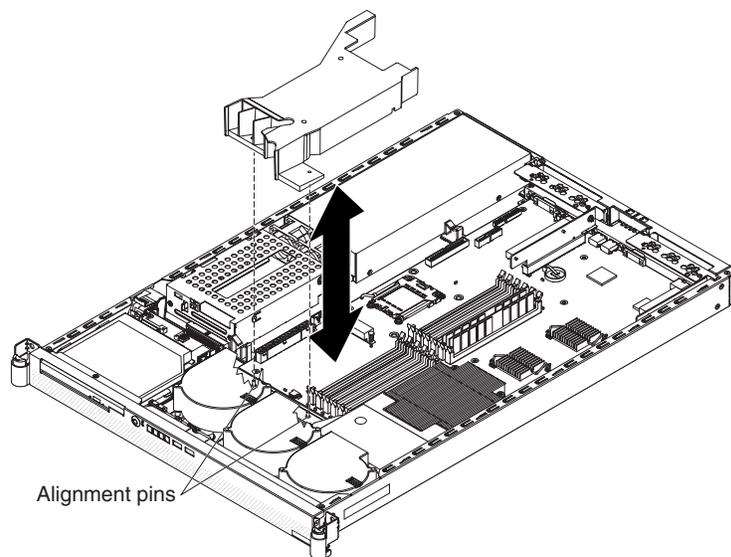
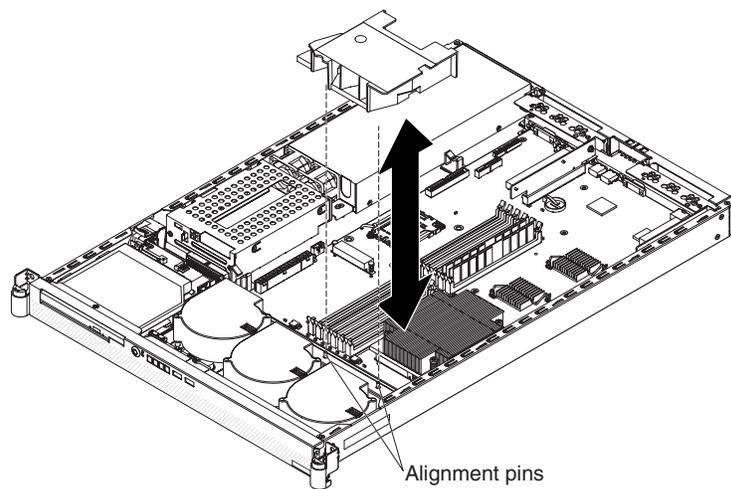
- c. Slide the cover toward the rear of the server, and lift the cover off the server.

Removing an air baffle

The server contains two air baffles, one customized for each microprocessor. These air baffles direct air to cool components inside the server. You might have to remove these air baffles to access certain components or connectors on the system board, such as microprocessors.

Attention: For proper cooling and airflow, replace the air baffles before turning on the server. Operating the server with the air baffles removed might damage server components.

To remove an air baffle, 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 all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.

3. Remove the server cover (see “Removing the cover” on page 9).
4. Lift the air baffle up, and out of the server. Store the air baffle in a safe place, and keep it available for later reinstallation.

If you have other devices to install or remove, do so now.

Installing a memory module

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

- The server uses interleaved DIMMs, which you must add, remove, or replace in pairs. Both DIMMs in a pair must have the same size, type, speed, and technology. The server comes with one pair of DIMMs that are installed in DIMM connectors 1 and 2 on the system board.
- You can increase the amount of memory in the server by replacing the installed DIMMs with higher-capacity DIMMs or by installing additional pairs of DIMMs.
- To optimize system performance in a single-microprocessor or dual-microprocessor configuration, install DIMMs in the following sequence. Do not install DIMMs in connectors 7 through 12 if microprocessor socket 2 (system-board identifier CPU2) is empty.

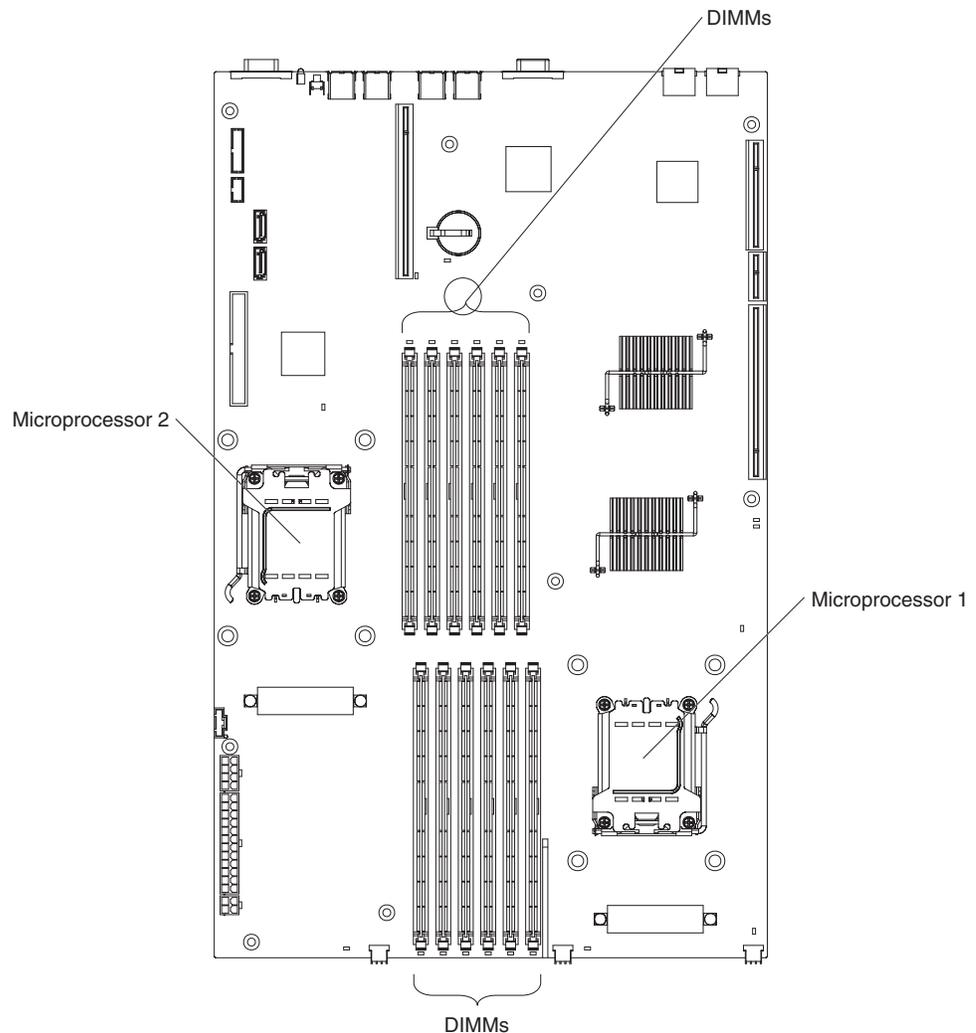


Table 2. DIMM installation sequence

Number of DIMMs installed	DIMM connector population with one microprocessor installed	DIMM connector population with two microprocessors installed
2	1, 2	1, 2
4	1, 2, 3, 4	1, 2, 7, 8
6	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 7, 8
8	Not supported	1, 2, 3, 4, 7, 8, 9, 10
10	Not supported	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
12	Not supported	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

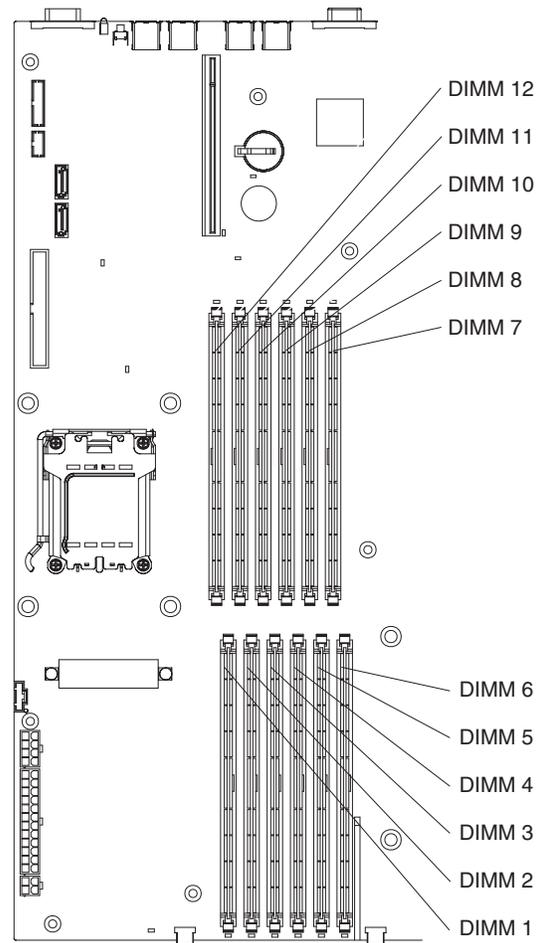
- The server supports 512 MB (type x8) DIMMs and the following sizes of type x4 DIMMs: 1 GB, 2 GB, and 4 GB. The memory can be expanded to a maximum of 48 GB, using twelve 4 GB DIMMs. For a list of memory modules that the server supports, see the ServerProven® list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

The memory controller also provides Chipkill memory protection if all DIMMs are of the type x4. Chipkill memory protection is a technology that protects the system from a single chip failure on a DIMM.

Note: Chipkill memory protection is not supported on 512 MB DIMMs.

- The server supports online-spare memory. For additional information, see the *User's Guide* on the IBM System x Documentation CD.
- The server does not support memory mirroring.
- When you restart the server after you add or remove DIMMs, the server displays a message indicating that the memory configuration has changed.
- The amount of usable memory will be reduced, depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Configuration/Setup Utility program and select **System Summary** from the menu. For additional information, see the *User's Guide* on the IBM System x Documentation CD.

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



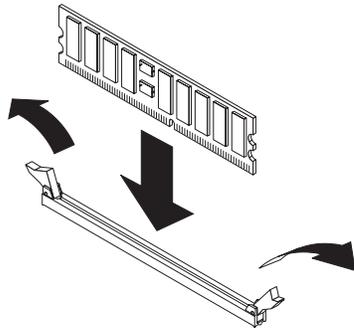
To install a DIMM, complete the following steps.

1. Read the safety information that begins on page v, and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover (see “Removing the cover” on page 9).
4. According to your server configuration, select the applicable DIMM installation sequence from Table 2 on page 12.

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

5. Open the retaining clip on each end of the DIMM connector.
6. Touch the static-protective package that contains the DIMM to any *unpainted* metal surface on the server. Then, remove the DIMM from the package.

7. Turn the DIMM so that the DIMM keys align correctly with the connector.



8. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
9. Repeat step 5 on page 13 through step 8 for the second DIMM in the pair that you selected from Table 2 on page 12. DIMMs must be installed in pairs.

Important: When you restart the server after you have installed DIMMs, the 162 code will be displayed to indicate that the server memory configuration has changed. You must run the Configuration/Setup Utility program to configure the DIMMs. For additional information, see the *User's Guide* on the IBM System x Documentation CD.

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

Installing a drive in the rear hard disk drive cage

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

- The server supports two 25.4 mm (1-inch), slim, 3.5-inch non-hot-swap hard disk drives.
- The server does not support hot-swap hard disk drives.
- The server comes with a front hard disk drive cage and a rear hard disk drive cage. In the standard configuration, the server comes with a hard disk drive in the front drive cage. You can install an additional hard disk drive in the rear drive cage. The rear drive cage is adjacent to the power supply.
- A non-hot-swap hard disk drive does not require a backplane or tray, and it does not have indicator LEDs. However, you must install the drive in either the front or rear drive cage that comes with the server.
- The front hard disk drive cage is under the CD or DVD drive assembly. Therefore, you must remove the CD or DVD drive assembly to access the front hard disk drive cage. If you decide to replace the hard disk drive in the front drive cage, follow the instructions in the *User's Guide* on the IBM System x Documentation CD.
- You can install either two SAS hard disk drives or two SATA hard disk drives in the server. The server does not support combining SAS and SATA drives in the same configuration. Operating the server with an unsupported hard disk drive

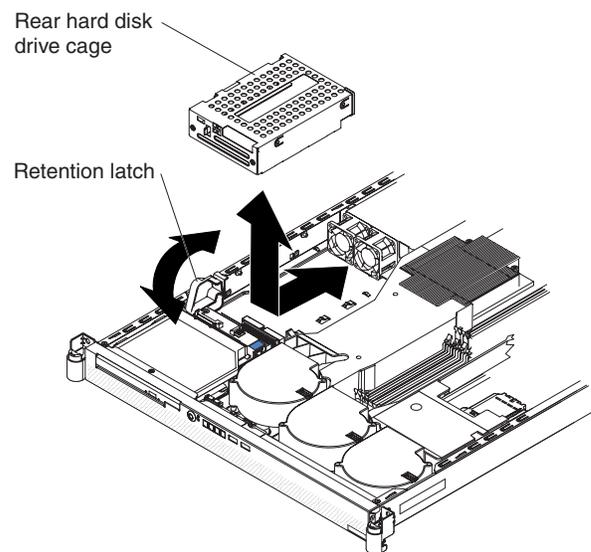
configuration might cause unpredictable results. For a list of supported drives for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

- If you install only one hard disk drive, for faster startup, install it in the primary startup device location; that is, the front drive cage. If you install a second hard disk drive, install it in the rear drive cage.
- You do not have to set any jumpers or switches on the hard disk drives before you install the drives in the server.

Removing the rear hard disk drive cage assembly

Before you can install a hard disk drive in the rear hard disk drive cage, you must first remove this drive cage from the server.

To remove the rear hard disk drive cage assembly, complete the following steps.

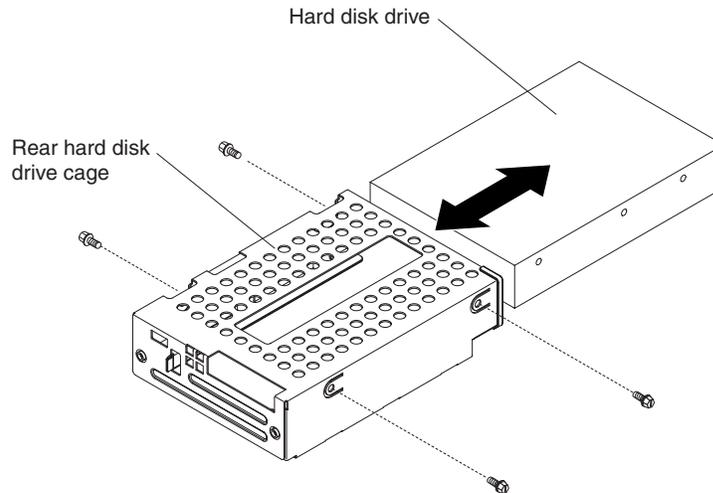


1. Read the safety information that begins on page v, and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover (see “Removing the cover” on page 9).
4. Open the drive-cage assembly retention latch; then, release the drive-cage assembly by sliding it slightly toward the front of the server.
5. Lift the drive cage assembly out of the server.
6. Continue with “Installing the drive” on page 16.

Installing the drive

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

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



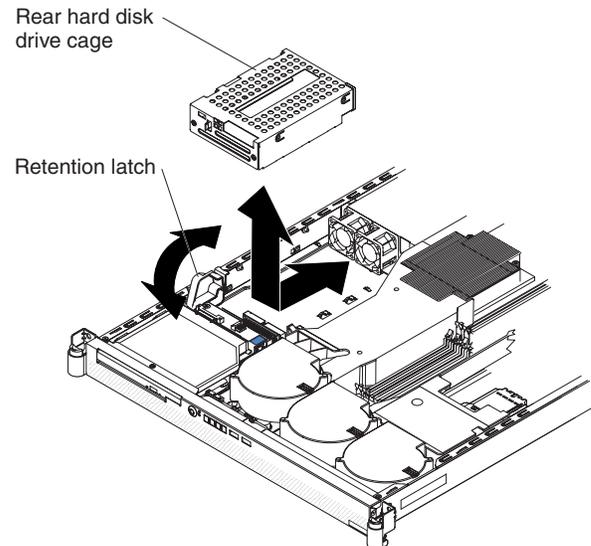
To install a drive in the rear hard disk drive cage, complete the following steps.

1. Touch the static-protective package that contains the new drive to any *unpainted* metal surface on the outside of the server; then, remove the drive from the package.
2. Mount the drive in the rear hard disk drive cage, using the four mounting screws that come with the drive kit option.
3. Connect the signal and power cables to the rear of the drive. The signal cable for the drive in the rear hard disk drive cage is labeled “HDD2”. Keep the cables clear of the airflow paths of the fans and air baffles.
4. Continue with “Installing the rear hard disk drive cage assembly” on page 17.

Installing the rear hard disk drive cage assembly

After you have installed a hard disk drive in the rear hard disk drive cage, reinstall this drive cage in the server.

To install the rear hard disk drive cage assembly, complete the following steps.



1. Insert the drive-cage assembly into the server; then, slide the drive-cage assembly toward the rear of the server until it seats securely.
2. Close the drive-cage assembly retention latch.

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

Installing a CD or DVD drive

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

- The server supports one CD or DVD drive.
- The server supports the following types of Ultrabay Enhanced integrated drive electronics (IDE) drives:
 - CD-RW/DVD-ROM combo
 - CD-RW
 - DVD-ROM
- Operating the server with an unsupported CD or DVD drive configuration might cause unpredictable results. For a list of supported drives for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

Note: If you are installing or removing 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.

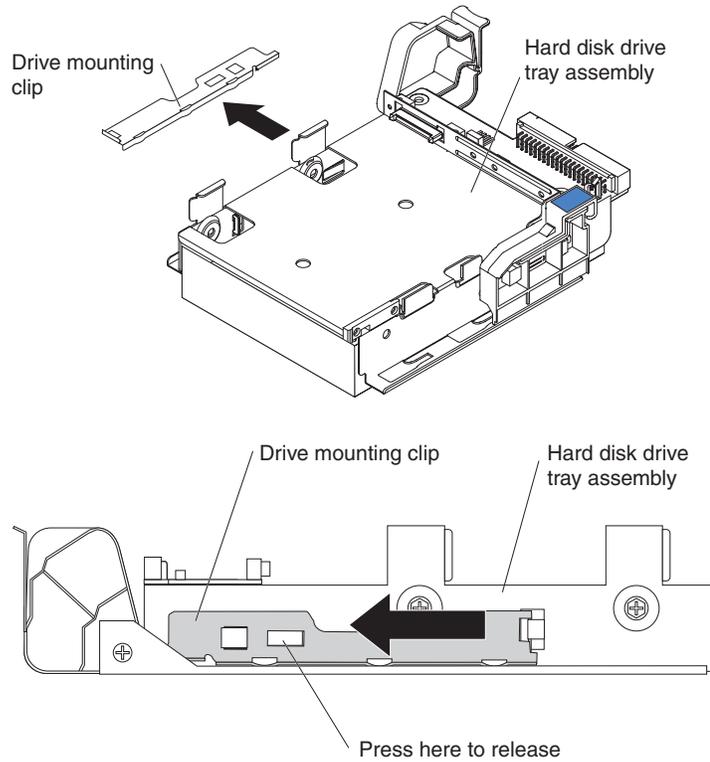
Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



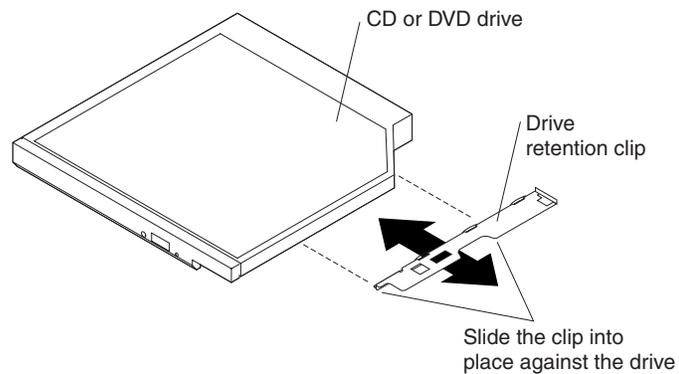
Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

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

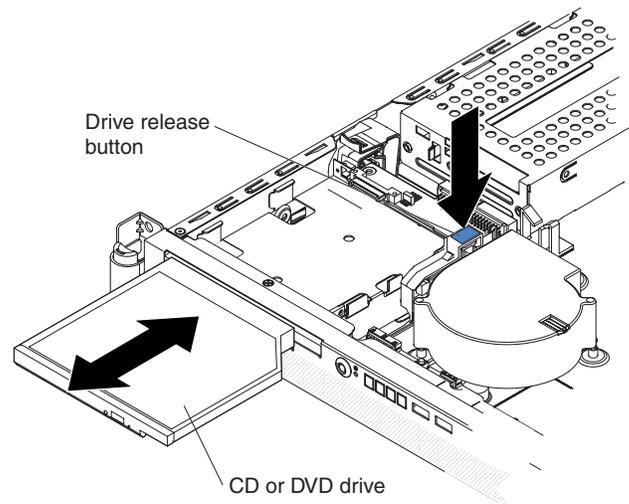
1. Read the safety information that begins on page v, and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover (see “Removing the cover” on page 9).
4. Follow the instructions that come with the drive to set any jumpers or switches.
5. You must attach a drive mounting clip to the drive before you can install the drive in the server. Detach the drive mounting clip that comes attached to the side of the drive cage, as shown in the following illustration.



Then, slide the drive mounting clip to attach it to the side of the drive.



- Slide the drive into the server until the drive clicks into place.

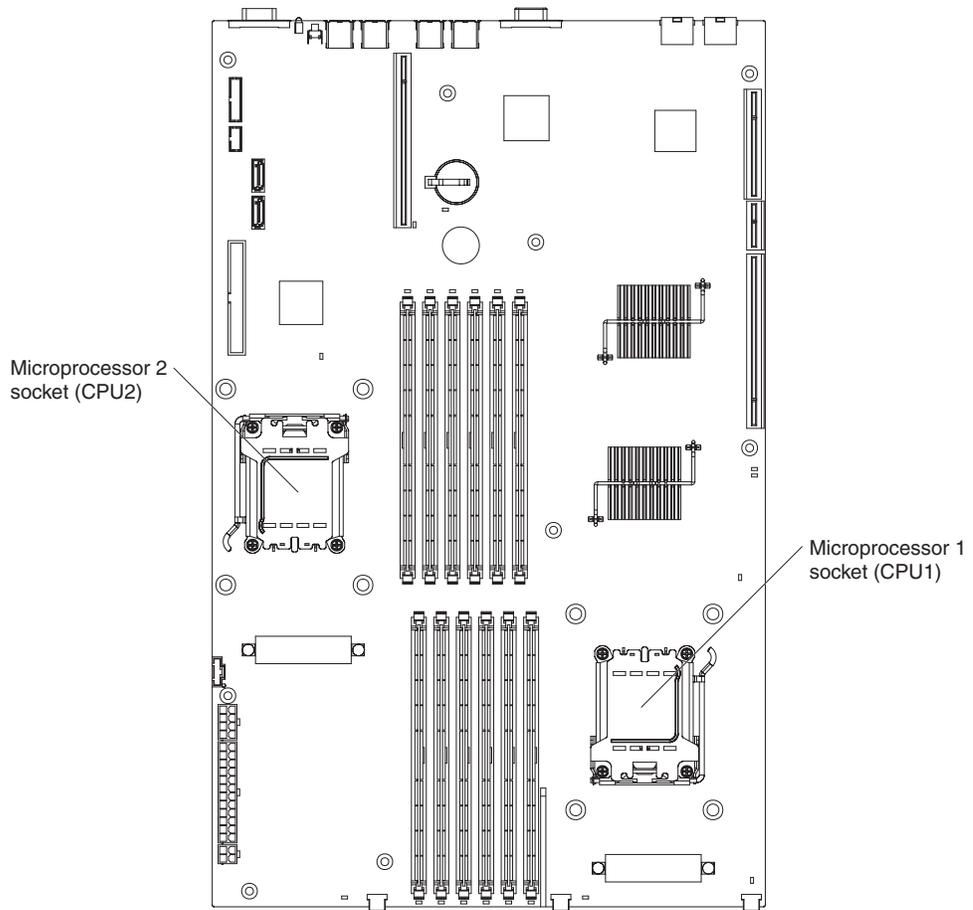


If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 27.

Installing an additional microprocessor

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

- For a list of microprocessors that the server supports, see the ServerProven list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.
- The server comes with one microprocessor. The server supports a maximum of two microprocessors. The following illustration shows the two microprocessor sockets on the system board.



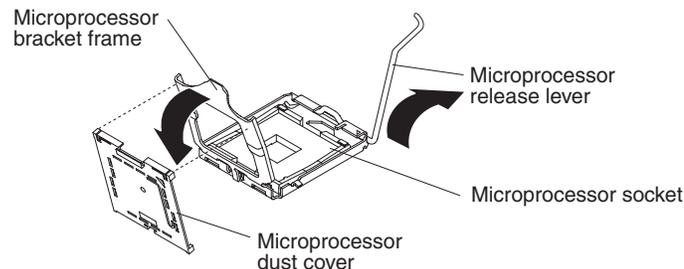
- If only one microprocessor is installed, make sure that it is installed in microprocessor socket 1 (system-board identifier CPU1). Microprocessor 1 supports both the startup and application processes.
- If you install a second microprocessor in the server, the server operates as a symmetric multiprocessing (SMP) server, and operating-system application programs can distribute the processing load between the microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications. Microprocessor 2 is installed in socket 2 (system-board identifier CPU2).
- Read the documentation that comes with the microprocessor to determine whether you must update the BIOS code in the server. To download the most current level of BIOS code for your server, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html> and follow the instructions.
- (Optional) Obtain an SMP-capable operating system. For a list of supported operating systems, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

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

- The server will not start if microprocessor socket 1 (system-board identifier CPU1) is empty.
- If two microprocessors are installed in the server, make sure that both microprocessors are the same type, have the same cache size, and have the same clock speed.
- Do not install DIMMs in connectors 7 through 12 if microprocessor socket 2 (system-board identifier CPU2) is empty. The server does not support this configuration.
- When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 8.
- Avoid touching the components and gold-pad connectors on the microprocessor. Make sure that the microprocessor is completely and correctly seated in the socket. Incomplete insertion might cause damage to the system board or to the microprocessor.
- Do not touch the thermal grease on the bottom of the heat sink or set down the heat sink after the plastic cover is removed. Touching the thermal grease will contaminate it. This damages its heat-conducting capability and exposes the new microprocessor to overheating.

To install an additional microprocessor, 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 server cover (see “Removing the cover” on page 9).
4. Remove the air baffle for microprocessor 2 (see “Removing an air baffle” on page 10).
5. Locate the microprocessor 2 socket (identifier CPU2) on the system board.
6. Remove the dust cover from the surface of the microprocessor 2 socket.
 - a. Press down and out on the release lever on the microprocessor socket. Lift up the release lever until it stops in the fully-open position (approximately 135° angle) and the top edge of the release lever has moved away from the microprocessor socket.

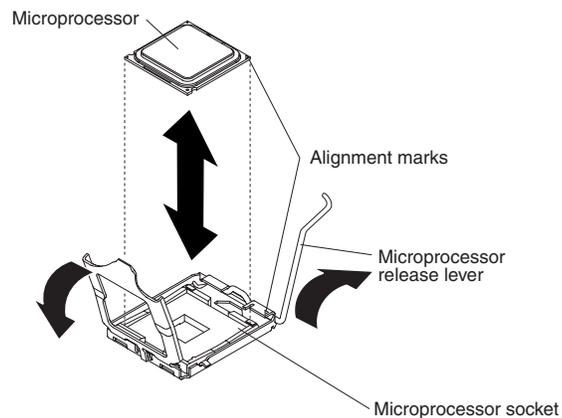


- b. Lift the hinged microprocessor bracket frame into the open position. Remove the protective cover from the bracket frame. Store the dust cover in a safe place.

7. Install the microprocessor:
 - a. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the outside of the server; then, remove the microprocessor from the package.
 - b. Align the microprocessor with the socket, as shown in the following illustration (note the alignment marks and the position of the notches); then, carefully place the microprocessor on the socket and close the microprocessor bracket frame.

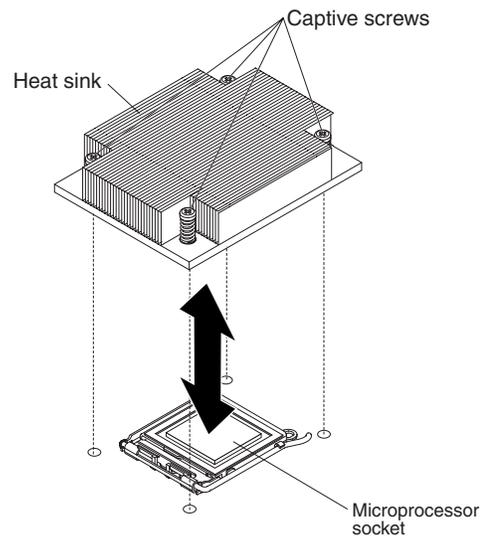
Attention: Do not use excessive force when you insert the microprocessor into the socket.

Note: The microprocessor fits only one way on the socket.



8. Carefully close the release lever to secure the microprocessor in the socket.

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



9. Install the heat sink.
 - a. Remove the heat sink from its package and remove the cover from the bottom of the heat sink.
 - b. Make sure that the thermal material is still on the bottom of the heat sink, and position the heat sink on top of the microprocessor.
 - c. Align the captive screws on the heat sink with the holes that surround the microprocessor socket.

- d. Press firmly on the captive screws and tighten them, alternating among the screws on opposite sides of the heat sink until they are tight. Do not overtighten the screws by using excessive force.
10. Reinstall the air baffle for microprocessor 2 (see step1 on page 27).

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

Installing an adapter

The following notes describe the types of adapters and riser cards 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 settings or jumper settings on the adapter, follow the instructions that come with the adapter.
- The server has one PCI Express (PCIe) x16 riser-card connector, one PCIe x8 riser-card connector, and one Hyper Transport (HTX) riser-card connector. These connectors support half-length riser cards.
- All PCIe devices in the server must conform to the PCIe based specification, revision 1.1 compliant requirements.
- If you plan to install an adapter in the server, you must install the adapter on a riser card that the server supports. The server supports a maximum of two riser cards and two adapters.
 - You can install a PCIe x16 riser card in its designated connector in the server. In addition, you can install either a PCIe x8 riser card or an HTX riser card in its designated connector in the server.
 - You can install a half-length adapter on the PCIe x16 riser card. In addition, you can install a half-length adapter on either the PCIe x8 riser card or the HTX riser card. The server does not support both a PCIe x8 adapter and an HTX adapter in the same configuration.
- The server is designed specifically for PCIe x16, PCIe x8, and HTX adapter support. The server supports the following adapter configurations:
 - The PCIe x16 riser card supports PCIe x16, x8, x4, and x1 adapters.
 - The PCIe x8 riser card supports PCIe x8, x4, and x1 adapters.
 - The HTX riser card supports only HTX adapters.

Important: For the most current list of supported adapters, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.
- The server does not support the following types of adapters:
 - 5.0-V-only adapters
 - PCI adapters
 - PCI-X adapters
 - The optional IBM Remote Supervisor Adapter II SlimLine (systems-management adapter)
- The integrated video controller is on the PCI bus. The integrated Ethernet controllers are on the PCI-X 100 MHz bus. The integrated SATA controller is on the SATA bus. The PCIe x16 riser-card slot is on the PCIe x16 bus. The PCIe x8 riser-card slot is on the PCIe x8 bus. The HTX riser-card slot is on the HTX bus.
- The server scans PCIe and HTX slots to assign system resources. By default, the server starts (boots) devices in the following order: PCIe, PCI-X, and PCI devices; HTX devices; then, IDE and SATA devices.

Note: To change the boot precedence for PCIe, PCI-X, PCI, and HTX devices, you must disable the devices through the Configuration/Setup Utility program. Start the Configuration/Setup Utility program and select **Startup** from the main menu. Then, select **Startup Sequence** and use the arrow keys to specify the startup order. For more information, see “Using the Configuration/Setup Utility program” on page 40 and the *User’s Guide* on the IBM *System x Documentation CD*.

To install an adapter and its corresponding riser-card assembly, 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 server cover (see “Removing the cover” on page 9).
4. If you have not already done so, determine the type of adapter (PCIe x16, PCIe x8, or HTX) that you want to install. For the locations of the riser-card slots on the system board, see “Major components of the System x3455 Types 7984 and 7986 server” on page 6.

Attention: For correct server operation, each installed adapter must be of the same type (PCIe or HTX) as the riser-card assembly in which it is installed.

5. According to the type of adapter that you are installing, select the correct riser-card adapter connector (PCIe x16, PCIe x8, or HTX) in which to install the adapter.
6. Route the adapter cables, if any, before you install the adapter in the riser-card assembly.

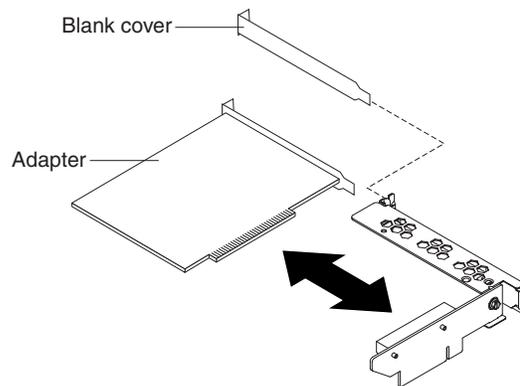
Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 8.

7. Touch the static-protective package that contains the adapter to any *unpainted* metal surface on the server. Then, remove the adapter from the package.
8. Set any jumpers or switches on the adapter as directed by the adapter manufacturer.

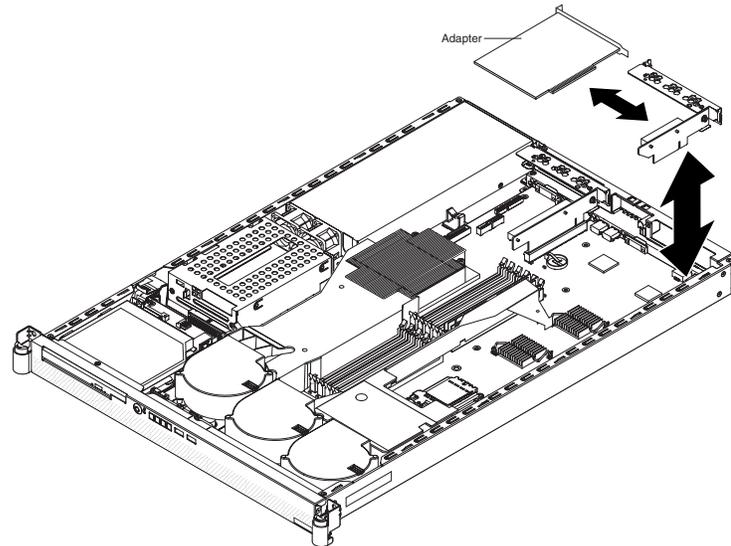
Attention: When you install an adapter, make sure that the adapter is correctly seated in the connector before you turn on the server. Improperly seated adapters might cause damage to the system board, the riser card, or the adapter.

9. Place the adapter on a flat, static-protective surface.
10. Touch the static-protective package that contains the corresponding riser-card assembly to any *unpainted* metal surface on the server. Then, remove the riser-card assembly from the package.

11. Place the riser-card assembly on a flat, static-protective surface.



12. Grasp the adapter by its top edge or upper corners; then, align the edge connector on the adapter with the connector on the riser-card assembly. Press the adapter *firmly* into the riser-card assembly connector so that the adapter edge connector seats fully. This secures the adapter in the connector.



13. Install the riser-card assembly in the server. Carefully align the riser-card assembly with the guides at the rear of the server, and the riser-card connector on the system board; then, press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector.
14. Connect any internal cables to the adapter. See the instructions that come with the adapter for details.
Attention: Make sure that the cables do not block the flow of air from the fans or air baffles.
15. Perform any configuration tasks that are required for the adapter.
See the documentation that comes with the adapter for information about installing the adapter firmware and configuring the adapter. After you initially configure the adapter, create a backup copy of the configuration so that if you have to replace the adapter in the future, you can restore the configuration and resume normal operation more quickly.

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

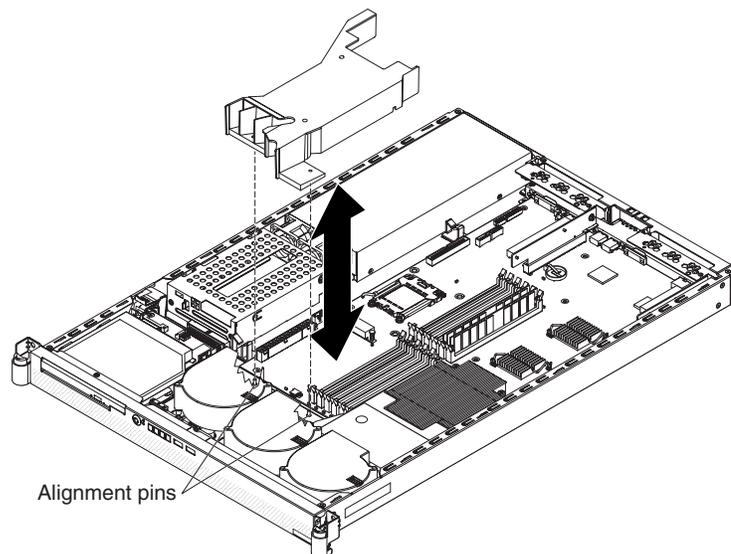
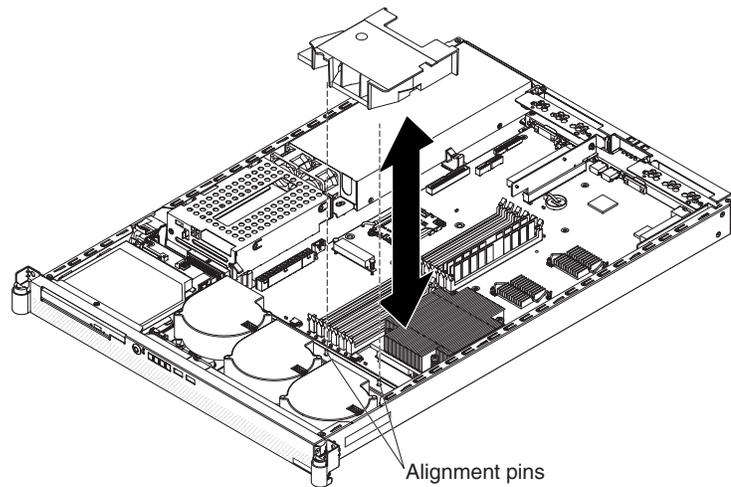
Completing the installation

Attention: For proper cooling and airflow, replace the air baffles before turning on the server. Operating the server with the air baffles removed might damage server components.

To complete the installation, complete the following steps:

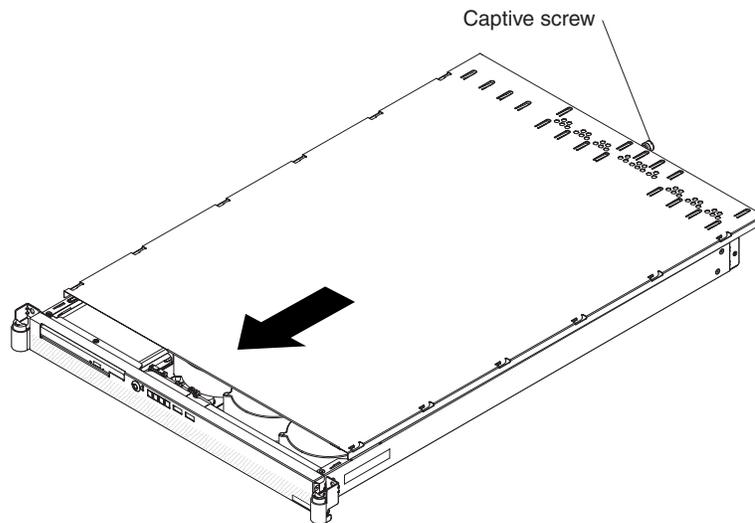
1. If you have not already done so, reinstall the two air baffles, if you removed them. Repeat the following procedure for each air baffle:

Put the air baffle into place from the top of the server, and align the holes near the front of the air baffle with the pins in the server. Make sure that the pins on the rear of the air baffle are seated in the system board.



2. Position the internal cables so that they do not interfere with the cover installation.

3. Reinstall the cover on the server.



- a. Position the cover on top of the server.
- b. Align the tabs on the sides of the cover with the matching slots on the sides of the chassis; then, slide the tabs into the slots.

Important: Before you slide the cover forward, make sure that all the tabs on the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be very difficult to remove the cover later.

- c. Slide the cover toward the front of the server.
 - d. Secure the cover to the server by tightening the captive screw on the back of the cover.
4. Install the server in the rack. For details, see the *Rack Installation Instructions* that come with the server.

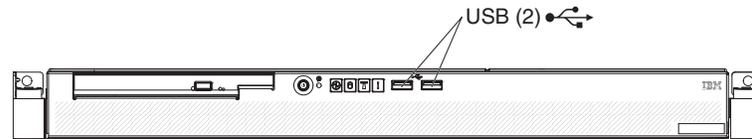
Note: Depending on the optional devices that you installed, after you cable the server, you might have to run the Configuration/Setup Utility program to update the server configuration. For more information, see “Updating the server configuration” on page 31 and the *User’s Guide* on the IBM *System x Documentation CD*.

5. To attach peripheral devices and connect the power cord, continue with “Connecting the cables” on page 29.

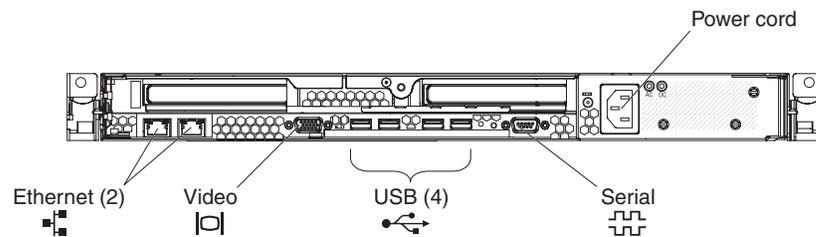
Connecting the cables

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

Front I/O connectors



Rear I/O connectors

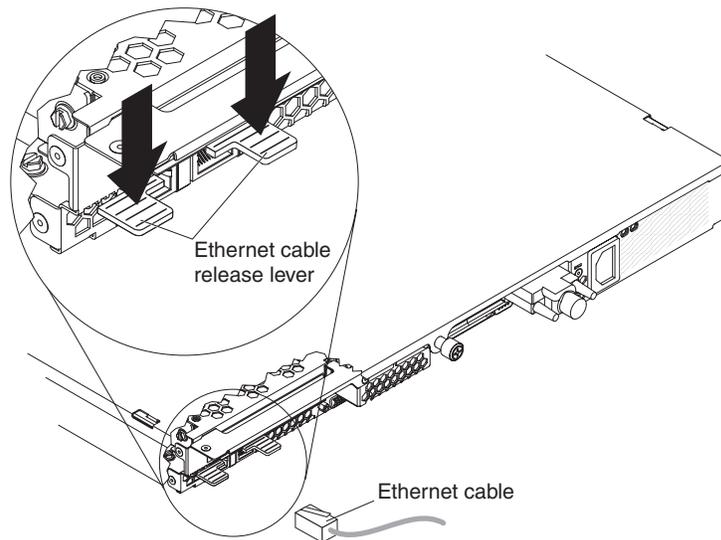


Cable identifiers are printed on the cables that come with the server and optional devices. Use these identifiers to connect the cables to the correct connectors, such as the identifiers in the following examples:

- The signal cable identifier for the CD or DVD in the CD or DVD drive is “ODD”, for *optical disk drive*.
- The signal cable identifier for the drive in the front hard disk drive cage is “HDD1”.
- The signal cable identifier for the drive in the rear hard disk drive cage is “HDD2”.

It might be easier for you to route cables before you connect the devices to the server. For detailed information about external devices and how to connect them to the server, see the documentation that comes with these devices.

There are release levers on the Ethernet connectors. To disconnect a cable from one of these connectors, push down on the lever to release the cable.



To attach non-USB devices to the server, use the cables that come with the devices and connect the cables to the applicable connectors on the server.

To attach a USB device to the server, use the cable that comes with the device and connect the cable to:

- One of the two USB connectors on the front of the server (see “Front view” on page 33), or
- One of the four USB connectors on the rear of the server (see “Rear view” on page 35)

Important:

- If you want to attach a keyboard or mouse to this server, you must use a USB keyboard or a USB mouse. For detailed information about the USB keyboard and how to connect it to the server, see the documentation that comes with the USB keyboard.
- The server supports keyboardless operation. If a USB keyboard is not connected to the server, when the server is turned on or restarted, error message 301 will appear during POST. No action is required. POST will continue within 1 minute.
- If you want to attach a diskette drive to this server, you must use an external USB diskette drive.

Depending on the optional devices that you installed, after you cable the server, you might have to run the Configuration/Setup Utility program to update the server configuration. For more information, see “Updating the server configuration” on page 31 and the *User's Guide* on the IBM *System x Documentation CD*.

Updating the server configuration

When you start the server for the first time after you add or remove a device, you might receive a message indicating that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. For more information, see the section about configuring the server in the *User's Guide* on the IBM *System x Documentation* CD.

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

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

If you have installed an adapter to manage the server remotely, see the documentation that comes with the adapter for information about setting up, configuring, and using the adapter.

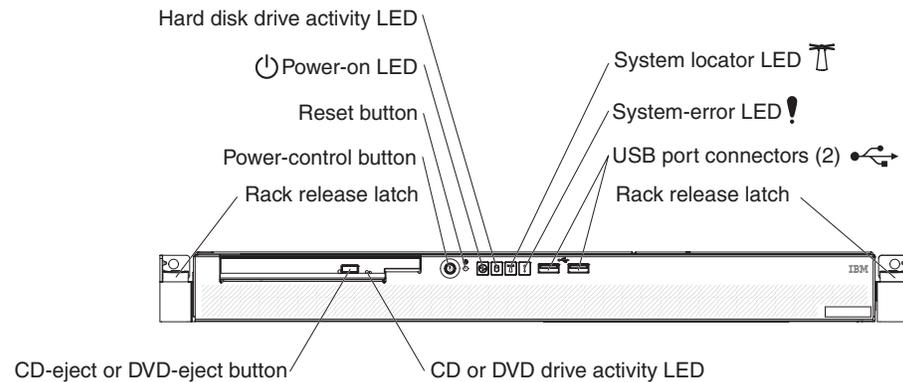
For information about configuring the integrated Gigabit Ethernet controllers, see the *User's Guide* on the IBM *System x Documentation* CD.

Chapter 3. Server controls, LEDs, and power

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

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server. Except for the CD or DVD drive activity LED, the CD-eject or DVD-eject button, and the rack release latches, these controls, LEDs, and connectors are on the operator information panel.

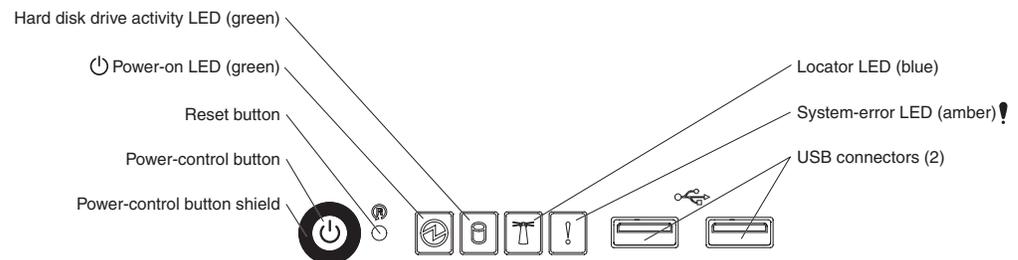


CD or DVD drive activity LED: When this LED is lit, it indicates that the CD drive or DVD drive is in use.

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

Rack release latches: Each side of the front of the server has a rack release latch. Press these latches to remove the server from the rack.

Operator information panel: This panel contains controls, LEDs, and connectors. The following illustration shows the operator information panel.



The following controls, LEDs, and connectors are on the operator information panel:

- **Power-control button:** Press this button to turn the server on and off manually. You might have to use a pen or the end of a straightened paper clip to press the button.

A power-control-button shield comes with the server. You can install it to prevent the server from being turned off accidentally.

- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button.
- **Power-on LED:** When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed.

Notes:

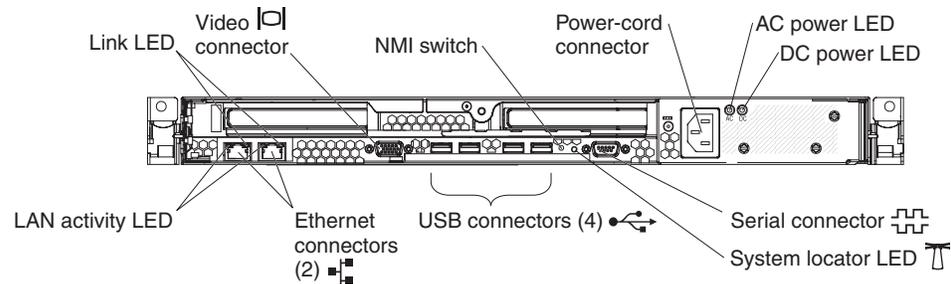
1. If this LED is off, it does not mean that there is no electrical power in the server. The LED might be defective, or has failed. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.
 2. The ac power and dc power LEDs are on the power supply and can be viewed from the rear of the server. For additional information, see “Rear view” on page 35.
- **Hard disk drive activity LED:** When this LED is lit, it indicates that either of the hard disk drives is in use.
 - **System locator LED:** This LED can be lit remotely by the system administrator to aid in visually locating the server. If the server supports IBM Director, you can use IBM Director to light this LED remotely. A system locator LED is also on the rear of the server.
 - **System-error LED (!):** When this LED is lit, it indicates that a system error has occurred. An LED near the failing component on the system board also might be lit to help isolate the error.
 - **USB connectors:** Connect a USB device to either of these connectors.

Notes:

1. If you want to attach a keyboard or mouse to this server, you must use a USB keyboard or a USB mouse. For detailed information about the USB keyboard and how to connect it to your server, see the documentation that comes with the USB keyboard.
2. The server supports keyboardless operation. If a USB keyboard is not connected to the server, when the server is turned on or restarted, error message 301 will be displayed during POST. No action is required. POST will continue within 1 minute.
3. If you want to attach a diskette drive to this server, you must use an external USB diskette drive.

Rear view

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



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

Video connector: Connect a monitor to this connector.

NMI switch: This switch is reserved for use by service technicians only.

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

AC power LED: The power supply has an ac power LED and a dc power LED. When the ac power LED is lit, it indicates that sufficient power is coming into the power supply through the power cord. During typical operation, both the ac and dc power LEDs are lit. For additional information about the ac power and dc power LEDs, see the *Problem Determination and Service Guide* on the IBM System x Documentation CD.

DC power LED: The power supply has a dc power LED and an ac power LED. When the dc power LED is lit, it indicates that the power supply is supplying adequate dc power to the system. During typical operation, both the ac and dc power LEDs are lit. For additional information about the ac power and dc power LEDs, see the *Problem Determination and Service Guide* on the IBM System x Documentation CD.

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

System locator LED: This LED can be lit remotely by the system administrator to aid in visually locating the server. If the server supports IBM Director, you can use IBM Director to light this LED remotely. A system locator LED is also on the front of the server.

USB connectors: Connect a USB device to any of these four connectors.

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

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

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

Server power features

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

Turning on the server

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

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

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

Turning off the server

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

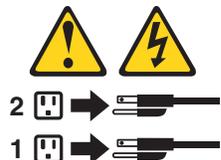
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:



CAUTION:

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



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

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

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 the operating-system installation. (See “Using the ServerGuide Setup and Installation CD” for more information.)

Note: If you are installing a Linux operating system, you can use ServerGuide™ to set up and configure your hardware; then, install a Linux operating system, using the procedure in “Installing your operating system without using ServerGuide” on page 40.

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

- Configuration/Setup Utility program
- Baseboard management controller firmware update program

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

If you have installed an optional SAS redundant array of independent disks (RAID) adapter that the server supports, the adapter comes with RAID configuration programs that you can use. To configure the adapter and the hard disk drives that are connected to it, follow the instructions in the documentation that comes with the RAID configuration programs. For a list of supported adapters for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

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, you can download the latest version from <http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html>.

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 67.
2. Follow the instructions on the screen to:
 - a. Select your language.
 - b. Select your keyboard layout and country.
 - c. View the overview to learn about ServerGuide features.
 - d. View the readme file to review installation tips about your operating system and adapter.
 - e. Start the setup and hardware configuration programs.
 - f. Start the operating-system installation. You will need your operating-system CD.

Installing your operating system without using ServerGuide

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

Note: The server does not support 32-bit Windows operating systems.

1. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>.
2. From the **Hardware** list, select **System x3455** and click **Go**.
3. Click the **Install and use** tab.
4. Click **Product documentation**.
5. Select the installation instructions for your operating system.

Using the Configuration/Setup Utility program

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

- Change interrupt request (IRQ) settings
- Change settings for baseboard management controller features
- Change the startup-drive sequence
- Configure assignments for devices and I/O ports
- Resolve configuration conflicts
- Set advanced hardware features
- 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 prompt **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.

Using the baseboard management controller

The baseboard management controller provides basic environmental monitoring functions for the server. If an environmental condition exceeds a threshold or if a system component fails, the baseboard management controller lights LEDs to help you diagnose the problem and also records the error in the BMC system event log.

The baseboard management controller also provides the following remote server management capabilities through the Avocent SMBridge management utility program:

- **Command-line interface (IPMI Shell)**

The command-line interface provides direct access to server management functions through the Intelligent Platform Management Interface (IPMI) protocol. Use the command-line interface to issue commands to control the server power, view system information, and identify the server. You can also save one or more commands as a text file and run the file as a script.

- **Serial over LAN**

Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the BIOS settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

Before you can perform remote management activities through an SOL connection, you must install the Avocent SMBridge management utility program on the server, and then enable and configure the server for SOL functions through the SMBridge management utility program. This enables you to use the SMBridge management utility program to remotely manage and configure a network. For instructions and additional information, see the *User's Guide* on the IBM *System x Documentation CD*.

Important: The server Ethernet ports are set to DHCP (dynamic host configuration protocol) by default. To find your BMC on an existing network, you will need to identify the server by the default host name. The default host name for each server is the last 8 characters of the BMC media-access control (MAC) address. The BMC MAC address can be found in the Configuration/Setup Utility program, on a label on the system board, and on a tag hanging from the front of the server. Once you have deployed your server, make sure that you remove the BMC MAC address tag from the front of the server so that it does not impede airflow through the front of the server.

Using the baseboard management controller firmware update program

Use the baseboard management controller firmware update utility program to download a baseboard management controller firmware update. This program updates the baseboard management controller firmware only and does not affect any device drivers.

Important: To ensure proper server operation, be sure to update the baseboard management controller firmware before you update the BIOS code.

To download the program, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>, select **System x3455** from the **Hardware** list, and click **Go**. Click the **Download** tab, and search for BMC software; then, copy the file `Flash.exe` to a firmware update CD or diskette.

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

- If the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained it, follow the instructions that come with the package.

- If you are using a CD or diskette, complete the following steps.
 1. Turn on the server.
 2. If you are using a CD, insert the firmware update CD into the CD-RW/DVD drive.
If you are using a diskette, insert the firmware update diskette into the external USB diskette drive.
 3. From a command line, type `flash -?` and press Enter.

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

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

Chapter 5. Updating IBM Director

If you plan to use IBM Director to manage the server, you must check for the latest applicable IBM Director updates and interim fixes.

To install the IBM Director updates and any other applicable updates and interim fixes, complete the following steps:

1. Check for the latest version of IBM Director:
 - a. Go to http://www.ibm.com/servers/eserver/xseries/systems_management/xseries_sm/dwnl.html.
 - b. If a newer version of IBM Director than what comes with the server is shown in the drop-down list, follow the instructions on the Web page to download the latest version.
2. Install the IBM Director program.
3. Download and install any applicable updates or interim fixes for the server:
 - a. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>.
 - b. From the **Hardware** list, select **System x3455**.
 - c. From the **Software** list, select the operating environment of the server and click **Go**.
 - d. Under **Fixes and drivers**, select the choice for your operating system.
 - e. Select any applicable update or interim fix that you want to download.
 - f. Click the file link for the executable file to download the file, and follow the instructions in the readme file to install the update or interim fix.
 - g. Repeat steps 3e and 3f for any additional updates or interim fixes that you want to install.

Chapter 6. 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 71, the *Problem Determination and Service Guide* on the IBM System x Documentation CD, and the “Server Support” flowchart in the front of this document.

Note: If any of the following server components requires replacement, see the *Problem Determination and Service Guide* on the IBM System x Documentation CD for additional information and instructions:

- Battery
- CD or DVD backplane
- (Trained service technician only) Microprocessors and heat sinks
- Operator information panel assembly
- Power supply (non-hot-swap)
- (Trained service technician only) System board

Diagnostic tools overview

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

- **POST beep codes**

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

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

See “POST beep codes” on page 46 and 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 57 for more information.

- **Diagnostic programs and error messages**

The system diagnostic programs are provided on a CD. These programs test the major components of the server. See the *Problem Determination and Service Guide* on the IBM System x Documentation CD for more information.

- **Error LEDs**

Use the error LEDs to diagnose system errors quickly. See the *Problem Determination and Service Guide* on the IBM System x Documentation CD 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.

One beep

POST was completed successfully without detecting any errors.

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 a list of the error codes that might appear during POST. See the *Problem Determination and Service Guide* on the IBM System x Documentation CD for more information about the POST error codes. To check for updated technical information, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>, select **System x3455**, and click **Go**; then, click the **Install and use** tab and click **Product documentation**.

Table 3. List of POST error codes

<ul style="list-style-type: none">• 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 <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.		
Error code	Description	Action
062	Three consecutive boot failures using the default configuration.	<ol style="list-style-type: none">1. Run the Configuration/Setup Utility program, save the configuration, and restart the server.2. Update the system firmware to the latest level (see “Updating the firmware” in the <i>Problem Determination and Service Guide</i>).3. Reseat the following components, one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. System-board batteryb. (Trained service technician only) Microprocessor 14. Replace the components listed in step 3, one at a time, in the order shown, restarting the server each time.

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
101, 102	System and microprocessor error.	1. (Trained service technician only) Replace the system board.
151	Real-time clock error.	<ol style="list-style-type: none"> 1. Reseat the battery. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. System-board battery b. (Trained service technician only) System board
161	Real-time clock battery error.	<ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> a. System-board battery b. (Trained service technician only) System board

Table 3. List of POST error codes (continued)

Error code	Description	Action
162	Device configuration error.	<ul style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the following components, one at a time, in the order shown, restarting the server each time: <ul style="list-style-type: none"> a. System-board battery b. Failing device (if the device is a FRU, the device must be reseated by a trained service technician only) 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ul style="list-style-type: none"> a. System-board battery b. Failing device (if the device is a FRU, the device must be replaced by a trained service technician only) c. (Trained service technician only) System board
163	Real-time clock error. (time of day not set)	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> a. System-board battery b. (Trained service technician only) System board

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
164	Memory configuration changed.	<ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board
175	Bad EEPROM CRC #1.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board.
184	Power-on password damaged.	<ol style="list-style-type: none"> 1. Restart the server and enter the administrator password. Run the Configuration/Setup Utility program, select Load Default Settings; then, reset the power-on password 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: <ol style="list-style-type: none"> a. System-board battery b. (Trained service technician only) System board
187	VPD serial number not set.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, set the serial number, and save the configuration. 2. (Trained service technician only) Replace the system board.

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
188	Bad EEPROM CRC #2.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reflash or update firmware for the BMC. 3. (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.
198	Microprocessor speed mismatch detected	<ol style="list-style-type: none"> 1. Make sure that the correct microprocessors are installed. See “Parts listing” in the <i>Problem Determination and Service Guide</i> for a list of supported microprocessors. 2. (Trained service technician only) If the wrong microprocessors are installed, replace them with the correct microprocessors. If the server contains two microprocessors, both microprocessors must be the same type and have the same speed.
201	Memory test error.	<ol style="list-style-type: none"> 1. Make sure that the DIMM is installed correctly (see “Installing a memory module” on page 11). 2. Reseat the DIMM. 3. Replace the DIMM. 4. (Trained service technician only) Replace the system board.

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
289	A DIMM has been disabled by the user or by the system.	<ol style="list-style-type: none"> 1. If the DIMM was disabled by the user, run the Configuration/Setup Utility program and enable the DIMM. 2. Make sure that the DIMM is installed correctly (see “Installing a memory module” on page 11). 3. Reseat the DIMM. 4. Replace the DIMM. 5. (Trained service technician only) Replace the system board.
301	Keyboard or keyboard controller error.	<ol style="list-style-type: none"> 1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. Reseat the keyboard cable in the connector. 3. If you are using an external 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: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
303	Keyboard controller error.	<ol style="list-style-type: none"> 1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. Reseat the keyboard cable in the connector. 3. If you are using an external 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: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board
1162	Serial port configuration error.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board.

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
1762	Hard drive configuration error.	<ol style="list-style-type: none"> 1. Run the hard disk drive diagnostics tests on drive x. 2. Reseat the following components: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cables 3. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cables c. (Trained service technician only) System board
1801	An adapter has requested memory resources that are not available	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and verify that sufficient memory is installed in the server. 2. Run the Configuration/Setup Utility program and disable some other resources to make more space available. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Each adapter b. (Trained service technician only) System board
1803	No memory above 1 MB for PCI Express adapter.	<ol style="list-style-type: none"> 1. Check that the memory addresses for all installed adapters are set correctly in the Configuration/Setup Utility program. 2. Reseat the adapter. 3. Replace the adapter. 4. (Trained service technician only) Replace the system board.

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Error code	Description	Action
1962	A hard disk drive does not contain a valid boot sector.	<ol style="list-style-type: none"> 1. Make sure that a startable operating system is installed. 2. Run the hard disk drive diagnostic tests. 3. Reseat the following components: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cables 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Hard disk drive cables b. Hard disk drive c. (Trained service technician only) System board d. Power supply
2462	Video memory configuration error.	<ol style="list-style-type: none"> 1. Optional video adapter (if installed) 2. (Trained service technician only) System board
8603	Pointing device error.	<ol style="list-style-type: none"> 1. Reseat the pointing-device cable. 2. If you are using an external USB hub, disconnect the pointing device from the hub and connect it directly to the server. 3. Replace the pointing device. 4. (Trained service technician only) Replace the system board.

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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	Microprocessor machine check error.	<ol style="list-style-type: none"> 1. Update the server BIOS (see “Updating the firmware” in the <i>Problem Determination and Service Guide</i>). 2. (Trained service technician only) Reseat the following components: <ol style="list-style-type: none"> a. Microprocessor 1 b. Microprocessor 2 (if present) 3. (Trained service technician only) Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Microprocessor 1 b. Microprocessor 2 (if present) c. System board
00180700	PCI Express device not responding.	(Trained service technician only) Replace the system board.
012980xx	No update data for microprocessor xx.	<ol style="list-style-type: none"> 1. Update the BIOS code again (see “Updating the firmware” in the <i>Problem Determination and Service Guide</i>). 2. (Trained service technician only) Replace microprocessor xx.
01298200	Microprocessor speed mismatch	<ol style="list-style-type: none"> 1. Make sure that the correct microprocessors are installed. See “Parts listing” in the <i>Problem Determination and Service Guide</i> for a list of supported microprocessors. 2. (Trained service technician only) If the wrong microprocessors are installed, replace them with the correct microprocessors. If the server contains two microprocessors, both microprocessors must be the same type and have the same speed.

Table 3. List of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
19990650	AC power has been restored.	<ol style="list-style-type: none"> 1. Check the power cables. 2. Check for interruption of the ac power supply.

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 the problem in these tables, run the diagnostic programs (see “Running the diagnostic programs” in the *Problem Determination and Service Guide*).

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

1. Check the diagnostics LEDs on the operator information panel, power supply, and the system board (see the *Problem Determination and Service Guide*).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

CD or DVD drive problems

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

Symptom	Action
The CD or DVD drive is not recognized.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The IDE channel to which the CD or DVD drive is attached (primary) is enabled in the Configuration/Setup Utility program.• All cables and jumpers are installed correctly.• The correct device driver is installed for the CD or DVD drive.2. Run the CD or DVD drive diagnostic programs.3. Reseat the following components:<ol style="list-style-type: none">a. CD or DVD driveb. CD or DVD drive cable4. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. CD or DVD driveb. CD or DVD drive cablec. CD or DVD drive backplaned. (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.

Symptom	Action
The CD or DVD is not working correctly.	<ol style="list-style-type: none"> 1. Clean the CD or DVD drive. 2. Run the CD or DVD drive diagnostic programs. 3. Reseat the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. CD or DVD drive b. CD or DVD drive cable 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. CD or DVD drive b. CD or DVD drive cable c. CD or DVD drive backplane d. (Trained service technician only) System board
The CD or DVD drive tray is not working.	<ol style="list-style-type: none"> 1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the CD or DVD drive cable. 4. Replace the CD or 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
An LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

Hard disk drive problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Reseat the hard disk drive signal cable at both ends; then, run the hard disk drive diagnostic test again. 2. 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.	<ol style="list-style-type: none"> 1. Reseat the hard disk drive signal cable at both ends; then, run the hard disk drive diagnostic test again. 2. Remove the hard disk drive that was being tested when the server stopped responding, and run the diagnostic test again. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.
A hard disk drive was not detected while the operating system was being started.	Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again.
A hard disk drive that you are installing does not fit correctly in the cage.	Make sure that the type of drive is correct for this server (see “Parts listing” in the <i>Problem Determination and Service Guide</i>).

Intermittent problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached devices. • There is adequate cooling airflow. Reduced airflow due to a failed fan or an internal or external obstruction can cause the server to overheat and shut down. 2. Check the BMC log (see “Error logs” in the <i>Problem Determination and Service Guide</i>).

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The server resets (restarts) occasionally.	<ol style="list-style-type: none"> 1. If the reset occurs during POST and the POST watchdog timer is enabled (click Advanced Setup --> Baseboard Management Controller (BMC) Setting --> BMC Post Watchdog in the Configuration/Setup Utility program to see the POST watchdog setting), make sure that sufficient time is allowed in the watchdog timeout value (BMC POST Watchdog Timeout). See the <i>User's Guide</i> for information about the settings in the Configuration/Setup Utility program. If the server continues to reset during POST, see “POST” and “Diagnostic programs, messages, and error codes” in the <i>Problem Determination and Service Guide</i>. 2. If the reset occurs after the operating system starts, disable any automatic server restart (ASR) utilities, such as the IBM Automatic Server Restart IPMI Application for Windows, or ASR devices that might be installed. Note: ASR utilities operate as operating-system utilities and are related to the IPMI device driver. If the reset continues to occur after the operating system starts, the operating system might have a problem; see “Software problems” on page 68. 3. If neither condition applies, check the BMC log (see “Error logs” in the <i>Problem Determination and Service Guide</i>).

USB keyboard, mouse, or pointing-device problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. Make sure that: <ul style="list-style-type: none"> • The keyboard cable is securely connected. • The server and the monitor are turned on. 3. Reseat the keyboard cable. 4. If you are using an external USB hub, disconnect the keyboard from the hub and connect it directly to the server. 5. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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 USB mouse or USB pointing device does not work.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The mouse or pointing-device USB cable is securely connected to the server, and the keyboard and the device drivers are installed correctly. • The server and the monitor are turned on. • Keyboardless operation has been enabled in the Configuration/Setup Utility program. 2. Reseat the mouse or pointing-device cable. 3. If you are using an external USB hub, disconnect the mouse or pointing device from the hub and connect it directly to the server. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Mouse or pointing device b. (Trained service technician only) System board

Memory problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • No error LED is lit on the operator information panel. • If memory sparing is enabled, the installed DIMMs are configured correctly. (For information about the types of DIMMs that the server supports and other information that you must consider when installing DIMMs, see “Installing a memory module” on page 11.) • The DIMMs are seated correctly. • You have installed the correct type of memory. See “Installing a memory module” on page 11. • If the server uses only one microprocessor, no DIMMs are installed in positions 7 through 12. 2. Run memory diagnostics (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i>). 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
Multiple rows of DIMMs in a branch are identified as failing.	<ol style="list-style-type: none"> 1. Reseat the DIMMs; then, restart the server. 2. Replace the lowest-numbered DIMM pair of those identified; then, restart the server. Repeat as necessary. 3. (Trained service technician only) Replace the system board.

Microprocessor problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	<p>Attention:</p> <ul style="list-style-type: none"> • The server will not start if microprocessor socket 1 (connector CPU1) is empty. • If only one microprocessor is installed, it must be in socket 1 (connector CPU1). For socket location and installation instructions, see “Installing an additional microprocessor” on page 20. <ol style="list-style-type: none"> 1. Correct any errors that are indicated by the error LEDs (see “System board error LEDs and the light path button” in the <i>Problem Determination and Service Guide</i>). 2. Make sure that the server supports the microprocessor. See “Parts listing” in the <i>Problem Determination and Service Guide</i> for a list of supported microprocessors. 3. (Trained service technician only) Make sure that the microprocessor is seated correctly. 4. (Trained service technician only) Replace the microprocessor. 5. (Trained service technician only) Replace the system board.

Monitor or video problems

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

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Make sure that the monitor cables are firmly connected. 2. Try using a different monitor on the server, or try testing the monitor on a different server. 3. If you are using a USB-connected monitor with an external USB hub, disconnect the monitor from the hub and connect it directly to the server. 4. Run the diagnostic programs (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i>). If the monitor passes the diagnostic programs, the problem might be a video device driver. 5. (Trained service technician only) Replace the system board
The screen is blank.	<ol style="list-style-type: none"> 1. If you are using an external USB hub, disconnect the monitor from the hub and connect it directly to the server. 2. Make sure that: <ul style="list-style-type: none"> • The server is turned on. If there is no power to the server, see “Power problems” on page 66. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. • No beep codes sound when the server is turned on, other than a single beep, which indicates successful POST completion. 3. Make sure that the correct server is controlling the monitor, if applicable. 4. Make sure that damaged BIOS code is not affecting the video; see “Updating the firmware” and “Recovering from a BIOS update failure” in the <i>Problem Determination and Service Guide</i>. 5. See “Solving undetermined problems” in the <i>Problem Determination and Service Guide</i>.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application. 2. Run video diagnostics (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i>). <ul style="list-style-type: none"> • If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” in the <i>Problem Determination and Service Guide</i>. • (Trained service technician only) If the server fails the video diagnostics, replace the system board.

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

Symptom	Action
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<ol style="list-style-type: none"> 1. If the monitor self-tests show the that monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. Attention: Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. Notes: <ol style="list-style-type: none"> a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor cable b. Monitor c. (Trained service technician only) System board
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the BIOS code with the correct language (see “Updating the firmware” in the <i>Problem Determination and Service Guide</i>). 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor b. (Trained service technician only) System board

Optional-device problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The device is designed for the server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/). • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or any other device is changed, you must update the configuration. 2. Reseat the device that you just installed. 3. Replace the device that you just installed.
An IBM optional device that worked previously does not work now.	<ol style="list-style-type: none"> 1. Make sure that all of the hardware and cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. Reseat the failing device. 4. Replace the failing device.

Power problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
<p>The power-control button does not work.</p> <p>Note: The power-control button will not function until 20 seconds after the server has been connected to ac power.</p>	<ol style="list-style-type: none"> 1. Make sure that the power-control button is working correctly: <ol style="list-style-type: none"> a. Disconnect the server power cord. b. Reconnect the power cord. c. Press the power-control button. d. If the server does not start, disconnect the server power cord and reseal the operator information panel cables; then, repeat steps 1a through 1c. If the problem remains, replace the operator information panel. 2. Make sure that: <ul style="list-style-type: none"> • The power cord is correctly connected to the server and to a working electrical outlet. • (Trained service technician only) The microprocessor is correctly installed. 3. If you just installed an optional device, remove it, and restart the server. If the server now turns on, you might have installed more devices than the power supply supports. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Power supply b. (Trained service technician only) System board 5. See “Solving undetermined problems” in the <i>Problem Determination and Service Guide</i>.
<p>The server does not turn off.</p>	<p>Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps.</p> <ol style="list-style-type: none"> 1. Press Ctrl+Alt+Delete. 2. Turn off the server by pressing the power-control button for 5 seconds. 3. Restart the server. 4. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server.
<p>The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.</p>	<p>See “Solving undetermined problems” in the <i>Problem Determination and Service Guide</i>.</p>

Serial port problems

For more information about the serial port, see the *User's Guide* on the IBM System x Documentation CD.

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports is disabled. • The serial-port adapter (if one is present) is seated correctly. 2. Reseat the serial port adapter. 3. Replace the serial port adapter.
A serial device does not work.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct connector (see “Internal LEDs, connectors, and jumpers” in the <i>Problem Determination and Service Guide</i>). 2. Reseat the following components: <ol style="list-style-type: none"> a. Failing serial device b. Serial cable 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Failing serial device b. Serial cable c. (Trained service technician only) System board

ServerGuide problems

The following table lists problem symptoms and suggested solutions.

Table 4. ServerGuide Setup and Installation CD

Symptom	Suggested action
The <i>ServerGuide Setup and Installation</i> CD will not start.	<ul style="list-style-type: none"> • Make sure that the server supports the ServerGuide program and has a startable (bootable) CD (or DVD) drive. • If the startup (boot) sequence settings have been altered, make sure that the CD or DVD drive is first in the startup sequence. • If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. See the <i>ServerGuide Setup and Installation</i> CD label for a list of operating-system versions that support the ServerGuide program.
The operating system cannot be installed; the option is not available.	Make sure that the server supports the operating system. Run the ServerGuide program and make sure that setup is complete.

Software problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. To determine whether the problem is caused by the software, make sure that: <ul style="list-style-type: none"> • The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, the server might have a memory-address conflict. • The software is designed to operate on the server. • Other software works on the server. • The software works on another server. 2. If you receive any error messages while you are using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact your place of purchase of the software.

Universal Serial Bus device problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • 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 <i>User's Guide</i> on the IBM System x Documentation CD for more information). 3. If you are using an external USB hub, disconnect the USB device from the hub and connect it directly to the server.

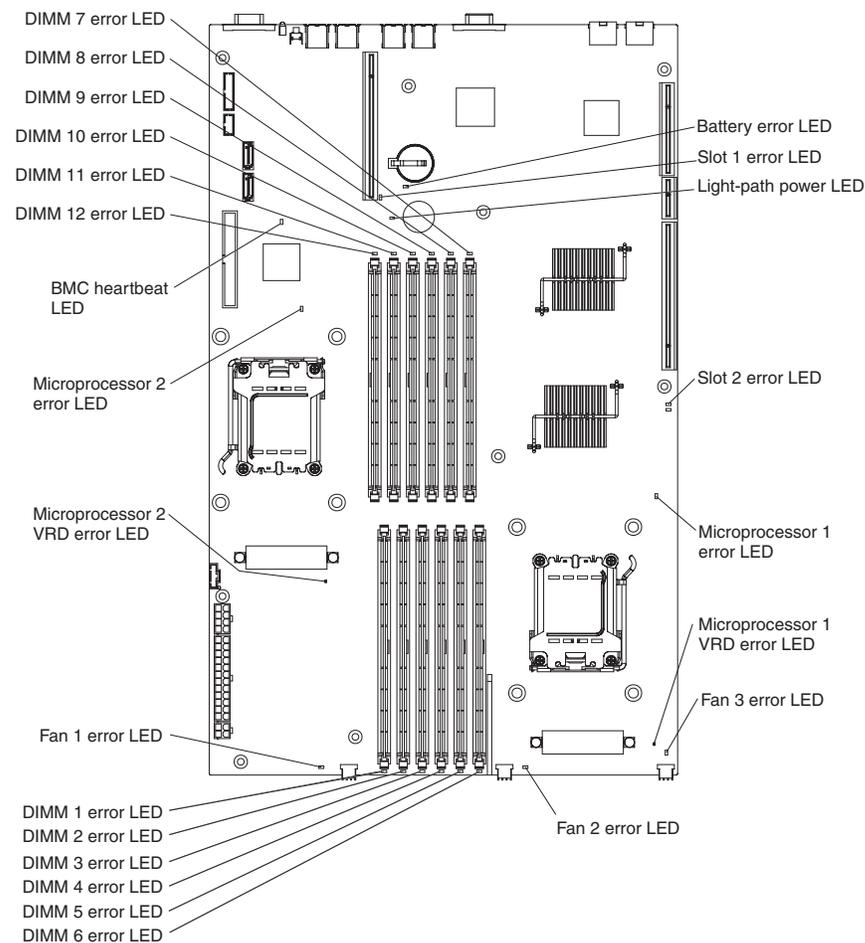
System-board error LEDs and light path button

When the system-board error LEDs are lit to indicate an error, they remain lit when the server is turned off, provided that the server is still connected to power and the power supply is operating correctly.

Before you work inside the server to view error LEDs, read the safety information that begins on page v and “Handling static-sensitive devices” on page 8.

After you turn off the server and peripheral devices, remove the server cover and look inside the server for lit LEDs. A lit LED on or beside a component identifies the component that is causing the error. For additional information about the error LEDs, see the *Problem Determination and Service Guide* on the IBM System x Documentation CD.

The following illustration shows the LEDs on the system board.



When you press the light path button, the light-path power LED (green) comes on. The light path button enables you to review error indications after the server has been turned off. Press and hold the button, which is behind the operator information panel, to relight the error LEDs that were lit before you removed power from the server. These LEDs and the light-path power LED will remain lit for as long as you press the button, to a maximum of 30 seconds.

Appendix A. Getting help and technical assistance

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

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.

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

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

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

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x and xSeries information is <http://www.ibm.com/systems/x/>. The address for IBM IntelliStation information is <http://www.ibm.com/intellistation/>.

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

Software service and support

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

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/>, or 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

Important: When you call for service, you will be asked to provide the four-digit machine type of your system, which is 7984 or 7986.

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:
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Taipei, Taiwan
Telephone: 0800-016-888

Appendix B. Notices

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

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

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

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

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Avis de conformité à la réglementation d'Industrie Canada

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United Kingdom telecommunications safety requirement

Notice to Customers

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