

IBM xSeries 100 Type 8486



# Problem Determination and Service Guide



IBM xSeries 100 Type 8486



# Problem Determination and Service Guide

**Note:** Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 97.

**Second Edition (January 2006)**

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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.

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## Guidelines for trained service technicians

This section contains information for trained service technicians.

### Inspecting for unsafe conditions

Use the information in this section to help you identify potential unsafe conditions in an IBM® product that you are working on. Each IBM product, as it was designed and manufactured, has required safety items to protect users and service technicians from injury. The information in this section addresses only those items. Use good judgment to identify potential unsafe conditions that might be caused by non-IBM alterations or attachment of non-IBM features or options that are not addressed in this section. If you identify an unsafe condition, you must determine how serious the hazard is and whether you must correct the problem before you work on the product.

Consider the following conditions and the safety hazards that they present:

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

To inspect the product for potential unsafe conditions, complete the following steps:

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
  - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
  - Make sure that the power cord is the correct type, as specified in “Power cords” on page 52.
  - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## Guidelines for servicing electrical equipment

Observe the following guidelines when servicing electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, power surges, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical currents.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.
- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.
- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
  - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
  - When you are working with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
  - When using a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when measuring high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

---

## Safety statements

### **Important:**

Each caution and danger statement in this documentation begins with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

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

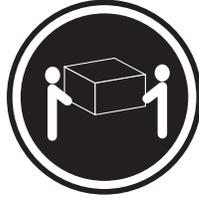


**DANGER**

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.

**Statement 4:**



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



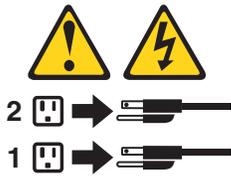
≥ 55 kg (121.2 lb)

**CAUTION:**  
Use safe practices when lifting.

**Statement 5:**



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



**Statement 8:**



**CAUTION:**

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



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

**Statement 10:**



**CAUTION:**

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



>82 kg (180 lb)

---

## Chapter 1. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM xSeries® 100 Type 8486 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

---

## Related documentation

In addition to this document, the following documentation also comes with the server:

- *Installation Guide*

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

- *User's Guide*

This document is in Portable Document Format (PDF) on the IBM *xSeries Documentation* CD. It provides general information about the server, including information about features, and how to configure the server. It also contains detailed instructions for installing, removing, and connecting optional devices that the server supports.

- *Rack Installation Instructions*

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

- *Safety Information*

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

- *Warranty and Support Information*

This document is in PDF on the *xSeries Documentation* CD. It contains information about the terms of the warranty and getting service and assistance.

Depending on the server model, additional documentation might be included on the IBM *xSeries Documentation* CD.

The server might have features that are not described in the documentation that you received with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation.

These updates are available from the IBM Web site. Complete the following steps to check for updated documentation and technical updates.

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

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 8486 and click **Search**.

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## Notices and statements in this document

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

The following notices and statements are used in this document:

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

## Features and specifications

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

Table 1. Features and specifications

<p><b>Microprocessor:</b></p> <ul style="list-style-type: none"> <li>• Intel® Pentium® 4 or Celeron Processor</li> <li>• 1 MB Level-2 or 256 KB level-2 cache</li> <li>• 800 MHz front-side bus (FSB) or 533 MHz front-side bus</li> </ul> <p><b>Note:</b> Use the Configuration/Setup Utility program to determine the type and speed of the microprocessor.</p> <p><b>Memory:</b></p> <ul style="list-style-type: none"> <li>• Minimum: 256 MB</li> <li>• Maximum: 8 GB</li> <li>• Types: PC2-4200, double-data-rate 2 (DDR2) with ECC</li> <li>• Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved</li> </ul> <p><b>Drives:</b> (depending on your model)</p> <ul style="list-style-type: none"> <li>• Diskette: (optional) 1.44 MB (two mode)</li> <li>• Hard disk drive: SATA</li> <li>• One of the following IDE drives: <ul style="list-style-type: none"> <li>– CD-ROM</li> <li>– CD-RW (optional)</li> <li>– DVD-ROM (optional)</li> <li>– DVD/CD-RW combo (optional)</li> </ul> </li> </ul> <p><b>Expansion bays:</b> (depending on your model)</p> <ul style="list-style-type: none"> <li>• Two 5.25-in. bays (one CD or DVD drive installed)</li> <li>• One 3.5-in. removable-media drive bays (optional)</li> <li>• Two 3.5-in. hard disk drive bays (one hard disk drive installed)</li> </ul> <p><b>Expansion slots:</b></p> <ul style="list-style-type: none"> <li>• One PCI Express x1</li> <li>• One PCI Express x8</li> <li>• Two PCI 32-bit/33 MHz</li> </ul> <p><b>Video controller:</b> ATI ES1000 video controller with 16 MB SDRAM video memory on the system board</p> <p><b>Fans:</b> Two speed-controlled fans</p>	<p><b>Power supply:</b> One 310 watt (90-240 V ac)</p> <p><b>Important:</b> Make sure that the ac power supply input voltage is set to the right level (between 110 V ac and 220 V ac) for your geographic location before powering on the system.</p> <p><b>Size:</b></p> <ul style="list-style-type: none"> <li>• Height: 438 mm (17.24 in.)</li> <li>• Depth: 497 mm (19.57 in.)</li> <li>• Width: 205 mm (8.07 in.)</li> <li>• Weight: 14 kg (31 lb) to 17 kg (37.48 lb) depending upon configuration</li> </ul> <p><b>Integrated functions:</b></p> <ul style="list-style-type: none"> <li>• Broadcom 5721 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet port</li> <li>• Two serial ports</li> <li>• One parallel port</li> <li>• Two-port Serial ATA controller</li> <li>• Four Universal Serial Bus (USB) v2.0 ports (two on front and two on rear)</li> <li>• Keyboard port</li> <li>• Mouse port</li> <li>• ATA-100 single-channel IDE controller</li> <li>• ATI ES1000 video <ul style="list-style-type: none"> <li>– Compatible with SVGA and VGA</li> <li>– 16 MB video memory</li> </ul> </li> </ul> <p><b>Diagnostic LEDs:</b></p> <ul style="list-style-type: none"> <li>• Fans</li> <li>• Memory</li> <li>• Microprocessor</li> </ul> <p><b>Acoustical noise emissions:</b></p> <ul style="list-style-type: none"> <li>• Sound power, idling: 5.0 bel</li> <li>• Sound power, operating: 5.5 bel</li> </ul>	<p><b>Environment:</b></p> <ul style="list-style-type: none"> <li>• Air temperature: <ul style="list-style-type: none"> <li>– Server on: 10° to 35°C (50° to 95°F)</li> <li>– Altitude: 0 to 914 m (2998.0 ft)</li> <li>– Server off: 0° to 60°C (-32° to 140°F)</li> <li>– Altitude: 0 to 2133 m (7000.0 ft)</li> </ul> </li> <li>• Humidity (operating and storage): 8% to 80%</li> </ul> <p><b>Heat output:</b></p> <p>Approximate heat output in British thermal units (Btu) per hour</p> <ul style="list-style-type: none"> <li>• Minimum configuration: 379 Btu (111 watts) per hour</li> <li>• Maximum configuration: 853 Btu (250 watts) per hour</li> </ul> <p><b>Electrical input:</b></p> <ul style="list-style-type: none"> <li>• Sine-wave input (50 or 60 Hz) required</li> <li>• Input voltage and frequency ranges manually selected</li> <li>• Input voltage low range: <ul style="list-style-type: none"> <li>– Minimum: 100 V ac</li> <li>– Maximum: 127 V ac</li> </ul> </li> <li>• Input voltage high range: <ul style="list-style-type: none"> <li>– Minimum: 200 V ac</li> <li>– Maximum: 240 V ac</li> </ul> </li> <li>• Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> <li>– Minimum: 0.15 kVA (all models)</li> <li>– Maximum: 0.59 kVA</li> </ul> </li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>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.</li> <li>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.</li> </ol>
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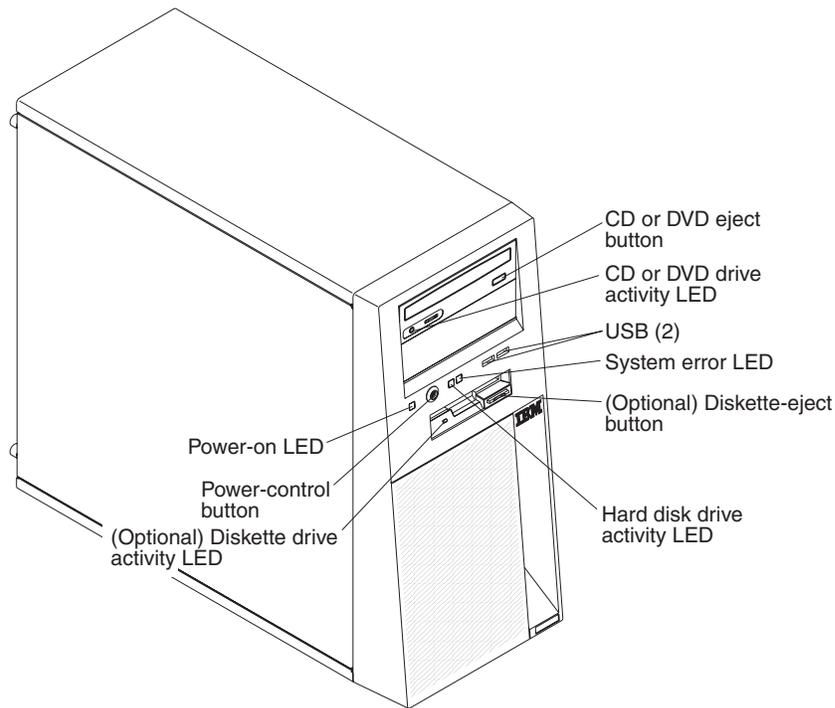
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## Server controls, LEDs, and connectors

This section describes the controls, light-emitting diodes (LEDs), and connectors on the front and rear of the server.

### Front view

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



#### **CD or DVD-eject button**

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

#### **CD or DVD drive activity LED**

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

#### **USB connectors**

Connect a USB device to these connectors.

#### **System-error LED**

When this amber LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error.

#### **(Optional) Diskette-eject button**

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

#### **Hard disk drive activity LED**

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

#### **(Optional) Diskette drive activity LED**

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

#### **Power-control button**

Press this button to turn the server on and off manually. A power-control-button shield comes with the server.

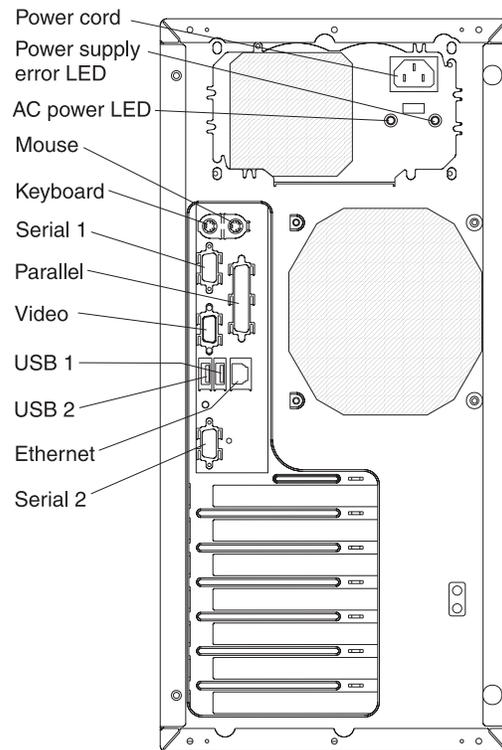
### Power-on LED

When this LED is lit, it indicates that the server is turned on. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed.

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

## Rear view

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



### Power-cord connector

Connect the power cord to this connector.

### Power supply error LED

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

### AC power LED

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

### Mouse connector

Connect a mouse or other PS/2<sup>®</sup> device to this connector.

### Keyboard connector

Connect a PS/2 keyboard to this connector.

### Serial 1 connector

Connect a 9-pin serial device to this connector.

**Parallel connector**

Connect a parallel device to this connector.

**Video connector**

Connect a monitor to this connector.

**USB 1 connector**

Connect a USB device to this connector.

**USB 2 connector**

Connect a USB device to this connector.

**Ethernet connector**

Use this connector to connect the server to a network.

**Serial 2 connector**

Connect a 9-pin serial device to this connector.

**Ethernet link status LED**

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

**Ethernet transmit/receive activity LED**

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

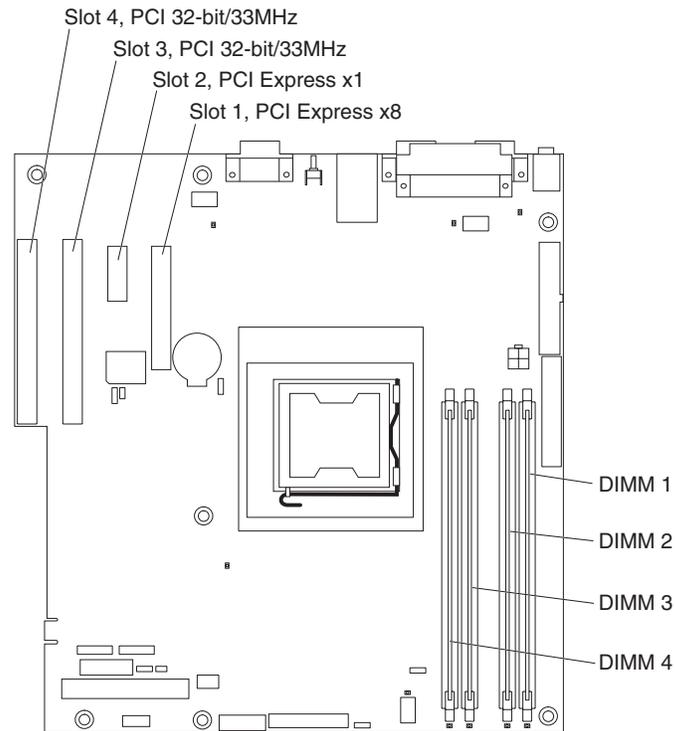
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## Internal LEDs, connectors, and jumpers

The following illustrations show the connectors, LEDs, and jumpers on the internal boards. The illustrations might differ slightly from your hardware.

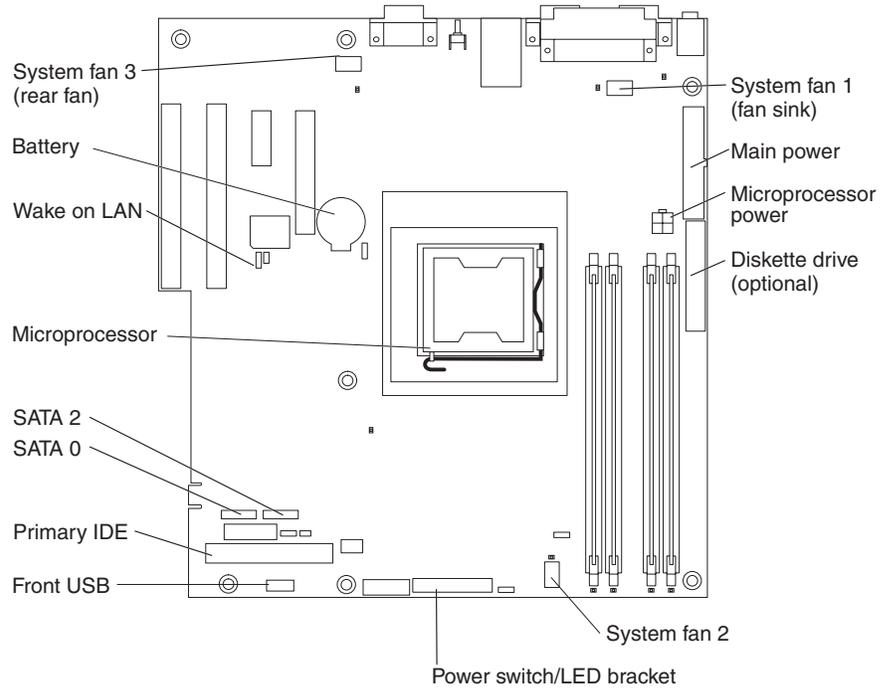
## System-board option connectors

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



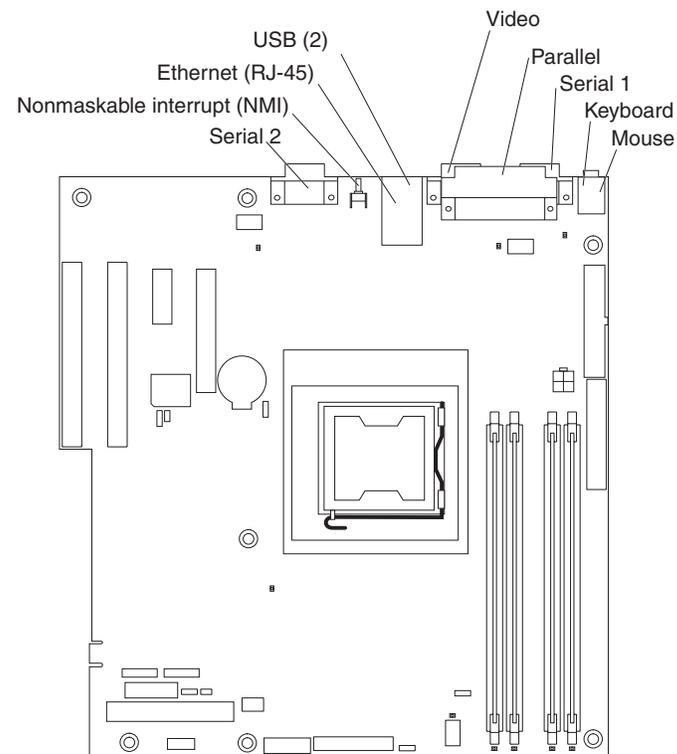
# System-board internal connectors

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



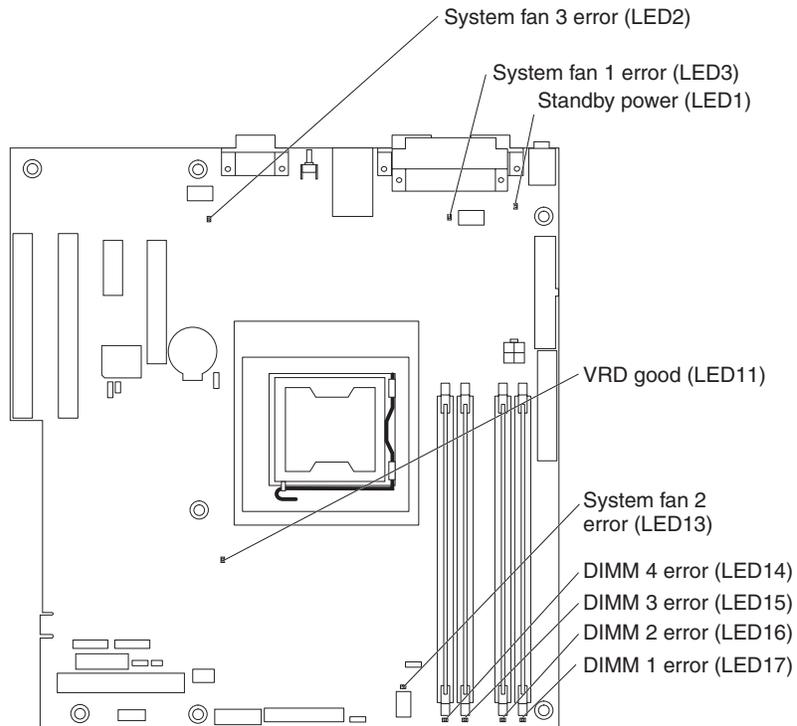
## System-board external connectors

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



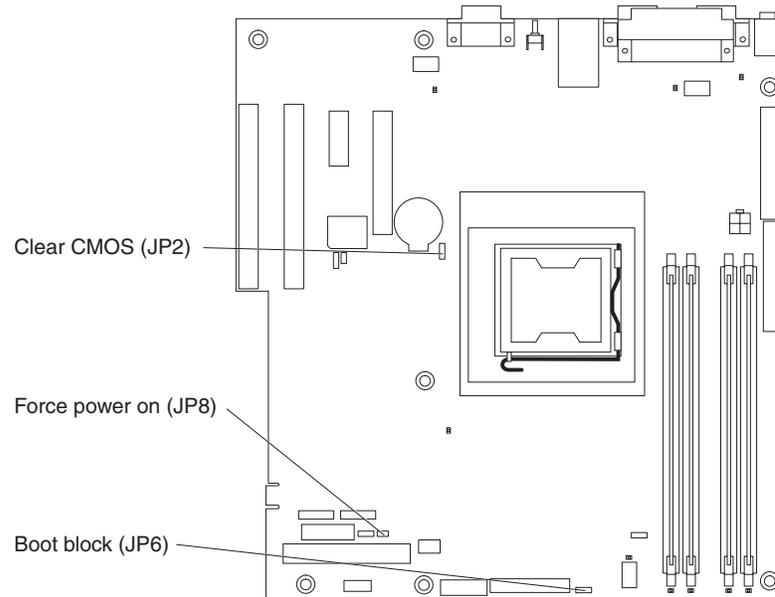
## System-board LEDs

The following illustration shows the light-emitting diodes (LEDs) on the system board.



## System-board jumpers

The following illustration shows the jumper blocks on the system board.



Any jumper blocks on the system board that are not shown in the illustration are reserved. The following table describes the function of each jumper block.

Table 2. System-board jumper blocks

Jumper name	Description
Clear CMOS (JP2)	<ul style="list-style-type: none"> <li>Pins 1 and 2: Keep CMOS data (default)</li> <li>Pins 2 and 3: Clear the CMOS data, which clears the power-on password</li> </ul> <p><b>Note:</b> Changing the position of this jumper does not affect the administrator password check if an administrator password is set. If the administrator password is set and forgotten, the system board must be replaced.</p>
Force power-on (JP8)	<ul style="list-style-type: none"> <li>Pins 1 and 2: Use the power-control button to start the server (default)</li> <li>Pins 2 and 3: Start up the server when ac power is connected</li> </ul>
Boot block (JP6)	<ul style="list-style-type: none"> <li>Pins 1 and 2: Normal (default)</li> <li>Pins 2 and 3: Recover boot block (see “Recovering from a BIOS update failure” on page 44)</li> </ul>



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## Chapter 2. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur in the server.

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 95 for more information.

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### Diagnostic tools

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

- **POST beep codes, error messages, and error logs**

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

- **Troubleshooting tables**

These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 25.

- **System-board error LEDs**

An LED on the system board might also be lit to help isolate an error that is indicated by the system-error LED on the front of the server. See “System-board LEDs” on page 10 for more information.

- **Diagnostic programs, messages, and error messages**

The diagnostic programs are the primary method of testing the major components of the server. The diagnostic programs are on the *IBM Enhanced Diagnostics* CD. See “Diagnostic programs, messages, and error codes” on page 37 for more information.

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### POST

When you turn on the server, it performs a series of tests to check the operation of the server components and some optional devices in the server. This series of tests is called the power-on self-test, or POST.

If a power-on password is set, you must type the password and press Enter, when prompted, for POST to run.

If POST is completed without detecting any problems, no beeps sound, and the server startup is completed.

If POST detects a problem, several beeps might sound, or an error message is displayed. See “POST beep codes” and “POST error codes” on page 16 for more information.

### POST beep codes

A beep code is a combination of short or long beeps or series of short beeps that are separated by pauses. For example, a “1-2-3” beep code is one short beep, a pause, two short beeps, and pause, and three short beeps. A beep code indicates that POST has detected a problem.

The following table describes the beep codes and suggested actions to correct the detected problems.

A single problem might cause more than one error message. When this occurs, correct the cause of the first error message. The other error messages usually will not occur the next time POST runs.

**Exception:** If there are multiple error codes that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 30 for information about diagnosing microprocessor problems.

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>		
Beep code	Description	Action
1-1-3	CMOS write/read test failed.	<ol style="list-style-type: none"> <li>1. Reseat the battery.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
1-1-4	BIOS ROM checksum failed.	<ol style="list-style-type: none"> <li>1. Recover the BIOS code.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
1-2-1	Programmable interval timer failed.	(Trained service technician only) Replace the system board.
1-2-2	DMA initialization failed.	(Trained service technician only) Replace the system board.
1-2-3	DMA page register write/read failed.	(Trained service technician only) Replace the system board.
1-2-4	RAM refresh verification failed.	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. DIMMs</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
1-3-1	First 64 K RAM test failed.	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. DIMMs</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
2-1-1	Secondary DMA register failed.	(Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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.

Beep code	Description	Action
2-1-2	Primary DMA register failed.	(Trained service technician only) Replace the system board.
2-1-3	Primary interrupt mask register failed.	(Trained service technician only) Replace the system board.
2-1-4	Secondary interrupt mask register failed.	(Trained service technician only) Replace the system board.
2-2-2	Keyboard controller failed.	<ol style="list-style-type: none"> <li>1. Reseat the keyboard cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Keyboard</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
2-2-3	CMOS power failure and checksums failed	<ol style="list-style-type: none"> <li>1. Reseat the battery.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
3-1-4	Time-of-day clock failed.	<ol style="list-style-type: none"> <li>1. Reseat the battery.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
3-3-3	<p>No operational memory in system.</p> <p><b>Important:</b> In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the <b>Boot Fail Count</b> feature in the <b>Startup Option</b> menu of the Configuration/Setup Utility program is set to <b>Enabled</b> (its default setting), you must restart the computer three times to force the system BIOS to reset the memory connector from <b>Disabled</b> to <b>Enabled</b>.</p>	<ol style="list-style-type: none"> <li>1. If you just installed memory, make sure that the new memory is correct for your computer and that you have installed the correct number of DIMMs (see the <i>User's Guide</i> for information about installing optional memory modules).</li> <li>2. Reseat the DIMMs.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. DIMMs</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

## Error logs

The POST error log contains the three most recent error codes and messages that were generated during POST. The system event/error log contains messages that were generated during POST and all system status messages from the service processor.

The system event/error log is limited in size. When the log is full, new entries will not overwrite existing entries; therefore, you must periodically clear the system event/error log through the Configuration/Setup Utility program (the menu choices are described in the *User's Guide*). When you are troubleshooting an error, be sure to clear the system event/error log so that you can find current errors more easily.

Entries that are written to the system event/error log during the early phase of POST show an incorrect date and time as the default time stamp; however, the date and time are corrected as POST continues.

Each system event/error log entry appears on its own page. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys.

You can view the contents of the POST error log and the system event/error log from the Configuration/Setup Utility program. For complete information about using the Configuration/Setup Utility program, see the *User's Guide*.

To view the error logs, complete the following steps:

1. Turn on the computer.
2. When the prompt Press F1 for Configuration/Setup appears, press F1.
3. Select **Error Logs**.
4. Use one of the following procedures:
  - To view the POST error log, select **POST Error Log**.
  - To view the system event/error log, select **System Event/Error Log**

## POST error codes

The following table describes the POST error codes and suggested actions to correct the detected problems.

<ul style="list-style-type: none"><li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li><li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li><li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li></ul>		
Error code	Description	Action
062	Three consecutive boot failures using the default configuration.	<ol style="list-style-type: none"><li>1. Flash the system firmware to the latest level (see “Updating the firmware” on page 91).</li><li>2. (Trained service technician only) Replace the system board.</li></ol>
101, 102	Tick timer internal interrupt, internal timer channel 2.	(Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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
151	Real-time clock error.	<ol style="list-style-type: none"> <li>1. Reseat the battery.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
161	Real-time clock battery error.	<ol style="list-style-type: none"> <li>1. Reseat the battery.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
162	Device configuration error.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program, select <b>Load Default Settings</b>, and save the settings.</li> <li>2. Reseat the following components: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. Failing device (if the device is a FRU, the device must be replaced by a trained service technician only)</li> </ol> </li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. Failing device (if the device is a FRU, the device must be replaced by a trained service technician only)</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
163	Real-time clock error.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program, select <b>Load Default Settings</b>, make sure that the date and time are correct, and save the settings.</li> <li>2. Reseat the battery.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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
184	Power-on password damaged.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program, select <b>Load Default Settings</b>, and save the settings.</li> <li>2. Reseat the battery.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
189	An attempt was made to access the server with an incorrect password.	Restart the server and enter the administrator password; then, run the Configuration/Setup Utility program and change the power-on password.
289	A DIMM has been disabled by the user or by the system.	<ol style="list-style-type: none"> <li>1. If the DIMM was disabled by the user, run the Configuration/Setup Utility program and enable the DIMM.</li> <li>2. Make sure that the DIMM is installed correctly (see “Removing a memory module” on page 63).</li> <li>3. Reseat the DIMM.</li> <li>4. Replace the DIMM.</li> </ol>
301	Keyboard or keyboard controller error.	<ol style="list-style-type: none"> <li>1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent this error message from being displayed during startup.</li> <li>2. Reseat the keyboard cable.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Keyboard</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
303	Keyboard controller error.	<ol style="list-style-type: none"> <li>1. Reseat the keyboard cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Keyboard</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
178x	Fixed disk error (where x is the drive number).	<ol style="list-style-type: none"> <li>1. Reseat the hard disk drive x cable.</li> <li>2. Replace the hard disk drive cable.</li> <li>3. Run the hard disk drive diagnostic tests.</li> <li>4. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Hard disk drive x</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
1800	Unavailable PCI hardware interrupt.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program and adjust the adapter settings.</li> <li>2. Remove each adapter one at a time, restarting the server each time, until the problem is isolated.</li> </ol>
1801	A PCI adapter has requested memory resources that are not available.	<ol style="list-style-type: none"> <li>1. Change the order of the adapters in the PCI-X slots. Make sure that the boot device is positioned early in the scan order (see the <i>User's Guide</i> for information about the scan order).</li> <li>2. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. If the memory resource settings are not correct, change them.</li> <li>3. If all memory resources are being used, remove an adapter to make memory available to the adapter. Disabling the BIOS on the adapter should correct the error. See the documentation that comes with the adapter.</li> </ol>
1805	PCI option ROM checksum error.	<ol style="list-style-type: none"> <li>1. Remove the failing adapter.</li> <li>2. Reseat each adapter.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Failing adapter</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
1810	PCI error	<ol style="list-style-type: none"> <li>1. Remove any adapters installed in the PCI slots.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
1962	A drive does not contain a valid boot sector.	<ol style="list-style-type: none"> <li>1. Make sure that a bootable operating system is installed.</li> <li>2. Run the hard disk drive diagnostic tests.</li> <li>3. Reseat the hard disk drive cable.</li> <li>4. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Hard disk drive cable</li> <li>b. Hard disk drive</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
8603	Pointing-device error.	<ol style="list-style-type: none"> <li>1. Reseat the pointing device cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Pointing device</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
00012000	Processor machine check error.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessor.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. (Trained service technician only) Microprocessor</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
00019701	Processor 1 failed BIST.	<ol style="list-style-type: none"> <li>1. Reseat the microprocessor.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. (Trained service technician only) Microprocessor</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
01298001	No update data for processor 1.	<ol style="list-style-type: none"> <li>1. Update the BIOS code (see “Updating the firmware” on page 91).</li> <li>2. (Trained service technician only) Reseat the microprocessor.</li> <li>3. (Trained service technician only) Replace the microprocessor.</li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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
01298101	Bad update data for processor 1.	<ol style="list-style-type: none"> <li>1. Update the BIOS code again (see “Updating the firmware” on page 91).</li> <li>2. (Trained service technician only) Reseat the microprocessor.</li> <li>3. (Trained service technician only) Replace the microprocessor.</li> </ol>
I9990301	Hard disk drive boot sector error.	<ol style="list-style-type: none"> <li>1. Reseat the hard disk drive cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Hard disk drive cable</li> <li>b. Hard disk drive</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
I9990305	An operating system was not found.	<ol style="list-style-type: none"> <li>1. Make sure that a bootable operating system is installed.</li> <li>2. Run the hard disk drive diagnostic tests.</li> <li>3. Reseat the following components: <ol style="list-style-type: none"> <li>a. Hard disk drive cable</li> <li>b. CD or DVD drive cable</li> </ol> </li> <li>4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Hard disk drive cable</li> <li>b. Hard disk drive</li> <li>c. CD or DVD drive cable</li> <li>d. CD or DVD drive</li> <li>e. (Trained service technician only) System board</li> </ol> </li> </ol>
I9990650	AC power has been restored.	<ol style="list-style-type: none"> <li>1. Reseat the power cord.</li> <li>2. (Trained service technician only) Check for interruption of the external power.</li> <li>3. Replace the power cord.</li> </ol>

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## Checkout procedure

The checkout procedure is the sequence of tasks that you should follow to diagnose a problem in the server.

### About the checkout procedure

Before performing the checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information that begins on page vii.
- The diagnostic programs provide the primary methods of testing the major components of the server, such as the system board, Ethernet controller, keyboard, mouse (pointing device), serial ports, and hard disk drives. You can also use them to test some external devices. If you are not sure whether a problem is caused by the hardware or by the software, you can use the diagnostic programs to confirm that the hardware is working correctly.
- When you run the diagnostic programs, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

**Exception:** If there are multiple error codes that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 30 for information about diagnosing microprocessor problems.

- Before running the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
  - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
  - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
  - One or more servers are located near the failing server.

**Important:** If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as “quick” or “normal” tests, because this might enable the hard disk drive diagnostic tests.

- If the server is halted and a POST error code is displayed, see “Error logs” on page 16. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 25 and “Solving undetermined problems” on page 47.
- For information about power-supply problems, see “Solving power problems” on page 45.
- For intermittent problems, check the error log; see “Error logs” on page 16 and “Diagnostic programs, messages, and error codes” on page 37.

## Performing the checkout procedure

To perform the checkout procedure, complete the following steps:

1. Is the server part of a cluster?
  - **No:** Go to step 2.
  - **Yes:** Shut down all failing servers that are related to the cluster. Go to step 2.
2. Complete the following steps:
  - a. Turn off the server and all external devices.
  - b. Check all cables and power cords.
  - c. Set all display controls to the middle positions.
  - d. Turn on all external devices.
  - e. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 25.
  - f. Check the system-error LED on the front of the server. If it is lit, check the LEDs on the system board (see “System-board LEDs” on page 10).
  - g. Check for the following results:
    - Successful completion of POST, indicated by no beep sounds
    - Successful completion of startup, indicated by a readable display of the operating-system desktop
3. Did one or more beeps sound, or was a POST error code displayed?
  - **Yes:** Find the beep code or error code in “POST beep codes” on page 13 or “POST error codes” on page 16; if necessary, see “Solving undetermined problems” on page 47.
  - **No:** Find the failure symptom in “Troubleshooting tables” on page 25; if necessary, run the diagnostic programs (see “Running the diagnostic programs” on page 37).
    - If you receive an error, see “Diagnostic error codes” on page 39.
    - If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 47.

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## Checkpoint codes (trained service technicians only)

A checkpoint code identifies the check that was occurring when the server stopped; it does not provide error codes or suggest replacement components. Checkpoint codes are shown on the checkpoint display, which is on the system board. By using the checkpoint display, you do not have to wait for the video to initialize each time you restart the server.

There are two types of checkpoint codes: complex programmable logic device (CPLD) hardware checkpoint codes and BIOS checkpoint codes. The BIOS checkpoint codes might change when the BIOS code is updated.

For a list of checkpoint codes for the xSeries 100 server, see <http://w3.pc.ibm.com/helpcenter/infotips/techinfo/MIGR-58350.html>.

## ServerGuide problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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 <i>ServerGuide™ Setup and Installation</i> CD will not start.	<ul style="list-style-type: none"> <li>• Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive.</li> <li>• If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence.</li> <li>• 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.</li> </ul>
The ServeRAID™ program cannot view all installed drives, or the operating system cannot be installed.	<ul style="list-style-type: none"> <li>• Make sure that there are no duplicate IRQ assignments.</li> <li>• Make sure that the hard disk drive is connected correctly.</li> </ul>
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 supported operating-system versions.
The operating system cannot be installed; the option is not available.	Make sure that the operating-system CD is supported on the server. If the operating system is supported, no logical drive is defined (RAID servers). Run the ServerGuide program and make sure that setup is complete.

## Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms.

If you cannot find the problem in these tables, see “Running the diagnostic programs” on page 37 for information about testing the server.

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

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

## 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 Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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"> <li>1. Make sure that:               <ul style="list-style-type: none"> <li>• The IDE channel to which the CD or DVD drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program.</li> <li>• All cables and jumpers are installed correctly.</li> <li>• The correct device driver is installed for the CD or DVD drive.</li> </ul> </li> <li>2. Run the CD-ROM/DVD drive or CD-RW/DVD-RW drive diagnostic programs.</li> <li>3. Reseat the CD or DVD drive cable.</li> <li>4. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. CD or DVD drive cable</li> <li>b. CD or DVD drive</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
A CD or DVD is not working correctly.	<ol style="list-style-type: none"> <li>1. Clean the CD or DVD.</li> <li>2. Run the CD-ROM/DVD drive or CD-RW/DVD-RW drive diagnostic programs.</li> <li>3. Reseat the CD or DVD drive cable.</li> <li>4. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. CD or DVD drive cable</li> <li>b. CD or DVD drive</li> </ol> </li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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 tray is not working.	<ol style="list-style-type: none"> <li>1. Make sure that the server is turned on.</li> <li>2. Insert the end of a straightened paper clip into the manual tray-release opening.</li> <li>3. Reseat the CD or DVD drive cable.</li> <li>4. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. CD or DVD drive cable</li> <li>b. CD or DVD drive</li> </ol> </li> </ol>

## Diskette drive problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The diskette drive activity LED stays lit, or the computer bypasses the diskette drive.	<ol style="list-style-type: none"> <li>1. If there is a diskette in the drive, make sure that:           <ul style="list-style-type: none"> <li>• The diskette drive is enabled in the Configuration/Setup Utility program.</li> <li>• The diskette is good and not damaged. (Try another diskette if you have one.)</li> <li>• The diskette is inserted correctly in the drive.</li> <li>• The diskette contains the necessary files to start the computer.</li> <li>• The software is working correctly.</li> <li>• The cable is connected correctly (in the proper orientation).</li> </ul> </li> <li>2. To prevent diskette drive read/write errors, make sure that the distance between monitors and diskette drives is at least 76 mm (3 in.).</li> <li>3. Run the diskette drive diagnostic test.</li> <li>4. Reseat the diskette drive cable.</li> <li>5. Replace the following components one at a time, in the order shown, restarting the computer each time:           <ol style="list-style-type: none"> <li>a. Diskette drive cable</li> <li>b. Diskette drive</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>

## General problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

## Hard disk drive problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
Not all drives are recognized by the hard disk drive diagnostic test (the Fixed Disk test).	Remove the drive that is indicated by the diagnostic tests; then, run the hard disk drive diagnostic test again. If the remaining drives are recognized, replace the drive that you removed with a new one.
The server stops responding during the hard disk drive diagnostic test.	Remove the hard disk drive that was being tested when the server stopped responding, and run the diagnostic test again. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.
A hard disk drive was not detected while the operating system was being started.	Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again.
A hard disk drive passes the diagnostic Fixed Disk Test but the problem remains.	Run the diagnostic small computer system interface (SCSI) Fixed Disk Test (see “Running the diagnostic programs” on page 37). <b>Note:</b> This test is not available on servers that have redundant array of independent disks (RAID) arrays or servers that have IDE or serial advanced technology attachment (SATA) hard disk drives.

## Intermittent problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<p>Make sure that:</p> <ul style="list-style-type: none"> <li>• All cables and cords are connected securely to the rear of the server and attached devices.</li> <li>• When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down.</li> </ul>

## Keyboard, mouse, or pointing-device problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• The keyboard cable is securely connected.</li> <li>• For PS/2 keyboards, the keyboard and mouse cables are not reversed.</li> <li>• The server and the monitor are turned on.</li> </ul> </li> <li>2. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup.</li> <li>3. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server.</li> <li>4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Keyboard</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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 mouse or pointing device does not work.	<ol style="list-style-type: none"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• The mouse or pointing-device cable is securely connected to the server.</li> <li>• For PS/2 devices, the keyboard and mouse or pointing-device cables are not reversed.</li> <li>• The mouse or pointing-device device drivers are installed correctly.</li> <li>• The server and the monitor are turned on.</li> <li>• The keyboardless operation and mouse options are enabled in the Configuration/Setup Utility program.</li> </ul> </li> <li>2. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Mouse or pointing device</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

## Memory problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
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"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• No error LEDs are lit on the system board.</li> <li>• Memory mirroring does not account for the discrepancy.</li> <li>• The memory modules are seated correctly.</li> <li>• You have installed the correct type of memory.</li> <li>• If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program.</li> <li>• All memory slots are enabled. The server might have automatically disabled a memory slot when it detected a problem, or a memory slot might have been manually disabled.</li> </ul> </li> <li>2. Check the POST error log for error message 289: <ul style="list-style-type: none"> <li>• If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM.</li> <li>• If a DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM.</li> </ul> </li> <li>3. Make sure that there is no memory mismatch when the server is over the minimum memory configuration (one 256 MB DIMM) and that you have installed the correct number of DIMMs (see the <i>User's Guide</i> for information about installing optional memory modules).</li> <li>4. Reseat the DIMMs</li> <li>5. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. DIMMs</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

## Microprocessor problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
The server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessor.</li> <li>2. (Trained service technician only) Replace the microprocessor.</li> </ol>

## Monitor or video problems

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

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
Testing the monitor	<ol style="list-style-type: none"> <li>1. Make sure that the monitor cables are firmly connected.</li> <li>2. Try using a different monitor on the server, or try using the monitor that is being tested on a different server.</li> <li>3. Run the diagnostic programs. If the monitor passes the diagnostic programs, the problem might be a video device driver.</li> <li>4. (Trained service technician only) Replace the system board.</li> </ol>
The screen is blank.	<ol style="list-style-type: none"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• The server is turned on. If there is no power to the server, see “Power problems” on page 34.</li> <li>• The monitor cables are connected correctly.</li> <li>• The monitor is turned on and the brightness and contrast controls are adjusted correctly.</li> <li>• No beep codes sound when the server is turned on.</li> </ul> <p><b>Important:</b> In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank monitor screen. If this occurs and the <b>Boot Fail Count</b> option in the <b>Startup Option</b> of the Configuration/Setup Utility program is enabled, you must restart the server three times to reset the configuration settings to the default configuration (the memory connector or bank of connectors enabled).</p> </li> <li>2. Make sure that damaged BIOS code is not affecting the video; see “Recovering from a BIOS update failure” on page 44.</li> <li>3. Observe the checkpoint LEDs on the system board; if the codes are changing, go to the next step. If the codes are not changing, see “Checkpoint codes (trained service technicians only)” on page 23.</li> <li>4. See “Solving undetermined problems” on page 47.</li> </ol>
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"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• The application program is not setting a display mode that is higher than the capability of the monitor.</li> <li>• You installed the necessary device drivers for the application.</li> </ul> </li> <li>2. Run video diagnostics (see “Running the diagnostic programs” on page 37). <ul style="list-style-type: none"> <li>• If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” on page 47.</li> <li>• (Trained service technician only) If the server fails the video diagnostics, replace the system board.</li> </ul> </li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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"> <li>1. If the monitor self-tests show the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. <b>Attention:</b> 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. <b>Notes:</b> <ol style="list-style-type: none"> <li>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.).</li> <li>b. Non-IBM monitor cables might cause unpredictable problems.</li> </ol> </li> <li>2. Reseat the monitor cable.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time:           <ol style="list-style-type: none"> <li>a. Monitor</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
Wrong characters appear on the screen.	<ol style="list-style-type: none"> <li>1. If the wrong language is displayed, update the BIOS code with the correct language (see “Updating the firmware” on page 91).</li> <li>2. Reseat the monitor cable.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time:           <ol style="list-style-type: none"> <li>a. Monitor</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

## Optional-device problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
An IBM optional device that was just installed does not work.	<ol style="list-style-type: none"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• The device is designed for the server (see <a href="http://www.ibm.com/servers/eserver/serverproven/compat/us/">http://www.ibm.com/servers/eserver/serverproven/compat/us/</a>).</li> <li>• You followed the installation instructions that came with the device and the device is installed correctly.</li> <li>• You have not loosened any other installed devices or cables.</li> <li>• You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or any other device is changed, you must update the configuration.</li> </ul> </li> <li>2. Reseat the device that you just installed.</li> <li>3. Replace the device that you just installed.</li> </ol>
An IBM optional device that used to work does not work now.	<ol style="list-style-type: none"> <li>1. Make sure that all of the hardware and cable connections for the device are secure.</li> <li>2. If the device comes with test instructions, use those instructions to test the device.</li> <li>3. If the failing device is a SCSI device, make sure that: <ul style="list-style-type: none"> <li>• The cables for all external SCSI devices are connected correctly.</li> <li>• The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly.</li> <li>• Any external SCSI device is turned on. You must turn on an external SCSI device before turning on the server.</li> </ul> </li> <li>4. Reseat the failing device.</li> <li>5. Replace the failing device.</li> </ol>

## Power problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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, and the reset button, if supported, does work (the server does not start).</p> <p><b>Note:</b> 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"> <li>1. Make sure that the power-control button is working correctly:               <ol style="list-style-type: none"> <li>a. Disconnect the server power cords.</li> <li>b. Reconnect the power cords.</li> <li>c. (Trained service technician only) Reseat the power switch/LED bracket cable, and then repeat steps 1a and 1b.                   <ul style="list-style-type: none"> <li>• (Trained service technician only) If the server starts, reseat the power switch/LED bracket cable. If the problem remains, replace the power switch/LED bracket.</li> <li>• If the server does not start, bypass the power-control button by using the force power-on jumper (see “System-board jumpers” on page 11); if the server starts, reseat the power switch/LED bracket cable. If the problem remains, replace the power switch/LED bracket.</li> </ul> </li> </ol> </li> <li>2. Make sure that:               <ul style="list-style-type: none"> <li>• The power cords are correctly connected to the server and to a working electrical outlet.</li> <li>• The type of memory that is installed is correct.</li> <li>• The power-supply error LED is not lit.</li> <li>• The microprocessor is installed correctly.</li> </ul> </li> <li>3. (Trained service technician only) Replace the system board.</li> <li>4. 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.</li> <li>5. See “Solving undetermined problems” on page 47.</li> </ol>
<p>The server does not turn off.</p>	<ol style="list-style-type: none"> <li>1. Determine whether you are using an Advanced Configuration and Power Management (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps:               <ol style="list-style-type: none"> <li>a. Press Ctrl+Alt+Delete.</li> <li>b. Turn off the server by holding the power-control button for 5 seconds.</li> <li>c. Restart the server.</li> <li>d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server.</li> </ol> </li> <li>2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.</li> </ol>
<p>The server unexpectedly shuts down, and the LEDs on the power switch/LED bracket are not lit.</p>	<p>See “Solving undetermined problems” on page 47.</p>

## Serial port problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
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"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports is disabled.</li> <li>• The serial-port adapter (if one is present) is seated correctly.</li> </ul> </li> <li>2. Replace the failing serial port adapter.</li> </ol>
A serial device does not work.	<ol style="list-style-type: none"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• The device is compatible with the server.</li> <li>• The serial port is enabled and is assigned a unique address.</li> <li>• The device is connected to the correct port (see “System-board external connectors” on page 9).</li> </ul> </li> <li>2. Reseat the following components: <ol style="list-style-type: none"> <li>a. Failing serial device</li> <li>b. Serial cable</li> </ol> </li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Failing serial device</li> <li>b. Serial cable</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>

## Software problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
You suspect a software problem.	<ol style="list-style-type: none"> <li>1. To determine whether the problem is caused by the software, make sure that: <ul style="list-style-type: none"> <li>• 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.</li> <li>• The software is designed to operate on the server.</li> <li>• Other software works on the server.</li> <li>• The software works on another server.</li> </ul> </li> <li>2. If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.</li> <li>3. Contact your place of purchase of the software.</li> </ol>

## Universal Serial Bus (USB) port problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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"><li>1. Run USB diagnostics (see “Running the diagnostic programs” on page 37).</li><li>2. Make sure that:<ul style="list-style-type: none"><li>• The correct USB device driver is installed.</li><li>• The operating system supports USB devices.</li><li>• A standard PS/2 keyboard or mouse is not connected to the server. If it is, a USB keyboard or mouse will not work during POST.</li></ul></li><li>3. Make sure that the USB configuration options are set correctly in the Configuration/Setup Utility program menu (see the <i>User's Guide</i> for more information).</li><li>4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.</li></ol>

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## Diagnostic programs, messages, and error codes

The server diagnostic programs are the primary method of testing the major components of the server. As you run the diagnostic programs, text messages and error codes are displayed on the screen and are saved in the test log. A diagnostic text message or error code indicates that a problem has been detected; to determine what action you should take as a result of a message or error code, see the table in “Diagnostic error codes” on page 39.

### Running the diagnostic programs

To run the diagnostic programs, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices; then, turn on the server.
3. When you see Press <F1> for Configuration/Setup, press F1.
4. When the Configuration/Setup Utility menu appears, select **Startup Option** → **Startup Sequence Options**.
5. Note the device that is selected as the first startup device. Later, you must restore this setting.
6. Make sure that CD/DVD-ROM is selected as the first startup device.
7. Press Esc two times to return to the Configuration/Setup Utility menu.
8. Insert the IBM *Enhanced Diagnostics* CD in the CD or DVD drive.
9. Select **Save Settings**; then, select **Exit Setup** and follow the prompts. The diagnostic programs will load.
10. From the diagnostic programs screen, select the test that you want to run, and follow the instructions on the screen.

When you are diagnosing hard disk drives, select **SCSI Fixed Disk Test** for the most thorough test. Select **Fixed Disk Test** for any of the following situations:

- You want to run a faster test.
- The server contains RAID arrays.
- The server contains SATA or IDE hard disk drives.

To determine what action you should take as a result of a diagnostic text message or error code, see the table in “Diagnostic error codes” on page 39.

If the diagnostic programs do not detect any hardware errors but the problem remains during normal server operations, a software error might be the cause. If you suspect a software problem, see the information that comes with your software.

A single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

**Exception:** If there are multiple error codes that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 30 for information about diagnosing microprocessor problems.

If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem remains, replace the component that was being tested when the server stopped.

The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server. If no mouse or a USB mouse is attached to the server, you cannot use the **Next Cat** and **Prev Cat** buttons to select categories. All other mouse-selectable functions are available through function keys. You can use the regular keyboard test to test a USB keyboard, and you can use the regular mouse test to test a USB mouse. You can run the USB interface test only if no USB devices are attached. The USB test will not run if a Remote Supervisor Adapter II SlimLine is installed.

To view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on), select **Hardware Info** from the top of the screen.

## Diagnostic text messages

Diagnostic text messages are displayed while the tests are running. A diagnostic text message contains one of the following results:

**Passed:** The test was completed without any errors.

**Failed:** The test detected an error.

**User Aborted:** You stopped the test before it was completed.

**Not Applicable:** You attempted to test a device that is not present in the server.

**Aborted:** The test could not proceed because of the server configuration.

**Warning:** The test could not be run. There was no failure of the hardware that was being tested, but there might be a hardware failure elsewhere, or another problem prevented the test from running; for example, there might be a configuration problem, or the hardware might be missing or is not being recognized.

The result is followed by an error code or other additional information about the error.

## Viewing the test log

To view the test log when the tests are completed, you can:

- View the Summary test log by pressing F3, or by selecting **Utility** from the top of the screen and selecting **View Test Log**. Press Page Up and Page Down to view the entire log.
- View the Detailed test log by pressing Tab while in the Summary log. Press Page Up and Page Down to view the entire log.
- Save the test log to a file on a diskette or to the hard disk by selecting **Utility** from the top of the screen and selecting **Save Test Log**.

### Notes:

1. To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette can contain other data.
2. The test-log data is maintained only while the diagnostic programs are active. When you exit from the diagnostic programs, the test log is cleared. Save the test log to a file on a diskette or to the hard disk if you want to refer to it later.

## Diagnostic error codes

The following table describes the error codes that the diagnostic programs might generate and suggested actions to correct the detected problems.

If the diagnostic programs generate error codes that are not listed in the table, make sure that the latest levels of BIOS, Remote Supervisor Adapter II SlimLine, and ServeRAID code are installed.

In the error codes, x can be any numeral or letter. However, if the three-digit number in the central position of the code is 000, 195, or 197, *do not* replace a CRU or FRU. These numbers appearing in the central position of the code have the following meanings:

- 000** The server passed the test. Do not replace a CRU or FRU.
- 195** The Esc key was pressed to end the test. Do not replace a CRU or FRU.
- 197** This is a warning error, but it does not indicate a hardware failure; do not replace a CRU or FRU. Take the action that is indicated in the Action column but *do not replace a CRU or a FRU*. See the description of **Warning** in “Diagnostic text messages” on page 38 for more information.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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
001-292-000	Core system: failed/CMOS checksum failed.	Load the BIOS default settings using the Configuration/Setup Utility program and run the test again (see “Using the Configuration/Setup Utility program” on page 92).
001-xxx-000	Failed core tests.	(Trained service technician only) Replace the system board.
001-xxx-001	Failed core tests.	(Trained service technician only) Replace the system board.
005-xxx-000	Failed video test.	(Trained service technician only) Replace the system board.
011-xxx-000	Failed COM1 serial port test.	(Trained service technician only) Replace the system board.
015-xxx-001	Failed USB test.	(Trained service technician only) Replace the system board.
015-xxx-198	USB device connected during USB test.	<ol style="list-style-type: none"> <li>1. Remove all USB devices and run the test again.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
020-xxx-000	Failed PCI Interface test.	(Trained service technician only) Replace the system board.
035-xxx-cnn	Failed hard disk drive; c = ServeRAID channel number, nn = SCSI ID of failing fixed disk drive.	<ol style="list-style-type: none"> <li>1. Reseat the hard disk drive on channel c, SCSI ID nn.</li> <li>2. Replace the hard disk drive on channel c, SCSI ID nn.</li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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
035-xxx-snn	Failed hard disk drive with SCSI ID <i>nn</i> on RAID adapter in slot <i>s</i> .	<ol style="list-style-type: none"> <li>1. Reseat the disk with SCSI ID <i>nn</i> on adapter in slot <i>s</i>.</li> <li>2. Replace the disk with SCSI ID <i>nn</i> on adapter in slot <i>s</i>.</li> </ol>
035-xxx-099	No adapters were found.	<p>If an adapter is installed:</p> <ol style="list-style-type: none"> <li>1. Reseat the adapter.</li> <li>2. Make sure that the adapter cables are secure.</li> </ol>
035-xxx-s99	Failed RAID test; <i>s</i> = number of failing adapter slot.	<ol style="list-style-type: none"> <li>1. Reseat the following components: <ol style="list-style-type: none"> <li>a. RAID adapter in slot <i>s</i></li> <li>b. Cable for the RAID adapter in slot <i>s</i></li> </ol> </li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. RAID adapter in slot <i>s</i></li> <li>b. Cable for the RAID adapter in slot <i>s</i></li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
075-xxx-000	Failed power supply test.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the power supply.</li> <li>2. (Trained service technician only) Replace the power supply.</li> </ol>
201-xxx-0nn	Failed memory test; <i>nn</i> = slot number of failing DIMM.	<ol style="list-style-type: none"> <li>1. Reseat the DIMM in slot <i>nn</i>.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. DIMM in slot <i>nn</i></li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
201-xxx-n99	Multiple DIMM failure; <i>n</i> = bank number of failing pair.	<ol style="list-style-type: none"> <li>1. See the error text to identify the failing DIMMs.</li> <li>2. Reseat the DIMMs in bank <i>nn</i>.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. DIMMs in bank <i>nn</i></li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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
204-198-000	Test aborted.	<ol style="list-style-type: none"> <li>1. Run the Quick Memory Test Diagnostic All Banks (see “Running the diagnostic programs” on page 37).</li> <li>2. Update the BIOS code (see “Updating the firmware” on page 91).</li> <li>3. Look in the test log (see “Viewing the test log” on page 38) and correct any other errors.</li> </ol>
204-210-000	Test failed.	<ol style="list-style-type: none"> <li>1. Run the Quick Memory Test Diagnostic All Banks (see “Running the diagnostic programs” on page 37).</li> <li>2. Update the BIOS code (see “Updating the firmware” on page 91).</li> <li>3. Look in the test log (see “Viewing the test log” on page 38) and correct any other errors.</li> </ol>
215-xxx-000	Failed CD or DVD test.	<ol style="list-style-type: none"> <li>1. Run the test again with a different CD or DVD.</li> <li>2. Reseat the following components:               <ol style="list-style-type: none"> <li>a. CD or DVD drive cable</li> <li>b. Power switch/LED bracket cable</li> </ol> </li> <li>3. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. CD or DVD drive cable</li> <li>b. CD or DVD drive</li> <li>c. Power switch/LED bracket cable</li> </ol> </li> </ol>
217-xxx-000	Failed fixed disk test.	<ol style="list-style-type: none"> <li>1. Reseat hard disk drive 1 cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Hard disk drive 1 cable</li> <li>b. Hard disk drive 1</li> </ol> </li> </ol>
217-xxx-001	Failed fixed disk test.	<ol style="list-style-type: none"> <li>1. Reseat hard disk drive 2 cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Hard disk drive 2 cable</li> <li>b. Hard disk drive 2</li> </ol> </li> </ol>
217-xxx-002	Failed fixed disk test.	<ol style="list-style-type: none"> <li>1. Reseat hard disk drive 3 cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>a. Hard disk drive 3 cable</li> <li>b. Hard disk drive 3</li> </ol> </li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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
217-198-xxx	Could not establish drive parameters.	<ol style="list-style-type: none"> <li>1. Reseat the hard disk drive cable and check terminators.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Hard disk drive cable</li> <li>b. Hard disk drive</li> </ol> </li> </ol>
301-xxx-000	Failed keyboard test. <b>Note:</b> After installing a USB keyboard, you might have to use the Configuration/Setup Utility program to enable keyboardless operation and prevent the POST error message 301 from being displayed during startup.	<ol style="list-style-type: none"> <li>1. Reseat the keyboard cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Keyboard</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
302-xxx-xxx	Failed mouse test.	<ol style="list-style-type: none"> <li>1. Reseat the mouse cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Mouse</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
305-xxx-xxx	Failed video monitor test.	<ol style="list-style-type: none"> <li>1. Reseat the monitor cable.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>a. Monitor</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
405-xxx-000	Failed Ethernet test on controller on the system board.	<ol style="list-style-type: none"> <li>1. Make sure that Ethernet is not disabled in the Configuration/Setup Utility program and that the BIOS code is at the latest level.</li> <li>2. (Trained service technician only) Reseat the system board.</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 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
405-xxx-00n	<p>Failed Ethernet test on the adapter in PCI slot <i>n</i>.</p> <ul style="list-style-type: none"> <li>• For single-port computers <math>n &gt; 0</math>, (adapter in PCI slot <i>n</i>)</li> <li>• For dual-port computers <math>n &gt; 1</math>, (adapter in PCI slot <i>n</i>)</li> </ul>	<ol style="list-style-type: none"> <li>1. Complete the following steps to identify the slot on the riser card: <ol style="list-style-type: none"> <li>a. Run the Configuration/Setup Utility program.</li> <li>b. Select <b>Advanced Setup</b> → <b>PCI Slot/Device Information</b>.</li> </ol> <p>In the information for the Ethernet controller, the entry in the Slot column is the PCI slot number for the adapter.</p> <p><b>Note:</b> If multiple adapters are installed, the failing adapter is the one with a MAC address in the Ethernet controller information that matches the MAC address on the diagnostics screen where the failure occurs.</p> </li> <li>2. Reseat the Ethernet adapter in slot <i>n</i>.</li> <li>3. Replace the Ethernet adapter in slot <i>n</i>.</li> </ol>

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## Recovering from a BIOS update failure

If power to the server is interrupted while BIOS code is being updated, the server might not restart correctly or might not display video. If this happens, complete the following steps to recover:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 56.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. Locate the boot block recovery jumper on the system board (see “System-board jumpers” on page 11), removing any adapters that impede access to the jumper (see “Removing an adapter” on page 61).
5. Move the boot block recovery jumper from pins 1 and 2 to pins 2 and 3.
6. Replace any adapters that were removed (see “Installing an adapter” on page 62); then, install the cover (see “Installing the cover” on page 58).
7. Reconnect all external cables and power cords.
8. Insert the update CD into the CD or DVD drive.
9. Turn on the server and the monitor.

After the update session is completed, remove the CD from the drive and turn off the server.

10. Disconnect all power cords and external cables.
11. Remove the cover (see “Removing the cover” on page 57).
12. Remove any adapters that impede access to the boot block recovery jumper (see “Removing an adapter” on page 61).
13. Move the boot block recovery jumper from pins 2 and 3 to pins 1 and 2.
14. Replace any adapters that were removed “Installing an adapter” on page 62); then, install the cover (see “Installing the cover” on page 58).
15. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

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## Solving SCSI problems

For any SCSI error message, one or more of the following devices might be causing the problem:

- A failing SCSI device (adapter, drive, or controller)
- An incorrect SCSI termination jumper setting
- Duplicate SCSI IDs in the same SCSI chain
- A missing or incorrectly installed SCSI terminator
- A defective SCSI terminator
- An incorrectly installed cable
- A defective cable

For any SCSI error message, follow these suggested actions in the order in which they are listed until the problem is solved:

1. Make sure that external SCSI devices are turned on before you turn on the server.
2. Make sure that the cables for all external SCSI devices are connected correctly.
3. If an external SCSI device is attached, make sure that the external SCSI termination is set to automatic.
4. Make sure that the last device in each SCSI chain is terminated correctly.
5. Make sure that the SCSI devices are configured correctly.

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## Solving power problems

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

1. Turn off the server and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.
3. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start (see “Solving undetermined problems” on page 47 for the minimum configuration).
4. Reconnect all ac power cords and turn on the server. If the server starts successfully, replace the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimum configuration, replace the components in the minimum configuration one at a time until the problem is isolated.

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## Solving Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Try the following procedures:

- Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
  - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
  - If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.
  - If you directly connect two servers (without a hub), or if you are not using a hub with X ports, use a crossover cable. To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
  - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the LAN activity LED on the rear of the server. The LAN activity LED is lit when data is active on the Ethernet network. If the LAN activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

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## Solving undetermined problems

If the diagnostic tests did not diagnose the failure or if the server is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 35.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the clear CMOS jumper (JP2) to clear the CMOS memory; see “System-board jumpers” on page 11. If you suspect that the BIOS code is damaged, see “Recovering from a BIOS update failure” on page 44.

Check the LEDs on the power supply. If the LEDs indicate that the power supply is working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
  - Any external devices.
  - Surge-suppressor device (on the server).
  - Modem, printer, mouse, and non-IBM devices.
  - Each adapter.
  - Hard disk drives.
  - Memory modules. The minimum configuration requirement is one 256 MB DIMM.

The following minimum configuration is required for the server to turn on:

- A microprocessor
  - One 256 MB DIMM on the system board
  - A power supply
  - Power cord
  - System board
4. Turn on the server. If the problem remains, suspect the following components in the following order:
    - a. System board
    - b. Memory module
    - c. Microprocessor

If the problem is solved when you remove an adapter from the server but the problem recurs when you reinstall the same adapter, suspect the adapter; if the problem recurs when you replace the adapter with a different one, suspect the system board.

If you suspect a networking problem and the server passes all the system tests, suspect a network cabling problem that is external to the server.

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## Calling IBM for service

See Appendix A, "Getting help and technical assistance," on page 95 for information about calling IBM for service.

When you call for service, have as much of the following information available as possible:

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
  - Does the server fail the diagnostic programs? If so, what are the error codes?
  - What occurs? When? Where?
  - Is the failure repeatable?
  - Has the current server configuration ever worked?
  - What changes, if any, were made before it failed?
  - Is this the original reported failure, or has this failure been reported before?
- Diagnostic program type and version level
- Hardware configuration (print screen of the system summary)
- BIOS code level
- Operating-system type and version level

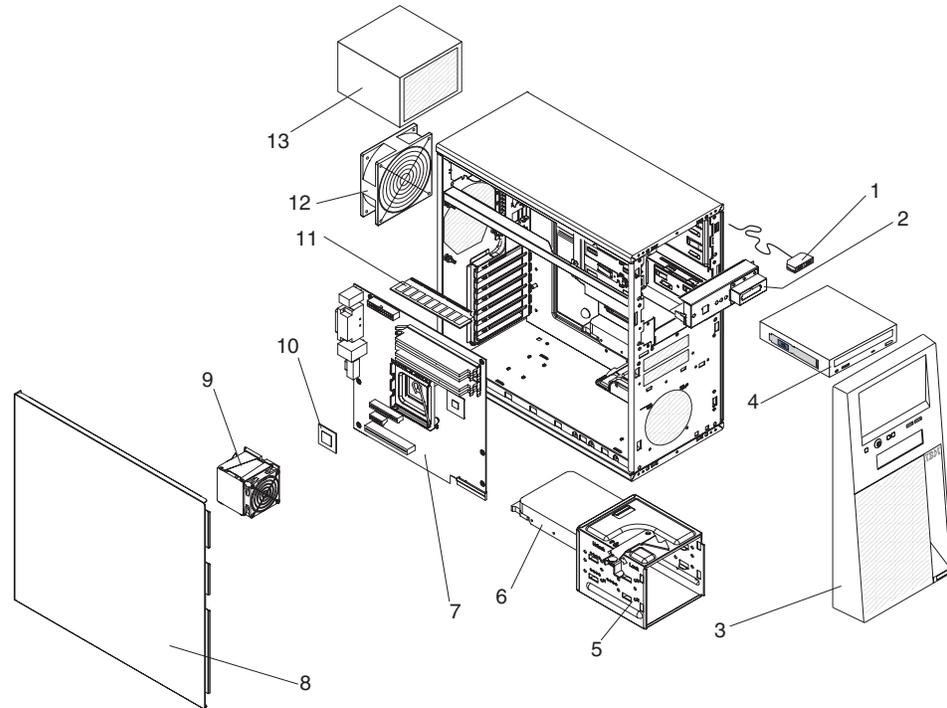
You can solve some problems by comparing the configuration and software setups between working and nonworking servers. When you compare servers to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the servers:

- Machine type and model
- BIOS level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Memory amount, type, and configuration
- Diagnostic program type and version level
- Configuration option settings
- Operating-system control-file setup

## Chapter 3. Parts listing, xSeries 100 Type 8486

The following replaceable components are available for the xSeries 100 Type 8486 server. To check for an updated parts listing on the Web, complete the following steps:

1. Go to <http://www.ibm.com/support/>
2. Under **Search technical support**, type 8486 and click **Search**.
3. Under Document type, select **Parts information** and click **Go**.



## Replaceable server components

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Table 3. Parts listing, Type 8486

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	USB connector assembly, front (all models)		26K7340	
2	Power switch/LED bracket (all models)			39M4410
3	Bezel (all models)	39M4408		
4	CD-ROM drive, 48X (primary) (models 11X, 91X, 92X, A2x)		39M3511	
4	CD-ROM drive, 48X (alternate) (models 11X, 91X, 92X, A2x)		39M3509	
4	CD-RW/DVD-ROM combo drive (primary) (models 21X, 31X, 41X, 71x, B2x, C2x, G2x, H2x)		39M3539	
4	CD-RW/DVD-ROM combo drive (alternate) (models 21X, 31X, 41X, 71x, B2x, C2x, G2x, H2x)		26K5429	
4	DVD-ROM 16/48 (optional)		26K5385	
4	DVD-ROM 16/48 (optional)		26K5435	
4	DVD-ROM 16/48 (optional)		39M3515	
4	DVD-ROM 48/32/48x (optional)		71P7349	
5	Cage, hard disk drive (all models)		39M4407	
6	Hard disk drive, 80 GB (all models)		39M3701	
6	Hard disk drive, 160 GB (all models)		39M4507	
6	Hard disk drive, 250 GB (all models)		39M4511	
7	System board (all except models A2x, B2x, C2x, G2x, H2x)			39Y8595
7	System board (models A2x, B2x, C2x, G2x, H2x)			39Y8675
8	Cover (all models)	39M4404		
9	Fan sink, microprocessor (all models)			39R9308
10	Microprocessor, 533/2.5G (models 91X, 92X)			39M4463
10	Microprocessor, 800M/2.8G-1M (model 11X)			39M4459
10	Microprocessor, 800M/2.8G-2M (model 71X)			39M4475
10	Microprocessor, 800M/3.0G-1M (model 21X)			39M4460
10	Microprocessor, 800M/3.2G-1M (model 31X)			39M4461
10	Microprocessor, 800M/3.4G-1M (model 41X)			39M4462

Table 3. Parts listing, Type 8486 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
10	Microprocessor, 2.66G (model A2x)			40K5446
10	Microprocessor, 3.0G (model B2x)			40K5448
10	Microprocessor, 3.2G-1M (model C2x)			40K5450
10	Microprocessor, 2.8G (model G2x)			40K5452
10	Microprocessor, 3.0G (model H2x)			40K5454
11	Memory, 256 MB, DDR2, PC 2-4200 ECC (model 91X)	39M5772		
11	Memory, 512 MB, DDR2, PC 2-4200 ECC (models 11x, 21x, 31x, 41x, 71x,92x, A2x, B2x, C2x, G2x, H2x)	30R5151		
11	Memory, 1GB, DDR2, PC 2-4200 ECC (optional)	30R5152		
11	Memory, 2GB, DDR2, PC 2-4200 ECC (optional)	30R5153		
12	Fan, system (all models)		25R8829	
13	Power supply, 310 watt (all models)			24R2686
	Battery, 3.0 volt (all models)		33F8354	
	Bezel, diskette drive (optional)	25R7474		
	Bezel, diskette drive blank (all models)	25R7472		
	Bracket, microprocessor (all models)			39M4401
	Cable, diskette drive (optional)			39Y8384
	Cable, IDE (all models)		13N2466	
	Cable, power (all models)	39M4412		
	Cable, SATA (all models)		25R5567	
	Chassis (all models)			39M4405
	Diskette drive (primary) (optional)		33P3343	
	Diskette drive (alternate) (optional)		24P3889	
	Diskette drive (alternate) (optional)		39M0101	
	Kit, miscellaneous parts (all models)		39R8113	
	Mouse (all models)	39Y9872		
	Retention module, fan sink (all models)			25R8873
	Shield, I/O (all models)	39M4403		
	System service label (all models)	39Y8516		

## Keyboards

Keyboard	CRU Number
Arabic (253)	39M6990
Arabic/French (462)	39M6991
Belgian/French (120)	39M6992
Belgian/UK (120)	39M6993
Brazilian/Portuguese (275)	39M6994
Bulgarian (442)	39M6995

<b>Keyboard</b>	<b>CRU Number</b>
Chinese/US (467)	39M6996
Czech ABB	39M6997
Danish (159)	39M6998
Dutch (143)	39M6999
English, UK (166)	39M7027
English, US (103P)	39M6989
English, US,-EMEA (103P)	39M7028
French (189)	39M7000
French Canadian (058)	39M7002
French Canadian (445)	39M7001
German (129)	39M7003
Greek (319)	39M7004
Hebrew (212)	39M7005
Hungarian (208)	39M7006
Icelandic (197)	39M7007
Italian (141)	39M7008
Italian (142)	39M7009
Japanese (194)	39M7010
Korean (413)	39M7011
Norwegian (155)	39M7013
Polish (214)	39M7014
Portuguese (163)	39M7015
Romanian (96)	39M7016
Russian (443)	39M7017
Russian/Cyrillic (441)	39M7018
Serbian/Cyrillic (118)	39M7019
Slovenian (234)	39M7029
Slovic (245)	39M7020
Spanish (172)	39M7021
Spanish, Latin American (171)	39M7012
Swedish/Finnish (153)	39M7022
Swiss, F/G (150)	39M7023
Thailand (191)	39M7024
Turkish (179)	39M7026
Turkish (440)	39M7025

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## Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

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

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

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## Chapter 4. Removing and replacing server components

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

See Chapter 3, “Parts listing, xSeries 100 Type 8486,” on page 49 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

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### Installation guidelines

Before you remove or replace a component, read the following information:

- Read the safety information that begins on page vii and the guidelines in “Handling static-sensitive devices” on page 56. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, hot-plug adapters, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before performing any steps that involve removing or installing adapter cables.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

## System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not run the server without the air baffle installed. Operating the server without the air baffle might cause the microprocessor to overheat.
- The microprocessor socket always contains a microprocessor and fan sink.

## 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. Always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part 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.

## Returning a device or component

If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

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## Removing and replacing Tier 1 CRUs

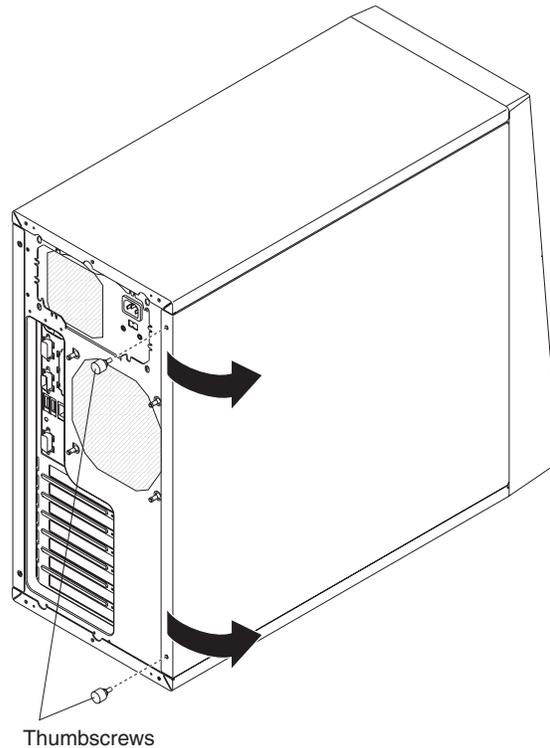
Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

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

### Removing the cover

**Attention:** For proper cooling and airflow, replace the cover before turning on the server. Operating the server for more than 2 minutes with the cover removed might damage server components.

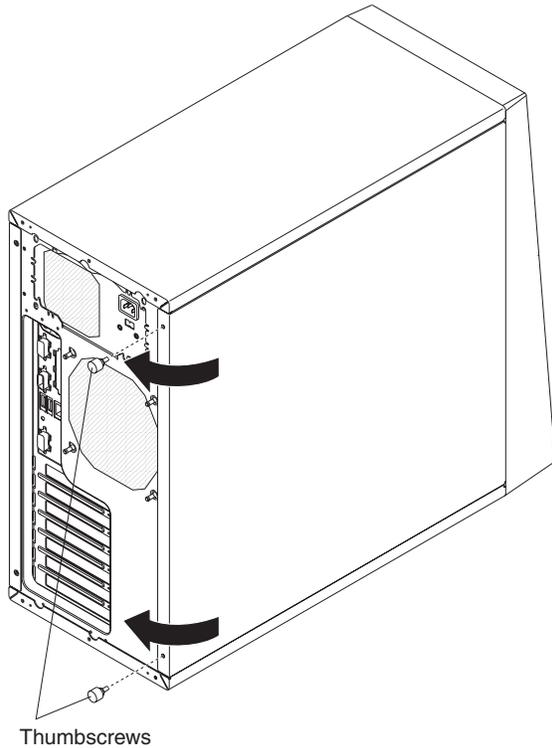
To remove the cover, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Lay the server on its right side.
4. Remove the two thumbscrews at the rear of the cover.
5. Lift the rear of the cover and pull it toward the rear of the server to disengage the front edge from the chassis.
6. If you are instructed to return the cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
7. If you are not returning the cover, store it and the thumbscrews in a safe place for reuse.

## Installing the cover

To install the cover, complete the following steps.

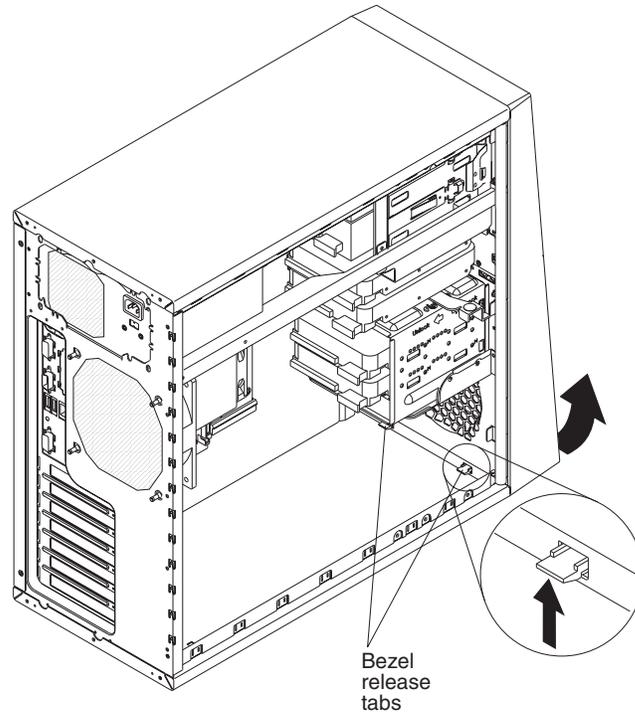


1. Make sure that:
  - All cables, adapters, and other components are installed and seated correctly.
  - You have removed all work tools or parts from inside the computer.
  - All internal cables are correctly routed.
2. Place the front edge of the cover into position on the front edge of the server and lower the cover onto the chassis.
3. Install the two thumbscrews at the rear of the cover.
4. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
5. Turn on the attached devices; then, turn on the server.

## Removing the bezel

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

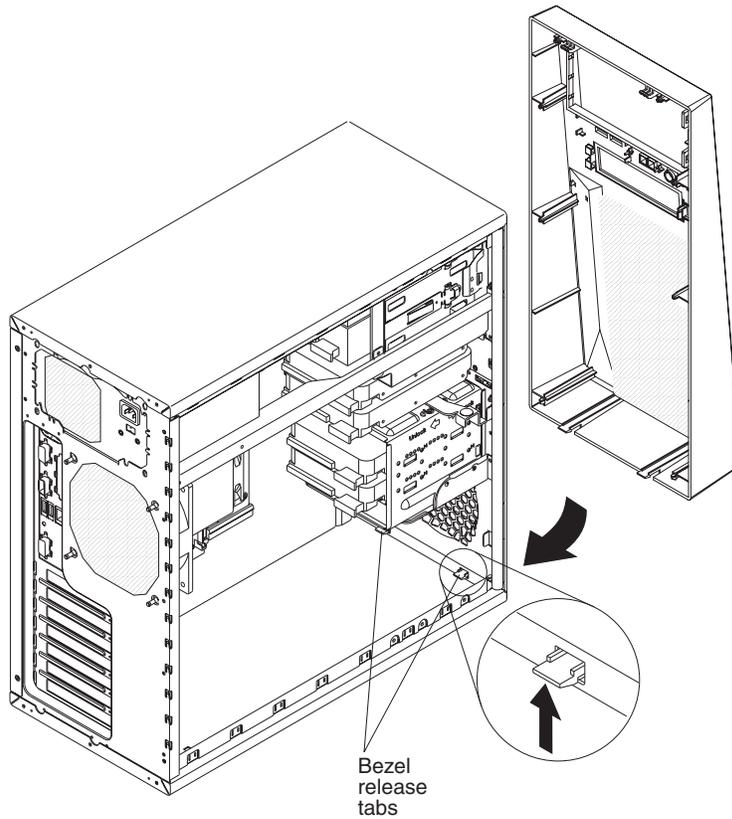
To remove the bezel, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. From inside the chassis, press up and out on the bezel release tabs to disengage them from the chassis; then, lift the bezel off of the front of the server.
5. If you are instructed to return the bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
6. If you are not returning the bezel, store it in a safe place for reuse.

## Installing the bezel

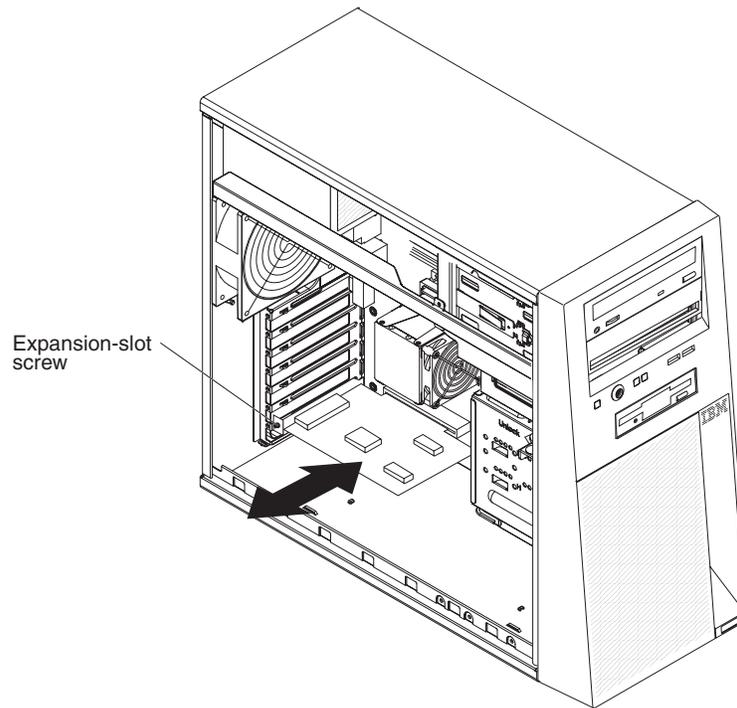
To install the bezel, complete the following steps.



1. Insert the two top tabs of the bezel into the corresponding openings in chassis above the CD or DVD drive.
2. Align the two lower tabs of the bezel with the corresponding openings in the chassis and gently press on the bezel until it clicks into place.
3. Install the cover (see “Installing the cover” on page 58).
4. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
5. Turn on the attached devices; then, turn on the server.

## Removing an adapter

To remove an adapter, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Disconnect any cables from the adapter.
4. Remove the cover (see “Removing the cover” on page 57).

**Note:** It might be helpful to lay the computer on its right side for the remainder of this procedure.

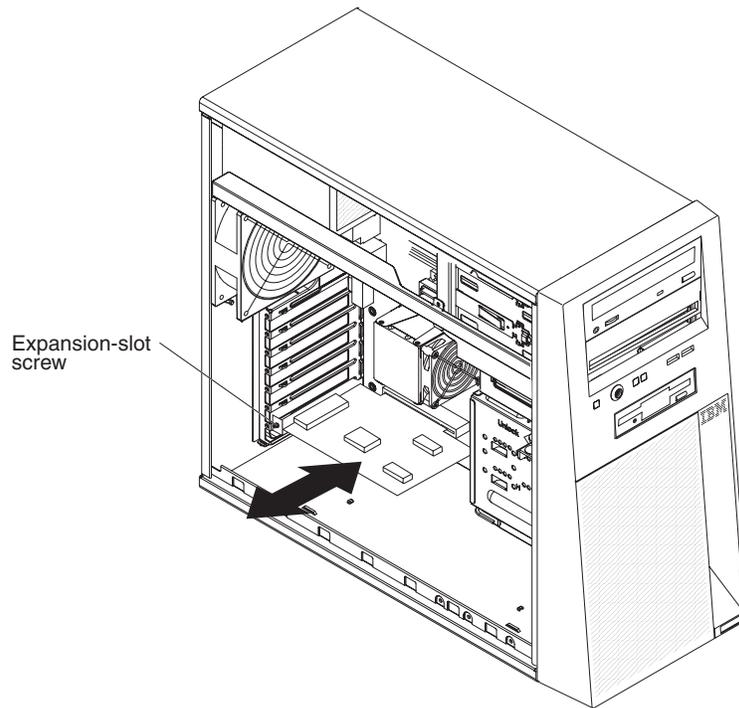
5. Remove the expansion-slot screw for the adapter to be removed.
6. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the server.
7. If the server will be used before a replacement adapter is installed, install an expansion-slot cover in the slot.

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

8. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
9. If you are not returning the adapter, store it in a safe place for reuse.

## Installing an adapter

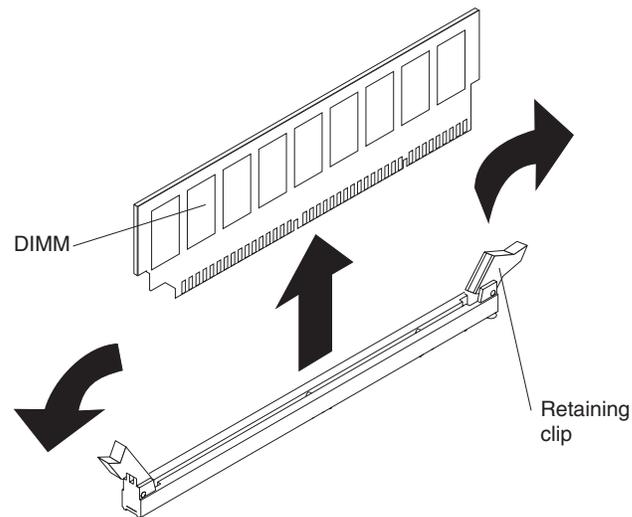
To install an adapter, complete the following steps.



1. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you install the adapter.
2. Follow the instructions that come with the adapter to set jumpers or switches, if any.
3. Touch the static-protective package that contains the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.
4. Carefully grasp the adapter by the top edge or upper corners, and align it with the expansion slot guides; then, press the adapter *firmly* into the expansion slot. Move the adapter directly from the static-protective package to the expansion slot.
5. Install the expansion-slot screw.
6. Connect any required cables to the adapter. Route cables so that they do not block the flow of air from the fans. If you are installing an optional SCSI adapter, see the *User's Guide* for additional information about cabling a SCSI adapter.
7. Install the cover (see "Installing the cover" on page 58).
8. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
9. Turn on the attached devices; then, turn on the server.

## Removing a memory module

To remove a dual inline memory module (DIMM), complete the following steps.



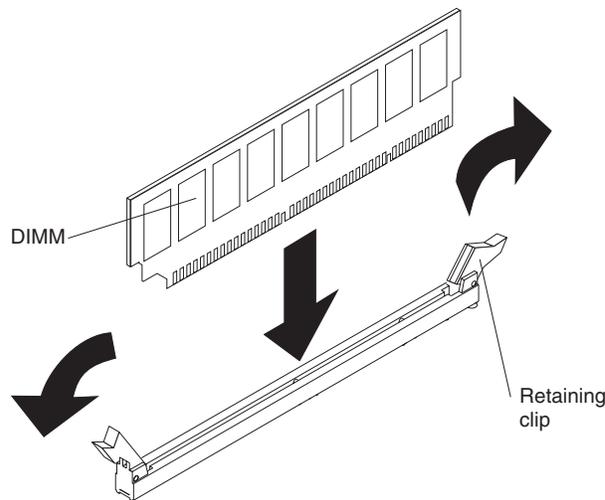
1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. Disconnect any cables that impede access to the DIMMs.
5. Locate the DIMM connector that contains the DIMM to be replaced (see “System-board option connectors” on page 7 for DIMM slot locations).  
**Attention:** To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.
6. Carefully open the retaining clips on each end of the DIMM connector and remove the DIMM.
7. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a memory module

**Note:** If you are replacing a faulty DIMM, make sure that the replacement DIMM is the correct type of memory. If you are adding DIMMs, install the DIMMs in the sequence shown in the following table. See the *User's Guide* for additional information about the type of memory that is compatible with the server.

Number of DIMMs	Slot numbers
One DIMM	1
Two DIMMs	1, 3
Three DIMMs	Not supported
Four DIMMs	1, 2, 3, 4

To install a replacement DIMM, complete the following steps.



1. Make sure that the retaining clips on each end of the DIMM connector are fully open.
2. Touch the static-protective package that contains the new DIMM to any unpainted metal surface on the computer. Then, remove the new DIMM from the package.
3. Turn the DIMM so that the contacts align correctly with the connector.  
**Attention:** To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.
4. Insert the DIMM into the connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, and reinsert it.
5. Reconnect any cables that were disconnected during removal.
6. Install the cover (see "Installing the cover" on page 58).
7. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
8. Turn on the attached devices; then, turn on the server.

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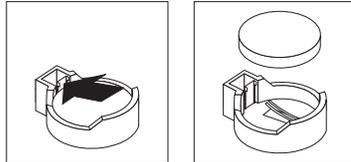
## Removing and replacing Tier 2 CRUs

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for the server.

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

### Removing the battery

To remove the battery, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. Remove any adapters that impede access to the battery.
5. Locate the battery on the system board (see “System-board option connectors” on page 7).
6. Remove the battery:
  - a. Use one finger to press the top of the battery clip away from the battery.
  - b. Lift and remove the battery from the socket.
7. Dispose of the battery as required by local ordinances or regulations (see “Battery return program” on page 101 for more information).

### Installing the battery

The following notes describe information that you must consider when replacing the battery in the server.

- You must replace the battery with a lithium battery of the same type from the same manufacturer.
- To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.
- After you replace the battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

**Statement 2:**



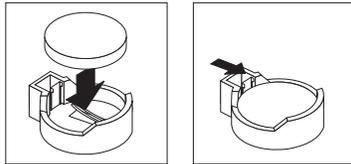
**CAUTION:**

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**

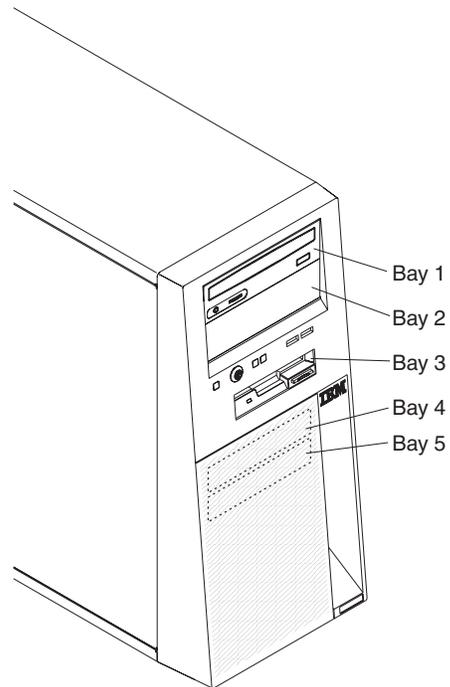
To install the replacement battery, complete the following steps.



1. Follow any special handling and installation instructions that come with the replacement battery.
2. Insert the new battery:
  - a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
  - b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.
3. Reinstall any adapters that were removed.
4. Install the cover. (See “Installing the cover” on page 58).
5. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
6. Turn on the attached devices; then, turn on the server.
7. Start the Configuration/Setup Utility program and reset the configuration.
  - Set the system date and time.
  - Set the passwords, if necessary.
  - Save the configuration.

## Removing and installing internal drives

This section describes the removal and installation of internal drives. See the *User's Guide* for more information about the types of drives that the computer supports. The following illustration shows the location of the internal drive bays.

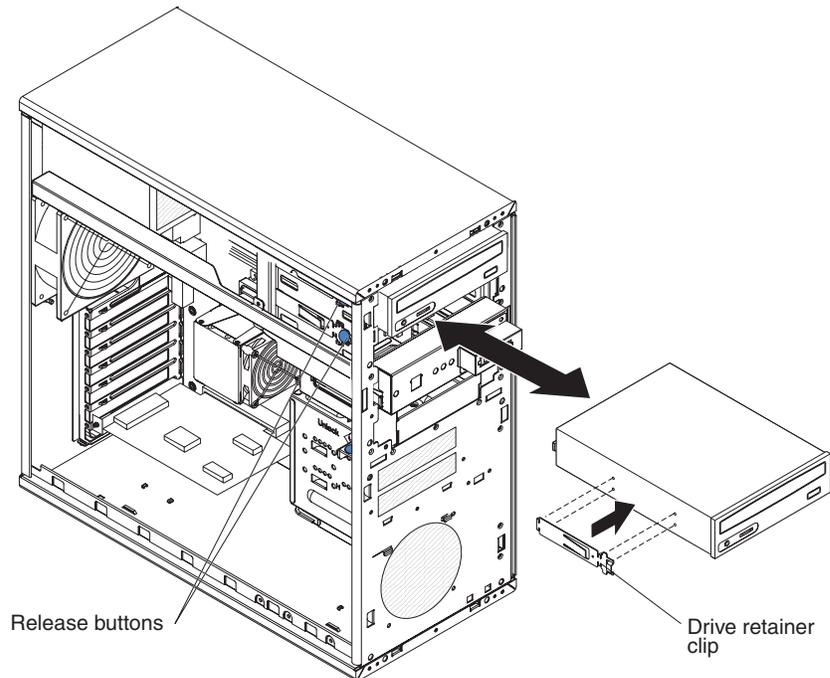


### Notes:

1. A second IDE device that is intended to be cabled to the CD or DVD drive in bay 1, can be installed only in bay 2.
2. The server supports one diskette drive. A diskette drive can be installed only in bay 3.

## Removing a drive in bay 1, 2, or 3

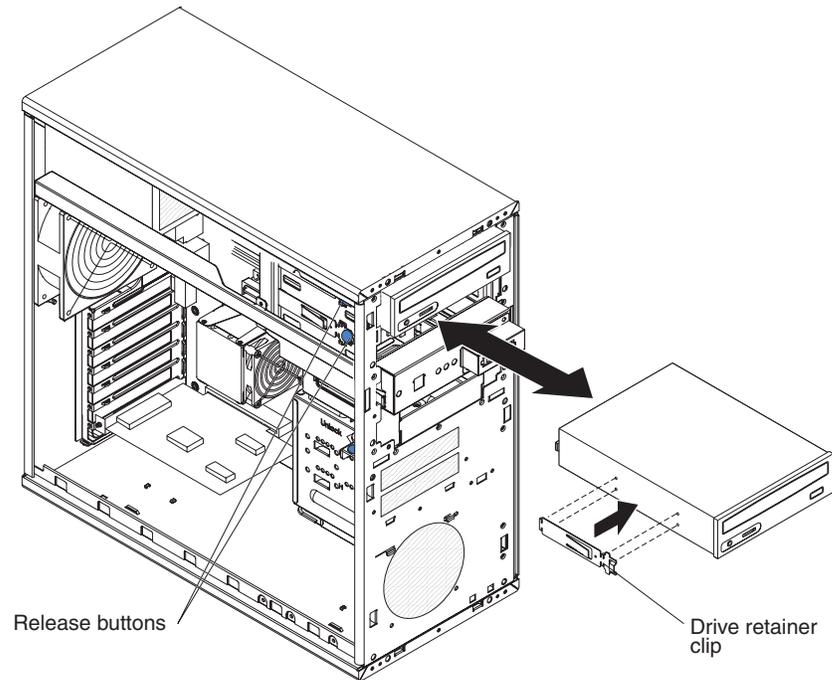
To remove a drive from bay 1, 2, or 3, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. If you are removing a diskette drive from bay 3, remove the bezel (see “Removing the bezel” on page 59).
5. Disconnect the cables from the drive to be removed.
6. Press the blue latch to release the drive; then, grasp the drive and pull it out of the front of the server.
7. If you are replacing the drive with a new drive, remove the drive retainer clip from the side of the drive and save it for installation on the replacement drive.
8. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a drive in bay 1, 2, or 3

To install a drive in bay 1, 2, or 3, complete the following steps.



1. If you are replacing a removed drive with a new drive, make sure that:
  - You have all the cables and other equipment specified in the documentation that comes with the new drive.
  - You check the instructions that come with the new drive to determine whether you must set any switches or jumpers on the drive. If you are installing a SCSI device, make sure that you select the SCSI ID for that device.
  - You have removed the blue drive retainer clip on the side of the old drive and have it available for installation on the new drive.

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

**Statement 3:**



**CAUTION:**

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

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



**DANGER**

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

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



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

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

**Note:** You might find it easier to install the new drive from the front and then attach the cables.

4. If you are installing a 3.5-in. drive in bay 2, attach a 5.25-in. conversion kit to the 3.5-in. drive.
5. Install the blue drive retainer clip into the screw holes on the side of the drive or conversion kit (with the blue side of the clip facing outward).
6. Push the drive into the bay from the front of the server.

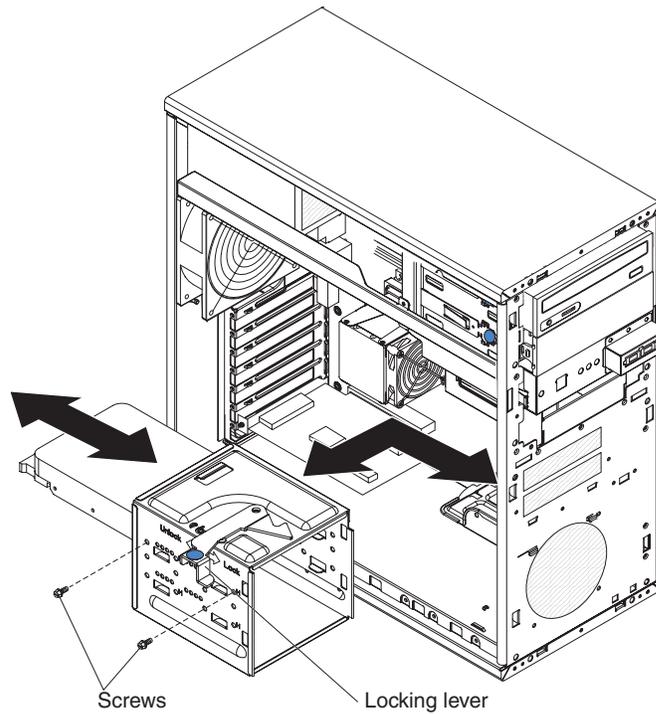
7. Connect the applicable signal cable (diskette, IDE, SCSI, or SATA) and power cable to the drive.

**Note:** Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor.

8. Install the bezel if it was removed (see “Installing the bezel” on page 60).
9. Install the cover (see “Installing the cover” on page 58).
10. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
11. Turn on the attached devices; then, turn on the server.

## Removing a drive in bay 4 or 5

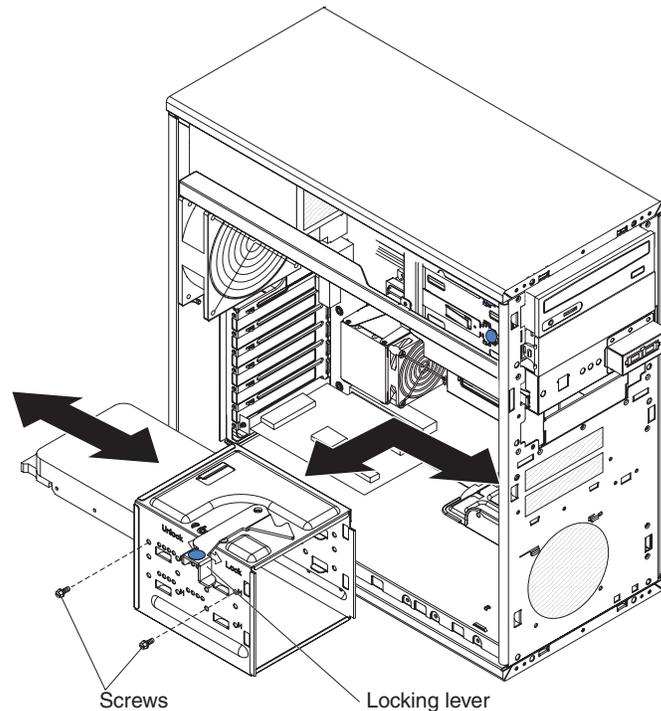
To remove a drive from bay 4 or 5, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. Disconnect the cables from the drive to be removed or from both drives in the drive cage, if two drives are installed.  
**Attention:** Make sure that you do not hit the microprocessor fan sink when removing the drive cage.
5. Remove the drive cage:
  - a. Move the locking lever on the drive cage to the Unlock position.
  - b. Firmly grasp the drive cage and slide it toward the rear of the server until it disengages from the chassis.
  - c. Lift the drive cage out of the server.
6. Remove the four screws (two on each side) that secure the drive to the drive cage and slide the drive out of the cage.
7. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a drive in bay 4 or 5

To install a drive in bay 4 or 5, complete the following steps.



1. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
2. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
3. Slide the drive into position in the drive cage and secure it with the four screws that were removed from the previous drive.

**Attention:** Make sure that you do not hit the microprocessor fan sink when installing the drive cage.

4. Install the drive cage:
  - a. Position the drive cage on the tray in the chassis and slide it forward until the upper and lower clips engage.

**Note:** Make sure that the locking lever on the drive cage is in the Unlock position before sliding the drive cage forward.

- b. Move the locking lever to the Lock position.

5. Connect the signal and power cables to the new drive or both drives in the drive cage, if two drives are installed.

**Note:** Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor.

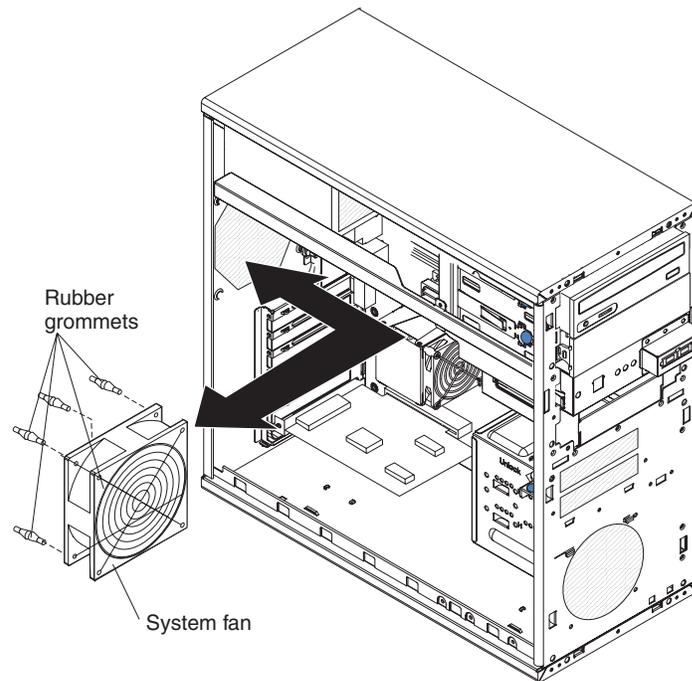
6. Install the cover (see “Installing the cover” on page 58).
7. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
8. Turn on the attached devices; then, turn on the server.

## Removing the system fan

### Attention:

- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 2 minutes with the cover removed.

To remove the system fan, complete the following steps.



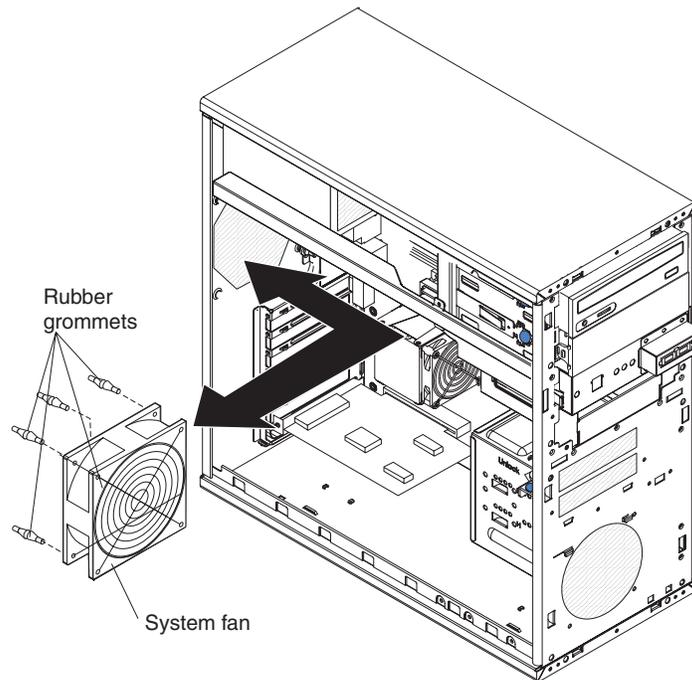
1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and attached devices; then, disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. Disconnect the fan cable from the system board, making a note of where the cable was connected for later installation.
5. Grasp the fan with both hands and pull firmly, extending the rubber grommets. The grommets will be pulled through the holes in either the fan or the chassis and can then be removed. Save the grommets for use with the replacement fan.

**Note:** It might be easier to use side cutters to sever the grommets.

6. Pull the fan up and out of the chassis.
7. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the system fan

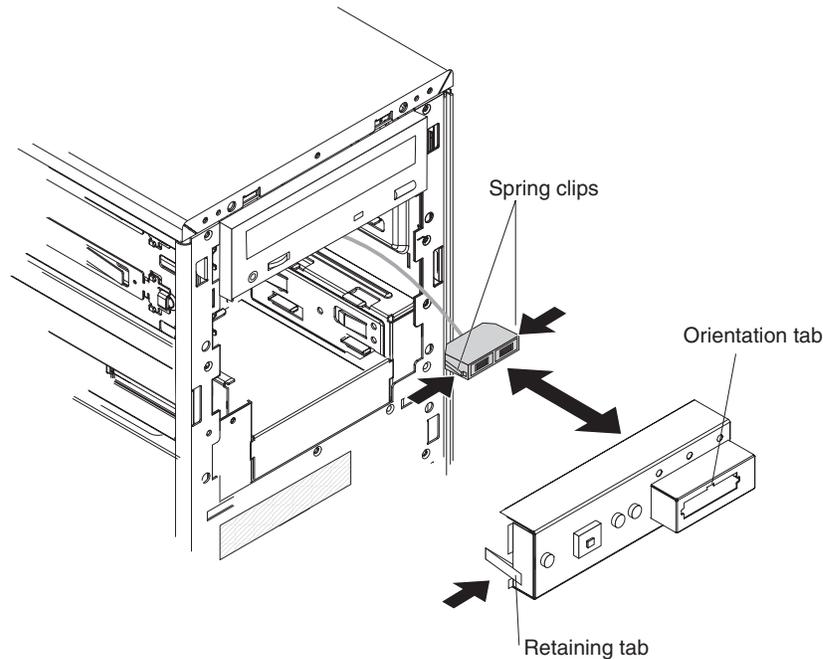
To install the system fan, complete the following steps.



1. Locate the rubber grommets that you removed from the defective fan. Use needle-nosed pliers to pull the grommets through the holes in the replacement fan.
2. Position the fan so that the grommets protrude through the holes in the chassis; then, use needle-nosed pliers to pull the grommets through the holes from outside the chassis.
3. Connect the fan cable to the system board (see “System-board internal connectors” on page 8 for the location of the system fan connector).
4. Install the cover (see “Installing the cover” on page 58).
5. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
6. Turn on the attached devices; then, turn on the server.

## Removing the front USB connector assembly

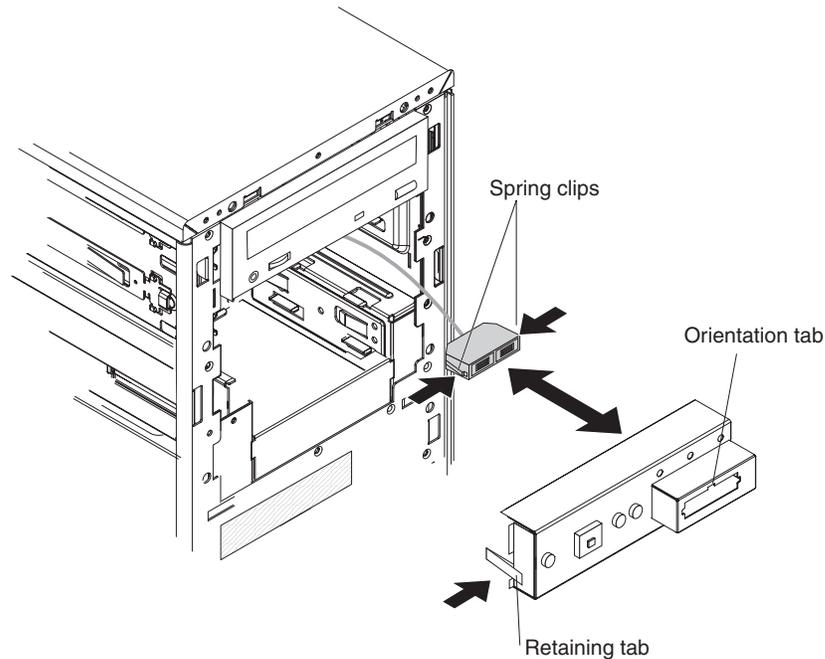
To remove the front USB connector assembly, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. Remove the bezel (see “Removing the bezel” on page 59).
5. Note the routing of the front USB connector assembly cable; then, disconnect it from the system board (see “System-board internal connectors” on page 8 for the location of the front USB connector).
6. Press in on the retaining tab and rotate the power switch/LED bracket toward the right; then, pull the bracket away from the server.
7. From the front of the power switch/LED bracket, squeeze the spring clips on the sides of the front USB connector assembly; then, pull the assembly from inside the bracket to remove it.
8. If you are instructed to return the front USB connector assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the front USB connector assembly

To install the front USB connector assembly, complete the following steps.



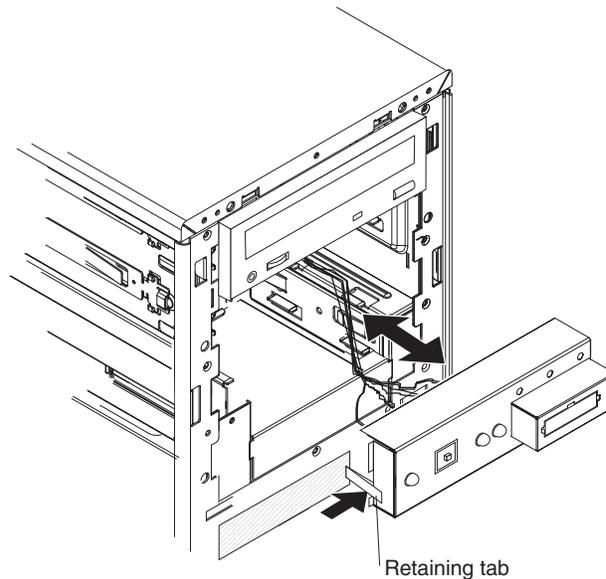
1. Carefully insert the front USB connector assembly cable into the opening in the front of the chassis.
2. Squeeze the spring clips on the sides of the front USB connector assembly; then, from the rear of the power switch/LED bracket, insert the assembly into the opening in the front of the bracket and release the spring clips.

**Note:** The orientation tab in the center of the connector is keyed to a notch in the top of the opening.

3. Place the right side of the power switch/LED bracket into the opening in the chassis and rotate the bracket to the left until the retaining tab clicks into place.
4. Route the front USB connector assembly cable; then, connect it to the system board (see “System-board internal connectors” on page 8 for the location of the front USB connector).
5. Install the bezel (see “Installing the bezel” on page 60).
6. Install the cover (see “Installing the cover” on page 58).
7. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
8. Turn on the attached devices; then, turn on the server.

## Removing the power switch/LED bracket

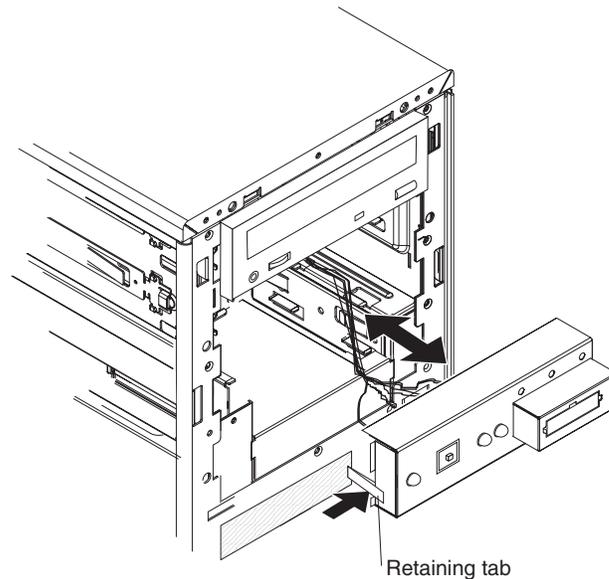
To remove the power switch/LED bracket, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).
4. Remove the bezel (see “Removing the bezel” on page 59).
5. Note the routing of the power switch/LED bracket cable; then, disconnect it from the system board (see “System-board internal connectors” on page 8 for the location of the power switch/LED bracket connector).
6. Press in on the retaining tab and rotate the power switch/LED bracket toward the right; then, pull the bracket away from the server.
7. From the front of the power switch/LED bracket, squeeze the spring clips on the sides of the front USB connector assembly; then, pull the assembly from inside the bracket to remove it (see “Removing the front USB connector assembly” on page 76).
8. Carefully pull the power switch/LED bracket cable out of the server.
9. If you are instructed to return the power switch/LED bracket, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the power switch/LED bracket

To install the power switch/LED bracket, complete the following steps.



1. Carefully insert the power switch/LED bracket cable into the opening in the front of the chassis.
2. Squeeze the spring clips on the sides of the front USB connector assembly; then, from the rear of the power switch/LED bracket, insert the assembly into the opening in the front of the bracket and release the spring clips.

**Note:** The orientation tab in the center of the connector is keyed to a notch in the top of the opening.

3. Place the right side of the power switch/LED bracket into the opening in the chassis and rotate the bracket to the left until the retaining tab clicks into place.
4. Route the power switch/LED bracket cable; then, connect it to the system board (see “System-board internal connectors” on page 8 for the location of the power switch/LED bracket connector).
5. Install the bezel (see “Installing the bezel” on page 60).
6. Install the cover (see “Installing the cover” on page 58).
7. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
8. Turn on the attached devices; then, turn on the server.

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## Removing and replacing FRUs

Field replaceable units (FRUs) must be installed only by trained service technicians.

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

## Removing the power supply

When you remove or install a power supply, observe the following precautions.

**Statement 8:**



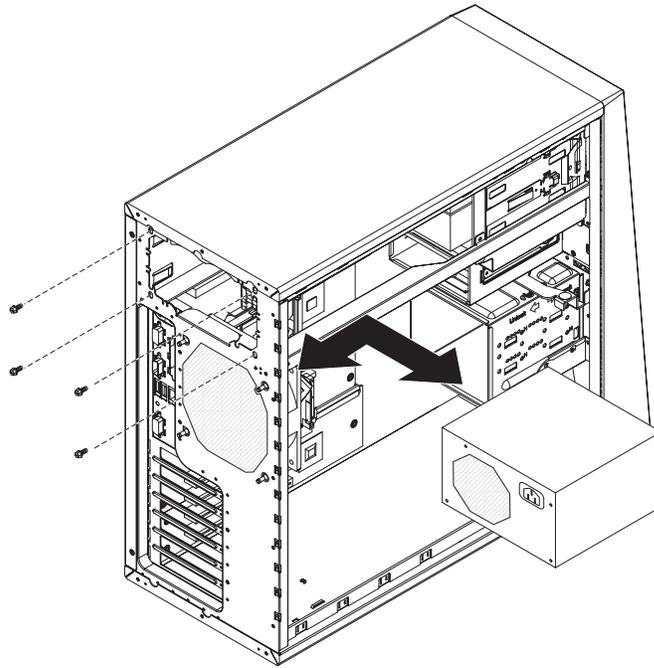
**CAUTION:**

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.

To remove the power supply, complete the following steps.



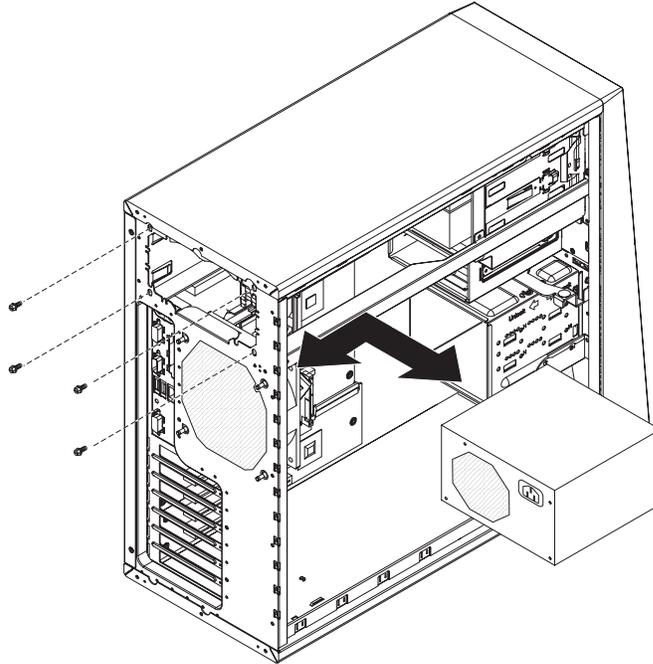
1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).

**Note:** It might be helpful to lay the computer on its right side for the remainder of this procedure.

4. Disconnect the cables from the power supply to the system board and all internal components.
5. To provide extra space for the power supply removal, use the following procedure:
  - Slide the drives in bay 1 and bay 2 (if any are installed) forward slightly (see “Removing a drive in bay 1, 2, or 3” on page 68 for more information). It is not necessary to remove these drives.
  - Remove the microprocessor fan sink (see “Removing the microprocessor and fan sink” on page 83). It is not necessary to remove the microprocessor.
  - Remove any DIMMs in DIMM slots 3 and 4 (see “Removing a memory module” on page 63).
6. Remove the four screws that secure the power supply to the chassis.
7. Slide the power supply toward the front of the chassis until it clears the mounting bracket; then, tilt the power supply toward the system board and carefully pull it out of the server.
8. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the power supply

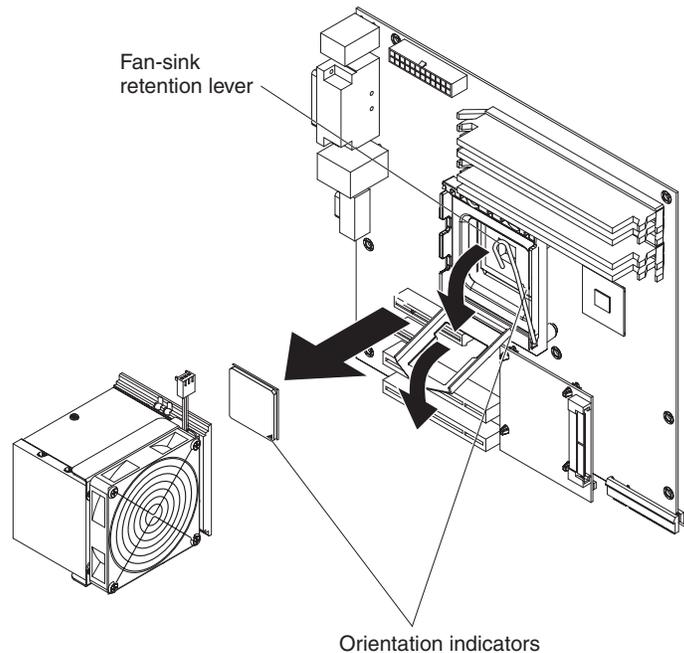
To install the power supply, complete the following steps.



1. Carefully insert the power supply into the chassis; then, position it on the mounting bracket and slide to the rear of the chassis.
2. Install the four screws that secure the power supply to the chassis.
3. Reinstall any of the following components that were removed:
  - Push the drives in bay 1 and bay 2 fully into the bays (see “Installing a drive in bay 1, 2, or 3” on page 69 for more information).
  - Install the microprocessor fan sink (see “Installing the microprocessor and fan sink” on page 85).
  - Reinstall any DIMMs that were removed from DIMM slots 3 and 4 (see “Installing a memory module” on page 64).
4. Reconnect the cables from the power supply to the system board and all internal components.
5. Install the cover (see “Installing the cover” on page 58).
6. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
7. Turn on the attached devices; then, turn on the server.

## Removing the microprocessor and fan sink

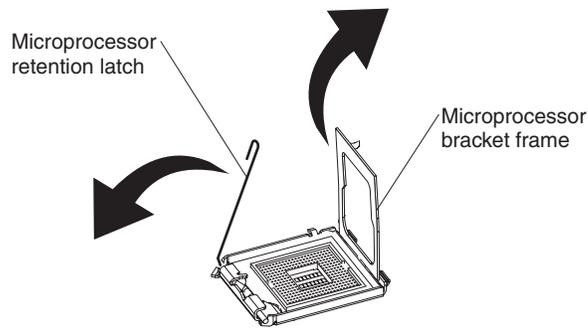
To remove the microprocessor and fan sink, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Turn the server on its side so that it is lying flat, with the cover facing up.
4. Remove the cover (see “Removing the cover” on page 57).
5. Disconnect any cables that impede access to the fan sink and microprocessor.  
**Attention:** The fan-sink retention lever is spring-loaded when the fan sink is in place. Releasing the lever too quickly or allowing it to spring upward can damage the fan sink and surrounding components.
6. Remove the fan sink from the microprocessor.
  - a. Disconnect the fan sink cable from the system board (see “System-board internal connectors” on page 8 for the location of the fan sink connector).
  - b. Release the fan-sink retention lever by pressing down on the end, moving it to the side and slowly releasing it to the open (up) position.

- Important:** Be careful when handling the microprocessor and fan sink. If the microprocessor and fan sink will be reused, do not contaminate the thermal material between them.
- c. Tip the top of the fan sink toward the front of the server while sliding it away from the lower flange of the retention module; then, remove it from the server. After removal, place the fan sink on its side on a clean, flat surface.

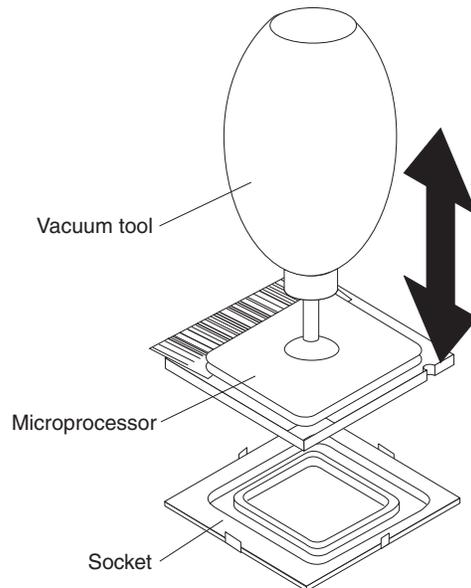
- Attention:** The microprocessor retention latch is spring-loaded when the microprocessor is in place. Releasing the latch too quickly or allowing it to spring upward can damage the microprocessor and surrounding components.
7. Release the microprocessor retention latch by pressing down on the end, moving it to the side, and slowly releasing it to the open (up) position.



8. Open the microprocessor bracket frame by lifting up the tab on the top edge.

**Attention:** Use the vacuum tool that comes with the replacement part to remove the microprocessor. Dropping the microprocessor during removal can damage the contacts. Also, contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.

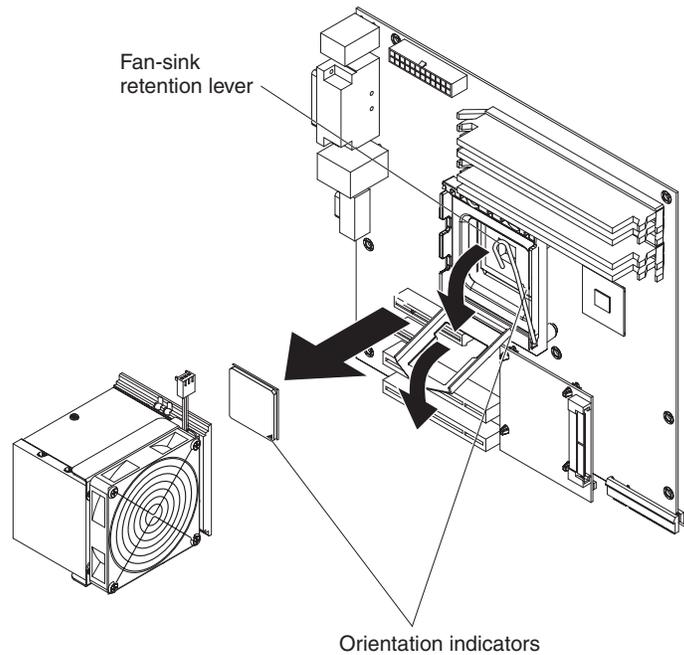
9. Remove the microprocessor by using the vacuum tool and completing the following steps.



- a. Squeeze and hold the bladder of the tool; then, place the suction cup on the microprocessor and release the bladder.
  - b. Using the tool, carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface.
  - c. Squeeze the bladder of the tool to release the microprocessor from the suction cup.
10. If you are instructed to return the fan-sink assembly and microprocessor, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the microprocessor and fan sink

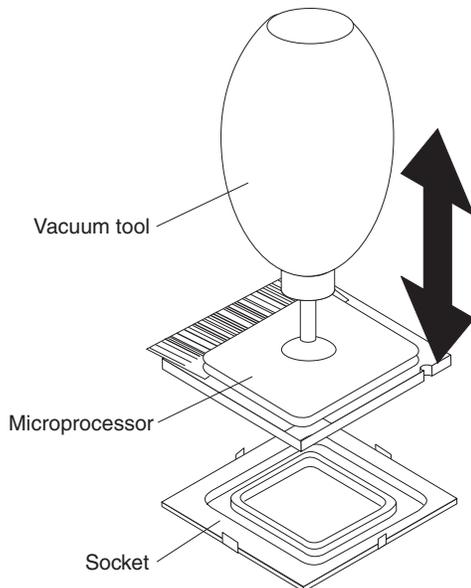
To install the microprocessor and fan sink, complete the following steps



1. Make sure that the microprocessor socket lever and cover are in the fully open position.

**Attention:** Use the vacuum tool that comes with the replacement part to install the microprocessor. Dropping the microprocessor during installation can damage the contacts. Also, contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.

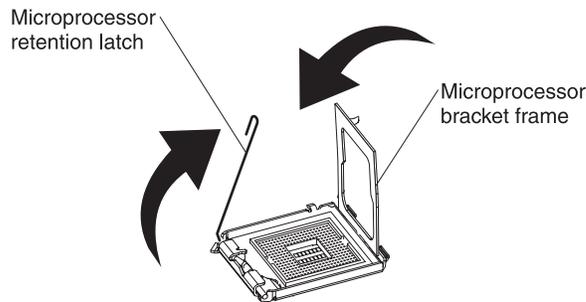
2. Install the microprocessor by using the vacuum tool and the completing the following steps.



- a. Squeeze and hold the bladder of the tool; then, place the suction cup on the microprocessor and release the bladder.

**Note:** To maintain proper orientation between the microprocessor and the microprocessor socket during installation, observe the following information:

- The microprocessor has two notches that are keyed to two tabs on the sides of the socket.
  - A triangle-shaped indicator on one corner of the microprocessor points to a 45-degree angle on one corner of the socket.
- b. Using the tool, carefully place the microprocessor into the socket.
  - c. Squeeze the bladder of the tool to release the microprocessor from the suction cup.
3. Close the microprocessor bracket frame; then, close the microprocessor retention latch and lock it securely in place.

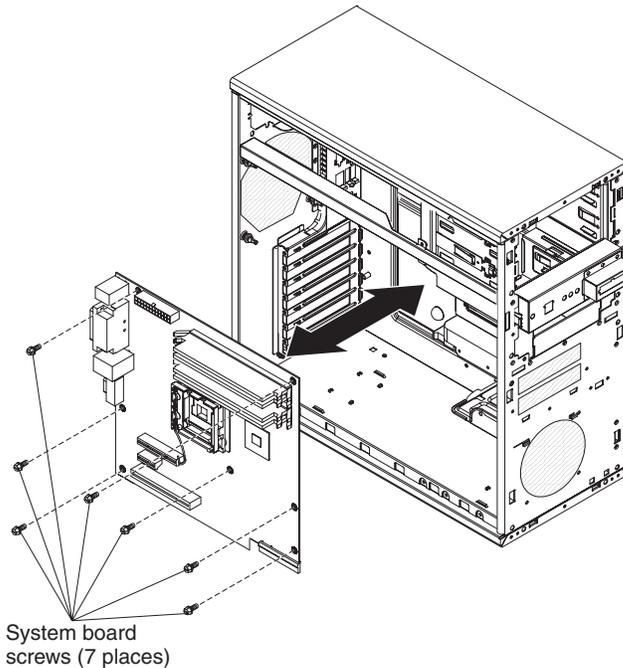


4. Install the fan sink.
  - a. Make sure that the fan-sink retention lever is in the fully open position.

**Important:** Be careful when handling the microprocessor and fan sink. Do not contaminate the thermal material between them.
  - b. Slide the bottom edge of the fan sink under the lower flange of the retention module; then, place the top of the fan sink onto the top of the retention module.
  - c. Close the fan-sink retention lever and lock it securely in place.
  - d. Reconnect the fan sink cable to the system board (see “System-board internal connectors” on page 8 for the location of the fan sink connector).
5. Reconnect any cables that were disconnected during removal of the microprocessor.
6. Install the cover (see “Installing the cover” on page 58).
7. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
8. Turn on the attached devices; then, turn on the server.

## Removing the system board

To remove the system board, complete the following steps.

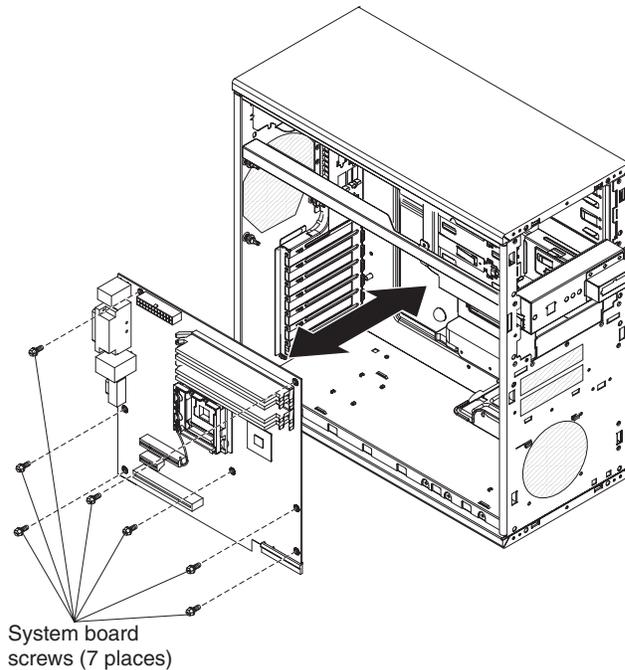


1. Read the safety information that begins on page vii and “Installation guidelines” on page 55.
2. Turn off the server and all peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the cover (see “Removing the cover” on page 57).  
**Attention:** Do not place any strain on the cables that are connected to the drives in the drive cage; if necessary, disconnect these cables from the drives before removing the drive cage.
4. Remove the drive cage:
  - a. Move the locking lever on the drive cage to the Unlock position.
  - b. Firmly grasp the drive cage and slide it toward the rear of the server until it disengages from the chassis.
  - c. Lift the drive cage out of the server.
5. Remove the system fan (see “Removing the system fan” on page 74).
6. Note where each cable is connected; then, disconnect all cables from the system board.
7. Remove any of the following components that are installed on the system board and put them in a safe, static-protective place:
  - Adapters (see “Removing an adapter” on page 61).
  - Microprocessor and fan-sink (see “Removing the microprocessor and fan sink” on page 83).
  - DIMMs (see “Removing a memory module” on page 63).
  - Battery (see “Removing the battery” on page 65).

8. Remove the seven screws that secure the system board to the chassis
9. Slide the system board toward the front of the server to disengage the tabs in the chassis; then, carefully lift the system board out of the server.
10. If you are instructed to return the system board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the system board

To install the system board, complete the following steps.



1. Insert the system board into the chassis and slide it toward the rear of the server until it fully engages the tabs in the chassis.

**Note:** The tabs are fully engaged when the screw holes in the system board are aligned with the corresponding holes in the chassis.

2. Install the seven screws that secure the system board to the chassis.
3. Install any of the following components that were removed from the system board:
  - Battery (see “Installing the battery” on page 65).
  - DIMMs (see “Installing a memory module” on page 64).
  - Microprocessor and fan sink (see “Installing the microprocessor and fan sink” on page 85).
  - Adapters (see “Installing an adapter” on page 62).
4. Reconnect any cables to the system board that were disconnected during removal.
5. Install the system fan (see “Installing the system fan” on page 75).

6. Install the drive cage:
  - a. Position the drive cage on the tray in the chassis and slide it forward until the upper and lower clips engage.  
  
**Note:** Make sure that the locking lever on the drive cage is in the Unlock position before sliding the drive cage forward.
  - b. Move the locking lever to the Lock position.
  - c. Reconnect any cables to the drives in the drive cage that were disconnected during removal.
7. Install the cover (see “Installing the cover” on page 58).
8. Reconnect the external cables and power cords to the server; then, connect the power cords to electrical outlets.
9. Turn on the attached devices; then, turn on the server.
10. Start the Configuration/Setup Utility program and reset the configuration.
  - a. Set the system date and time.
  - b. Set the passwords, if necessary.
  - c. Save the configuration.
11. Update the BIOS code (see “Updating the firmware” on page 91).



---

## Chapter 5. Configuration information and instructions

This chapter provides information about updating the firmware and using the configuration utilities.

---

### Updating the firmware

The firmware in the server is periodically updated and is available for download on the Web. Go to <http://www.ibm.com/support/> to check for the latest level of firmware, such as BIOS code, vital product data (VPD) code, device drivers, and service processor firmware.

When you replace a device in the server, you might have to either update the server with the latest version of the firmware that is stored in memory on the device or restore the pre-existing firmware from a diskette or CD image.

- BIOS code is stored in read-only memory (ROM) on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller on the system board.
- Major components contain VPD code. You can select to update the VPD code during the BIOS code update procedure.

---

### 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 your server to configure basic hardware features and to simplify your operating system installation. (See “Using the ServerGuide Setup and Installation CD” for more information.)

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

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

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

### Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation CD* provides state-of-the-art programs to detect the server model and hardware options that are installed, 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 your server, you can download the latest version from the ServerGuide Web page at <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 24
2. Follow the instructions that appear on the screen to:
  - a. Select your language.
  - b. Select your keyboard layout and country.
  - c. View the overview to learn about ServerGuide features.
  - d. View the readme file to review installation tips about your operating system and adapter.
  - e. Start the setup and hardware configuration programs.
  - f. Start the operating system installation. You will need your copy of the operating-system CD.

## Using the Configuration/Setup Utility program

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

- Change interrupt request (IRQ) settings
- Change the startup drive sequence
- Configure serial-port assignments
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set passwords and security settings

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

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

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

## Using the Boot Menu program

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

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

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

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

## Enabling the Broadcom NetXtreme Gigabit Ethernet Boot Agent

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

To enable the Broadcom NetXtreme Gigabit Ethernet Boot Agent, complete the following steps:

1. Turn on the server.
2. When the prompt Press F1 for Configuration/Setup appears during startup, press F1.
3. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports** and press Enter.
4. Select **System Board Ethernet PXE/DHCP** and use the Right Arrow (→) key to set it to **Enabled**.
5. Select **Save Settings** and press Enter.

## Configuring the Broadcom NetXtreme Gigabit Ethernet controller

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

You do not have to set any jumpers or configure the controller. However, you must install a device driver when you install a different operating system to enable the operating system to address the controller. For device drivers and information about configuring the Gigabit Ethernet controller, go to <http://www.ibm.com/support/>.



---

## Appendix A. Getting help and technical assistance

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

---

### Before you call

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

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

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

---

### Using the documentation

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

---

## Getting help and information from the World Wide Web

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

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

---

## Software service and support

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

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

---

## Hardware service and support

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

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

---

## Appendix B. Notices

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## Important notes

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

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

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

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

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## Product recycling and disposal

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---

## Battery return program

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

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

In the Netherlands, the following applies.



For Taiwan: Please recycle batteries.



---

## Electronic emission notices

IBM xSeries 100 Type 8486

### Federal Communications Commission (FCC) statement

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

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Responsible party:

International Business Machines Corporation  
New Orchard Road  
Armonk, NY 10504  
Telephone: 1-919-543-2193



Tested To Comply  
With FCC Standards

FOR HOME OR OFFICE USE

### Industry Canada Class B emission compliance statement

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

### Avis de conformité à la réglementation d'Industrie Canada

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取扱説明書に従って正しい取り扱いをして下さい。



---

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Part Number: 31R2070

Printed in USA

(1P) P/N: 31R2070

