

IBM System x3500 Type 7977



# Problem Determination and Service Guide



IBM System x3500 Type 7977



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**Note**

Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 167.

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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.

在安裝本產品之前，請仔細閱讀 **Safety Information**  
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по  
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

**Important:**

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

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

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

**Statement 1:**



**DANGER**

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

**To avoid a shock hazard:**

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

**To Connect:**

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

**To Disconnect:**

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

**Statement 2:**



**CAUTION:**

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

*Do not:*

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

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



**Statement 3:**



**CAUTION:**

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

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



**DANGER**

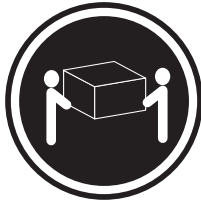
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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



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

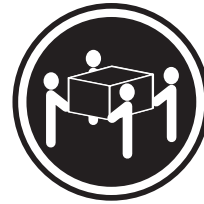
**Statement 4:**



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

**CAUTION:**

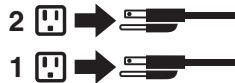
Use safe practices when lifting.

**Statement 5:**



**CAUTION:**

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



Statement 8:



**CAUTION:**

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



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

Statement 11:



**CAUTION:**

The following label indicates sharp edges, corners, or joints nearby.



Statement 17:



**CAUTION:**

The following label indicates moving parts nearby.



**Attention:** This product is suitable for use on an IT power distribution system whose maximum phase to phase voltage is 240 V under any distribution fault condition.



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## Chapter 1. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM® System x3500 Type 7977 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.

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## 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 optional devices.

- *User's Guide*

This document is in Portable Document Format (PDF) on the IBM *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 *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 *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 *Documentation* CD.

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

updates are available from the IBM Web site. To check for updated documentation and technical updates, complete the following steps.

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

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type **IBM System x3500**, and click **Search**.

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## Notices and statements in this document

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

The following notices and statements are used in this document:

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

## Features and specifications

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

Table 1. Features and specifications

<p><b>Microprocessor:</b></p> <ul style="list-style-type: none"> <li>Intel Xeon dual-core or quad-core with 12 MB Level-2 cache</li> <li><b>Important:</b> Do not use dual-core and quad-core processors in the same server.</li> <li>Support for up to two microprocessors</li> <li>Support for Intel Extended Memory 64 Technology (EM64T)</li> </ul> <p><b>Note:</b> Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors.</p> <p><b>Memory:</b></p> <ul style="list-style-type: none"> <li>Minimum: 1 GB depending on server model, expandable to 48 GB</li> <li>Type: 667 MHz, PC2-5300, ECC Fully Buffered DIMMs (FBD) with double data rate (DDR) II, SDRAM</li> <li>Connectors: Twelve 240-pin dual inline memory module (DIMM) connectors</li> </ul> <p><b>Drives:</b></p> <ul style="list-style-type: none"> <li>IDE: <ul style="list-style-type: none"> <li>DVD (standard)</li> <li>CD, CD-RW, DVD/CD-RW (optional)</li> <li>Maximum of two devices can be installed</li> </ul> </li> <li>Diskette (optional): External USB 1.44 MB</li> <li>Supported hard disk drives: <ul style="list-style-type: none"> <li>Serial Attached SCSI (SAS)</li> <li>Serial Advanced Technology Attachment (SATA)</li> </ul> </li> </ul> <p><b>Expansion bays:</b></p> <ul style="list-style-type: none"> <li>Eight hot-swap SAS, 3.5-inch bays or 12 hot-swap SAS, 2.5-inch bays</li> <li>Three half-high 5.25-inch bays (DVD drive installed)</li> <li><b>Note:</b> Full-high devices such as an optional tape drive will occupy two half-high 5.25-inch bays.</li> </ul> <p><b>PCI and PCI-X expansion slots:</b></p> <ul style="list-style-type: none"> <li>Six PCI expansion slots <ul style="list-style-type: none"> <li>Three PCI Express x8 (two x8 links and one x4 link)</li> <li>One PCI 33 MHz/32-bit</li> <li>Two PCI-X 2.0 133 MHz/64-bit slots</li> </ul> </li> </ul> <p><b>Upgradeable microcode:</b></p> <p>System BIOS, service microprocessor, BMC, and SAS microcode</p> <p><b>Power supply:</b></p> <p><b>Note:</b> To upgrade to two 835-watt hot-swap power supplies, install the redundant power and cooling option kit. Kit includes one 835-watt power-supply and three hot-swap fans.</p> <ul style="list-style-type: none"> <li>Standard: One 835-watt 110 V or 240 V ac input dual-rated power supply</li> <li>Upgradeable to two 835-watt hot-swap power supplies</li> </ul>	<p><b>Hot-swap fans:</b></p> <ul style="list-style-type: none"> <li>Three (standard)</li> <li>Upgradeable to six fans (for redundant cooling)</li> </ul> <p><b>Note:</b> To upgrade to redundant cooling, install the redundant power and cooling option kit. Kit includes one 835-watt hot-swap power-supply and three hot-swap fans.</p> <p><b>Size:</b></p> <ul style="list-style-type: none"> <li>Tower <ul style="list-style-type: none"> <li>Height: 440 mm (17.3 in.)</li> <li>Depth: 747 mm (29.4 in.)</li> <li>Width: 218 mm (8.6 in.)</li> <li>Weight: approximately 38 kg (84 lb) when fully configured or 20 kg (42 lb) minimum</li> </ul> </li> <li>Rack <ul style="list-style-type: none"> <li>5 U</li> <li>Height: 218 mm (8.6 in.)</li> <li>Depth: 696 mm (27.4 in.)</li> <li>Width: 424 mm (16.7 in.)</li> <li>Weight: approximately 34 kg (75 lb) when fully configured or 20 kg (42 lb) minimum</li> </ul> </li> </ul> <p>Racks are marked in vertical increments of 4.45 cm (1.75 inches). Each increment is referred to as a unit, or "U." A 1-U-high device is 4.45 cm (1.75 inches) tall.</p> <p><b>Integrated functions:</b></p> <ul style="list-style-type: none"> <li>Baseboard management controller (Intelligent Platform Management Interface (IPMI) 2.0 compliant)</li> <li>Service microprocessor support for Remote Supervisor Adapter II SlimLine</li> <li>Light path diagnostics</li> <li>ServeRAID-8k (512 MB with battery backup) and ServeRAID-8s SAS Controllers support RAID levels 0, 1, 1E, 10, 5, 6, 50, and 60</li> <li><b>Note:</b> The server will not start without a RAID controller installed. <ul style="list-style-type: none"> <li>Eight 3.5-inch hard disk drive models: ServeRAID-8k-l or ServeRAID-8k</li> <li>Twelve 2.5-inch hard disk drive models: ServeRAID-8k and ServeRAID-8s</li> <li>The ServeRAID-8s controller is only supported in slot 2.</li> <li>The ServeRAID-8s is currently limited in setup as the first boot priority.</li> </ul> </li> <li>Four Universal Serial Bus (USB) ports (2.0) <ul style="list-style-type: none"> <li>Two on rear of server</li> <li>Two on front of server</li> </ul> </li> <li>Broadcom 5721 and 5721KFB3 10/100/1000 Gigabit Ethernet controllers</li> <li>ATI PCI ES1000 video <ul style="list-style-type: none"> <li>16 MB video memory</li> <li>VGA and SVGA compatible</li> </ul> </li> <li>ATA-100 single-channel IDE controller (bus mastering)</li> <li>Vitesse VSC7250 SAS/SATA RAID controller</li> <li>Mouse connector</li> <li>Keyboard connector</li> <li>Serial connector</li> </ul>	<p><b>Acoustical noise emissions:</b></p> <ul style="list-style-type: none"> <li>Sound power, idle: 5.5 bel declared</li> <li>Sound power, operating: 6.0 bel declared</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 (50.0° to 95.0°F); altitude: 0 to 2134 m (7000 ft)</li> <li>Server off: -40° to 60°C (-40.0° to 140.4°F); maximum altitude: 2134 m (7000 ft)</li> </ul> </li> <li>Humidity: <ul style="list-style-type: none"> <li>Server on: 8% to 80%</li> <li>Server off: 8% to 80%</li> </ul> </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: 2013 Btu per hour (590 watts)</li> <li>Maximum configuration: 2951 Btu per hour (865 watts)</li> </ul> <p><b>Electrical input:</b></p> <ul style="list-style-type: none"> <li>Sine-wave input (50-60 Hz) required</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>Approximate input kilovolt-amperes (kVA): <ul style="list-style-type: none"> <li>Minimum: 0.60 kVA</li> <li>Maximum: 0.88 kVA</li> </ul> </li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use.</li> <li>These levels were measured in controlled acoustical environments according to the procedures that are specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average stated values 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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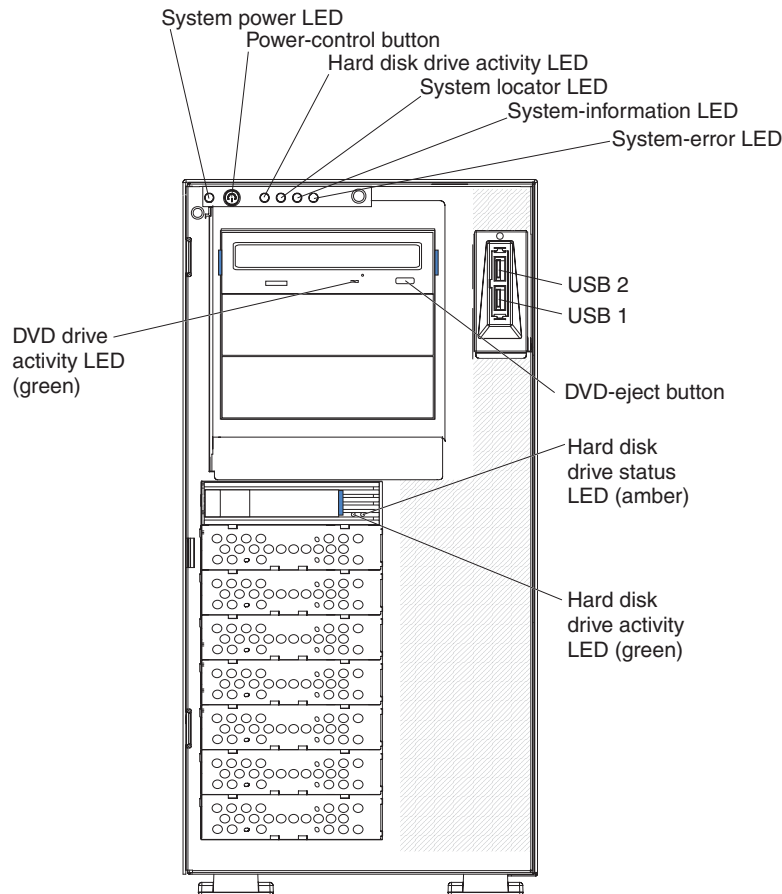
## Server controls, LEDs, and connectors

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.

**Note:** The front bezel door is not shown so that the drive bays are visible.



**System Power-on LED:** When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed. A power LED is also on the rear of the server.

**Power-control button:** Press this button to turn the server on and off manually. A power-control-button shield comes with the server. You can install this disk-shaped shield to prevent the server from being turned off accidentally.

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

**System locator LED:** Use this LED to visually locate the server among other servers. You can use IBM Director to light this LED remotely.



**System-information LED:** When this amber LED is on, the server power supplies are nonredundant, or some other noncritical event has occurred. The event is recorded in the error log. Check the light path diagnostic panel for more information.

**System-error LED:** When this amber LED is lit, it indicates that a system error has occurred. Use the diagnostic LED panel and the system service label on the inside of the left-side cover to further isolate the error.

**USB 1:** Connect a USB device to this connector.

**USB 2:** Connect a USB device to this connector.

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

**Hard disk drive status LED:** When this LED is lit, it indicates that the associated hard disk drive has failed. If an optional RAID adapter is installed in the server and the LED flashes slowly (one flash per second), the drive is being rebuilt. If the LED flashes rapidly (three flashes per second), the controller is identifying the drive.

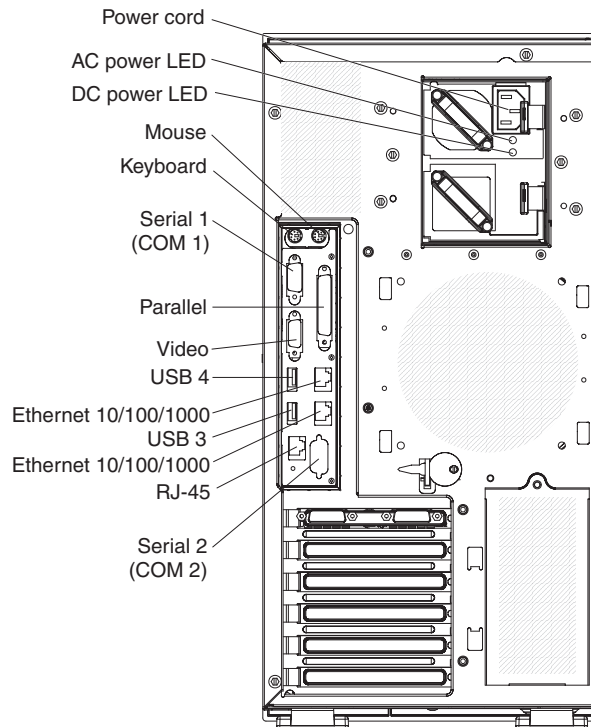
**Hard disk drive activity LED:** When this LED is flashing, it indicates that the drive is in use.

**Hard disk drive status LED:** On some server models, each hot-swap hard disk drive has a status LED. When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID controller is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

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

## Rear view

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



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

**AC power LED:** This green LED provides status information about the power supply. During typical operation, both the ac and dc power LEDs are lit.

**DC power LED:** This green LED provides status information about the power supply. During typical operation, both the ac and dc power LEDs are lit.

**Mouse connector:** Connect a mouse or other PS/2 device to this connector.

**Keyboard connector:** Connect a PS/2 keyboard to this connector.

**COM 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 3 connector:** Connect a USB device to this connector.

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

**USB 4 connector:** Connect a USB device to this connector.

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

**RJ-45 connector:** Use this connector to connect the optional Remote Supervisor Adapter II SlimLine to a network.

**COM 2 connector:** Connect a 9-pin serial device to this connector. This connector can also be redirected in the Configuration/Setup Utility program for use with the baseboard management controller (BMC) or Remote Supervisor Adapter II SlimLine to control the server remotely. Do not connect any 9-pin serial devices to this connector when it is configured for use with the BMC or Remote Supervisor Adapter II SlimLine.

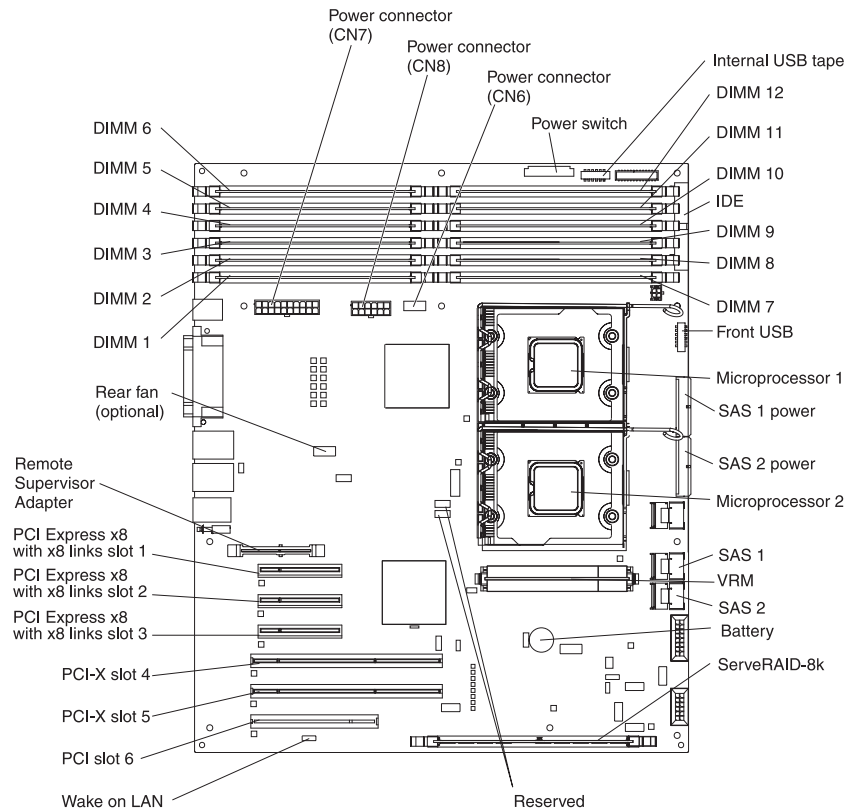
**Note:** When this connector is configured for use with the server management, do not connect any other 9-pin serial devices to this connector.

## Internal LEDs, connectors, and jumpers

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

### System-board internal connectors and switches

The following illustrations show the internal connectors and switches on the system board.



See Table 2 on page 9 for information about the switch settings.

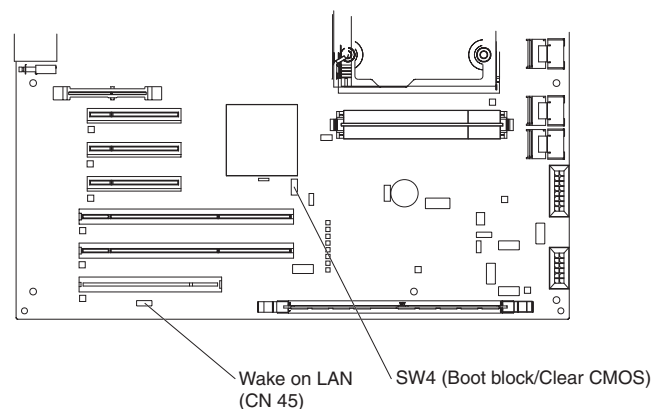


Table 2. Switches on SW4

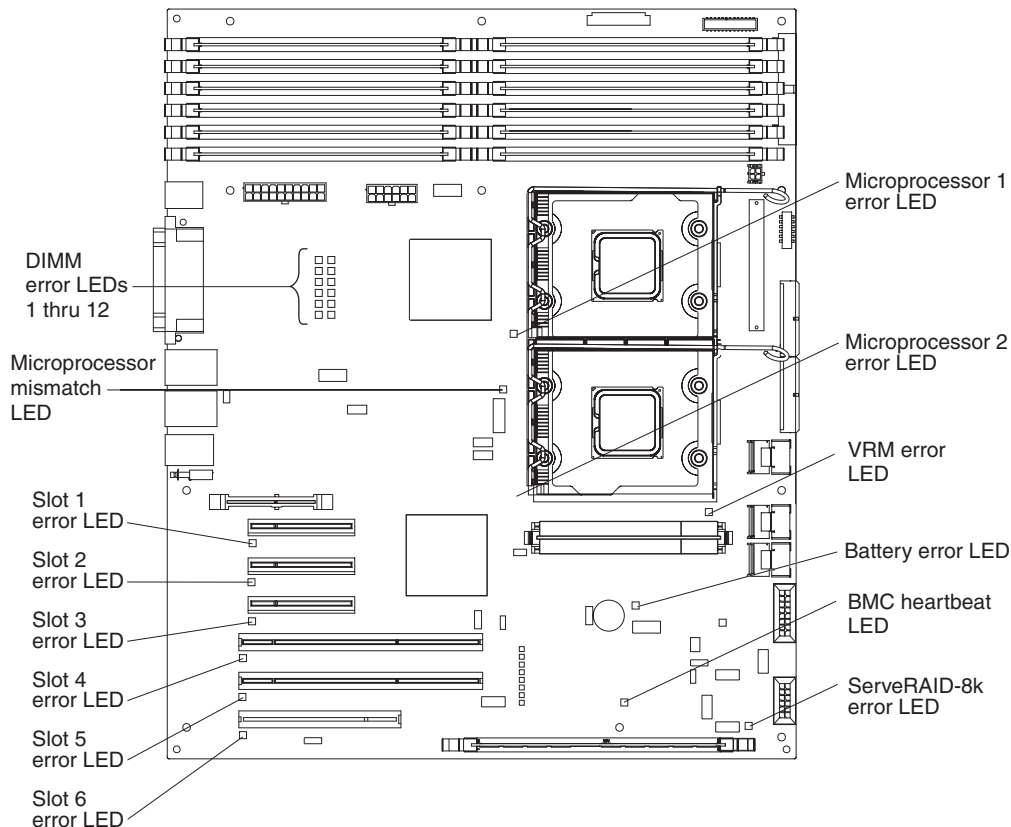
Switch number	Description
1	<p>Boot block:</p> <ul style="list-style-type: none"><li>• Leave the switch in the Off position for normal mode.</li><li>• Move the switch to the On position to enable the system to recover if the BIOS code becomes damaged.</li></ul> <p>See “Recovering from a BIOS update failure” on page 149 for more information.</p>
2	<p>Clear CMOS:</p> <ul style="list-style-type: none"><li>• Leave the switch in the Off position to keep the CMOS data.</li><li>• Move the switch to the On position to clear the CMOS data, which clears the power-on password and administrator password.</li></ul>

**Notes:**

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. (Review the information in “Safety” on page vii, “Installation guidelines” on page 55, and “Handling static-sensitive devices” on page 57.)
2. Any system-board switch or jumper blocks that are not shown in the illustrations in this document are reserved.

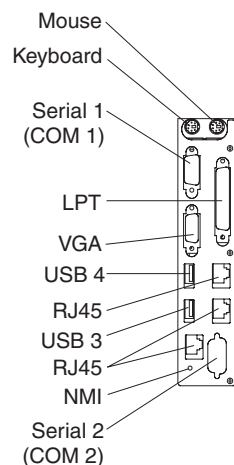
## System-board LEDs

The following illustration shows the switches and LEDs on the system board.



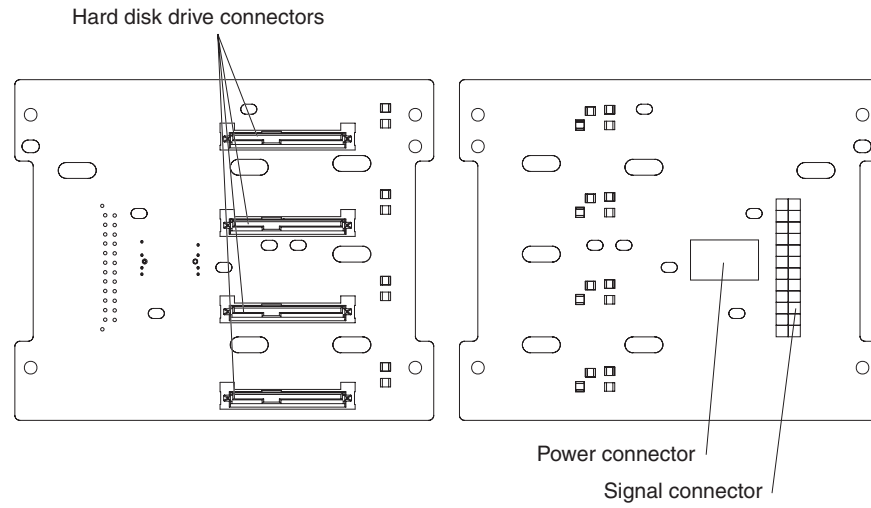
## System-board external connectors

The following illustration shows the external input/output connectors and the NMI switch on the system board.



## SAS backplane

The following illustration shows the connectors on the SAS backplane.







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## Chapter 2. Configuration information and instructions

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

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### Updating the firmware

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

The UpdateXpress program is available for most System x servers and optional devices. It detects supported and installed device drivers and firmware in your server and installs available updates. You can download the UpdateXpress program from the Web at no additional cost, or you can purchase it on a CD. To download the program or purchase the CD, go to <http://www.ibm.com/systems/management/xpress.html>.

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

- BIOS code stored in ROM on the microprocessor board.
- BMC firmware is stored in ROM on the baseboard management controller on the microprocessor board.
- Ethernet firmware is stored in ROM on the Ethernet controller on the PCI-X board.
- ServeRAID firmware is stored in ROM on the ServeRAID adapter.
- SAS firmware is stored in ROM on the SAS controller on the I/O board.
- Major components contain VPD code. You can select to update the VPD code during the BIOS code update procedure.

---

### Configuring the server

The following configuration programs come with the server:

- **Configuration/Setup Utility program**

The Configuration/Setup Utility program is part of the basic input/output system (BIOS). Use it to configure serial port assignments, change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this utility program, see “Using the Configuration/Setup Utility program” on page 14.

- **IBM ServerGuide Setup and Installation CD**

The ServerGuide program provides software-setup tools and installation tools that are designed for the server. Use this CD during the installation of the server to configure basic hardware features, such as an integrated SAS controller with RAID capabilities, and to simplify the installation of the operating system. For information about using this CD, see “Using the ServerGuide Setup and Installation CD” on page 20.

- **Baseboard management controller**

Use these programs to configure the baseboard management controller, to update the firmware and sensor data record/field replaceable unit (SDR/FRU)

data, and to remotely manage a network. For information about using these programs, see “Using the baseboard management controller” on page 22.

- **Boot Menu program**

The Boot Menu program is part of the BIOS. Use it to override the startup sequence that is set in the Configuration/Setup Utility program and temporarily assign a device to be first in the startup sequence, see “Using the Boot Menu program” on page 34.

- **Broadcom Gigabit Ethernet Utility program**

The Broadcom Gigabit Ethernet Utility program is part of the BIOS. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in your startup sequence. Enable the Broadcom Gigabit Ethernet Utility from the Configuration/Setup Utility program. For information, see “Enabling the Broadcom Gigabit Ethernet Utility program” on page 34.

- **Ethernet controller configuration**

For information about configuring the Ethernet controller, see “Configuring the Broadcom Gigabit Ethernet controller” on page 35.

- **Remote Supervisor Adapter II SlimLine configuration**

For information about setting up and cabling the Remote Supervisor Adapter II SlimLine, see “Setting up the Remote Supervisor Adapter II SlimLine” on page 35.

- **ServeRAID Manager**

ServeRAID Manager is available as a stand-alone program and as an IBM Director extension. Use the ServeRAID Manager to define and configure the disk-array subsystem *before* you install the operating system. For information about using this program, see “Using ServeRAID Manager” on page 38.

- **IBM Director**

IBM Director is a workgroup-hardware-management tool that you can use to centrally manage servers. If you plan to use IBM Director to manage the server, you must check for the latest applicable IBM Director updates and interim fixes. For information about updating IBM Director, see “Updating IBM Director” on page 40. For more information about IBM Director, see the IBM Director documentation on the *IBM Director* CD.

## Using the Configuration/Setup Utility program

Use the Configuration/Setup Utility program to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords and Remote Control Security settings
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- Set and change settings for the baseboard management controller (BMC)
- View and clear error logs

### Starting the Configuration/Setup Utility program

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

1. Turn on the server.
2. When the prompt Press F1 for Configuration/Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you

must type the administrator password to access the full Configuration/Setup Utility menu. If you do not type the administrator password, a limited Configuration/Setup Utility menu is available.

3. Select settings to view or change.

### **Configuration/Setup Utility menu choices**

The following choices are on the Configuration/Setup Utility main menu. Depending on the version of the BIOS, some menu choices might differ slightly from these descriptions.

- **System Summary**

Select this choice to view configuration information, including the type, speed, and cache sizes of the microprocessors and the amount of installed memory. When you make configuration changes through other choices in the Configuration/Setup Utility program, the changes are reflected in the system summary; you cannot change settings directly in the system summary.

This choice is on the full and limited Configuration/Setup Utility menu.

- **Processor Summary**

Select this choice to view the processor information, including the type, speed, and cache size of the microprocessor.

- **System Information**

Select this choice to view information about the server. When you make changes through other choices in the Configuration/Setup Utility program, some of those changes are reflected in the system information; you cannot change settings directly in the system information.

This choice is on the full Configuration/Setup Utility menu only.

- **Devices and I/O Ports**

Select this choice to view or change assignments for devices and input/output (I/O) ports.

Select this choice to enable or disable integrated Ethernet controllers and all standard ports (such as serial, USB, and parallel). **Enable** is the default setting for all controllers. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device). If you disable the integrated Ethernet controller and no Ethernet adapter is installed, the server will have no Ethernet capability. If you disable the integrated USB controller, the server will have no USB capability; to maintain USB capability, make sure that **Enabled** is selected for the **USB Support** and **USB 2.0 Support** options.

Select this choice to enable and configure serial remote video and keyboard redirection, and to set other remote console values.

This choice is on the full Configuration/Setup Utility menu only.

- **Parallel Port Setup**

Select this choice to enable or disable the parallel port and to adjust the parallel port resources and features.

- **Remote Console Redirection**

Select this choice to enable and configure serial remote video and keyboard redirection.

- **System MAC Addresses**

Select this choice to view the MAC addresses of the server.

- **Advanced Chipset Control**

Select this choice to modify settings that control features of the core chip set on the system board and to configure memory features.

**Attention:** Do not make changes in the **Advanced Chipset Control** option unless you are directed to do so by an IBM authorized service representative.

- **Video**

Select this choice to view the video information.

- **Date and Time**

Select this choice to set the date and time in the server, in 24-hour format (*hour:minute:second*).

- **System Security**

Select this choice to set password settings. See “Passwords” on page 19 for more information about passwords. You can also enable the chassis-intrusion detector to alert you each time that the server cover is removed.

- **Administrator Password**

This choice is on the Configuration/Setup Utility menu only if an optional IBM Remote Supervisor Adapter II SlimLine Slimline is installed.

Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If an administrator password is set, the full Configuration/Setup Utility menu is available only if

you type the administrator password at the password prompt. For more information, see “Administrator password” on page 20.

- **Power-on Password**

Select this choice to set or change a power-on password. See “Power-on password” on page 19 for more information.

- **Start Options**

Select this choice to view or change the start options. Changes in the start options take effect when you restart the server.

You can set keyboard operating characteristics, such as whether the server starts with the keyboard number lock on or off. You can enable the server to run without a monitor, or keyboard.

This choice is on the full Configuration/Setup Utility menu only.

- **Startup Sequence Options**

The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds. If the server has Wake on LAN hardware and software and the operating system supports Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. You can also specify whether an integrated controller or a PCI adapter has boot precedence.

If you enable the boot fail count, the BIOS default settings will be restored after three consecutive failures to find a boot record.

- **Advanced Setup**

Select this choice to change settings for advanced hardware features.

**Important:** The server might malfunction if these optional devices are incorrectly configured. Follow the instructions on the screen carefully.

This choice is on the full Configuration/Setup Utility menu only.

- **CPU Options**

Select this choice to enable or disable Hyper-Threading, the pre-fetch queue, C1 enhanced mode, and no-execute mode memory protection.

The default setting for Hyper-Threading is **Enabled**.

- **PCI Bus Control**

Select this choice to view the system resources that are used by the installed PCI, PCI Express, or PCI-X devices.

- **IPMI**

Select this choice to view or clear the system event log, make changes to the serial/modem device commands and the POST watchdog settings, and view the LAN settings.

- **IPMI Specification Version**

This is a nonselectable menu item that displays the IPMI and BMC version.

- **BMC Hardware/Firmware Version**

This is a nonselectable menu item that displays the BMC firmware version.

- **Clear System Event Log**

Enable or disable the system event log clearing. If system event-log clearing is enabled, it will reset to disabled when the BMC system-event log is cleared. **Disabled** is the default setting.

- **Existing Event Log number**

This is a nonselectable menu item that displays the number of entries in the system-event log.

- **BIOS POST Watchdog**  
Enable or disable the BMC POST watchdog. **Disabled** is the default setting.
- **POST Watchdog Timeout**  
Set the BMC POST watchdog timeout value. **5 minutes** is the default setting.
- **System Event Log**  
Select this choice to view the BMC system-event log, which contains all system error and warning messages that have been generated. Use the arrow keys to move among pages in the log. If an optional IBM Remote Supervisor Adapter II SlimLine is installed, the full text of the error messages is displayed; otherwise, the log contains only numeric error codes. Run the diagnostic program to get more information about error codes that occur. See Chapter 5, "Diagnostics," on page 95 for more information. Select **Clear System Event Log** to clear the BMC system-event log.  
  
**Important:** If the system-error LED on the front of the server is lit but there are no other error indications, clear the BMC system-event log. This log does not clear itself, and if it begins to fill up, the system-error LED will be lit. Also, after you complete a repair or correct an error, clear the BMC system-event log to turn off the system-error LED on the front of the server.
- **Serial /Modem Device Commands**  
Select this choice to change the serial port sharing and access mode.
  - **Serial Port Sharing**  
Enable or disable serial port sharing. **Enabled** is the default setting.
  - **Serial Port Access Mode**  
Share, disable, preboot only, or always available. **Shared** is the default setting.
- **LAN Settings**  
Select this choice to view the baseboard management controller network configuration information.
- **NMI Options**  
Select this choice to enable or disable the NMI reboot. **Enabled** is the default setting.
- **Error Logs**  
Select this choice to view or clear error logs.
  - **POST Error Log**  
Select this choice to view the three most recent error codes and messages that the system generated during POST. For more information about error logs, see IPMI on page 17.
  - **System Event/Error Log**  
Select this choice to view error codes and messages that the system generated during POST and all system status messages from the service processor. Select **Clear error logs** to clear the system event/error log. For more information on error logs, see IPMI on page 17.  
  
**Important:** If the system-error LED on the front of the server is lit but there are no other error indications, clear the system event/error log. This log does not clear itself, and if it begins to fill up, the system-error LED will be lit. Also, after you complete a repair or correct an error, clear the system event/error log to turn off the system-error LED on the front of the server.
- **Save Settings**  
Select this choice to save the changes that you have made in the settings.

- **Restore Settings**

Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

- **Load Default Settings**

Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

- **Exit Setup**

Select this choice to exit from the Configuration/Setup Utility program. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

## **Passwords**

From the **System Security** choice, you can set, change, and delete a power-on password and an administrator password. The **System Security** choice is on the full Configuration/Setup menu only.

If you set only a power-on password, you must type the power-on password to complete the system startup and to have access to the full Configuration/Setup Utility menu.

An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If you set only an administrator password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Configuration/Setup Utility menu.

If you set a power-on password for a user and an administrator password for a system administrator, you can type either password to complete the system startup. A system administrator who types the administrator password has access to the full Configuration/Setup Utility menu; the system administrator can give the user authority to set, change, and delete the power-on password. A user who types the power-on password has access to only the limited Configuration/Setup Utility menu; the user can set, change, and delete the power-on password, if the system administrator has given the user that authority.

**Power-on password:** If a power-on password is set, when you turn on the server, the system startup will not be completed until you type the power-on password. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the password.

When a power-on password is set, you can enable the Unattended Start mode, in which the keyboard and mouse remain locked but the operating system can start. You can unlock the keyboard and mouse by typing the power-on password.

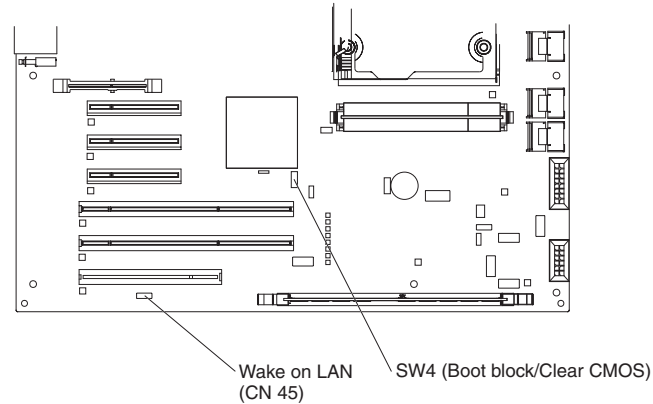
If you forget the power-on password, you can regain access to the server in any of the following ways:

- If an administrator password is set, type the administrator password at the password prompt. Start the Configuration/Setup Utility program and reset the power-on password.
- Remove the server battery and then reinstall it. See “Battery” on page 60 for information on how to remove the battery from the system board.
- Toggle switch 2 of SW4 on the system board to the on position to bypass the power-on password check.



**Attention:** Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Do not change settings or move jumpers on any system-board switch or jumper blocks that are not shown in this document.

The following illustration shows the locations of the power-on password override, boot recovery, and Wake on LAN bypass jumpers.



While the server is turned off, toggle the position of switch 2 of SW4 to the On position. You can then start the Configuration/Setup Utility program and reset the power-on password. After you reset the password, turn off the server again and move the switch back to the off position.

The power-on password override switch does not affect the administrator password.

**Administrator password:** If an administrator password is set, you must type the administrator password for access to the full Configuration/Setup Utility menu. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the password. The **Administrator Password** choice is on the Configuration/Setup Utility menu only if an optional IBM Remote Supervisor Adapter II SlimLine is installed.

**Attention:** If you forget the administrator password, you must replace the system board.

## Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD contains a setup and installation program that is designed for your server. The ServerGuide program detects the server model and optional hardware devices that are installed and uses that information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically.

If a later version of the ServerGuide program is available, you can download a free image of the *ServerGuide Setup and Installation* CD or purchase the CD from the ServerGuide fulfillment Web site at <http://www.ibm.com/systems/management/serverguide/sub.html>. To download the free image, click **IBM Service and Support Site**.

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

The ServerGuide program has the following features:



- An easy-to-use interface
- Diskette-free setup, and configuration programs that are based on detected hardware
- ServeRAID Manager program, which configures your ServeRAID adapter or integrated SAS/SATA controller with RAID capabilities
- Device drivers that are provided for the server model and detected hardware
- File-system type that is selectable during setup

### ServerGuide features

Features and functions can vary slightly with different versions of the ServerGuide program. To learn more about the version that you have, start the *ServerGuide Setup and Installation* CD and view the online overview. Not all features are supported on all server models.

The ServerGuide program requires a supported IBM server with an enabled startable (bootable) CD drive. In addition to the *ServerGuide Setup and Installation* CD, you must have the operating-system CD to install the operating system.

The ServerGuide program performs the following tasks:

- Sets system date and time
- Detects an installed SAS RAID adapter or controller and runs the SAS RAID configuration program
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed optional hardware devices and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems
- Includes an online readme file with links to tips for your hardware and operating-system installation

### Setup and configuration overview

When you use the *ServerGuide Setup and Installation* CD, you do not need setup diskettes. You can use the CD to configure any supported IBM server model. The setup program provides a list of tasks that are required to set up the server model. On a server with a ServeRAID SAS controller or integrated SAS/SATA controller with RAID capabilities, you can run ServeRAID Manager to create logical drives.

**Note:** Features and functions can vary slightly with different versions of the ServerGuide program.

When you start the *ServerGuide Setup and Installation* CD, the program prompts you to complete the following tasks:

- Select your language.
- Select your keyboard layout and country.
- View the overview to learn about ServerGuide features.
- View the readme file to review installation tips for your operating system and adapter.
- Start the operating-system installation. You will need your operating-system CD.

### Typical operating system installation

The ServerGuide program can reduce the time it takes to install an operating system. It provides the device drivers that are required for your hardware and for the operating system that you are installing. This section describes a typical ServerGuide operating-system installation.

**Note:** Features and functions can vary slightly with different versions of the ServerGuide program.

1. After you have completed the setup process, the operating-system installation program starts. (You will need your operating-system CD to complete the installation.)
2. The ServerGuide program stores information about the server model, service processor, hard disk drive controllers, and network adapters. Then, the program checks the CD for newer device drivers. This information is stored and then passed to the operating-system installation program.
3. The ServerGuide program prompts you to insert your operating-system CD and restart the server. At this point, the installation program for the operating system takes control to complete the installation.

### Installing your operating system without ServerGuide

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

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

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. From the menu on the left side of the page, click **System x support search**.
4. From the **Task** menu, select **Install**.
5. From the **Product family** menu, select **System x3500**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

## Using the baseboard management controller

The baseboard management controller provides environmental monitoring for the server. If environmental conditions exceed thresholds or if system components fail, the baseboard management controller lights LEDs to help you diagnose the problem and also records the error in the system event/error log.

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

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

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

- **Serial over LAN**

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

## Enabling and configuring SOL using the OSA SMBridge management utility program

To enable and configure the server for SOL by using the OSA SMBridge management utility program, you must update and configure the BIOS; update and configure the baseboard management controller (BMC) firmware; update and configure the Ethernet controller firmware; and enable the operating system for an SOL connection.

**BIOS update and configuration:** Complete the following steps to update and configure the BIOS code to enable SOL:

1. Update the BIOS code:
  - a. Download the latest version of the BIOS code from <http://www.ibm.com/systems/support/>.
  - b. Update the BIOS code, following the instructions that come with the update file that you downloaded.
2. Update the BMC firmware:
  - a. Download the latest version of the BMC firmware from <http://www.ibm.com/systems/support/>.
  - b. Update the BMC firmware, following the instructions that come with the update file that you downloaded.
3. Configure the BIOS settings:
  - a. Restart the server and press F1 when are prompted to start the Configuration/Setup Utility program.
  - b. Select **Devices and I/O Ports**; then, make sure that the values are set as follows:
    - **Serial Port A**: Auto-configure
    - **Serial Port B**: Auto-configure
  - c. Select **Remote Console Redirection**; then, make sure that the values are set as follows:
    - **Remote Console COM Port**: COM 2
    - **Remote Console Baud Rate**: 19200 or higher
    - **Remote Console Connection Type**: VT100
    - **Remote Console Connect**: Direct
    - **Remote Console Flow Control**: Hardware
    - **Remote Console Active After Boot**: Enabled
  - d. Press Esc twice to exit the **Remote Console Redirection** and **Devices and I/O Ports** sections of the Configuration/Setup Utility program.
  - e. Select **Advanced Setup**; then, select **Baseboard Management Controller (BMC) Settings**.
  - f. Set **BMC Serial Port Access Mode** to **Dedicated**.
  - g. Press Esc twice to exit the **Baseboard Management Controller (BMC) Settings** and **Advanced Setup** sections of the Configuration/Setup Utility program.
  - h. Select **Save Settings**; then, press Enter.
  - i. Press Enter to confirm.
  - j. Select **Exit Setup**; then, press Enter.
  - k. Make sure that **Yes, exit the Setup Utility** is selected; then, press Enter.

**Linux configuration:** For SOL operation on the server, you must configure the Linux operating system to expose the Linux initialization (booting) process. This enables users to log in to the Linux console through an SOL session and directs Linux output to the serial console. See the documentation for your specific Linux operating-system type for information and instructions.

Use one of the following procedures to enable SOL sessions for your Linux operating system. You must be logged in as a root user to perform these procedures.

*Red Hat Enterprise Linux ES 2.1 configuration:*

**Note:** This procedure is based on a default installation of Red Hat Enterprise Linux ES 2.1. The file names, structures, and commands might be different for other versions of Red Hat Linux.

Complete the following steps to configure the general Linux parameters for SOL operation when using the Red Hat Enterprise Linux ES 2.1 operating system.

**Note:** Hardware flow control prevents character loss during communication over a serial connection. You must enable it when using a Linux operating system.

1. Add the following line to the end of the # Run gettys in standard runlevels section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.  
`7:2345:respawn:/sbin/agetty -h ttyS0 19200 vt102`
2. Add the following line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:  
`ttyS0`

*LILO configuration:* If you are using LILO, complete the following steps:

1. Complete the following steps to modify the /etc/lilo.conf file:
  - a. Add the following text to the end of the first default=linux line  
`-Monitor`
  - b. Comment out the map=/boot/map line by adding a # at the beginning of this line.
  - c. Comment out the message=/boot/message line by adding a # at the beginning of this line.
  - d. Add the following line before the first image= line:  
`# This will allow you to only Monitor the OS boot via SOL`
  - e. Add the following text to the end of the first label=linux line:  
`-Monitor`
  - f. Add the following line to the first image= section. This enables SOL.  
`append="console=ttyS0,19200n8 console=tty1"`
  - g. Add the following lines between the two image= sections:  
`# This will allow you to Interact with the OS boot via SOL`  
`image=/boot/vmlinuz-2.4.9-e.12smp`  
`label=linux-Interact`  
`initrd=/boot/initrd-2.4.9-e.12smp.img`  
`read-only`  
`root=/dev/hda6`  
`append="console=tty1 console=ttyS0,19200n8 "`

The following examples show the original content of the `/etc/lilo.conf` file and the content of this file after modification.

Original <code>/etc/lilo.conf</code> contents
---

<pre>prompt timeout=50 default=linux boot=/dev/hda map=/boot/map install=/boot/boot.b message=/boot/message linear image=/boot/vmlinuz-2.4.9-e.12smp     label=linux     initrd=/boot/initrd-2.4.9-e.12smp.img     read-only     root=/dev/hda6 image=/boot/vmlinuz-2.4.9-e.12     label=linux-up     initrd=/boot/initrd-2.4.9-e.12.img     read-only     root=/dev/hda6</pre>
---

#### Modified /etc/lilo.conf contents

```
prompt
timeout=50
default=linux-Monitor
boot=/dev/hda
#map=/boot/map
install=/boot/boot.b
#message=/boot/message
linear
# This will allow you to only Monitor the OS boot via SOL
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux-Monitor
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
    append="console=ttyS0,19200n8 console=tty1"
# This will allow you to Interact with the OS boot via SOL
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux-Interact
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
    append="console=tty1 console=ttyS0,19200n8 "
image=/boot/vmlinuz-2.4.9-e.12
    label=linux-up
    initrd=/boot/initrd-2.4.9-e.12.img
    read-only
    root=/dev/hda6
```

2. Run the **lilo** command to store and activate the LILO configuration.

When the Linux operating system starts, a LILO boot: prompt is displayed instead of the graphical user interface. Press Tab at this prompt to install all of the boot options that are listed. To load the operating system in interactive mode, type linux-Interact and then press Enter.

*GRUB configuration:* If you are using GRUB, complete the following steps to modify the /boot/grub/grub.conf file:

1. Comment out the splashimage= line by adding a # at the beginning of this line.
2. Add the following line before the first title= line:  
# This will allow you to only Monitor the OS boot via SOL
3. Append the following text to the first title= line:  
SOL Monitor
4. Append the following text to the kernel/ line of the first title= section:  
console=ttyS0,19200 console=tty1
5. Add the following five lines between the two title= sections:  
# This will allow you to Interact with the OS boot via SOL  
title Red Hat Linux (2.4.9-e.12smp) SOL Interactive  
root (hd0,0)

```

kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=tty1
console=ttyS0,19200
initrd /initrd-2.4.9-e.12smp.img

```

**Note:** The entry that begins with `kernel /vmlinuz` is shown with a line break after `console=tty1`. In your file, the entire entry must all be on one line.

The following examples show the original content of the `/boot/grub/grub.conf` file and the content of this file after modification.

#### Original `/boot/grub/grub.conf` contents

```

#grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#          all kernel and initrd paths are relative to /boot/, eg.
#          root (hd0,0)
#          kernel /vmlinuz-version ro root=/dev/hda6
#          initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
splashimage=(hd0,0)/grub/splash.xpm.gz
title Red Hat Enterprise Linux ES (2.4.9-e.12smp)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12smp.img
title Red Hat Enterprise Linux ES-up (2.4.9-e.12)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12 ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12.img

```

#### Modified /boot/grub/grub.conf contents

```
#grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#           all kernel and initrd paths are relative to /boot/, eg.
#           root (hd0,0)
#           kernel /vmlinuz-version ro root=/dev/hda6
#           initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
# splashimage=(hd0,0)/grub/splash.xpm.gz
# This will allow you to only Monitor the OS boot via SOL
title Red Hat Enterprise Linux ES (2.4.9-e.12smp) SOL Monitor
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=ttyS0,19200 console=tty1
    initrd /initrd-2.4.9-e.12smp.img
# This will allow you to Interact with the OS boot via SOL
title Red Hat Linux (2.4.9-e.12smp) SOL Interactive
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=tty1 console=ttyS0,19200
    initrd /initrd-2.4.9-e.12smp.img
title Red Hat Enterprise Linux ES-up (2.4.9-e.12)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12 ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12.img
```

You must restart the Linux operating system after you complete these procedures for the changes to take effect and to enable SOL.

#### *SUSE SLES 8.0 configuration:*

**Note:** This procedure is based on a default installation of SUSE Linux Enterprise Server (SLES) 8.0. The file names, structures, and commands might be different for other versions of SUSE Linux.

Complete the following steps to configure the general Linux parameters for SOL operation when using the SLES 8.0 operating system.

**Note:** Hardware flow control prevents character loss during communication over a serial connection. You must enable it when using a Linux operating system.

1. Add the following line to the end of the # getty-programs for the normal runlevels section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.  
7:2345:respawn:/sbin/agetty -h ttyS0 19200 vt102
2. Add the following line after the tty6 line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:  
ttyS0
3. Complete the following steps to modify the /boot/grub/menu.lst file:



- a. Comment out the gfxmenu line by adding a # in front of the word gfxmenu.
- b. Add the following line before the first title line:  
# This will allow you to only Monitor the OS boot via SOL
- c. Append the following text to the first title line:  
SOL Monitor
- d. Append the following text to the kernel line of the first title section:  
console=ttyS0,19200 console=tty1
- e. Add the following four lines between the first two title sections:  
# This will allow you to Interact with the OS boot via SOL  
title linux SOL Interactive  
kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791  
console=tty1 console=ttyS0,19200  
initrd (hd0,1)/boot/initrd

The following examples show the original content of the /boot/grub/menu.lst file and the content of this file after modification.

Original /boot/grub/menu.lst contents	Notes
<pre>gfxmenu (hd0,1)/boot/message color white/blue black/light-gray default 0 timeout 8  title linux kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791 initrd (hd0,1)/boot/initrd  title floppy root chainloader +1  title failsafe kernel (hd0,1)/boot/vmlinuz.shipped root=/dev/hda2 ide=nodma apm=off vga=normal nosmp disableapic maxcpus=0 3 initrd (hd0,1)/boot/initrd.shipped</pre>	<p>1</p> <p>1</p>
<b>Note 1:</b> The kernel line is shown with a line break. In your file, the entire entry must all be on one line.	

Modified /boot/grub/menu.lst contents	Notes
<pre>#gfxmenu (hd0,1)/boot/message color white/blue black/light-gray default 0 timeout 8  # This will allow you to only Monitor the OS boot via SOL title linux SOL Monitor kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791 console=ttyS1,19200 console=tty1 initrd (hd0,1)/boot/initrd # This will allow you to Interact with the OS boot via SOL title linux SOL Interactive kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791 console=tty1 console=ttyS0,19200 initrd (hd0,1)/boot/initrd title floppy</pre>	<p>1</p>

Modified /boot/grub/menu.lst contents	Notes
<pre> root chainloader +1 title failsafe kernel (hd0,1)/boot/vmlinuz.shipped root=/dev/hda2 ide=nodma apm=off vga=normal nosmp disableapic maxcpus=0 3 initrd (hd0,1)/boot/initrd.shipped </pre>	1
<b>Note 1:</b> The kernel line is shown with a line break. In your file, the entire entry must all be on one line.	

You must restart the Linux operating system after you complete these procedures for the changes to take effect and to enable SOL.

### ***Microsoft Windows 2003 Standard Edition configuration:***

**Note:** This procedure is based on a default installation of the Microsoft Windows 2003 operating system.

Complete the following steps to configure the Windows 2003 operating system for SOL operation. You must be logged in as a user with administrator access to perform this procedure.

1. Complete the following steps to determine which boot entry ID to modify:
  - a. Type `bootcfg` at a Windows command prompt; then, press Enter to display the current boot options for your server.
  - b. In the Boot Entries section, locate the boot entry ID for the section with an OS friendly name of Windows Server 2003, Standard. Write down the boot entry ID for use in the next step.
2. To enable the Microsoft Windows Emergency Management System (EMS), at a Windows command prompt, type

```
bootcfg /EMS ON /PORT COM1 /BAUD 19200 /ID boot_id
```

where *boot\_id* is the boot entry ID from step 1b; then, press Enter.

3. Complete the following steps to verify that the EMS console is redirected to the COM2 serial port:
  - a. Type `bootcfg` at a Windows command prompt; then, press Enter to display the current boot options for your server.
  - b. Verify the following changes to the bootcfg settings:
    - In the Boot Loader Settings section, make sure that `redirect` is set to COM2 and that `redirectbaudrate` is set to 19200.
    - In the Boot Entries section, make sure that the OS Load Options: line has `/redirect` appended to the end of it.

The following examples show the original bootcfg program output and the output after modification.

#### Original bootcfg program output

```
Boot Loader Settings
-----
timeout: 30
default: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
Boot Entries
-----
Boot entry ID: 1
OS Friendly Name: Windows Server 2003, Standard
Path: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
OS Load Options: /fastdetect
```

#### Modified bootcfg program output

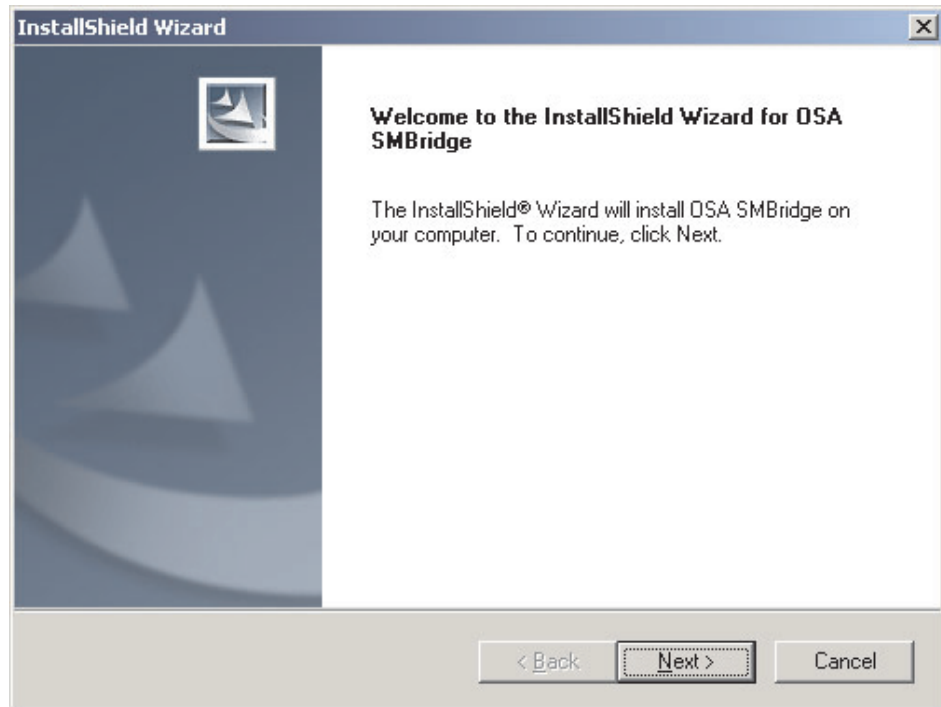
```
Boot Loader Settings
-----
timeout: 30
default: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
redirect: COM1
redirectbaudrate: 19200
Boot Entries
-----
Boot entry ID: 1
OS Friendly Name: Windows Server 2003, Standard
Path: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
OS Load Options: /fastdetect /redirect
```

You must restart the Windows 2003 operating system after you complete this procedure for the changes to take effect and to enable SOL.

### Installing the OSA SMBridge management utility program

Complete the following steps to install the OSA SMBridge management utility program on a server running a Windows operating system:

1. Go to <http://www.ibm.com/systems/support/>, download the utility program, and create the OSA BMC Management Utility CD.
2. Insert the OSA BMC Management Utility CD into the drive. The InstallShield wizard starts, and a window similar to that shown in the following illustration opens.



3. Follow the prompts to complete the installation.

The installation program prompts you for a TCP/IP port number and an IP address. Specify an IP address, if you want to limit the connection requests that will be accepted by the utility program. To accept connections from any server, type `INADDR_ANY` as the IP address. Also specify the port number that the utility program will use. These values will be recorded in the `smbridge.cfg` file for the automatic startup of the utility program.

Complete the following steps to install the OSA SMBridge management utility program on a server running a Linux operating system. You must be logged in as a root user to perform these procedures.

1. Go to <http://www.ibm.com/systems/support/>, download the utility program, and create the OSA BMC Management Utility CD.
2. Insert the OSA BMC Management Utility CD into the drive.
3. Type `mount/mnt/cdrom`.
4. Locate the directory where the installation RPM package is located and type `cd/mnt/cdrom`.
5. Type the following command to run the RPM package and start the installation:  
`rpm -ivh smbridge-2.0-XX.rpm`
6. Follow the prompts to complete the installation. When the installation is complete, the utility copies files to the following directories:  
`/etc/init.d/SMBridge`  
`/etc/smbridge.cfg`  
`/usr/sbin/smbrided`  
`/var/log/smbridge/License.txt`  
`/var/log/smbridge/Readme.txt`

The utility starts automatically when the server is started. You can also locate the `/ect/init.d` directory to start the utility and use the following commands to manage the utility:

smbridge status  
smbridge start  
smbridge stop  
smbridge restart

## Using the baseboard management controller utility programs

Use the baseboard management controller utility programs to configure the baseboard management controller, download firmware updates and SDR/FRU updates, and remotely manage a network.

### ***Using the baseboard management controller configuration utility program:***

Use the baseboard management controller configuration utility program to view or change the baseboard management controller configuration settings. You can also use the utility program to save the configuration to a file for use on multiple servers.

Complete the following steps to start the baseboard management controller configuration utility program:

1. Insert the configuration utility diskette into the diskette drive and restart the server.
2. From a command-line prompt, type `bmc_cfg` and press Enter.
3. Follow the instructions on the screen.

### ***Using the baseboard management controller firmware update utility***

***program:*** Use the baseboard management controller firmware update utility disk to update the baseboard management controller firmware and SDR/FRU data. The firmware update utility updates the baseboard management controller firmware and SDR/FRU data only and does not affect any device drivers.

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

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

***Using the OSA SMBridge management utility program:*** Use the OSA SMBridge management utility program to remotely manage and configure a network. The utility program provides the following remote management capabilities:

- **CLI (command-line interface) mode**

Use CLI mode to remotely perform power-management and system identification control functions over a LAN or serial port interface from a command-line interface. Use CLI mode also to remotely view the system event/error log.

Use the following commands in CLI mode:

- **identify**

Control the system-locator LED on the front of the server.

- **power**

Turn the server on and off remotely.

- **sel**

Perform operations with the BMC system event log.

- **sysinfo**

Display general system information that is related to the server and the baseboard management controller.

- **Serial over LAN**

Use the Serial over LAN capability to remotely perform control and management functions over a Serial over LAN (SOL) network. You can also use SOL to remotely view and change the server BIOS settings.

At a command prompt, type `Telnet localhost 623` to access the SOL network. Type `help` at the `smbridge>` prompt for more information.

Use the following commands in an SOL session:

- **connect**  
Connect to the LAN. Type `connect -ip ip_address -u username -p password`.
- **identify**  
Control the system-locator LED on the front of the server.
- **power**  
Turn the server on and off remotely.
- **reboot**  
Force the server to restart.
- **sel get**  
Display the system event/error log.
- **sol**  
Configure the SOL function.
- **sysinfo**  
Display system information that is related to the server and the globally unique identifier (GUID).

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

## Enabling the Broadcom Gigabit Ethernet Utility program

The Broadcom Gigabit Ethernet Utility 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.

To enable the Broadcom Gigabit Ethernet Utility program, complete the following steps:

1. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports** and press Enter.
2. Select **Planar Ethernet** and use the Right Arrow (→) key to set it to **Enabled**.
3. Select **Save Settings** and press Enter.

## Configuring the Broadcom Gigabit Ethernet controller

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

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. To find updated information about configuring the controller, complete the following steps.

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

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3500** and click **Continue**.

## Setting up the Remote Supervisor Adapter II SlimLine

You use the optional Remote Supervisor Adapter II SlimLine to obtain enhanced system management capabilities, above those of the embedded BMC. The Remote Supervisor Adapter II SlimLine has a dedicated Ethernet connection at the rear of the server.

This section describes how to set up, cable, and configure the Remote Supervisor Adapter II SlimLine so that you can manage the server remotely.

In addition to the information in this section, see the *IBM Remote Supervisor Adapter II SlimLine User's Guide* for information about how to configure and use the Remote Supervisor Adapter II SlimLine to manage the server remotely through the Web-based interface or the text-based interface.

**Note:** The Web-based interface and text-based interface do not support double-byte character set (DBCS) languages.

### Requirements

Make sure that the following Remote Supervisor Adapter II SlimLine requirements are met:

- The Web interface Remote Disk function requires the client system to be running Microsoft Windows 2000 or later. The Web interface Remote Control features require the Java1.4 Plug-in or later. The following Web browsers are supported:
  - Microsoft Internet Explorer version 5.5 or later with the latest Service Pack
  - Netscape Navigator version 7.0 or later
  - Mozilla version 1.3 or later
- If you plan to configure Simple Network Management Protocol (SNMP) trap alerts on the Remote Supervisor Adapter II SlimLine, install and compile the management information base (MIB) on your SNMP manager.
- You will need an Internet connection to the client system to download software and firmware from the IBM Support Web site during the installation process. The Remote Supervisor Adapter II SlimLine firmware and the SNMP MIB are

available on the *ServerGuide Setup and Installation* CD; the latest versions are available at <http://www.ibm.com/systems/management/serverguide/sub.html>.

## **Cabling the Remote Supervisor Adapter II SlimLine**

You can manage the server remotely through the Remote Supervisor Adapter II SlimLine by using the dedicated system-management Ethernet connector on the rear of the server.

For additional information about network configuration, go to the *Remote Supervisor Adapter II SlimLine Installation Guide*.

Complete the following steps to cable the Remote Supervisor Adapter II SlimLine:

1. Connect one end of a Category 3 or Category 5 Ethernet cable to the dedicated systems-management Ethernet connector. See “Server controls, LEDs, and connectors” on page 4 for the location of the systems-management Ethernet connector.
2. Connect the other end of the cable to the network.

## **Installing the Remote Supervisor Adapter II SlimLine firmware**

The software and firmware files that you need are contained in one system service package installation kit. The kit contains the following files:

- Software and firmware installation instructions
- BIOS code update with support for the Remote Supervisor Adapter II SlimLine
- Diagnostics code update
- Remote Supervisor Adapter II SlimLine device drivers
- Remote Supervisor Adapter II SlimLine firmware update
- Integrated service processor firmware update
- Video device driver
- Firmware-update utility program

Complete the following steps to download and install the software and firmware.

**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. In the left navigation pane, click **Downloads and drivers**.
3. In the **Search** field, type **Remote Supervisor Adapter II SlimLine firmware** and click **Search**.
4. Select the system service package for the operating system that is running on the server in which the Remote Supervisor Adapter II SlimLine is installed.
5. Click the file link to download the system service package to *d:\ibmssp*, where *d* is the hard disk drive letter. (Create the directory if necessary.)
6. Extract the files into *d:\ibmssp*. See the *readme.txt* file, which is included with the extracted files, for a list of the files in the package.
7. Follow the instructions in *Remote Supervisor Adapter II SlimLine Installation Instructions*, which is in Portable Document Format (PDF) in *d:\ibmssp*, to install the software and firmware.
8. Restart the server after the software and firmware are installed.



## Completing the setup

See the *IBM Remote Supervisor Adapter II SlimLine User's Guide* on the IBM Documentation CD for instructions for completing the configuration, including the following procedures:

- Configuring the Ethernet ports
- Defining login IDs and passwords
- Selecting the events that will receive alert notifications
- Monitoring remote server status using the Remote Supervisor Adapter II SlimLine Web-based interface
- Controlling the server remotely
- Attaching a remote diskette drive, CD drive, or disk image to the server

After you configure the adapter, use the Web-based interface to create a backup copy of the configuration so that you can restore the configuration, if you have to replace the adapter. For more information, see the *Remote Supervisor Adapter II SlimLine User's Guide*.

## Using the Adaptec RAID Configuration Utility program

Use the Adaptec RAID Configuration Utility programs to perform the following tasks:

- Configure a redundant array of independent disks (RAID) array
- View or change the RAID configuration and associated devices

When you are using the Adaptec RAID Configuration Utility programs to configure and manage arrays, consider the following information:

- Hard disk drive capacities affect how you create arrays. Drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- To help ensure signal quality, do not use drives with different speeds and data rates.
- To update the firmware and BIOS code for an optional ServeRAID SAS controller, you must use the IBM *ServeRAID Support* CD that comes with the ServeRAID option.

## Starting the Adaptec RAID Configuration Utility program

To start the Adaptec RAID Configuration Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt <<< Press <CTRL><A> for Adaptec RAID Configuration Utility! >>> is displayed, press Ctrl+A.
3. To select a choice from the menu, use the arrow keys to highlight it and press Enter.

## Adaptec RAID Configuration Utility menu choices

The following choices are on the Adaptec RAID Configuration Utility menu:

- **Array Configuration Utility**  
Select this choice to create, manage, or delete arrays, or to initialize drives.
- **SerialSelect Utility**  
Select this choice to configure the controller interface definitions or to configure the physical transfer and SAS address of the selected drive.
- **Disk Utilities**

Select this choice to format a disk or verify the disk media. Select a device from the list and read the instructions on the screen carefully before you make a selection.

### Creating a RAID array

To create a RAID array, complete the following steps:

1. Start the Adaptec RAID Configuration Utility program.
2. Select **Array Configuration Utility**.
3. From the Main menu, select **Create Array**.

**Note:** Hard disk drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.

4. From the list of available drives, select the drives that you want to include in the array and press Enter.
5. From the list of available RAID levels, select the one that you want to use.
6. Follow the instructions on the screen to complete the configuration; then, select **Done** to exit.
7. Restart the server.

### Viewing the array configuration

To view information about the RAID array, complete the following steps:

1. Start the Adaptec RAID Configuration Utility program.
2. Select **Array Configuration Utility**.
3. From the Main menu, select **Manage Arrays**.
4. Select an array and press Enter.
5. To exit from the program, press Esc.

## Using ServeRAID Manager

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

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

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

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

## Configuring the controller

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

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

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

**Using express configuration:** Complete the following steps to use express configuration:

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

**Using custom configuration:** Complete the following steps to use custom configuration:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Custom configuration**.
3. Click **Next**. The “Create arrays” window opens.
4. From the list of ready drives, select the two drives that you want to group into the array.
5. Click the icon on the toolbar to add the selected drives to the array.
6. If you want to configure a hot-spare drive, complete the following steps:
  - a. Click the **Spares** tab.
  - b. Select the physical drive that you want to designate as the hot-spare drive, and the icon on the toolbar to add the selected drives.
7. Click **Next**. The “Configuration summary” window opens.
8. Review the information in the “Configuration summary” window. To change the configuration, click **Back**.
9. Click **Apply**; then, click **Yes** when asked if you want to apply the new configuration. The configuration is saved in the controller and in the physical drives.
10. Exit from ServeRAID Manager and remove the CD from the DVD-ROM drive.
11. Restart the server.

## Viewing the configuration

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

## Updating IBM Director

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

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

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

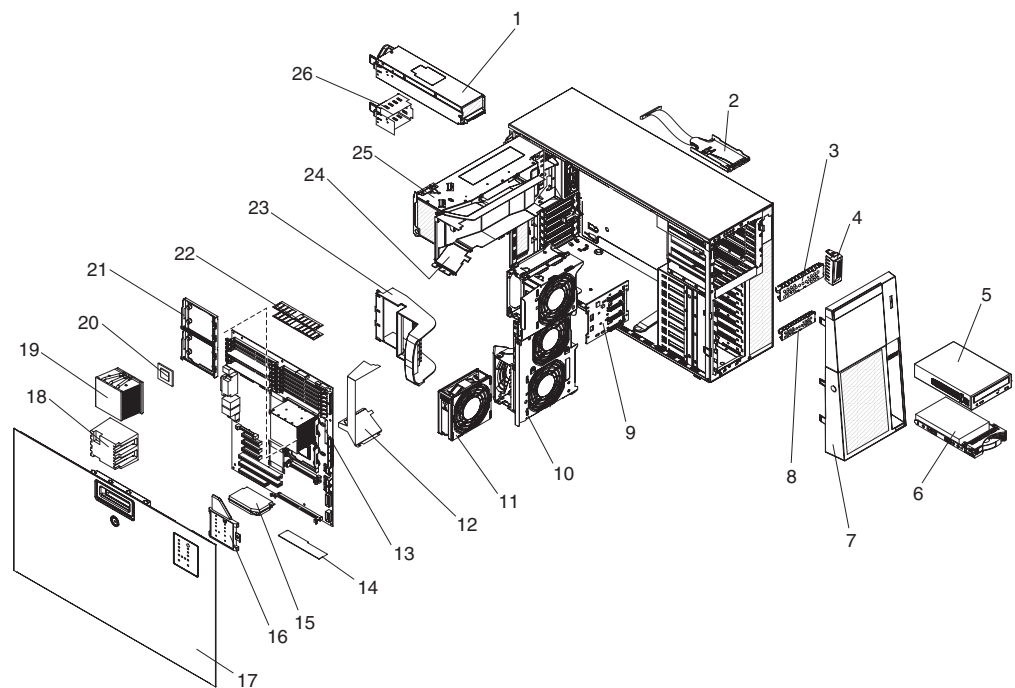
1. Check for the latest version of IBM Director:
  - a. Go to <http://www.ibm.com/systems/management/downloads.html>.
  - b. If the drop-down list shows a newer version of IBM Director than what comes with the server, follow the instructions on the Web page to download the latest version.
2. Install the IBM Director program.
3. Download and install any applicable updates or interim fixes for the server:
  - a. Go to <http://www.ibm.com/support/>.
  - b. Click **Downloads and drivers**.
  - c. From the **Category** list, select **xSeries (Intel and AMD processor-based)**.
  - d. From the **Sub-category** list, select **System x3500** and click **Continue**.
  - e. In the **Search within results** field, type **director** and click **Search**.
  - f. Select any applicable update or interim fix that you want to download.
  - g. Click the link for the executable (.exe) file to download the file, and follow the instructions in the readme file to install the update or interim fix.
  - h. Repeat steps 3f and 3g for any additional updates or interim fixes that you want to install.

## Chapter 3. Parts listing, System x3500 Type 7977

The following replaceable components are available for all models of the System x3500 Type 7977 server, except as specified otherwise in “Replaceable server components” on page 42. For an updated parts listing on the Web, complete the following steps.

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

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Parts documents lookup**.
4. From the **Product family** menu, select **System x3500**, and click **Continue**.



## 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 7977

Index	Description	CRU part number (Tier 1)	CRU part number. (Tier 2)	FRU part number
1	Power supply, 835 W (models 12x, 22x, 42x, 52x, 62x, 72x, 82x, 92x, A2x, B2x, C2x, D2x, F2x, G2x, H2x, J2x, L2x, M2x, Q4x, R2x, E1x, E2x, E4x, E5x, E7x, E3x, E6x, E8x, E9x, EBx, EFx, EGx)	24R2731		
2	Operator information panel assembly, with bracket and cables		41Y9080	
3	5.25 inch EMC flange (included in kit 39Y8355)	39Y8355		
4	USB mounting bracket (model CTO)	41Y9068		
5	DVD-ROM (primary)	39M3569		
5	DVD-ROM (option)	39M3517		
5	DVD-ROM (option)	39M3515		
5	DVD-ROM, half-high (option)	43W4615		
5	DVD-ROM, half-high, SATA (option)	43W8466		
5	CD/RW/DVD combo drive (option)	43W4575		
5	CD-ROM, 48X (option)	43W4615		
5	CD-ROM, 48X (option)	39M3509		
5	DVD-ROM (option)	39M3519		
6	Half-high CD-ROM (option)	42C0953		
6	Half-high combo drive (option)	39M0135		
6	Half-high DVD-ROM (option)	43W4577		
6	Half-high SATA DVD-ROM (option)	43W8467		
6	Hard disk drive, 73 GB, 10K, SAS, HS (option)	39R7340		
6	Hard disk drive, 146 GB, 10K, SAS, HS (option)	39R7342		
6	Hard disk drive, 73 GB, 15K, SAS, HS (option)	39R7348		
6	Hard disk drive, 146 GB, 15K, SAS, HS (option)	39R7350		
6	Hard disk drive, 36 GB (option)	39R7346		
6	Hard disk drive, 80 GB (option)	39M4521		
6	Hard disk drive, 160 GB (option)	39M4525		

Table 3. Parts listing, Type 7977 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number. (Tier 2)	FRU part number
6	Hard disk drive, 250 GB (option)	39M4529		
6	Hard disk drive, 300 GB (option)	39R7344		
6	Hard disk drive, 500 GB (option)	39M4533		
7	Bezel	44E3223		
7	Bezel, SFF filler assembly (models E8x, J2x, L2x, )	26K8680		
8	Hard disk drive filler	41Y9043		
9	SAS hard disk drive backplane			44E8783
9	Hard disk drive backplane (models E8x, J2x, L2x)		43X0334	
9	Hard disk drive backplane (models E8x, E9x, J2x, L2x)		46C6425	
10	Fan cage, front	41Y9067		
11	Fan assembly , 120 mm top cover (models CTO, E3x, E6x, E8x, E9x, Efx, EGx)	44E4563		
12	Microprocessor duct	39Y8501		
13	System board with tray			44R5619
13	Tray, system board			41Y9077
14	ServeRAID-8k with battery pack		25R8076	
15	Power supply VRM (model CTO)			24R2694
16	Light Path Diagnostic panel assembly		39Y7125	
17	Left-side cover	39Y8362		
18	Microprocessor baffle (models 12x, 22x, 42x, 52x, 62x, 72x, 82x, 92x, A2x, B2x, C2x, D2x, E1x, E2x, E3x, E4x, E5x, E6x, E7x, E8x, Efx, EGx, F2x, G2x, H2x, J2x, L2x, M2x, Q4x, R2x)	39M6800		
19	Heat sink	40K7438		
20	Microprocessor, 1.6 GHz (models 42x, E1x, E2x)			41Y4275
20	Microprocessor, 1.6 GHz, quad core, 80 watt (model B2x)			43W5174
20	Microprocessor, 1.86 GHz, quad core, 80 watt (model C2x)			43W5175
20	Microprocessor, 1.87 GHz (model 52x)			41Y4276
20	Microprocessor, 2.0 GHz (models 62x, E6x)			41Y4277
20	Microprocessor, 2.0 GHz, quad core, 80 watt (models F2x, Efx)			43W5182
20	Microprocessor, 2.0 GHz, quad core, 80 watt, with heat sink (model A2x)			44R5644
20	Microprocessor, 2.33 GHz (models 72x, E4x)			41Y4278
20	Microprocessor, 2.33 GHz, quad core, 80 watt (models G2x, EGx)			43W5183
20	Microprocessor, 2.33 GHz, quad core, 80 watt, with heat sink (model D2x)			44R5645
20	Microprocessor, 2.5 GHz, quad core, 80 watt, with heat sink (models E7x, EBx, J2x)			44R5646

Table 3. Parts listing, Type 7977 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number. (Tier 2)	FRU part number
20	Microprocessor, 2.66 GHz, quad core, 120 watt (model H2x)			43W5184
20	Microprocessor, 2.66 GHz, quad core, 80 watt, with heat sink (models E8x, L2x)			44R5647
20	Microprocessor, 2.67 GHz (models 82x, E5x)			41Y4279
20	Microprocessor, 2.83 GHz, quad core, 80 watt, with heat sink (model E3x, M2x)			44R5648
20	Microprocessor, 3.0 GHz (model 92x)			41Y4280
20	Microprocessor, 3.0 GHz (model 12x)			41Y8905
20	Microprocessor, 3.0 GHz, quad core, 120 watt (model E9x, R2x)			44E5117
20	Microprocessor, 3.2 GHz (model 22x)			41Y4223
20	Microprocessor, 3.16 GHz, quad core, (model Q4x)			46C7740
20	Microprocessor, 3.33 GHz, dual core, without heat sink (option)			46C7742
20	Microprocessor, 3.33 GHz, quad core, without heat sink (option)			46M1028
21	Retention module, microprocessor	39M6783		
22	Memory, 512 MB PC5300 ECC (models 12x, 22x, 42x, 52x, 62x, 72x, 82x, 92x, A2x, B2x, C2x, D2x, E1x, E4x, E5x, F2x, G2x, H2x, J2x, L2x, M2x, Q4x, R2x)	39M5781		
22	Memory, 1 GB PC5300 ECC (models E2x, E6x, E7x, Efx)	39M5784		
22	Memory, 1 GB DDRR (option)	46C7421		
22	Memory, 2 GB PC5300 ECC (models E3x, E8x, EBx, EGx, E9x)	39M5790		
22	Memory, 2 GB DDRR (option)	46C7422		
22	Memory, 4 GB PC5300 ECC (option)	41Y2845		
22	Memory, 4 GB DDRR (option)	46C7423		
23	Remote Supervisor Adapter II SlimLine Bracket	41Y9086		
24	DIMM air duct		39Y8499	
25	Power supply cage			24R2738
26	Filler panel, power supply (models 12x, 22x, 42x, 52x, 62x, 72x, 82x, 92x, A2x, B2x, C2x, D2x, E1x, E2x, E3x, E4x, E5x, E6x, E7x, E8x, E9x, EBx, Efx, EGx, F2x, G2x, H2x, J2x, L2x, M2x, Q4x, R2x) E1y E2y E3y E4y E5y E6y E7y E8y E9y Efy Efy EBY	39Y7391		
	Alcohol wipe			59P4739
	Adapter, 3U SCSI (option)	43W4325		
	Adapter, NetXtreme1000 (option)	39Y6081		
	Adapter, NetXtreme SXG (option)	39Y6090		
	Adapter, NetXtreme dual (option)	39Y6095		
	Adapter, NetXtreme TXG (option)	39Y6100		



Table 3. Parts listing, Type 7977 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number. (Tier 2)	FRU part number
	Adapter, iSCSI TX server (option)	30R5209		
	Adapter, iSCSI SX server (option)	30R5509		
	Adapter, SCSI (option)	39R8750		
	Card, SAS (option)	25R8071		
	Chassis			41Y9084
	Battery pack, SAS 8i (models E8x, J2x, L2x)		25R8118	
	Battery, ServeRAID-8k (option)	25R8088		
	Cable, DVD signal, IDE			13N2466
	Cable, CD/FDD power		39R9343	
	Cable, fan harness (models CTO, E8x, J2x, L2x)		39Y8341	
	Cable, front panel USB		26K7340	
	Cable, power supply interposer		39Y8356	
	Cable, rear 120x38 fans	39Y8400		
	Cable, redundant rear 120x38 fans (model CTO)	39Y8401		
	Cable, SAS power (models 12x, 22x, 42x, 52x, 62x, 72x, 82x, 92x, A2x, B2x, C2x, D2x, F2x, G2x, H2x, M2x, Q4x, R2x, E1x, E2x, E3x, E4x, E5x, E6x, E7x, E9x, EBx, EFx, EGx)		39Y8508	
	Cable, mini SAS signal (models A2x, B2x, C2x, D2x, F2x, G2x, H2x, M2x, Q4x, R2x, 12x, 22x, 42x, 52x, 62x, 72x, 82x, 92x, E1x, E2x, E3x, E4x, E5x, E6x, E7x, E9x, EBx, EFx, EGx)		46C4006	
	Cable, SAS 710 mm (models E8x, J2x L2x)		46M6498	
	Cable, SCSI 38 inch (option)	25R0048		
	Cable, power microfit, CGRID, 20 pins (models E8x, J2x, L2x)		44E4042	
	Cable, power microfit, CGRID, 24 pins (models E8x, J2x, L2x)		44E4040	
	Cable, SAS (models E8x, J2x, L2x)		42C2378	
	Cable, SAS/SATA 2 drop (models AC1, CTO, MC1)		46C7660	
	Cable, SFF SAS (models E8x, J2x, L2x)		44E4044	
	Cable, second serial port			42C1053
	Cover button (model CTO)	41Y9069		
	Converter kit, 3.5/5.25 inch bracket (option)		32P4743	
	DD S/5 drive (option)	40K2553		
	Drive bay filler (models 12x, 22x, 42x, 52x, 62x, 72x, 82x, 92x, A2x, B2x, C2x, D2x, E1x, E2x, E3x, E4x, E5x, E6x, E7x, E8x, EBx, EFx, EGx, F2x, G2x, H2x, J2x, L2x, M2x, Q4x, R2x)	39M6800		
	Fan air duct, rear	39Y8504		
	Fan, rear bracket assembly (E3x, E6x, E8x, E9x, EFx, EGx, CTO)	41Y9074		

Table 3. Parts listing, Type 7977 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number. (Tier 2)	FRU part number
	Feet, stabilizer, front			26K7345
	Filler bezel assembly (option)	41Y9071		
	Foot, system			13N2985
	Hard disk drive inner cage assembly (models E8x, J2x, L2x)			44E4036
	Hard disk drive outer cage assembly (models E8x, J2x, L2x)			44E4038
	Interposer (models AC1, CTO, E3x, E9x, MC1)		46M0452	
	Keylock, alike keyed (option)	26K7363		
	Keylock, random keyed (option)	26K7364		
	Miscellaneous kit contains: • RAID enable cable (1) • Power button (1) • Diagnostics label assembly (1) • Optical guide rail assembly (1)		41Y9079	
	Miscellaneous kit contains: • EMC shield, single bay SAS (1) • EMC shield, 5.25 inch • 525 EMC flange, tower top • 525 EMC flange, tower bottom	39Y8355		
	Miscellaneous kit contains: • Auxiliary PSU latch (1) • Strain relief bracket (1)		44E7524	
	Mouse, 3B USB optical (option)	40K9203		
	Netxtreme II 1000 express dual port ethernet adapter (option)	42C1782		
	Netxtreme II express fiber SR adapter (option)	42C1792		
	PATA/SATA interposer card		69Y1457	
	PCIe 8s SAS controller (models E8x, J2x, L2x)		46M0839	
	Power converter (optional)	44E8879		
	PRO/1000 GT server Ethernet adapter (option)	39Y6107		
	PRO/1000 GT server Ethernet adapter, DP (option)	73P5109		
	PRO/1000 GT server Ethernet adapter, QP (option)	73P5209		
	Qlogic iSCSI single port PCI-E adapter	39Y6148		
	Qlogic iSCSI dual port PCI-E adapter	42C1772		
	Qlogic 10 GB dual-port CNA adapter (option)	42C1802		
	Qlogic 10 GB SFP+ SR optical transceiver (option)	42C1816		
	Rack bezel assembly (option)	41Y9072		
	Shield kit, contains: (option) • Top EMC shield (1) • Bottom EMC shield (1)	41Y9070		

Table 3. Parts listing, Type 7977 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number. (Tier 2)	FRU part number
	RSA II card (models E3x, E9x)		44T1412	
	ServeRAID-MR10is VAULT SAS/SATA Controller, without battery (option)		44E8696	
	Shield, system board I/O			41Y9076
	Side cover assembly (option)	39Y8362		
	Slide kit		40K6679	
	System service label	39Y8359		
	Top/side cover	39Y8360		
	Thermal grease			41Y9292
	USB optical wheel	39Y9875		

## Product recovery CDs

Table 4. Product recovery CDs

Operating system, Language	CRU part number
Software recovery CD pack	43X1420
Windows 2003 Small Business Server Standard Edition R2 w/SP2, English	44W4028
Windows 2003 Small Business Server Standard Edition R2 w/SP2, French	44W4029
Windows 2003 Small Business Server Standard Edition R2 w/SP2, Italian	44W4030
Windows 2003 Small Business Server Standard Edition R2 w/SP2, German	44W4031
Windows 2003 Small Business Server Standard Edition R2 w/SP2, Spanish	44W4032
Windows 2003 Small Business Server Standard Edition R2 w/SP2, Korean	44W4033
Windows 2003 Small Business Server Standard Edition R2 w/SP2, Traditional Chinese	44W4034
Windows 2003 Small Business Server Standard Edition R2 w/SP2, Simplified Chinese	44W4035
Windows 2003 Small Business Server Standard Edition R2 w/SP2, Japanese	44W4036
Windows 2003 Small Business Server Premium Edition R2 w/SP2, English	44W4037
Windows 2003 Small Business Server Premium Edition R2 w/SP2, French	44W4038
Windows 2003 Small Business Server Premium Edition R2 w/SP2, Italian	44W4039
Windows 2003 Small Business Server Premium Edition R2 w/SP2, German	44W4040

Table 4. Product recovery CDs (continued)

Operating system, Language	CRU part number
Windows 2003 Small Business Server Premium Edition R2 w/SP2, Spanish	44W4041
Windows 2003 Small Business Server Premium Edition R2 w/SP2, Korean	44W4042
Windows 2003 Small Business Server Premium Edition R2 w/SP2, Traditional Chinese	44W4043
Windows 2003 Small Business Server Premium Edition R2 w/SP2, Simplified Chinese	44W4044
Windows 2003 Small Business Server Premium Edition R2 w/SP2, Japanese	44W4045
MS Windows Server 2003 R2 w/SP2 Standard 32 bit Edition 1-4 Processors, English	44W4046
Windows Server 2003 R2 w/SP2 32 bit Standard Edition 1-4 Processors, French	44W4047
Windows Server 2003 R2 w/SP2 32 bit Standard Edition 1-4 Processors, Italian	44W4048
Windows Server 2003 R2 w/SP2 32 bit Standard Edition 1-4 Processors, German	44W4049
Windows Server 2003 R2 w/SP2 32 bit Standard Edition 1-4 Processors, Spanish	44W4050
Windows Server 2003 R2 w/SP2 32 bit Standard Edition 1-4 Processors, Traditional Chinese	44W4051
Windows Server 2003 R2 w/SP2 32 bit Standard Edition 1-4 Processors, Japanese	44W4052
Windows Server 2003 R2 w/SP2 32 bit Standard Edition 1-4 Processors, Simplified Chinese	44W4053
Windows Server 2003 R2 w/SP2 32 bit Standard Edition 1-4 Processors, Korean	44W4054
Windows Server 2003 R2 w/SP2 Standard 64 Bit Edition 1-4 Processors, English	44W4055
Windows Server 2003 R2 w/SP2 Standard 64 Bit Edition 1-4 Processors, Japanese	44W4056
Windows Server 2003 R2 w/SP2 Enterprise 32 bit Edition 1-2 Processors, English	44W4057
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-2 Processors, French	44W4058
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-2 Processors, German	44W4059
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-2 Processors, Spanish	44W4060
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-2 Processors, Simplified Chinese	44W4061

Table 4. Product recovery CDs (continued)

Operating system, Language	CRU part number
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-2 Processors, Traditional Chinese	44W4062
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-2 Processors, Japanese	44W4063
Windows Server 2003 R2 w/SP2 Enterprise 32 bit Edition 1-2 Processors, Korean	44W4064
Windows Server 2003 R2 w/SP2 Enterprise 32 bit Edition 1-8 Processors, English	44W4065
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-8 Processors, French	44W4066
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-8 Processors, Italian	44W4067
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-8 Processors, German	44W4068
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-8 Processors, Spanish	44W4069
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-8 Processors, Simplified Chinese	44W4070
Windows Server 2003 R2 w/SP2 Enterprise 32 bit Edition 1-8 Processors, Traditional Chinese	44W4071
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-8 Processors, Japanese	44W4072
Windows Server 2003 R2 w/SP2 32 bit Enterprise Edition 1-8 Processors, Korean	44W4073
Windows Server 2003 R2 w/SP2 Enterprise 64 Bit Edition 1-2 Processors, English	44W4074
Windows Server 2003 R2 w/SP2 Enterprise 64 Bit Edition 1-2 Processors, Japanese	44W4075
Windows Server 2003 R2 w/SP2 Enterprise 64 Bit Edition 1-8 Processors, English	44W4076
Windows Server 2003 R2 w/SP2 Enterprise 64 Bit Edition 1-8 Processors, Japanese	44W4077
Windows Server 2003 R2 w/SP2 Enterprise 32 bit Edition 1-2 Processors, Italian	44W4078
Windows Server 2003 ENTERPRISE 32 Embedded Software Package	68Y9467
Windows Server 2008 Datacenter 32/64 Bit, Multilingual	49Y0222
Windows Server 2008 Datacenter 32/64 Bit, Simplified Chinese	49Y0223
Windows Server 2008 Datacenter 32/64 Bit, Traditional Chinese	49Y0224
Windows Server 2008 Standard Edition 32/64 Bit 1-4 Processors, Multilingual	49Y0892

Table 4. Product recovery CDs (continued)

Operating system, Language	CRU part number
Windows Server 2008 Standard Edition 32/64 Bit 1-4 Processors, Simplified Chinese	49Y0893
Windows Server 2008 Standard Edition 32/64 Bit 1-4 Processors, Traditional Chinese	49Y0894
Windows Server 2008 Enterprise Edition 32/64 Bit 1-8 Processors, Multilingual	49Y0895
Windows Server 2008 Enterprise Edition w/SP2 32/64 Bit 1-8 Processors, Simplified Chinese	49Y0896
Windows Server 2008 Enterprise Edition 32/64 Bit 1-8 Processor, Traditional Chinese	49Y0897
Windows Server 2008 Datacenter R2, Multilingual	59Y7332
Windows Server 2008 Datacenter R2, Simplified Chinese	59Y7333
Windows Server 2008 Datacenter R2, Traditional Chinese	59Y7334
Windows Server 2008 Datacenter w/SP2 32/64 Bit, Multilingual	60Y1760
Windows Server 2008 HPC Edition, English	68Y9455
Windows Server 2008 HPC Edition, Japanese	68Y9456
Windows Server 2008 HPC Edition, Simplified Chinese	68Y9457
Windows Server 2008 R2 Foundation, English	81Y2001
Windows Server 2008 R2 Foundation, French	81Y2002
Windows Server 2008 R2 Foundation, German	81Y2003
Windows Server 2008 R2 Foundation, Spanish	81Y2004
Windows Server 2008 R2 Foundation, Italian	81Y2005
Windows Server 2008 R2 Foundation, Brazilian	81Y2006
Windows Server 2008 R2 Foundation, Polish	81Y2007
Windows Server 2008 R2 Foundation, Russian	81Y2008
Windows Server 2008 R2 Foundation, Turkish	81Y2009
Windows Server 2008 R2 Foundation, Japanese	81Y2010
Windows Server 2008 R2 Foundation, Simplified Chinese	81Y2011
Windows Server 2008 R2 Foundation, Traditional Chinese	81Y2012

Table 4. Product recovery CDs (continued)

Operating system, Language	CRU part number
Windows Server 2008 R2 Foundation, Korean	81Y2013
Windows Server 2008 R2 Foundation, Czech	81Y2014
Windows Server 2008 R2 Standard Edition 32/64 Bit 1-4 Processors, Multilingual	81Y2015
Windows Server 2008 R2 Standard Edition 32/64 Bit 1-4 Processors, Simplified Chinese	81Y2016
Windows Server 2008 R2 Standard Edition 32/64 Bit 1-4 Processors, Traditional Chinese	81Y2017
Windows Server 2008 R2 Enterprise Edition 32/64 Bit 1-8 Processors 10 Users, Multilingual	81Y2018
Windows Server 2008 R2 Enterprise Edition 32/64 Bit 1-8 Processors 10 Users, Simplified Chinese	81Y2019
Windows Server 2008 R2 Enterprise Edition 32/64 Bit 1-8 Processors 10 Users, Traditional Chinese	81Y2020
Windows Server 2008 R2 Enterprise Edition 32/64 Bit 1-8 Processors 25 Users, Multilingual	81Y2021
Windows Server 2008 R2 Enterprise Edition 32/64 Bit 1-8 Processors 25 Users, Simplified Chinese	81Y2022
Windows Server 2008 R2 Enterprise Edition 32/64 Bit 1-8 Processors 25 Users, Traditional Chinese	81Y2023

## 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
39M5206	China
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
39M5123	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
39M5130	Denmark
39M5144	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
39M5151	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
39M5158	Liechtenstein, Switzerland
39M5165	Chile, Italy, Libyan Arab Jamahiriya
39M5172	Israel
39M5095	220 - 240 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, 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



IBM power cord part number	Used in these countries and regions
39M5081	110 - 120 V 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
39M5219	Korea (Democratic People's Republic of), Korea (Republic of)
39M5199	Japan
39M5068	Argentina, Paraguay, Uruguay
39M5226	India
39M5233	Brazil



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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, System x3500 Type 7977,” on page 41 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 install optional devices, read the following information:

- Read the safety information that begins on page vii and the guidelines in “Handling static-sensitive devices” on page 57. 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 tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific

hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- You can install a maximum of two IDE devices in the server.
- For a list of supported optional devices for the server, see <http://www.ibm.com/us/compact/>.

## System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield 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 (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not remove the air baffles or air ducts while the server is running. Operating the server without the air baffle or air ducts might cause the microprocessor to overheat.
- Microprocessor socket 2 always contains either a microprocessor baffle or a microprocessor and heat sink.

## Working inside the server with the power on

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

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

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

## Handling static-sensitive devices

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

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

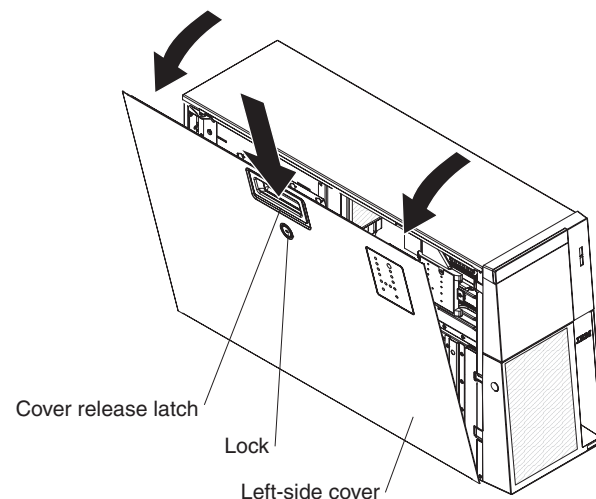
- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available. Always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal 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 you handle 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 the packaging instructions provided with the replacement part. Use any packaging materials for shipping that are supplied to you.

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## Removing the left-side cover and bezel



To remove the left-side cover and bezel complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices.”

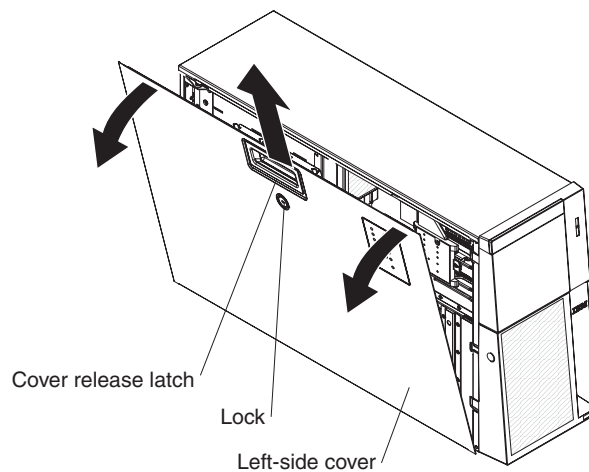
2. If you are installing or replacing a non-hot-swap component, turn off the server and all peripheral devices, and disconnect the power cords and all external cables.
3. Unlock the left-side cover and pull the cover-release latch down while you rotate the top edge of the cover away from the server; then, lift the cover off the server.

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

4. Press on the left edge of the bezel, and rotate the left side of the bezel away from the server. Rotate the left edge of the bezel out beyond 90°; then, pull the bezel away from the server.

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## Replacing the left-side cover and bezel



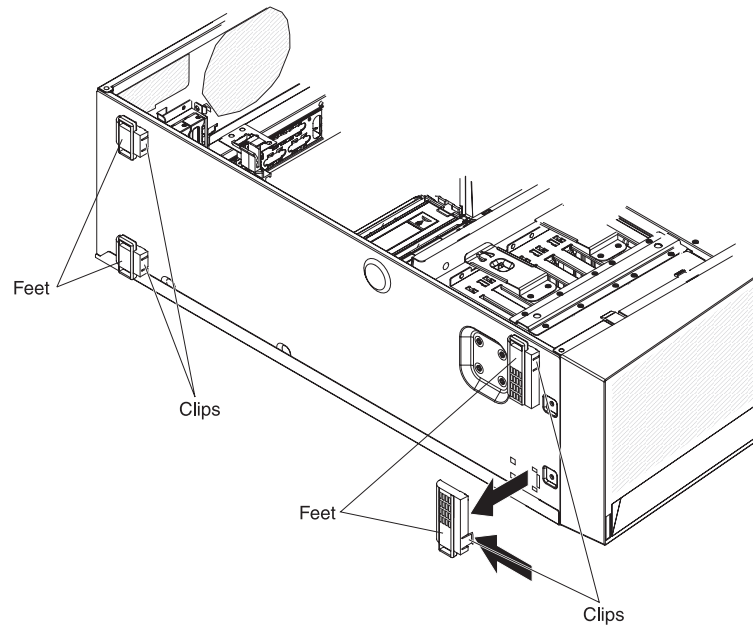
To install the left-side cover and bezel, complete the following steps:

1. Set the bottom edge of the left-side cover on the bottom ledge of the server; then, rotate the top edge of the cover toward the server and press down on the cover until it clicks into place.
2. Insert the tabs of the bezel into the slots on the server chassis; then, rotate the bezel until it is closed.
3. Lock the bezel and left-side cover in place with the lock on the side cover.

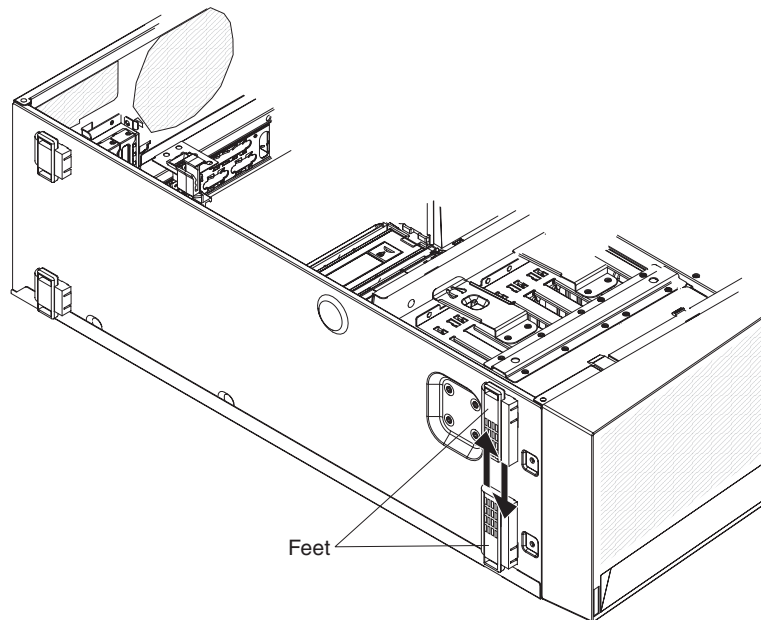
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## Turning the stabilizing feet

To rotate the front feet, complete the following steps.



1. Carefully position the server on a flat surface. The feet should hang over the edge of the flat surface to ease removal.
2. Press in on the clips to hold the feet in place; then, pry the feet away from the server. In some cases, you might need a screwdriver to pry the feet from the server.



3. Reinstall the feet in the opposite location. The tab on the feet should extend beyond the edge of the server.

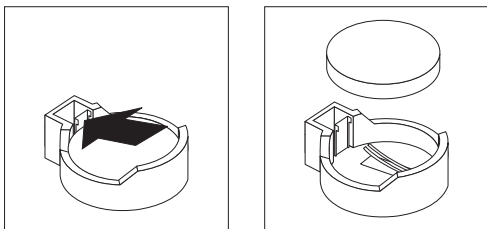
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## Tier 1 CRU information

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

### Battery

To remove the battery, complete the following steps:



1. Read the safety information that begins on page “Safety” on page vii.
2. Turn off the server and all attached devices.
3. Disconnect all external cables and power cords.
4. Remove the left-side cover and bezel (see “Removing the left-side cover and bezel” on page 57).
5. See “System-board internal connectors and switches” on page 8 for the location of the battery.
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 170 for information about disposing of the battery).

### Installing the battery

The following notes describe information that you must consider when you replace 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 marketing representative or authorized reseller.
- 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:**



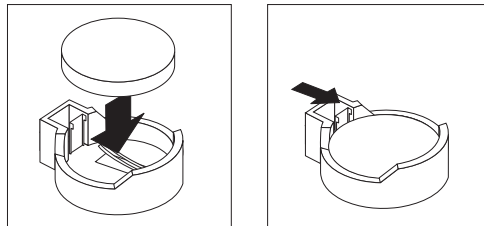
**CAUTION:**

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 replacement battery:
  - a. Position the battery so that the positive (+) symbol is facing away from you.
  - b. Use one finger to press the top of the battery clip away from the battery.
  - c. Press the battery into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Install the left-side cover and bezel (see “Removing the left-side cover and bezel” on page 57).
4. Connect the cables and power cords (see “Completing the installation” in the *Installation Guide* or *User’s Guide* for cabling instructions).

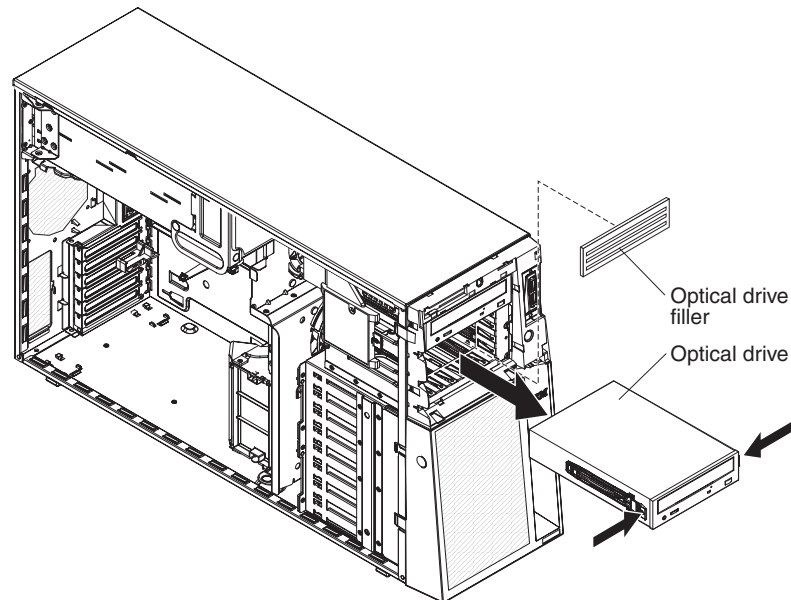
**Note:** You must wait approximately 20 seconds after you connect the power cord of the server to an electrical outlet before the power-control button becomes active.

5. Turn on all attached devices and the server.
6. Start the Configuration/Setup Utility program and reset the configuration:
  - Set the system date and time.
  - Set the power-on password.
  - Reconfigure the server.

See “Using the Configuration/Setup Utility program” on page 14 for details.

## DVD drive

To remove the DVD drive, complete the following steps.



1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Unlock and remove the left-side cover (see “Removing the left-side cover and bezel” on page 57).
4. Press on the bezel retention tab at the center of the left edge of the bezel, and rotate the left side of the bezel away from the server; then, pull the bezel away from the server.
5. Disconnect the DVD drive cable from the system board.
6. Grasping the blue tabs on each side of the DVD drive, press them inward while you pull the drive out of the sever.
7. Remove the rails from the DVD drive and save them for future use.

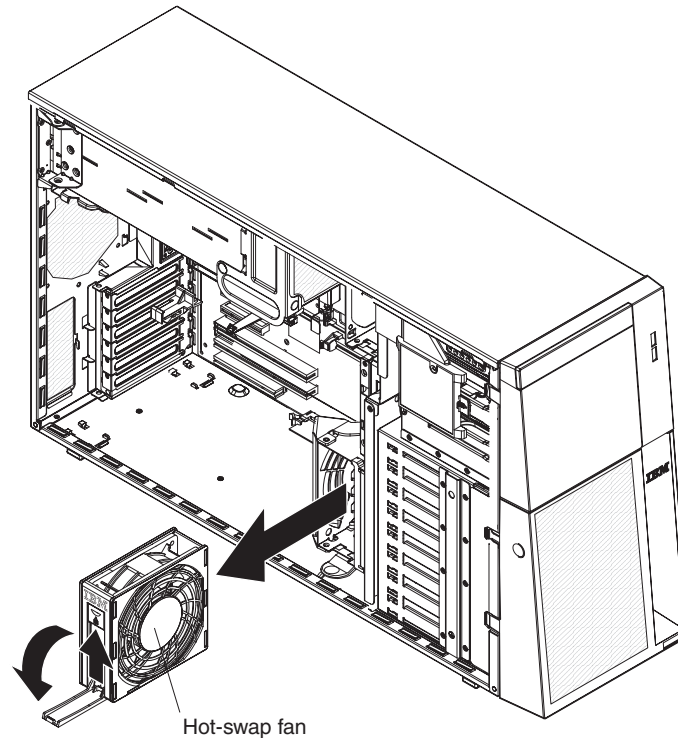
To install a DVD drive, complete the following steps:

1. Install the rails on the DVD drive.
2. Connect the DVD drive cable to the system board.
3. Slide the DVD drive into the server to engage the drive.
4. Replace the left-side cover and bezel; then, lock the side cover and bezel.
5. Reconnect the external cables and power cords.

## Hot-swap fan

The server comes with three 120 mm x 38 mm hot-swap fans in the fan support bracket at the front of the server. The following removal and replacement instructions can be used to remove and replace any hot-swap fan in the server.

Complete the following steps to remove a hot-swap fan.



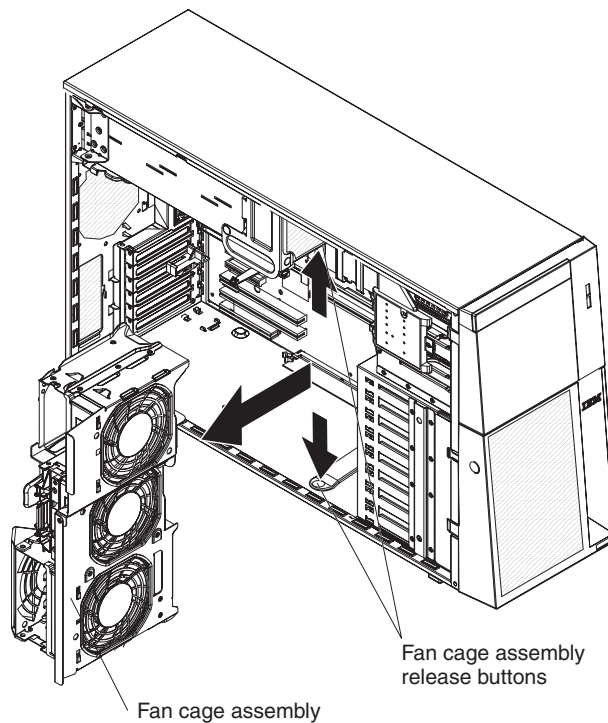
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.  
**Attention:** Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.
2. Remove the left-side cover (see “Removing the left-side cover and bezel” on page 57).  
**Attention:** To ensure proper system cooling, do not leave the top cover off the server for more than 2 minutes.
3. Open the fan-locking handle by sliding the orange release latch in the direction of the arrow.
4. Pull upward on the free end of the handle to lift the fan out of the server.

Complete the following steps to install a hot-swap fan:

1. Open the fan-locking handle on the replacement fan.
2. Lower the fan into the socket and close the handle to the locked position.
3. Replace the left-side cover.

## Front fan cage

Complete the following steps to remove the front fan cage.



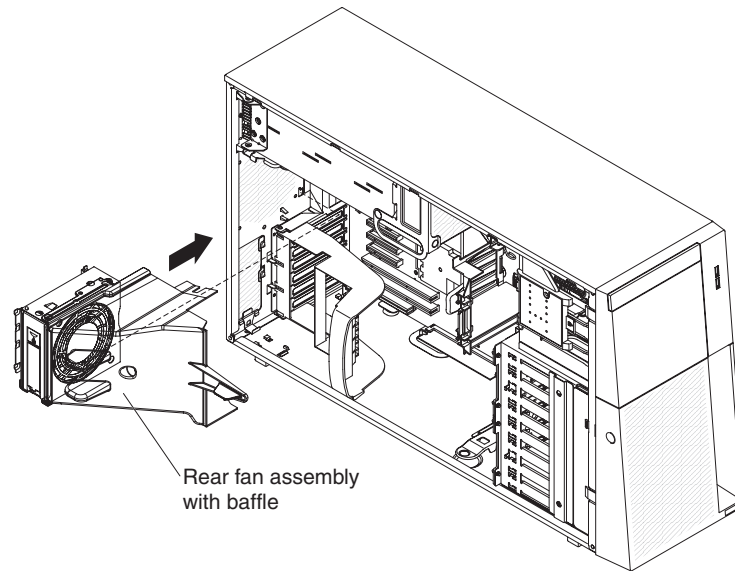
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.  
**Attention:** Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.
2. Remove the fans (see “Hot-swap fan” on page 63).
3. Press the fan cage release latches on each side of the fan cage toward the sides of the server. The cage will lift up slightly when the release latches are fully open.
4. Grasp the cage and lift it out of the server.

To install the front fan cage, complete the following steps:

1. Align the guides on the fan cage with release latches on each side.
2. Push the cage into the server until it clicks into place.
3. Install the fans (see “Hot-swap fan” on page 63).

## Rear fan cage

If you have installed a redundant power supply, you also installed a fan cage on the rear of the server.

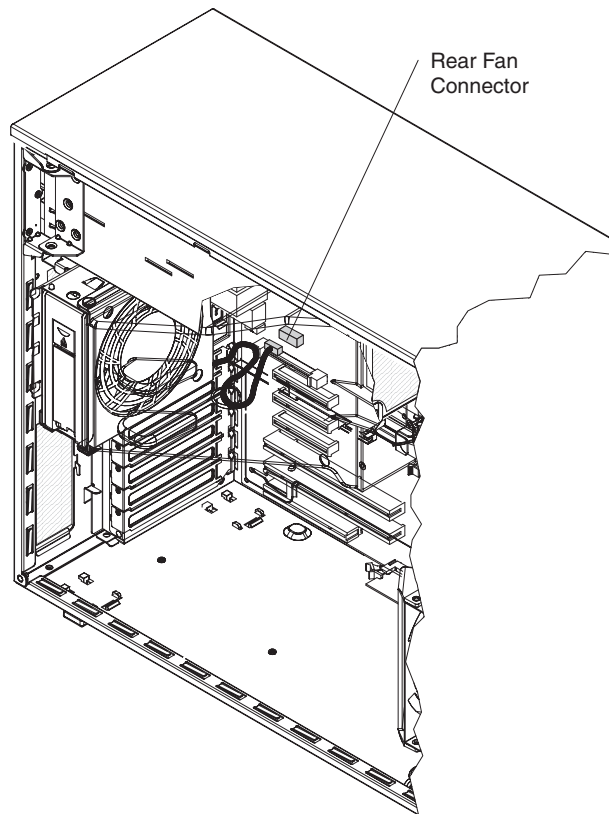


To remove the rear fan cage, complete the following steps:

**Note:** You do not have to remove the rear fan from the fan cage to remove or replace the fan cage.

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.

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



2. Lift the rear fan air baffle up and rotate it back out of the way.
3. Disconnect the fan power cable from the system board.
4. Grasp the fan cage by the top edges.
5. Pull the retention pin out and slide the fan cage toward the PCI expansion slots; then, pull the cage toward the front of the server and lift it out.

To install the rear fan cage, complete the following:

1. Rotate the air baffle out of the way.
2. Align the clips on the back of the fan cage with the mounting holes in the rear of the chassis.
3. Insert the clips through the holes and push the fan cage toward the power-supply cage until it stops. The retention pin clicks into place when the fan cage is in place.
4. Connect the rear fan power cable to the connector on the system board.
5. Rotate the air baffle into the closed position.

## Memory module

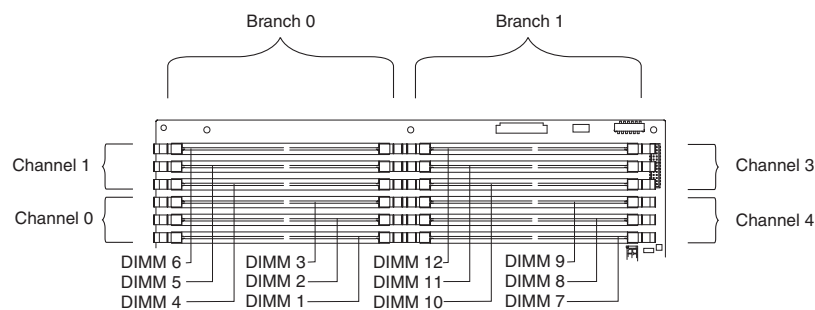
The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when you install DIMMs:

- The server supports 667 MHz, 1.8 V, 240-pin, PC2-5300 double-data-rate (DDR) II, fully buffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest 5300 SDRAM Fully Buffered DIMM (FBD) specification. For a list of supported optional devices for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

- The server supports up to 12 DIMMs.
- There must be at least one pair of DIMMs installed for the server to operate.
- When you install additional DIMMs, be sure to install them in pairs. All the DIMM pairs must be the same size and type.
- The server supports online-spare memory. This feature disables the failed memory from the system configuration and activates an online-spare DIMM to replace a failed active DIMM. Online-spare memory reduces the amount of available memory. Each online-spare DIMM must be the same speed, type, and the same size as, or larger than, the largest active DIMM.

Enable online-spare memory through the Configuration/Setup Utility program. The BIOS code assigns the online-spare DIMMs according to your DIMM configuration. Two online-spare configurations are supported.

- You do not have to save new configuration information when you install or remove DIMMs.



- Two memory branches are split between the 12 DIMM slots. DIMM slots 1 through 6 are on branch 0, and DIMM slots 7 through 12 are on branch 1.
- The server can operate in memory mirroring, non-mirroring (normal), and online-spare modes. The server can also operate in a single-channel mode when one DIMM is installed.
- The server supports memory mirroring (mirroring mode) and online-spare memory.
  - Memory mirroring replicates and stores data on DIMMs within two branches simultaneously. You must enable memory mirroring through the Configuration/Setup Utility program (see “Using the Configuration/Setup Utility program” on page 14). To enable memory mirroring in the Configuration/Setup Utility program, select **Devices and I/O Ports → Advanced Chipset Control → Memory Branch Mode**. Use the arrow keys to change the Memory Branch Mode setting to Mirror; then, save your changes. When you use memory mirroring, consider the following information:
    - The maximum available memory is reduced to 16 GB, instead of the 32 GB available in non-mirroring mode.
    - The minimum memory configuration is four identical DIMMs. You must install identical pairs of fully buffered, dual-inline memory modules (DIMMs) in all four DIMM connectors (same size, type, speed, and technology). These DIMMs must span across both branches and all four channels. For example, when you install the first four DIMMs, you must install two DIMMs in branch 0 (one in channel 0 and one in channel 1) and two DIMMs in branch 1 (one in channel 2 and one in channel 3). See Table 5 on page 68 for the DIMM installation sequence.
    - When you upgrade the server to eight DIMMs, the DIMMs that are next to each other (for example, DIMM connector 1 and DIMM connector 4) within the channels of a branch must be identical in size, type, speed, and technology. However, the DIMMs in the connectors above or below each

other within the channels of a branch do not have to be identical to each other (for example, the DIMMs in DIMM connector 1 and DIMM connector 2).

- Both branches operate in dual-channel mode.

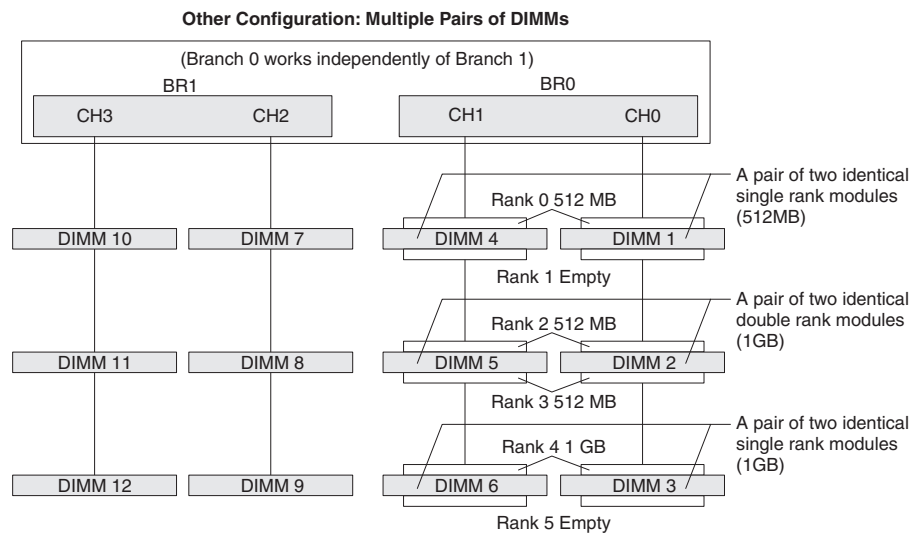
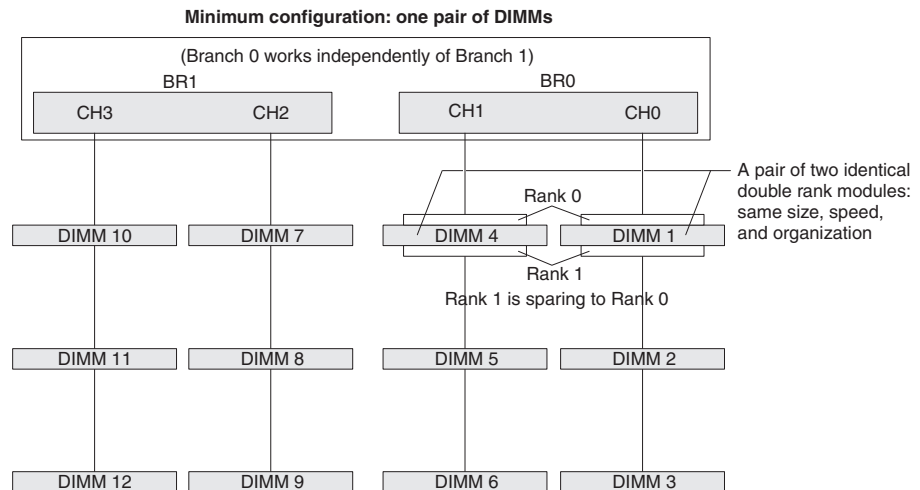
The following table shows the DIMM configuration upgrade sequence for operating in mirroring mode.

*Table 5. DIMM upgrade configuration sequence in mirroring mode*

Number of DIMMs	DIMM connectors
4	1, 4, 7, 10
8	1, 4, 7, 10, 2, 5, 8, 11
12	1, 4, 7, 10, 2, 5, 8, 11, 3, 6, 9, 12

- Online-spare memory disables a failed rank pair of DIMMs from the system configuration and activates an online-spare rank pair of DIMMs to replace the failed rank pair of DIMMs. For an online-spare pair of DIMMs to be activated, you must enable this feature and have installed an additional rank pair of DIMMs of the same speed, type, size (or larger), and technology as the failed pair of DIMMs. You must enable the feature through the Configuration/Setup Utility program. To enable online-spare memory in the Configuration/Setup Utility program, select **Devices and I/O Ports → Advanced Chipset Control → Memory Branch Mode**. Use the arrow keys to change the setting for **Branch 0 Rank Sparing** or **Branch 1 Rank Sparing** to **Enabled**; then, save your changes. See “Using the Configuration/Setup Utility program” on page 14 for additional information. When you use online-spare memory, you must consider the following information:
  - You cannot enable online-spare memory while the server is operating in mirroring mode.
  - When you use online-spare memory the two memory branches operate independently of each other. You can enable online-spare memory for one or both branches.
  - Online-spare memory reduces the amount of available memory.
  - Online-spare DIMM pairs are assigned according to your DIMM configuration.
  - Online-spare memory works by copying data from a failed DIMM rank to another good DIMM rank within the same memory branch.
  - Online-spare memory can not copy data from one branch to the other.





Rank 4 is used to spare any defective rank of rank 0, 2, and 3

- A rank is defined as an area or block of 64 bits that is created by using some or all of the chips on a DIMM. For an ECC DIMM, a memory rank is a block of 72 data bits (64 bits plus 8 ECC bits).
- The minimum memory configuration is two single-rank DIMMs that are installed in branch 0, DIMM connector 1 (in channel 0) and connector 4 (in channel 1); however, online-sparing is not supported with this configuration.
- To support online-sparing in branch 0, you must add a second pair of DIMMs. The spare pair of DIMMs can be single-rank or double-rank and must be the same speed, type, size (or larger), and technology as the failed pair of DIMMs. The spare pair must be installed in branch 0, DIMM connector 2 (in channel 0) and connector 5 (in channel 1). Branch 0 and branch 1 operate independently.
- The following notes apply when the server operates in non-mirroring mode (normal mode):
  - DIMMs must be installed in matched pairs. If you install a second pair of DIMMs in DIMM connector 7 and DIMM connector 10, they do not have to be the same size, speed, type, and technology as the DIMMs in DIMM connector

1 and DIMM connector 4. However, the size, speed, type, and technology of the DIMMs that you install in DIMM connector 7 and DIMM connector 10 must match each other.

- The following table shows the DIMM upgrade configuration sequence for operating in non-mirroring mode (normal mode).

Table 6. 5. DIMM upgrade configuration sequence in non-mirroring mode

Number of DIMMs	DIMM connectors
2	1, 4
4	1, 4, 7, 10
6	1, 4, 7, 10, 2, 5
8	1, 4, 7, 10, 2, 5, 8, 11
10	1, 4, 7, 10, 2, 5, 8, 11, 3, 6
12	1, 4, 7, 10, 2, 5, 8, 11, 3, 6, 9, 12

- If a problem with a DIMM is detected, light path diagnostics lights the system-error LED on the front of the server, indicating that there is a problem, and guides you to the defective DIMM. When this occurs, first identify the defective DIMM; then, remove and replace the DIMM.

## Removing and replacing memory modules

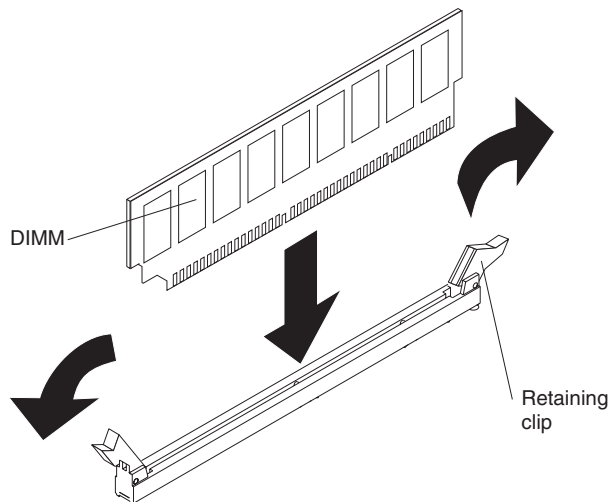
At least one pair of DIMMs must be installed for the server to operate correctly.

### Installing memory modules

DIMMs must be installed in pairs of the same type and speed. To use the memory mirroring feature, all the DIMMs in the server must be the same type and speed, and the feature must be supported by your operating system. The following instructions are for installing one pair of memory modules.

**Installing a memory module:** To install a memory module, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices; then, disconnect the power cords and all external cables necessary to replace the device.

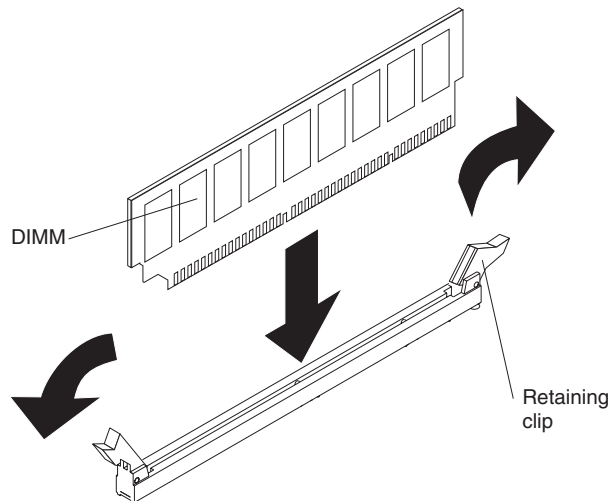


3. Remove the power supply or power supplies from the server.

4. Raise the power-supply cage out of the way:
  - a. Press in on the power-supply latch bracket on the left side of the server, when you are facing the rear of the server.
  - b. Lift the end of the power-supply cage and rotate the cage up until it stops. The tab on the rear power-supply latch bracket will click into place when the cage is completely out of the way.
  - c. Let the power-supply cage rest on the rear power supply latch bracket.

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

5. Open the retaining clip on each end of the DIMM connector.
6. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.
7. Turn the DIMM so that the DIMM keys align correctly with the slot.



8. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector.
9. 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 seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
10. Repeat steps 5 through 9 to install the second DIMM in the pair and for each additional pair that you install.
11. Reconnect any cables that were disconnected during removal.

**Attention:** Make sure the CN6, CN7 and CN8 power connectors are setup properly, see “System-board internal connectors and switches” on page 8.

12. Lower the power-supply cage:
  - a. Rotate the power-supply cage back slightly; then, push the tab on the rear power supply latch bracket out of the way.
  - b. Lower the power-supply cage until it snaps into place; then, lower the handle.
  - c. Replace the power supply or power supplies in the cage.
13. Reconnect external cables and power cords.

## Hot-swap power supply

If you install or remove a hot-swap power supply, observe the following precautions.

### Statement 8:



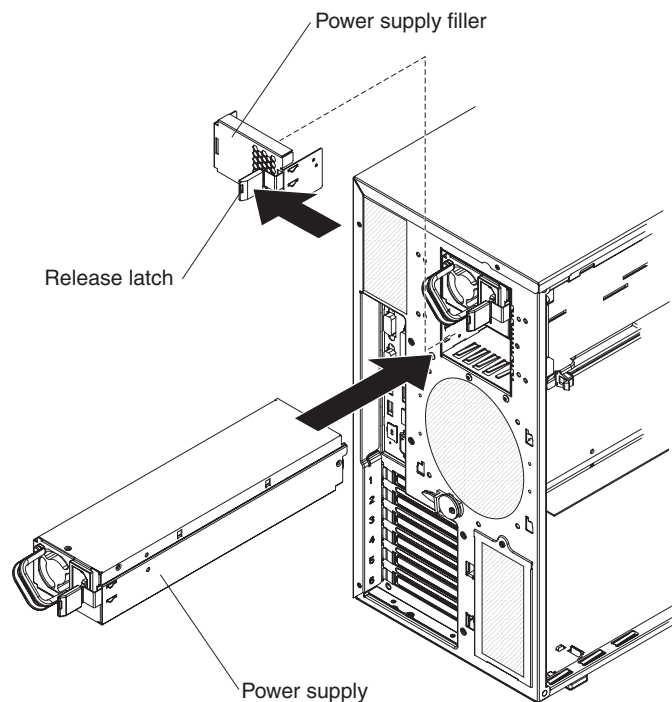
### CAUTION:

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 a hot-swap power supply, complete the following steps.



1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.

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

2. Disconnect the power cord from the connector on the back of the power supply.

**Attention:** To ensure proper system cooling, do not leave the top cover off the server for more than 2 minutes.

3. Press the locking latch on the power-supply and pull the power supply out of the bay.

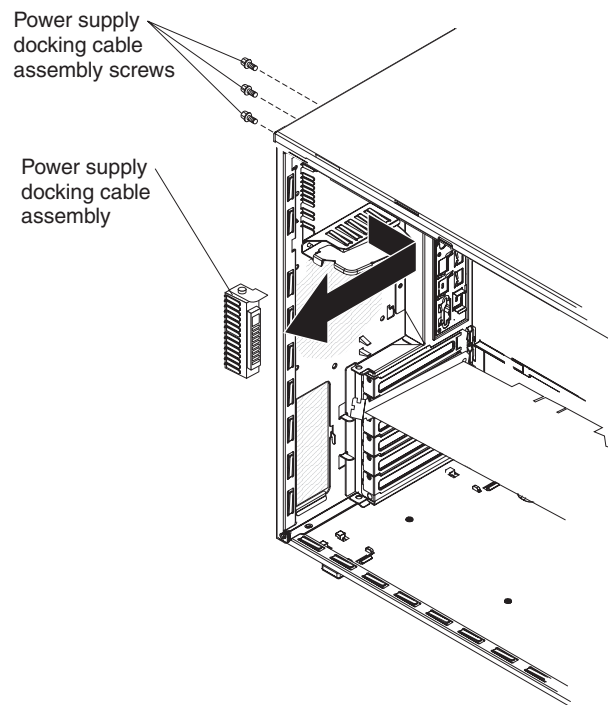
To install a hot-swap power supply, complete the following steps:

1. Place the power supply into the bay and push it in until it locks into place.
2. Connect one end of the power cord for the new power supply into the connector on the back of the power supply, and connect the other end of the power cord into a properly grounded electrical outlet.
3. Make sure that the ac power LED on the top of the power supply is lit, indicating that the power supply is operating correctly. If the server is turned on, make sure that the dc power LED on the top of the power supply is lit also.

## Power-supply docking cable

The following section describes how to replace the power-supply docking cable.

To remove the power-supply docking cable assembly, complete the following steps.



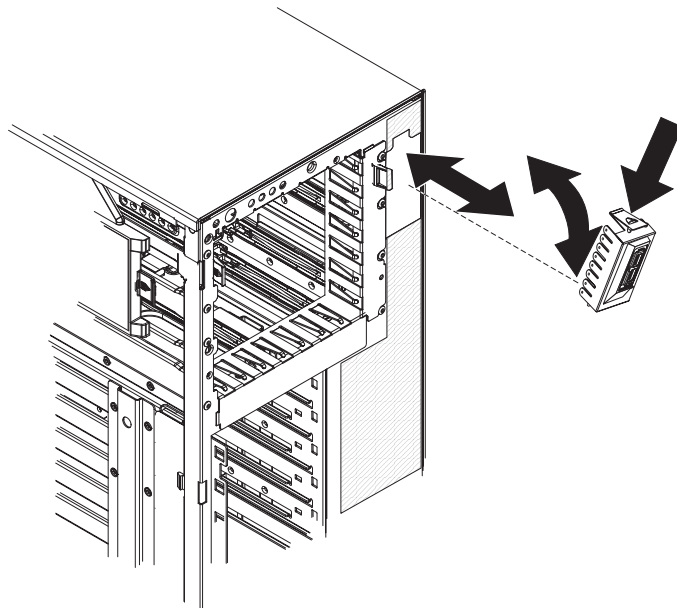
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices; then, disconnect the power cords and all external cables necessary to replace the device.
3. Unlock and remove the left-side cover (see “Removing the left-side cover and bezel” on page 57).

4. Remove the power supply or power supplies from the server.
5. Rotate the power-supply cage out of the way.
6. Disconnect the power-supply docking cable from the system board.
7. Using a Phillips screwdriver, remove the three screws that secure the docking-cable connector to the chassis and remove the docking cable and its cage from the server.

To install a new power-supply docking cable, complete the following steps:

1. Connect the power-supply docking cable to the system board.
2. Position the power-supply docking cable cage inside the server, aligning the screw holes with the holes in the chassis.
3. Secure the cage in the chassis using the three screws.
4. Lower the power-supply cage into place.
5. Install the power supply; then, connect the power cord and all external cables.
6. Install and lock the left-side cover.

## USB cable assembly



To remove the USB cable assembly from the server, complete the following steps:

1. Read the safety information that begins on page vii and "Handling static-sensitive devices" on page 57.
2. Turn off the server and peripheral devices; then, disconnect the power cords and all external cables as necessary to replace the device.
3. Unlock and remove the left-side cover and open the bezel.
4. Disconnect the USB cable from the system board.
5. Press down on the release latch on the top of the USB mounting bracket and rotate the top of the mounting bracket away from the server.
6. Lift the mounting bracket out and away from the server while you pull the USB cable through the hole.

To replace the USB cable in the USB mounting bracket, complete the following steps:

1. Complete steps 1 through 6 to remove the USB cable assembly from the server; then, return to this procedure and continue with step 2.
2. Rotate the mounting bracket so that you are looking at the rear of the bracket; then, squeeze the retaining clips on each side of the connector and remove the cable from the mounting bracket.
3. Squeeze the retaining clips on each side of the USB cable connector and insert the connector into the mounting bracket; then, release the retaining clips.

To install the USB cable assembly in the server, complete the following steps:

1. Feed the USB cable into the server through the opening in the front of the server.
2. Position the bottom of the mounting bracket into the opening and rotate the top of the bracket toward the server until it clicks into place.
3. Connect the USB cable to the USB connector on the system board. See “System-board internal connectors and switches” on page 8 to locate the USB connector on the system board.

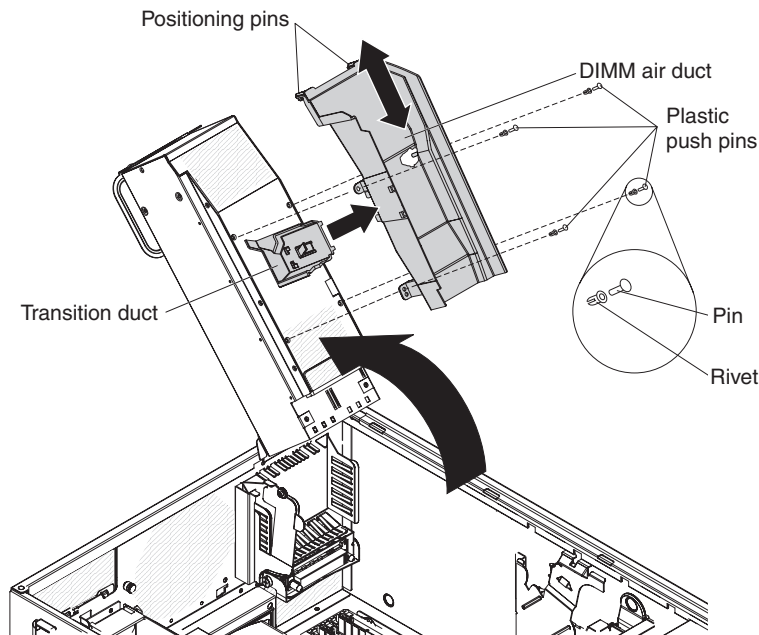
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## Tier 2 CRU information

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.

### DIMM air duct

To remove the DIMM air duct, complete the following steps.



1. Read the safety information that begins on page vii, and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.
3. Unlock and remove the left-side cover (see “Removing the left-side cover and bezel” on page 57).
4. Remove the power supply or power supplies from the power-supply cage; then, rotate the power-supply cage to its open position.
5. Remove the plastic push-pins that secure the DIMM air duct to the power-supply cage.
  - a. Grasp the top of the plastic push-pins and pull them out of the rivets.
  - b. Grasp the rivets and pull them out of the mounting hole and set them to the side.

**Note:** If the DIMM air duct in your system is secured with screws, remove the screws.

6. Push the air duct up toward the rear of the power-supply cage. When the locator pins are free of the power-supply cage, you can remove the air duct from the server.

To install a replacement DIMM air duct, complete the following steps:

1. Align the positioning pins on the end of the air duct so that they hang over the end of the power-supply cage.

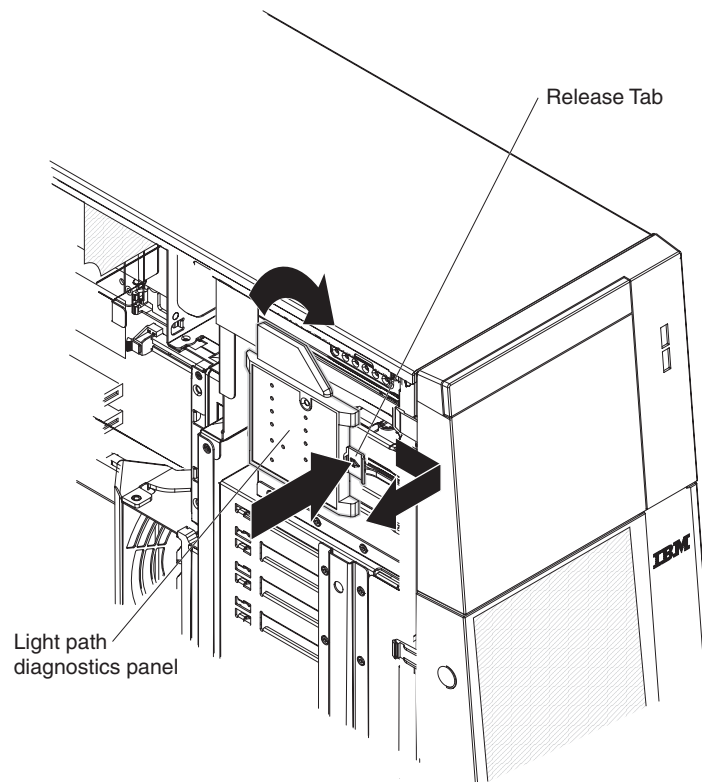


2. Slide the air duct down the power-supply cage (away from the positioning pins) until the positioning pins lock in place and the mounting holes in the air duct align with the holes in the power-supply cage.
3. Use the plastic push-pins and rivets to secure the air duct to the power-supply cage. Place the rivets in the mounting holes and then insert the push-pins in the rivets. Press the push-pins all the way down to lock the rivets in place.

**Note:** If the air duct in your server uses screws, use the screws to secure the air duct to the power-supply cage.

## Light path diagnostics panel

To remove the light path diagnostics panel, complete the following steps.



1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cable as necessary to replace the device.
3. Unlock and remove the left-side cover (see “Removing the left-side cover and bezel” on page 57).
4. Disconnect the light path diagnostics panel cable from the system board.
5. Press in on the release tab and twist the light path diagnostics panel clockwise until it stops; then, remove the panel from the server.

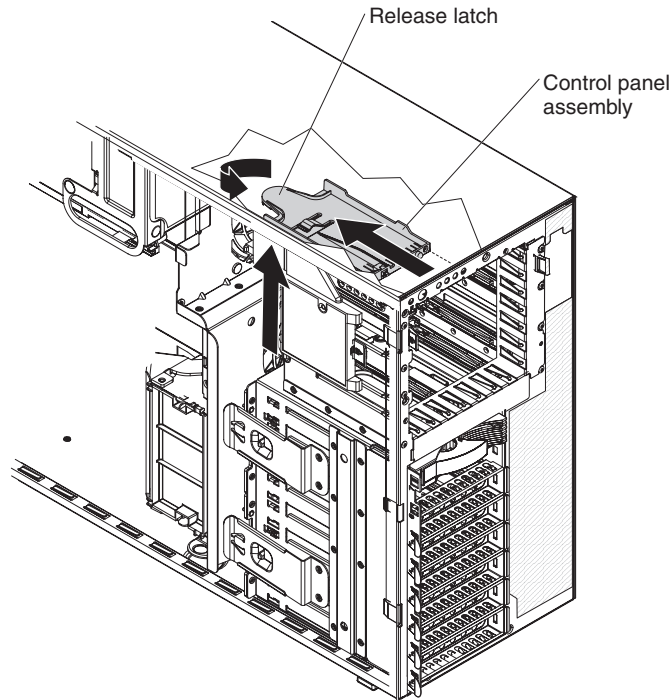
To install a replacement light path diagnostics panel, complete the following steps:

1. While you hold the cable out of the way, position the light path diagnostics panel over the slots on the side of the drive bay cage.
2. Rotate the panel counter clockwise until it clicks into place.
3. Connect the cable to the system board.

4. Install the left-side cover and close the bezel.
5. Reconnect power cords and external cables.

## Control panel assembly

To remove the control panel assembly, complete the following steps.



1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.
3. Unlock and remove the left-side cover (see “Removing the left-side cover and bezel” on page 57).
4. Remove the bezel (see “Removing the left-side cover and bezel” on page 57).
5. Lay the server on its right side.
6. Remove the fan cage from the server.
7. Remove the power supply and rotate the power-supply cage out of the way.
8. Remove the information LED assembly cable from the system board.
9. Locate the control panel assembly release latch just above the DVD drive.
10. Press on the release latch while you pull the assembly toward the rear of the server; then, angle the back of the assembly toward the system board and remove the assembly from the server.

To install a replacement control panel assembly, complete the following steps:

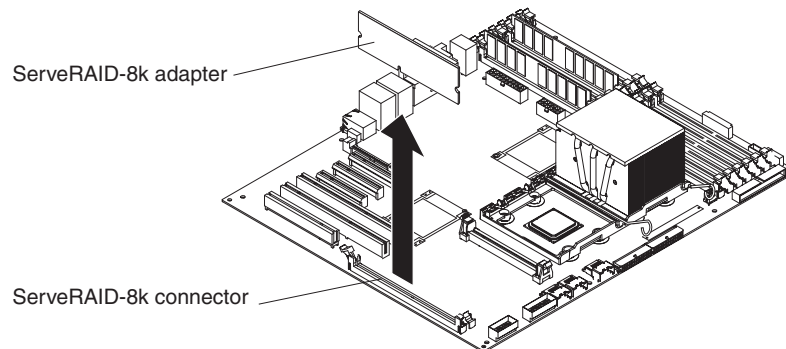
1. Angle the assembly so that the edge of the assembly is in the guide slot.
2. Slide the assembly forward until it clicks into place.
3. Connect the operator information LED assembly cable into the system board.
4. Install the fan cage and air baffle.
5. Rotate the power-supply cage back into place and install the power supply.
6. Install the left-side cover and close the bezel.

7. Reconnect power cords and external cables.

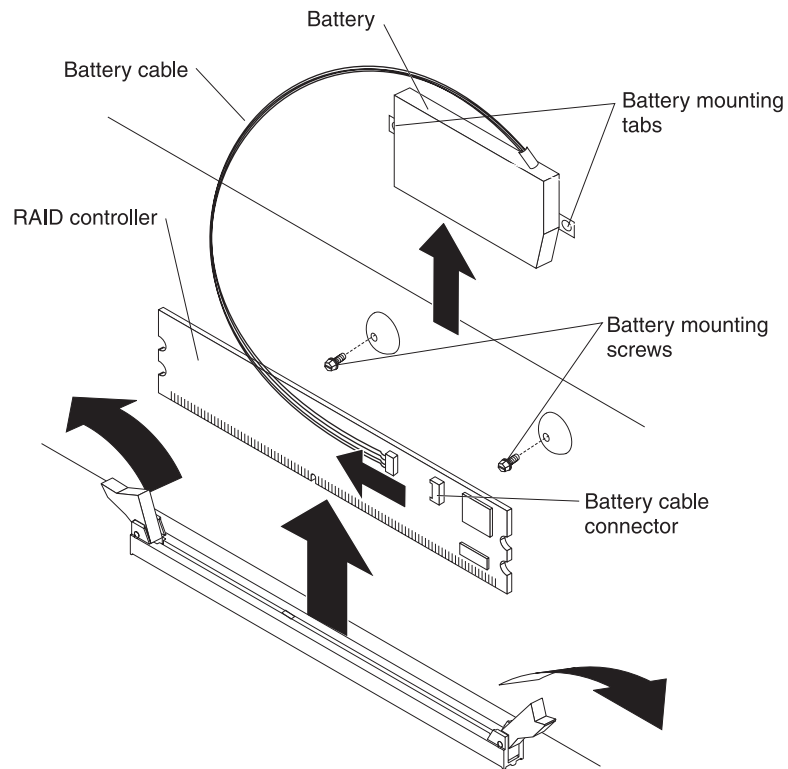
## ServeRAID-8k adapter

The ServeRAID-8k adapter can be installed only in its dedicated connector on the system board. See the following illustration for the location of the connector on the system board. The ServeRAID-8k adapter is not cabled to the system board, and no rerouting of the SAS cable is required.

To remove the ServeRAID-8k adapter, complete the following steps.

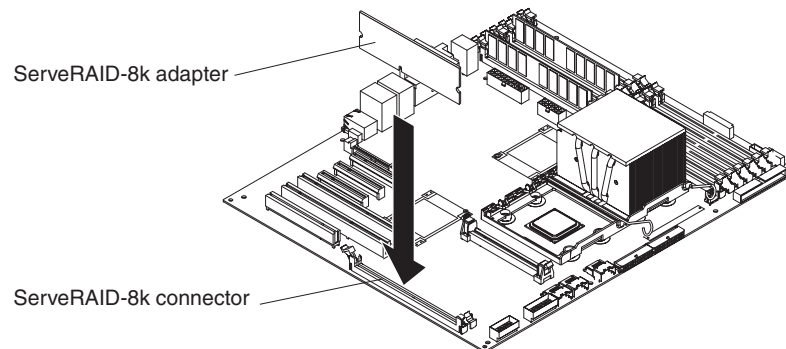


1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the left-side cover.  
**Attention:** To avoid breaking the retaining clips or damaging the ServeRAID-8k adapter connector, open and close the clips gently.
3. Disconnect the battery pack cable from the adapter.
4. Open the retaining clips on each end of the ServeRAID-8k adapter connector and remove the adapter from the server.



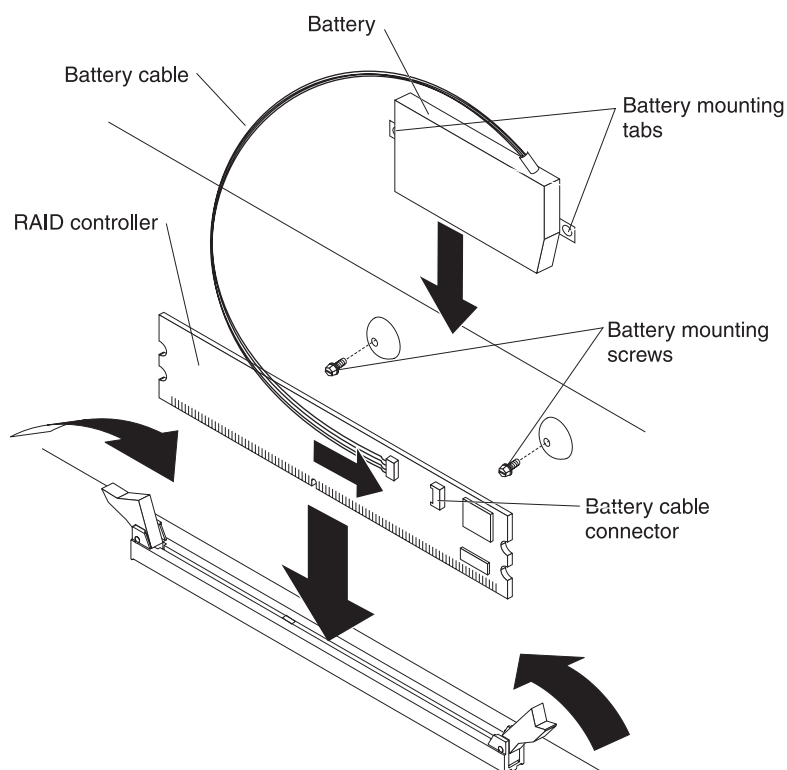
5. Remove the two battery mounting screws on the chassis wall; then, remove the battery pack from the server. Be sure not to drop the screws into the server chassis. If you are not going to replace the ServeRAID-8k adapter, reinstall the battery pack mounting screws into the holes in the chassis, otherwise set them aside for future use.

To replace the ServeRAID-8k adapter, complete the following steps.



1. Open the retaining clips on each end of the ServeRAID-8k adapter connector.
2. Touch the static-protective package that contains the ServeRAID-8k adapter to any unpainted metal surface on the server. Then, remove the ServeRAID-8k adapter and battery pack from the package.
3. Turn the ServeRAID-8k adapter so that the ServeRAID-8k adapter keys align correctly with the connector.

**Attention:** Incomplete insertion might cause damage to the system board or the ServeRAID-8k adapter.



4. Press the ServeRAID-8k adapter firmly into the connector.
5. Mount the battery pack to the chassis, using the two mounting screws.
6. Plug the battery pack cable into the connector on the adapter.

## ServeRAID-MR10is VAULT SAS/SATA Controller

The optional IBM ServeRAID-MR10is VAULT SAS/SATA controller can be installed only in its dedicated PCI slot 2 connector on the system board, and only in server models with eight 3.5-inch hot-swap hard disk drives. See “System-board internal connectors and switches” on page 8 for the location of the connector on the system board. The ServeRAID-MR10is SAS/SATA controller is not cabled to the system board. Instructions for routing the cables are described below.

To install the ServeRAID-MR10is SAS/SATA controller and route the cables, complete the following steps:

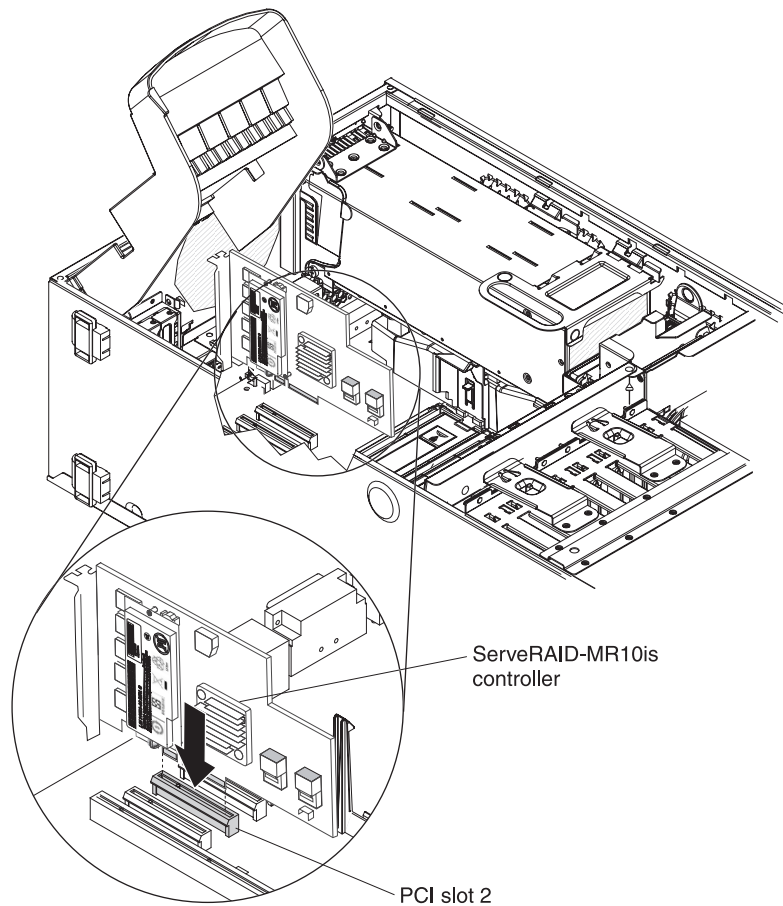
1. Read the safety information that begins on page “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.  
**Attention:** To avoid breaking the retaining clips or damaging the ServeRAID-MR10is SAS/SATA adapter connector, open and close the clips gently.
3. Remove the side cover (see “Removing the left-side cover and bezel” on page 57).
4. Rotate the rear adapter-retention bracket to the open (unlocked) position.
5. Remove the screw that secures the expansion-slot cover to the chassis (if no adapter is installed in the slot). Store the expansion-slot cover and screw in a safe place for future use.

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

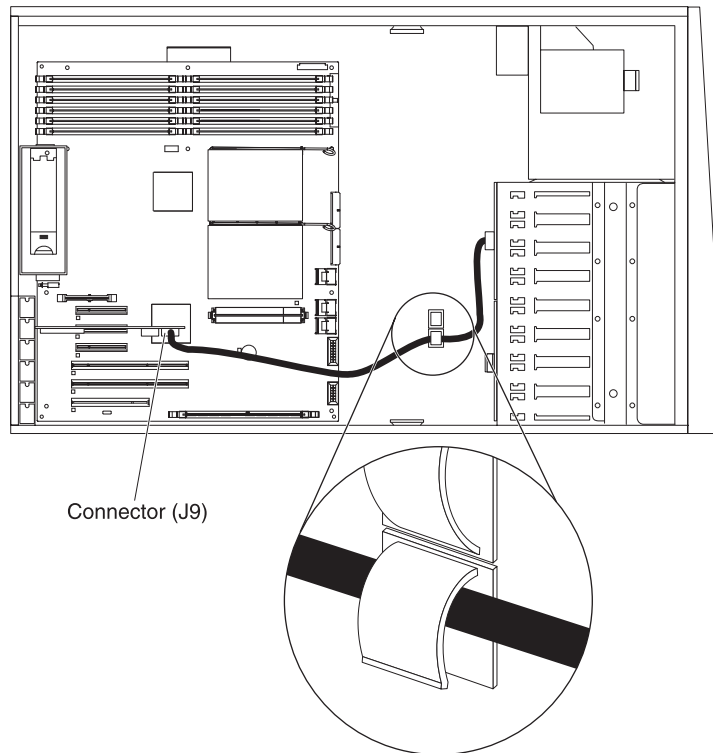
6. Open the retaining clips on each end of the ServeRAID-MR10is adapter connector.
7. Touch the static-protective package that contains the ServeRAID-MR10is adapter to any unpainted metal surface on the server; then, remove the ServeRAID-MR10is adapter from the package and place it on a static-protective surface.

8. Turn the ServeRAID-MR10is adapter so that the ServeRAID-MR10is adapter keys align correctly with the connector on the system board.

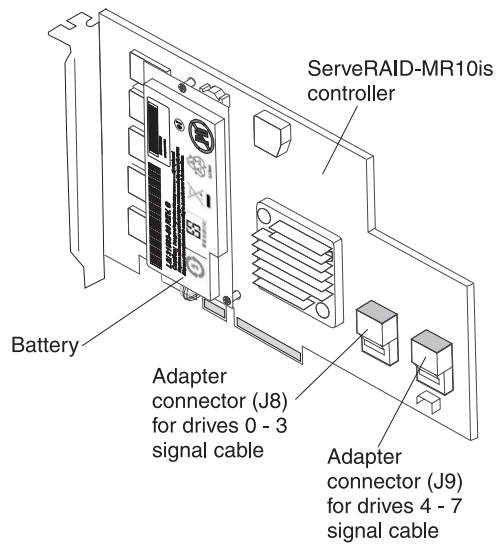
**Attention:** Incomplete insertion might cause damage to the system board or the ServeRAID-MR10is adapter.



9. Press the ServeRAID-MR10is adapter firmly into the connector on the system board.
10. Rotate the power-supply cage assembly out of the chassis:
  - a. Remove the hot-swap power-supply. Press down on the orange release lever and pull the power supply out of the bay, using the handle.
  - b. Lift up the power-supply cage handle and pull the power-supply cage assembly all the way up until the retainer latch locks the cage in place on the chassis.
11. Remove the front fan cage assembly (see “Front fan cage” on page 64).
12. Take the other end of the signal cable that is attached to the drive backplane for drive bays 8 through 11 and route it through the plastic slot on the chassis underneath the front fan cage; then, connect it to connector J9 on the ServeRAID-MR10is SAS/SATA controller.

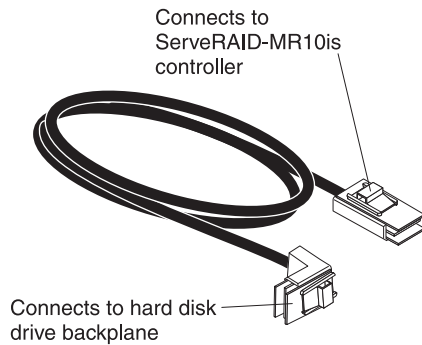


The following illustration shows the connectors on the controller to which you connect the signal cables from the drive backplanes.

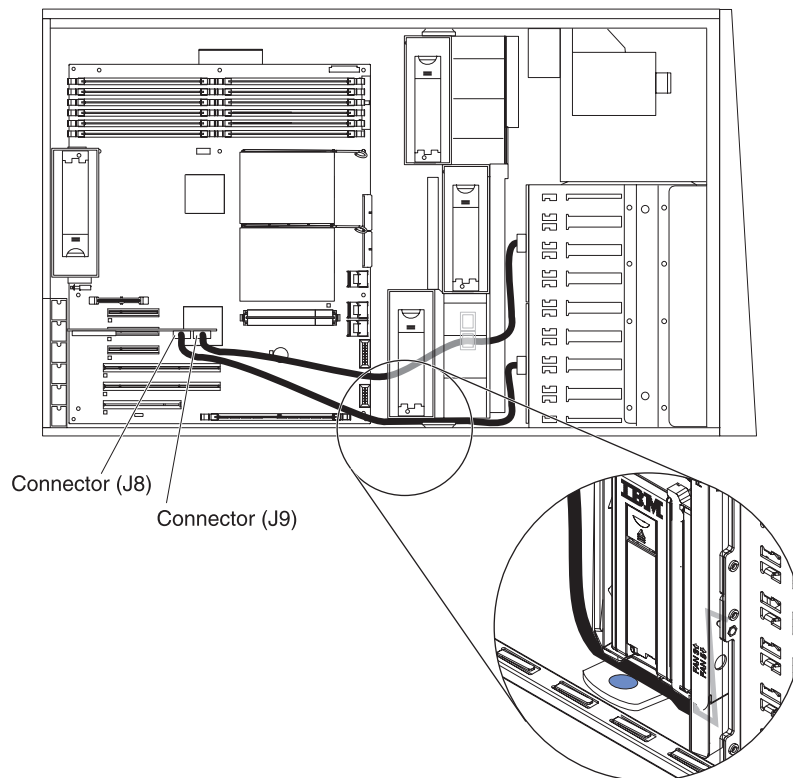


The following illustration shows which end of the cable connects to the backplane and to the controller.





13. Reinstall the front fan cage assembly. Align the front fan cage assembly over the fan cage assembly slot and with the connector on the system board. Lower the fan cage assembly into the chassis and press down firmly until the fan cage assembly is seated firmly in place. Make sure that no cables will be pinched.
14. Take the other end of the signal cable that is attached to the drive backplane for drive bays 4 through 7 and route the cable around the right side of the front fan cage assembly and along the chassis wall (make sure that the cable is in front of the fan cage release tab): then, connect it to connector J8 on the ServeRAID-MR10is SAS/SATA controller.



15. Rotate the rear adapter-retention bracket to the closed (locked) position.
16. Rotate the power-supply cage assembly back into the server. Press the power-supply cage release tab and rotate the power-supply cage assembly into the chassis.
17. Reinstall the hot-swap power supplies.
18. If you have other options to install or remove, do so now.

19. Replace the side cover (see “Replacing the left-side cover and bezel” on page 58).

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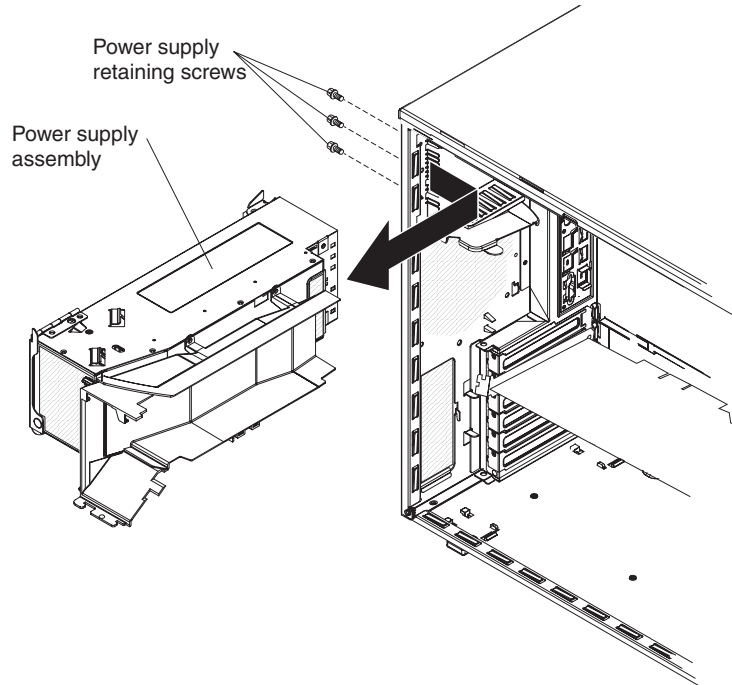
## Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

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

### Power-supply cage

To remove the power-supply cage, complete the following steps.



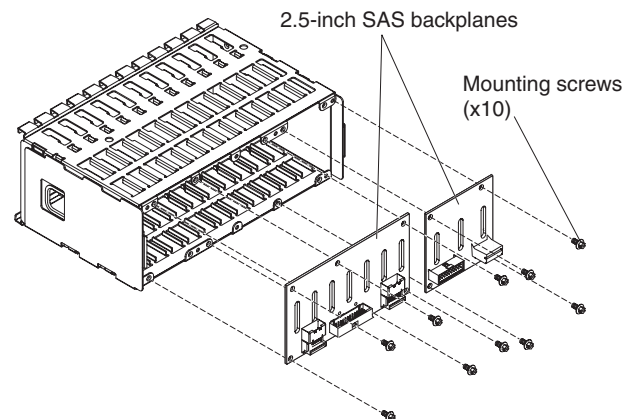
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.  
**Attention:** Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cable as necessary to replace the device.
3. Remove the left-side cover.
4. Remove the power supplies (see “Hot-swap power supply” on page 72).
5. Press the release tab and use the handle to lift up the power-supply cage and rotate it into the fully open position.
6. Remove two of the screws on the rear of the server that secure the cage to the server chassis.
7. While you hold the cage in place with one hand, remove the last screw; then, remove the cage from the server.

To install the power-supply cage, complete the following steps:

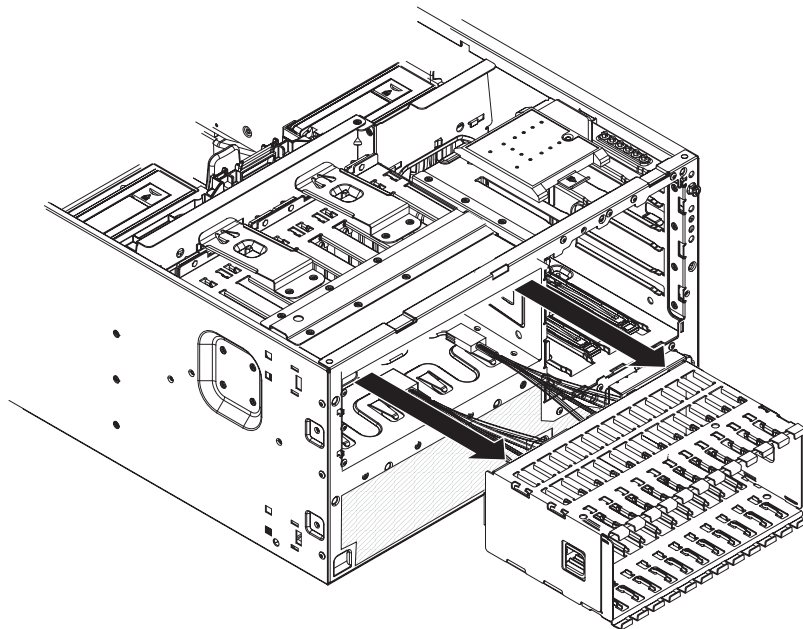
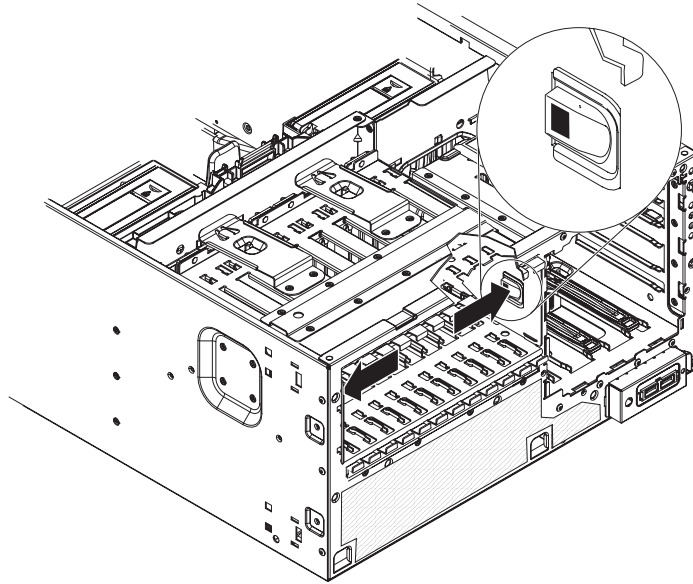
1. Position the hinge so that the cage would be in the open position if it were installed in the server.
2. Move the hinge inside the server chassis and align the screw holes with the holes in the chassis.
3. Secure the cage to the chassis, using three screws.
4. Press on the release tab of the support bracket while you hold the power-supply cage up with the handle; then, lower the power-supply cage.
5. Press down on the end of the cage until it clicks into place.
6. Close the handle.
7. Replace the power supplies (see “Hot-swap power supply” on page 72).
8. Replace the left-side cover.
9. Reconnect the external cables and power cords.

## 2.5-inch SAS backplane

To remove a 2.5-inch Serial Attached SCSI (SAS) backplane, complete the following steps.



1. Read the safety information that begins on page vii, and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cable as necessary to replace the device.
3. Lay the server on its right side.
4. Remove the left-side cover.
5. Remove the hard disk drives from the server.
6. Remove the fan cage from the server.
7. Note where the SAS signal and power cables are connected to the system board and the ServerRAID-8s adapter; then, disconnect the SAS signal and power cables from the system board and the ServerRAID-8s adapter.



8. Using your thumbs, press in on the retention tabs on the inside of the inner hard disk drive cage while you pull the cage out of the server. While you remove the cage, use your free hand to guide the SAS signal and power cables out of the server.
9. Note where the SAS signal and power cables are connected to the backplane; then, disconnect the cables from the backplane.
10. Remove the screws that secure the backplane to the inner cage assembly and set them aside for future use.

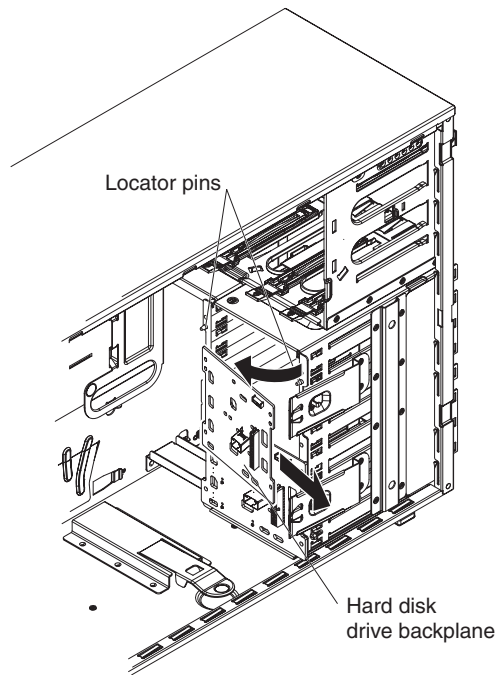
To install the 2.5-inch SAS backplane, complete the following steps:

1. Position the replacement backplane on the back of the inner hard disk drive cage; then, using the screws that you removed in step 10 secure the backplane to the inner hard disk drive cage.

2. Connect the SAS signal and power cables to the replacement backplane.
3. Feed the SAS signal and power cables into the server through the hard disk drive cage opening while you push the inner hard disk drive cage into the server. Push the inner hard disk drive cage assembly into the server until it stops.
4. Connect the SAS signal and power cables to the system-board and the ServeRAID-8s adapter.
5. Reinstall the fan cage.
6. Replace the left-side cover.
7. Replace the hard disk drives.
8. Reconnect the external cables and power cords.
9. If you are replacing both 2.5-inch SAS backplanes, repeat steps 1 and 2 to install the second replacement backplane.

## SAS backplane

To remove a Serial Attached SCSI (SAS) backplane, complete the following steps.



1. Read the safety information that begins on page vii, and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.
3. Remove the left-side cover.
4. Pull the hard disk drives out of the server slightly to disengage them from the SAS backplane.
5. Note where the cables are connected to the SAS backplane, and then disconnect the power and SAS signal cables from the SAS backplane.
6. Lift the retention bracket that holds the backplane in place; then, grasp the top edge of the backplane and rotate it toward the rear of the server. When the backplane is clear of the retention bracket, remove it from the server.
7. If you are removing both SAS backplanes, repeat steps 5 and 6 to remove the remaining backplane.

To install a SAS backplane, complete the following steps:

1. Position the replacement backplane on the back of the SAS cage; then, rotate the top of the backplane toward the SAS cage until it clicks into place under the retention tab.
2. Connect the power cable to the replacement backplane.
3. Connect the SAS signal cable to the backplane.
4. Replace the left-side cover.
5. Replace the hard disk drives.
6. Reconnect the external cables and power cords.
7. If you are replacing both SAS backplanes, repeat steps 1 through 4 to install the second replacement backplane.

## System board and microprocessor

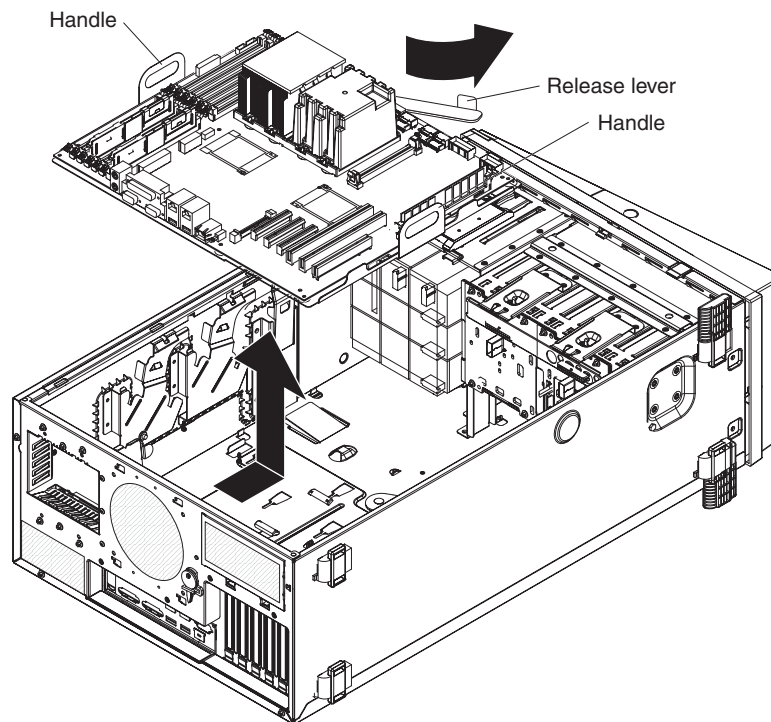
The following sections describe how to replace the system board and a microprocessor.

The following notes describe information that you must consider when you install a microprocessor:

- The voltage regulators for microprocessor 1 is integrated on the system board; the VRM for microprocessor 2 comes with the microprocessor option and must be installed on the system board.
- You can use the Configurations/Setup utility program to determine the specific type of microprocessor in the server.

### Removing and installing the system board

To remove the system board tray, complete the following steps.



1. Read the safety information that begins on page vii and "Handling static-sensitive devices" on page 57.

2. Turn off the server and peripheral devices; then, disconnect the power cords and all external cables necessary to replace the device.
3. Remove the left-side cover (see “Removing the left-side cover and bezel” on page 57).
4. Remove all fans from their cages.
5. Remove the front fan cage:
  - a. Press in on the release tabs on each side of the fan cage. The cage will be pushed up slightly.
  - b. Grasp the fan cage and lift it out of the server.
6. If necessary remove the rear fans structure:
  - a. Lift or remove the air duct from the cage.
  - b. Grasp the rear fan cage and lift it up until it disengages from the pins on the chassis; then, remove it from the server.
7. Note the location of all the cables connected to the system board; then, disconnect them. If the rear fan was installed you will have to remove the fan power cable from the server. Place the cable in a safe place for future use.
8. Press the system-board tray release latch toward the front of the server.
9. Using the two handles on each side of the system-board tray, lift the system-board tray out of the server.

To install a system-board tray, complete the following steps:

1. Lower the replacement system-board tray into the server.
2. Slide the microprocessors system-board tray toward the rear of the server until it stops; then close the system-board tray release lever. The system-board tray will be pushed into its final position.
3. Connect the cables to the system board. If you removed the rear fan power cable install it now as well.
4. Install the microprocessor or microprocessors (see “Removing and installing a microprocessor”); then, install the fans, fans cage or cages, and air baffles.
5. Remove the socket covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the system board you are removing.

## Removing and installing a microprocessor

To remove a microprocessor, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.
3. Remove the left-side cover (see “Removing the left-side cover and bezel” on page 57).

### Notes:

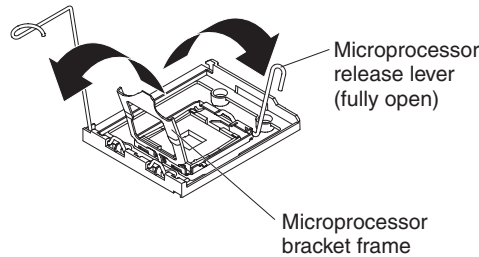
- a. If you are removing the microprocessor in socket 1, rotate the power-supply cage out of the way before continuing. See “Power-supply cage” on page 86.
- b. If you are removing the microprocessor in socket 2, remove the air baffle from the fan cage by pinching the two tabs on the air baffle together while lifting the air baffle out of the server.
- c. Do not use dual-core and quad-core processors in the same system.
4. Lift the heat-sink release lever to the fully open position.



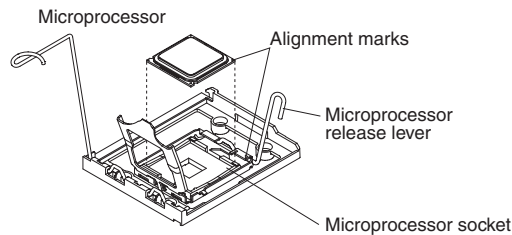
5. Rotate the back of the heat sink out of the retention bracket and remove the heat sink from the server.
6. Lift the microprocessor-release lever to the fully open position (approximately 135° angle) and remove the microprocessor from the server.

To install a microprocessor, complete the following steps:

1. 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.



2. Position the microprocessor over the microprocessor socket as shown in the following illustration. Carefully press the microprocessor into the socket.



3. Close the microprocessor-release lever to secure the microprocessor.
4. Open the heat-sink release lever and install a heat sink on the microprocessor; then, close the release lever.
5. If you are installing a new heat sink, remove the cover from the bottom of the heat sink. If you are reinstalling a heat sink that was previously removed, go to "Thermal grease" on page 93 for instructions for replacing the contaminated or missing thermal grease; then, return to this procedure and continue with step 6.
6. If necessary, remove the cover from the bottom of the heat sink.
7. Place the tab on the heat sink into the slot in the retention bracket; then, rotate the heat sink into place and close the heat-sink release lever.

**Note:** If you are installing an additional microprocessor in microprocessor socket 2, you must also install a VRM.

8. If necessary, install a VRM in the connector:
  - a. Open the retaining clips on each end of the VRM connector.
  - b. Turn the VRM so that the keys align with the slot.
  - c. Insert the VRM into the connector by aligning the edges of the VRM with the slots at the end of the VRM connector. Firmly press the VRM straight down into the connector by applying pressure on both ends of the VRM simultaneously. The retaining clips snap into the locked position when the VRM is seated in the connector.
9. Lower the power-supply cage and install the power supply or power supplies. If necessary, reinstall the air baffle on the fan cage.
10. Reinstall the left-side cover.



11. Reconnect external cables and power cords.

### Thermal grease

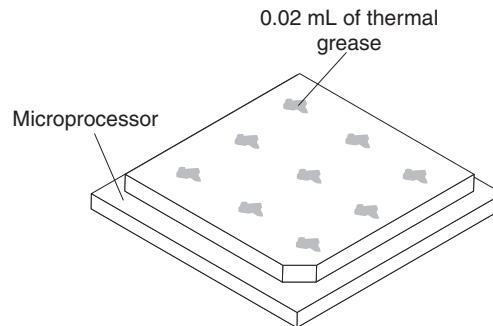
The thermal grease must be replaced whenever the heat sink has been removed from the top of the microprocessor and is going to be reused or when debris is found in the grease.

To replace damaged or contaminated thermal grease on the microprocessor and heat sink, complete the following steps:

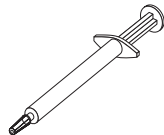
1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

**Note:** Make sure that all of the thermal grease is removed.

4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.



5. Use the thermal-grease syringe to place 9 uniformly spaced dots of 0.02 mL each on the top of the microprocessor. The outer-most dots must be within approximately 5 mm of the edge. This is to ensure uniform distribution.



**Note:** 0.01 mL is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22 mL) of the grease will remain in the syringe.

6. Install the heat sink onto the microprocessor as described in “Removing and installing a microprocessor” on page 91.



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## Chapter 5. 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 a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 165 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 and procedures**

This section lists problem symptoms and actions to correct the problems. See “Troubleshooting tables and procedures” on page 116.

- **Light path diagnostics**

Use the light path diagnostics to diagnose system errors quickly. See “Light path diagnostics” on page 131 for more information.

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

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 that comes with the server. See “Diagnostic programs, messages, and error codes” on page 138 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 you are prompted, for POST to run.

If POST is completed without detecting any problems, a single beep sounds, and the server startup is completed.

If POST detects a problem, more than one beep might sound, or an error message is displayed. See “Beep code descriptions” on page 96 and “POST error codes” on page 102 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 other than one beep indicates that POST has detected a problem. To determine the meaning of a beep code, see “Beep code descriptions” on page 96. If no beep code sounds, see “No-beep symptoms” on page 100.

## Beep code descriptions

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 multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 123 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, System x3500 Type 7977,” on page 41 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. Clear CMOS memory. See “System-board internal connectors and switches” on page 8 for information about how to clear CMOS memory.</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>
1-1-4	BIOS ROM checksum failed.	(Trained service technician only) Replace the system board.
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 DIMMs, one at a time, in the order shown, restarting the server each time.</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. DIMM</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, System x3500 Type 7977,” on page 41 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
1-3-1	1st 64K RAM test failed.	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. Replace the lowest-numbered pair of DIMMs with an identical known good pair of DIMMs; then, restart the server. If the beep code error remains, go to 3b. Return one DIMM at a time from the failed pair to its connector, restarting the server after you reinstall each DIMM, to identify the failed DIMM.</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. DIMM</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.
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.
2-4-1	Video failed; screen believed operable.	(Trained service technician only) Replace the system board.
3-1-1	Timer tick interrupt failed.	(Trained service technician only) Replace the system board.
3-1-2	Interval timer channel 2 failed.	(Trained service technician only) Replace the system board.
3-1-4	Time-of-day clock failed.	<ol style="list-style-type: none"> <li>1. Reseat the battery.</li> <li>2. Clear CMOS memory. See “System-board internal connectors and switches” on page 8 for information about how to clear CMOS memory.</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, System x3500 Type 7977,” on page 41 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
3-3-2	Critical SMBUS error occurred.	<ol style="list-style-type: none"> <li>1. Disconnect the power cord, wait 30 seconds, and retry.</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. DIMM</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
3-3-3	No operational memory in system.	<ol style="list-style-type: none"> <li>1. Make sure that the system board contains the correct number and type of DIMMs; install or reseat the DIMMs; then, restart the server.  <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>Start Options</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).</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</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
Two short beeps	Information only, configuration has changed.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program.</li> <li>2. Run the diagnostic programs.</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, System x3500 Type 7977,” on page 41 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
One continuous beep	Microprocessor error.	<ol style="list-style-type: none"> <li>Reseat the following components: <ol style="list-style-type: none"> <li>(Trained service technician only) Microprocessor</li> <li>(Trained service technician only) Optional microprocessor</li> </ol> </li> <li>(Trained service technician only) Remove microprocessor 2 and restart the server. <ul style="list-style-type: none"> <li>If no beep code occurs, microprocessor 2 might have failed; replace the microprocessor.</li> <li>If the beep code remains, remove microprocessor 1 and install microprocessor 2 in the connector for microprocessor 1; then, restart the server. If no beep code occurs, microprocessor 1 might have failed; replace the microprocessor.</li> </ul> </li> <li>Replace the following components one at a time, in the order shown, restarting the server each time. <ol style="list-style-type: none"> <li>(Trained service technician only) Microprocessor</li> <li>(Trained service technician only) Optional microprocessor</li> <li>(Trained service technician only) System board</li> </ol> </li> </ol>
Repeating short beeps	Keyboard error.	<ol style="list-style-type: none"> <li>Reseat the keyboard</li> <li>Replace the keyboard.</li> </ol>
Repeating long beeps	Memory error.	<ol style="list-style-type: none"> <li>Reseat the DIMMs.</li> <li>Replace the lowest-numbered pair of DIMMs with an identical known good pair of DIMMs; then, restart the server. If the beep code error remains, go to 3. Return one DIMM at a time from the failed pair to its connector, restarting the server after you reinstall each DIMM, to identify the failed DIMM.</li> <li>Replace the following components, one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> <li>DIMMs</li> <li>(Trained service technician only) System board</li> </ol> </li> </ol>

## No-beep symptoms

The following table describes situations in which no beep code sounds when POST is completed.

- 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, System x3500 Type 7977,” on page 41 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.

No-beep symptom	Description	Action
No beeps occur, and the server operates correctly.		<ol style="list-style-type: none"><li>1. (Trained service technician only) Reseat the operator information LED cable.</li><li>2. (Trained service technician only) Replace the operator information LED assembly.</li></ol>
No beeps occur after successful completion of POST.	The power-on status is Disabled.	<ol style="list-style-type: none"><li>1. Run the Configuration/Setup Utility program and select <b>Start Options</b>; then, set <b>Power-On Status</b> to <b>Enable</b>.</li><li>2. (Trained service technician only) Reseat the operator information LED assembly.</li><li>3. (Trained service technician only) Replace the operator information LED assembly.</li></ol>
No beeps occur, and there is no video.		See “Solving undetermined problems” on page 161.

## Error logs

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

The following illustration shows an example of a BMC log entry.

BMC System Event Log	
-----	
Get Next Entry Get Previous Entry Clear BMC SEL	
Entry Number=	00005 / 00011
Record ID=	0005
Record Type=	02
Timestamp=	2005/01/25 16:15:17
Entry Details:	Generator ID= 0020
	Sensor Type= 04
	Assertion Event
	Fan
	Threshold
	Lower Non-critical - going high
	Sensor Number= 40
	Event Direction/Type= 01
	Event Data= 52 00 1A



The BMC log is limited in size. When the log is full, new entries will not overwrite existing entries; therefore, you must periodically clear the BMC 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 BMC log so that you can find current errors more easily.

Entries that are written to the BMC 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 BMC log entry appears on its own page. To display all the data for an entry, use the Up Arrow (↑) and Down Arrow (↓) keys or the Page Up and Page Down keys. To move from one entry to the next, select **Get Next Entry** or **Get Previous Entry**.

The log indicates an assertion event when an event has occurred. It indicates a deassertion event when the event is no longer occurring.

Some of the error codes and messages in the BMC log are abbreviated.

If you view the BMC log through the Web interface of the optional Remote Supervisor Adapter II SlimLine, the messages can be translated.

You can view the contents of the POST error log, the BMC log, and the system-error log from the Configuration/Setup Utility program. You can view the contents of the BMC log also from the diagnostic programs.

When you are troubleshooting PCI-X slots, note that the error logs report the PCI-X buses numerically. The numerical assignments vary depending on the configuration. You can check the assignments by running the Configuration/Setup Utility program (see the *User's Guide* for more information).

### Viewing error logs 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 server.
2. When the prompt Press F1 for Configuration/Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the error logs.

**Note:** If you forgot the power-on password or administrator password, you can change the position of the jumper on pin 2 (boot block/clear CMOS) of SW4 to the On position to bypass the password check. This enables you to reset the passwords.

3. Use one of the following procedures:
  - To view the POST error log, select **Error Logs**, and then select **POST Error Log**.
  - To view the BMC log, select **Advanced Settings**, select **Baseboard Management Controller (BMC) settings**, and then select **BMC System Event Log**.
  - To view the system-error log (available only if an optional Remote Supervisor Adapter II SlimLine is installed), select **Event/Error Logs**, and then select **System Event/Error Log**.

## Viewing the BMC log from the diagnostic programs

The BMC log contains the same information, whether it is viewed from the Configuration/Setup Utility program or from the diagnostic programs.

For information about using the diagnostic programs, see “Running the diagnostic programs” on page 138.

To view the BMC log, 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 the prompt F1 for Configuration/Setup appears, press F1.
4. When the Configuration/Setup Utility menu appears, select **Start Options**.
5. From the **Start Options** menu, select **Startup Sequence Options**.
6. Note the device that is selected as the first startup device. Later, you must restore this setting.
7. Select **DVD-ROM** as the first startup device.
8. Press Esc two times to return to the Configuration/Setup Utility menu.
9. Insert the IBM *Enhanced Diagnostics* CD in the CD drive.
10. Select **Save & Exit Setup** and follow the prompts. The diagnostics will load.
11. From the top of the screen, select **Hardware Info**.
12. From the list, select **BMC 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, System x3500 Type 7977,” on page 41 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 13).</li><li>2. (Trained service technician only) Replace the system board.</li></ol>
101	Tick timer internal interrupt, internal timer channel 2.	(Trained service technician only) Replace the system board.
102	Internal timer channel 2 test failure	(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, System x3500 Type 7977,” on page 41 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. Clear CMOS memory. See “System-board internal connectors and switches” on page 8 for information about how to clear CMOS memory.</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>
161	Real-time clock battery error.	<ol style="list-style-type: none"> <li>1. Reseat the battery.</li> <li>2. Clear CMOS memory. See “System-board internal connectors and switches” on page 8 for information about how to clear CMOS memory.</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>
162	A device configuration has changed	<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. Clear CMOS memory. See “System-board internal connectors and switches” on page 8 for information about how to clear CMOS memory.</li> <li>3. Reseat the following components: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. Failing device</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. Battery</li> <li>b. Failing device</li> <li>c. (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, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
163	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. Clear CMOS memory. See “System-board internal connectors and switches” on page 8 for information about how to clear CMOS memory.</li> <li>3. Reseat the battery.</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. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
175	Service processor flash code damaged or not installed. <b>Note:</b> In this case, the service processor is the optional Remote Supervisor Adapter II SlimLine.	<ol style="list-style-type: none"> <li>1. Update the Remote Supervisor Adapter II firmware (see “Installing the Remote Supervisor Adapter II SlimLine firmware” on page 36 for information on updating the firmware).</li> <li>2. Replace the Remote Supervisor Adapter II SlimLine.</li> </ol>
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. Clear CMOS memory. See “System-board internal connectors and switches” on page 8 for information about how to clear CMOS memory.</li> <li>3. Reseat the battery.</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. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
187	VPD serial number not set.	<ol style="list-style-type: none"> <li>1. Set the serial number by updating the BIOS code level (see “Updating the firmware” on page 13).</li> <li>2. Reseat the Remote Supervisor Adapter II SlimLine</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. Remote Supervisor Adapter II SlimLine</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
188	Remote Supervisor Adapter II SlimLine EEPROM error	Replace the Remote Supervisor Adapter II SlimLine.

- 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, System x3500 Type 7977,” on page 41 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
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. <b>Note:</b> If you forgot the power-on password or administrator password, you can change the position of the jumper on pin 2 on SW4 to the On position to bypass the password check. This enables you to reset the passwords.
196	Microprocessors do not have the same L2 or L3 cache size.	Install microprocessors with the same L2 or L3 cache size. <b>Note:</b> Do not use dual-core and quad-core processors in the same system.
198	Microprocessors are not the same speed	Install microprocessor of the same speed. <b>Note:</b> Do not use dual-core and quad-core processors in the same system.
289	A DIMM has been disabled by the system.	<ol style="list-style-type: none"> <li>1. Replace the lowest-numbered pair of DIMMs with an identical known good pair of DIMMs; then, restart the server. If the beep code error remains, return one DIMM at a time from the failed pair to its connector, restarting the server after you reinstall each DIMM, to identify the failed DIMM.</li> <li>2. Make sure that the DIMM is installed correctly (see “Memory module” on page 66).</li> <li>3. Reseat the DIMM.</li> <li>4. Replace the DIMM.</li> </ol>
301, 303	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 the POST error message 301 from being displayed during startup.</li> <li>2. Reseat the keyboard.</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>

- 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, System x3500 Type 7977,” on page 41 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
1604	Machine type mismatch detected. The error might be displayed after updating the BIOS to version 1.40 or the operator information panel is disconnected.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings.</li> <li>2. Update the BIOS code to version 1.43 or higher and make sure the machine type information for the server is correct.</li> <li>3. Update the BMC firmware (see “Updating the firmware” on page 13).</li> <li>4. Make sure that the operator information panel cables are correctly connected (verify LED activity).</li> <li>5. (Trained service technician only) Replace the system board.</li> <li>6. Check the Light Path Display (LPD) connection.</li> </ol>
1762	Fixed disk configuration error.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program and load the defaults.</li> <li>2. Reseat the following components:               <ol style="list-style-type: none"> <li>a. SAS cables</li> <li>b. SAS hard disk drive</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. SAS cables</li> <li>b. SAS hard disk drive</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
178x	Fixed disk error.	<ol style="list-style-type: none"> <li>1. Reseat the hard disk drive cables.</li> <li>2. Replace the hard disk drive cables.</li> <li>3. Run the hard disk drive diagnostic tests.</li> <li>4. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Optional ServeRAID-8i adapter</li> <li>b. Hard disk drive</li> </ol> </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. Optional ServeRAID-8i adapter</li> <li>b. Hard disk drive</li> <li>c. (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>

- 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, System x3500 Type 7977,” on page 41 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 following components: <ol style="list-style-type: none"> <li>a. SAS drive</li> <li>b. SAS hard disk drive backplane 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. SAS drive</li> <li>b. SAS hard disk drive backplane</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
5962	IDE DVD drive configuration error.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program and load the default settings (see “Using the Configuration/Setup Utility program” on page 14).</li> <li>2. Reseat the following components: <ol style="list-style-type: none"> <li>a. DVD drive cable</li> <li>b. DVD drive</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. DVD drive cable</li> <li>b. DVD 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</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>
0001295	ECC circuit check.	<ol style="list-style-type: none"> <li>1. Reseat DIMMs</li> <li>2. Replace the DIMMs, one at a time, restarting the server each time.</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, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
00012000	Processor machine check error.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessor.</li> <li>2. (Trained service technician only) Remove microprocessor 2 and restart the server. <ul style="list-style-type: none"> <li>• If no error code occurs, microprocessor 2 might have failed; replace the microprocessor.</li> <li>• If the error code remains, remove microprocessor 1 and install microprocessor 2 in the connector for microprocessor 1; then, restart the server. If no error code occurs, microprocessor 1 might have failed; replace the microprocessor.</li> </ul> </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. (Trained service technician only) Microprocessor</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
00019501	Processor 1 is not functioning; check processor LEDs.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessor 1.</li> <li>2. (Trained service technician only) Remove microprocessor 2 and restart the server. <ul style="list-style-type: none"> <li>• If no error code occurs, microprocessor 2 might have failed; replace the microprocessor.</li> <li>• If the error code remains, remove microprocessor 1 and install microprocessor 2 in the connector for microprocessor 1; then, restart the server. If no error code occurs, microprocessor 1 might have failed; replace the microprocessor.</li> </ul> </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. (Trained service technician only) Microprocessor 1</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, System x3500 Type 7977,” on page 41 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
00019502	Processor 2 is not functioning; check processor LEDs.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat microprocessor 2</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 2</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. (Trained service technician only) Reseat microprocessor 1. <ol style="list-style-type: none"> <li>a. (Trained service technician only) Microprocessor 1</li> </ol> </li> <li>2. (Trained service technician only) Remove microprocessor 2 and restart the server. <ul style="list-style-type: none"> <li>• If no error code occurs, microprocessor 2 might have failed; replace the microprocessor.</li> <li>• If the error code remains, remove microprocessor 1 and install microprocessor 2 in the connector for microprocessor 1; then, restart the server. If no error code occurs, microprocessor 1 might have failed; replace the microprocessor.</li> </ul> </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. (Trained service technician only) Microprocessor 1</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
00019702	Processor 2 failed BIST.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat microprocessor 2.</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 2</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, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
1801	A PCI adapter has requested memory resources that are not available.	<ol style="list-style-type: none"> <li>1. Make sure that no devices have been disabled in the Configuration/Setup Utility program.</li> <li>2. 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>3. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. If the memory resource settings are not correct, change them.</li> <li>4. If all memory resources are being used, remove an adapter to make memory available to the adapter. Disabling the BIOS on the adapter should correct the error. See the documentation that comes with the adapter.</li> </ol>
1802	No more I/O space is available for a PCI adapter.	<ol style="list-style-type: none"> <li>1. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct.</li> <li>2. If the error code indicates a particular PCI or PCI-X slot or device, remove that device.</li> <li>3. Reseat each adapter.</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. Each adapter</li> <li>b. (Trained service technician only) PCI-X board</li> </ol> </li> </ol>
1803	No more memory (above 1 MB for a PCI adapter).	<ol style="list-style-type: none"> <li>1. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct.</li> <li>2. If the error code indicates a particular PCI or PCI-X slot or device, remove that device.</li> <li>3. Reseat each adapter.</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. Each adapter</li> <li>b. (Trained service technician only) PCI-X board</li> </ol> </li> </ol>
1804	No more memory (below 1 MB for a PCI adapter).	<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. Each adapter</li> <li>b. (Trained service technician only) PCI-X 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, System x3500 Type 7977,” on page 41 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
1805	PCI option ROM checksum error.	<ol style="list-style-type: none"> <li>1. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct.</li> <li>2. If the error code indicates a particular PCI or PCI-X slot or device, remove that device.</li> <li>3. Reseat each adapter.</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. Each adapter</li> <li>b. (Trained service technician only) PCI-X board</li> </ol> </li> </ol>
1806	PCI built-in self-test failure.	<ol style="list-style-type: none"> <li>1. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct.</li> <li>2. If the error code indicates a particular PCI or PCI-X slot or device, remove that device.</li> <li>3. Reseat each adapter.</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. Each adapter</li> <li>b. (Trained service technician only) PCI-X board</li> </ol> </li> </ol>
1807, 1808	General PCI error.	<ol style="list-style-type: none"> <li>1. Make sure that no devices have been disabled in the Configuration/Setup Utility program.</li> <li>2. Reseat the failing adapter. <b>Note:</b> If an error LED is lit for a specific adapter, reseat that adapter first; if no LEDs are lit, reseat each adapter one at a time, restarting the server each time, to isolate the failing adapter.</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. Each adapter</li> <li>b. (Trained service technician only) PCI-X 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, System x3500 Type 7977,” on page 41 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
1810	PCI error.	<ol style="list-style-type: none"> <li>1. Make sure that no devices have been disabled in the Configuration/Setup Utility program.</li> <li>2. Reseat the failing adapter. <b>Note:</b> If an error LED is lit for a specific adapter, reseat that adapter first; if no LEDs are lit, reseat each adapter one at a time, restarting the server each time, to isolate the failing adapter.</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. Each adapter</li> <li>b. (Trained service technician only) PCI-X board</li> </ol> </li> </ol>
01295085	ECC checking hardware test error.	<ol style="list-style-type: none"> <li>1. Reseat the following components: <ol style="list-style-type: none"> <li>a. (Trained service technician only) Microprocessor</li> <li>b. DIMM</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. (Trained service technician only) Microprocessor</li> <li>b. DIMM</li> <li>c. (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. Make sure that all microprocessors have the same cache size (see “Using the Configuration/Setup Utility program” on page 14).</li> <li>2. Update the BIOS code again (see “Updating the firmware” on page 13).</li> <li>3. (Trained service technician only) Reseat microprocessor 1.</li> <li>4. (Trained service technician only) Replace microprocessor 1.</li> </ol>
01298002	No update data for processor 2.	<ol style="list-style-type: none"> <li>1. Make sure that all microprocessors have the same cache size (see “Using the Configuration/Setup Utility program” on page 14).</li> <li>2. Update the BIOS code again (see “Updating the firmware” on page 13).</li> <li>3. (Trained service technician only) Reseat microprocessor 2.</li> <li>4. (Trained service technician only) Replace microprocessor 2.</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, System x3500 Type 7977,” on page 41 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. Make sure that all microprocessors have the same cache size (see “Using the Configuration/Setup Utility program” on page 14).</li> <li>2. Update the BIOS code again (see “Updating the firmware” on page 13).</li> <li>3. (Trained service technician only) Reseat microprocessor 1.</li> <li>4. (Trained service technician only) Replace microprocessor 1.</li> </ol>
01298102	Bad update data for processor 2.	<ol style="list-style-type: none"> <li>1. Make sure that all microprocessors have the same cache size (see “Using the Configuration/Setup Utility program” on page 14).</li> <li>2. Update the BIOS code again (see “Updating the firmware” on page 13).</li> <li>3. (Trained service technician only) Reseat microprocessor 2.</li> <li>4. (Trained service technician only) Replace microprocessor 2.</li> </ol>
01298200	Processor speed mismatch.	Make sure that all microprocessors have the same cache size (see “Using the Configuration/Setup Utility program” on page 14).
I9990301	Fixed disk sector error.	<ol style="list-style-type: none"> <li>1. Reseat the following components: <ol style="list-style-type: none"> <li>a. Hard disk drive</li> <li>b. SAS hard disk drive backplane</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. Hard disk drive</li> <li>b. SAS hard disk drive backplane</li> <li>c. (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, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
I9990305	An operating system was not found.	<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</li> <li>b. SAS hard disk drive backplane and cables</li> <li>c. DVD drive and cables</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</li> <li>b. SAS hard disk drive backplane and cables</li> <li>c. DVD drive and cables</li> <li>d. (Trained service technician only) System board</li> </ol> </li> </ol>
I9990650	AC power has been restored.	<ol style="list-style-type: none"> <li>1. Check the power cables.</li> <li>2. Check for interruption of the power supply (see “Power-supply LEDs” on page 137).</li> <li>3. Reseat the following components: <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. (Trained service technician only) Power backplane</li> </ol> </li> <li>4. Replace the components listed in step 3, one at a time, in the order shown, restarting the server each time.</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 multiple error codes or light path diagnostics LEDs that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 123 for information about diagnosing microprocessor problems.

- Before you run 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 100. If the server is halted and no error message is displayed, see “Troubleshooting tables and procedures” on page 116 and “Solving undetermined problems” on page 161.
- For information about power-supply problems, see “Solving power problems” on page 160 and “Power-supply LEDs” on page 137.
- For intermittent problems, check the error log; see “Error logs” on page 100 and “Diagnostic programs, messages, and error codes” on page 138.

### 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. Check all internal and external devices for compatibility at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.
    - d. Set all display controls to the middle positions.
    - e. Turn on all external devices.
    - f. Turn on the server. If the server does not start, see “Troubleshooting tables and procedures”.
    - g. Check the system-error LED on the operator information panel. If it is flashing, check the light path diagnostics LEDs (see “Light path diagnostics” on page 131).
    - h. Check for the following results:
      - Successful completion of POST, indicated by a single beep
      - Successful completion of startup, indicated by a readable display of the operating-system desktop
  3. Did a single beep sound and are there readable instructions on the main menu?
    - **No:** Find the failure symptom in “Troubleshooting tables and procedures”; if necessary, see “Solving undetermined problems” on page 161.
    - **Yes:** Run the diagnostic programs (see “Running the diagnostic programs” on page 138).
      - If you receive an error, see “Diagnostic error codes” on page 140.
      - If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 161.

**Important:** If the server has a baseboard management controller, clear the BMC log and system-event log after you correct the condition. This will turn off the information LED.

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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. By using the checkpoint display, you do not have to wait for the video to initialize each time you restart the server.

Only one type of checkpoint code is supported in your server: BIOS checkpoint codes. The BIOS checkpoint codes might change when the BIOS code is updated. To read the BIOS checkpoint codes, you must install a PCI POST card in one of the PCI slots.

For a list of checkpoint codes for the IBM System x3500 server, see <http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html>.

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## Troubleshooting tables and procedures

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



If you cannot find a problem in these tables, see “Running the diagnostic programs” on page 138 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 you use the troubleshooting tables and procedures:

1. Check the light path diagnostics LEDs on the operator information panel (see “Light path diagnostics” on page 131).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

## DVD 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, System x3500 Type 7977,” on page 41 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 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 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 signal cable and connector are not damaged and the connector pins are not bent.</li><li>• The correct device driver is installed for the DVD drive.</li></ul></li><li>2. Run the DVD drive diagnostic programs.</li><li>3. Reseat the following components:<ol style="list-style-type: none"><li>a. DVD drive</li><li>b. 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. DVD drive</li><li>b. DVD drive and cables</li><li>c. (Trained service technician only) System board</li></ol></li></ol>
A DVD is not working correctly.	<ol style="list-style-type: none"><li>1. Clean the DVD.</li><li>2. Run the DVD drive diagnostic programs.</li><li>3. Reseat the DVD drive.</li><li>4. Replace the DVD drive.</li></ol>
The 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 DVD drive.</li><li>4. Replace the DVD drive.</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, System x3500 Type 7977,” on page 41 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.

## Fan 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, System x3500 Type 7977,” on page 41 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 fan speed is abnormal. The following errors may occur: <ul style="list-style-type: none"><li>• 271 09/18/2006 15:20:12 Fan/cooling device 3 Fan</li><li>• Fan 3 Tach): Assertion: Lower Critical - going low</li><li>• Trigger threshold value: 750.00 RPM. Trigger reading: 0.00 RPM.</li></ul>	<ol style="list-style-type: none"><li>1. Before you replace a FRU:<ol style="list-style-type: none"><li>a. Power off the server, and make sure that the fan cage is installed correctly.</li><li>b. Use the following instructions to install the fan cage:<ol style="list-style-type: none"><li>1) Make sure that all cables that plug into the system board are connected and routed properly underneath the plastic fasteners.</li><li>2) Carefully slide the fan cage into both side wall rails until the fan cage lock holes snap into the two latch handles.</li><li>3) Push down on both sides of the fan cage until it clicks in place.</li></ol></li></ol></li><li>2. If the symptoms remains, contact IBM Service to assist in validating that the following solution is appropriate: Place one more rubber grommet (FRU 44E7524) underneath the fan cage power connector and reinstall the fan cage.</li></ol>

<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, System x3500 Type 7977,” on page 41 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
Abnormal fan noise	<ol style="list-style-type: none"> <li>1. Before you replace a FRU:               <ol style="list-style-type: none"> <li>a. Power off the server, and make sure that the fan cage is installed correctly.</li> <li>b. Use the following instructions to install the fan cage:                   <ol style="list-style-type: none"> <li>1) Make sure that all cables that plug into the system board are connected and routed properly underneath the plastic fasteners.</li> <li>2) Carefully slide the fan cage into both side wall rails until the fan cage lock holes snap into the two latch handles.</li> <li>3) Push down on both sides of the fan cage until it clicks in place.</li> <li>4) Check the microprocessor heat sink and make sure it is installed correctly</li> <li>5) Make sure if the Baseboard Management Controller is updated to the latest version. See <a href="http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310496&amp;typeind=0&amp;osind=0&amp;brandind=5000008&amp;oldbrand=5000008&amp;oldfamily=5312474&amp;oldtype=0&amp;taskind=2&amp;matrix=Y&amp;psid=bm">http://www-947.ibm.com/systems/support/supportsite.wss/selectproduct?familyind=5310496&amp;typeind=0&amp;osind=0&amp;brandind=5000008&amp;oldbrand=5000008&amp;oldfamily=5312474&amp;oldtype=0&amp;taskind=2&amp;matrix=Y&amp;psid=bm</a></li> <li>6) After the server boots, wait five minutes; then, check the fan to see if the speed gradually slows down.</li> </ol> </li> </ol> </li> <li>2. If the symptoms remains, replace the suspected fan</li> </ol>

## 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, System x3500 Type 7977,” on page 41 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 tests.	Remove the drive that is indicated by the diagnostic tests; then, run the hard disk drive diagnostic tests 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.	<p>Run the diagnostic SCSI Fixed Disk Test (see “Running the diagnostic programs” on page 138).</p> <p><b>Note:</b> This test is not available on servers that have RAID arrays or servers that have SATA hard disk drives.</p>

## Intermittent 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, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<ol style="list-style-type: none"><li>1. Make sure that:<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></li><li>2. Check the system-error log or BMC log (see “Error logs” on page 100).</li><li>3. See “Solving undetermined problems” on page 161.</li></ol>

## Keyboard, mouse, or pointing-device problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"><li>1. Make sure that:<ul style="list-style-type: none"><li>• The keyboard cable is securely connected.</li><li>• If you are using a PS/2 keyboard, the keyboard and mouse cables are not reversed.</li><li>• The server and the monitor are turned on.</li></ul></li><li>2. See <a href="http://www.ibm.com/servers/eserver/serverproven/compat/us/">http://www.ibm.com/servers/eserver/serverproven/compat/us/</a> for keyboard compatibility.</li><li>3. If you are using a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the 301 POST error message from being displayed during startup.</li><li>4. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server.</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. 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, System x3500 Type 7977,” on page 41 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 is compatible with 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>• The mouse or pointing-device cable is securely connected to the server.</li> <li>• If you are using a PS/2 mouse or pointing device, 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 mouse is enabled in the Configuration/Setup Utility program.</li> </ul> </li> <li>2. If you are using a USB mouse or pointing device and it is connected to a USB hub, disconnect the mouse or pointing device from the hub and connect it directly to the server.</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

- 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, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	<ol style="list-style-type: none"> <li>1. Make sure that: <ul style="list-style-type: none"> <li>• No error LEDs are lit on the operator information panel or on the DIMM.</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 banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.</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. Run memory diagnostics (see “Running the diagnostic programs” on page 138).</li> <li>4. Make sure that there is no memory mismatch when the server is at the minimum memory configuration (two 512 MB DIMMs; see the information about the minimum required configuration on page 161).</li> <li>5. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair are matching.</li> <li>6. Reseat the DIMMs.</li> <li>7. Replace the components in step 6, one at a time, in the order shown, restarting the server each time.</li> </ol>
Multiple rows of DIMMs in a branch are identified as failing.	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs; then, restart the server.</li> <li>2. Replace the lowest-numbered pair of DIMMs with an identical known good pair of DIMMs; then, restart the server. Repeat as necessary. If the failures continue after all identified pairs are replaced, go to step 4.</li> <li>3. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the server after each pair, until a pair fails. Replace each DIMM in the failed pair with an identical known good DIMM, restarting the server after you reinstall each DIMM. Replace the failed DIMM. Repeat step 3 until you have tested all removed DIMMs.</li> <li>4. (Trained service technician only) Replace the system board.</li> </ol>

## Microprocessor 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, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	<ol style="list-style-type: none"><li>1. Correct any errors that are indicated by the light path diagnostics LEDs (see “Light path diagnostics” on page 131).</li><li>2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size.</li><li>3. (Trained service technician only) Reseat Microprocessor 1</li><li>4. (Trained service technician only) If there is no indication of which microprocessor has failed, isolate the error by testing with one microprocessor at a time.</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. (Trained service technician only) Microprocessor 2</li><li>b. VRM 2</li><li>c. (Trained service technician only) System board</li></ol></li><li>6. (Trained service technician only) If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, reverse the locations of two microprocessors to determine whether the error is associated with a microprocessor or with a microprocessor socket.<ul style="list-style-type: none"><li>• If the error is associated with a microprocessor, replace the microprocessor.</li><li>• If the error is associated with a VRM, replace the VRM.</li><li>• If the error is associated with a microprocessor socket, replace the system board.</li></ul></li></ol>

## Monitor problems

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

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
Testing the monitor	<ol style="list-style-type: none"> <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. Reseat the Remote Supervisor Adapter II SlimLine</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. Remote Supervisor Adapter II SlimLine</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
The screen is blank.	<ol style="list-style-type: none"> <li>1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server.</li> <li>2. Make sure that: <ul style="list-style-type: none"> <li>• The ServeRAID 8K or ServeRAID 8k-I controller is installed in the system.</li> <li>• The server is turned on. If there is no power to the server, see “Power problems” on page 127.</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>Start Options</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>3. Make sure that the correct server is controlling the monitor, if applicable.</li> <li>4. See “Solving undetermined problems” on page 161.</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 138). <ul style="list-style-type: none"> <li>• If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” on page 161.</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, System x3500 Type 7977,” on page 41 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 that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.   <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 following components: <ol style="list-style-type: none"> <li>a. Monitor</li> <li>b. Remote Supervisor Adapter II SlimLine (if one is present)</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. Monitor</li> <li>b. Remote Supervisor Adapter II SlimLine (if one is present)</li> <li>c. (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 13).</li> <li>2. Reseat the monitor</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

- 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, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
An IBM optional device that was just installed does not work.	<ol style="list-style-type: none"><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 you turn 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, System x3500 Type 7977,” on page 41 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 (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 operator information panel cables, and then repeat steps 1a and 1b. <ul style="list-style-type: none"> <li>• (Trained service technician only) If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.</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 DIMM is fully seated.</li> <li>• The LEDs on the power supply do not indicate a problem.</li> <li>• The microprocessors are installed in the correct sequence.</li> </ul> </li> <li>3. Reseat the following components: <ol style="list-style-type: none"> <li>a. DIMMs</li> <li>b. (Trained service technician only) Power switch connector</li> <li>c. (Trained service technician only) Power backplane</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. DIMMs</li> <li>b. (Trained service technician only) Power switch connector</li> <li>c. (Trained service technician only) Power backplane</li> <li>d. (Trained service technician only) System board</li> </ol> </li> <li>5. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.</li> <li>6. See “Power-supply LEDs” on page 137.</li> <li>7. See “Solving undetermined problems” on page 161.</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 Interface (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 pressing 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 power cord for 20 seconds; then, reconnect the 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>

<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, System x3500 Type 7977,” on page 41 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 unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See “Solving undetermined problems” on page 161.

## 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, System x3500 Type 7977,” on page 41 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. Reseat the serial port adapter.</li> <li>3. Replace the 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 connector (see “Checkpoint codes (trained service technicians only)” on page 116).</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> <li>c. Remote Supervisor Adapter II SlimLine (if one is present)</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. Remote Supervisor Adapter II SlimLine (if one is present)</li> <li>d. (Trained service technician only) System board</li> </ol> </li> </ol>

## ServerGuide 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, System x3500 Type 7977,” on page 41 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 <i>ServerGuide Setup and Installation</i> CD will not start.	<ol style="list-style-type: none"> <li>Make sure that the server supports the ServerGuide program and has a startable (bootable) DVD drive.</li> <li>If the startup (boot) sequence settings have been changed, make sure that the DVD drive is first in the startup sequence.</li> <li>If more than one DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.</li> </ol>
The ServeRAID Manager program cannot view all installed drives, or the operating system cannot be installed.	<ol style="list-style-type: none"> <li>Make sure that the hard disk drive is connected correctly.</li> <li>Make sure that the SAS hard disk drive cables are securely connected.</li> </ol>
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 server supports the operating system. If it does, either no logical drive is defined (SCSI RAID servers), or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

## Software problems

<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, System x3500 Type 7977,” on page 41 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>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>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>Contact your place of purchase of the software.</li> </ol>

## Server boot failure problem

Use the following procedure when the server fails to boot and there are no video symptoms.

1. Do the Power Supply LEDs indicate an error?
  - Yes - See "Power-supply LEDs" on page 137.
  - No - Go to step 2.
2. Do the PCI LED or microprocessor LED indicate an error?
  - Yes - Make sure there is a ServeRAID 8k or ServeRAID 8k-L installed in the server.
  - No - Go to step 3.

3. Reseat all system board connectors, cables, memory, and microprocessors.

Retest the server with the following minimum configuration:

- One microprocessor
- Two 512 MB DIMMs
- One power supply
- Power backplane
- Power cord
- ServeRAID SAS adapter
- System board assembly

Did the no boot symptom remain?

- Yes - Go to step 4.
- No - The problem has been corrected.

4. Remove all of the memory DIMMs installed in the server; then, restart server and check for the following:
  - A memory beep error during POST.
  - One or more fans running

Did POST generate a memory beep error and one or more fans are running?

- Yes - Most likely a video problem.
- No - Go to step 5.

5. Clear CMOS; then, retest the server. Did the memory beep error occur?

- Yes - Reinstall the memory DIMMs; then, retest the server.
- No - Go to step 6.

6. Reinstall the memory DIMMs in the server. Did the no boot symptoms remain?

- Yes - Go to step 7.
- No - The problem has been corrected.

7. Call IBM Service with the following information:

- The results you received while performing each step of this procedure
- A complete list of the hardware inventory of your server.

## 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, System x3500 Type 7977,” on page 41 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 138).</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 optional devices 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>

## Video problems

See “Monitor problems” on page 123.

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## Light path diagnostics

Light path diagnostics is a system of LEDs on various external and internal components of the server. When an error occurs, LEDs are lit throughout the server. By viewing the LEDs in a particular order, you can often identify the source of the error.

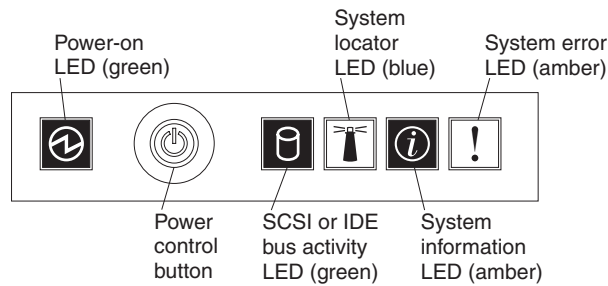
When LEDs are lit to indicate an error, they remain lit when the server is turned off, provided that the server is still connected to power and the power supply is operating correctly.

Before you work inside the server to view light path diagnostics LEDs, read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.

If an error occurs, view the light path diagnostics LEDs in the following order:

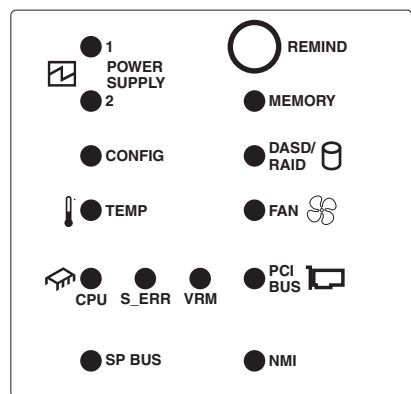
1. Look at the informational LEDs on the front of the server.
  - If the information LED is lit, it indicates that information about a suboptimal condition in the server is available in the BMC log or in the system-error log.
  - If the system-error LED is lit, it indicates that an error has occurred; go to step 2 on page 132.

The following illustration shows the information LEDs that show through the bezel.



- To view the light path diagnostics panel, press the release latch on the front of the operator information panel to the left; then, slide it forward. This reveals the light path diagnostics panel. Lit LEDs on this panel indicate the type of error that has occurred.

The following illustration shows the light path diagnostics panel.

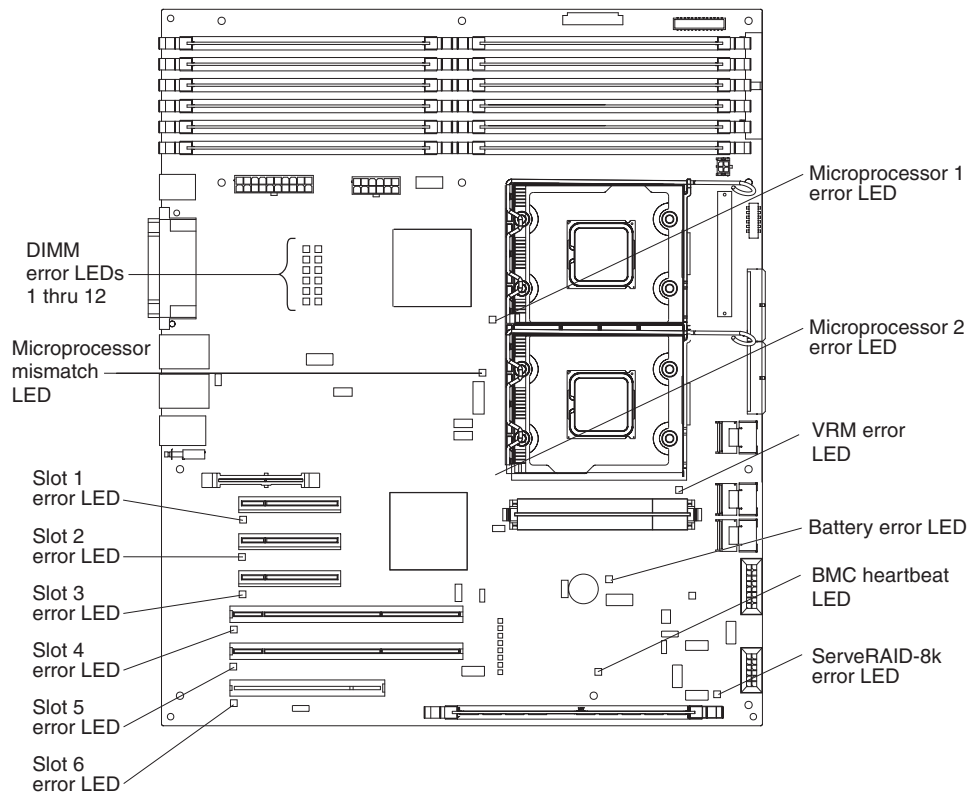


Look at the system service label on the top of the server, which gives an overview of internal components that correspond to the LEDs on the light path diagnostics panel. This information and the information in “Light path diagnostics LEDs” on page 133 can often provide enough information to diagnose the error.

- Remove the server cover and look inside the server for lit LEDs. Certain components inside the server have LEDs that will be lit to indicate the location of a problem.

The following illustration shows the LEDs on the system board.





## Remind button

You can use the remind button on the light path diagnostics panel to put the system-error LED on the operator information panel into Remind mode. When you press the remind button, you acknowledge the error but indicate that you will not take immediate action. The system-error LED flashes while it is in Remind mode and stays in Remind mode until one of the following conditions occurs:

- All known errors are corrected.
- The server is restarted.
- A new error occurs, causing the system-error LED to be lit again.

## Light path diagnostics LEDs

The following table describes the LEDs on the light path diagnostics panel 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, System x3500 Type 7977,” on page 41 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>		
Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
All LEDs are off (the power LED is lit; the information LED might be lit).		No action is necessary.
POWER SUPPLY 1	Power supply 1 has failed or has been removed; also see “Power-supply LEDs” on page 137. <b>Note:</b> In a redundant power configuration, the dc power LED on one power supply might be off.	<ol style="list-style-type: none"> <li>Reinstall the power supply 1.</li> <li>Check the individual power-supply LEDs.</li> <li>Reseat the following components: <ol style="list-style-type: none"> <li>Power supply</li> <li>(Trained service technician only) Power backplane</li> </ol> </li> <li>Replace the components listed in step 3, one at a time, in the order shown, restarting the server each time.</li> <li>If a 240 V ac fault has occurred, remove ac power before you restore dc power.</li> </ol>
POWER SUPPLY 2	Power supply 2 has failed or has been removed; also see “Power-supply LEDs” on page 137. <b>Note:</b> In a redundant power configuration, the dc power LED on one power supply might be off.	<ol style="list-style-type: none"> <li>Reinstall the power supply 2.</li> <li>Check the individual power-supply LEDs.</li> <li>Reseat the following components: <ol style="list-style-type: none"> <li>Power supply</li> <li>(Trained service technician only) Power backplane</li> </ol> </li> <li>Replace the components listed in step 3, one at a time, in the order shown, restarting the server each time.</li> <li>If a 240 V ac fault has occurred, remove ac power before you restore dc power.</li> </ol>
CONFIG	Microprocessor configuration error.	<ol style="list-style-type: none"> <li>Install two microprocessors of the same cache size, type, and clock speed.</li> <li>Check the system-error log for information that indicates incompatible components.</li> </ol>
TEMP	A system temperature or component has exceeded specifications. <b>Note:</b> A fan LED might also be lit.	<ol style="list-style-type: none"> <li>See the BMC log or the system-error log (see “Error logs” on page 100) for the source of the fault.</li> <li>Make sure that the airflow in the server is not blocked.</li> <li>If a fan LED is lit, reseat the fan.</li> <li>Replace the fan for which the LED is lit.</li> <li>Make sure that the room is neither too hot nor too cold (see “Environment” in “Features and specifications” on page 3).</li> </ol>

<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, System x3500 Type 7977,” on page 41 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>		
Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
CPU	<p>A microprocessor has failed, is missing, or has been incorrectly installed.</p> <p><b>Note:</b> (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence; see “System board and microprocessor” on page 90.</p>	<ol style="list-style-type: none"> <li>1. Check the BMC log or the system-error log to determine the reason for the lit LED.</li> <li>2. Find the failing, missing, or mismatched microprocessor by checking the LEDs on the system board.</li> <li>3. (Trained service technician) Reseat the failing microprocessor</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. (Trained service technician only) Failing microprocessor</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
S_ERR	Reserved	
VRM	<p>A dc-dc regulator has failed or is missing.</p> <p><b>Note:</b> This error is for either the VRM or integrated VRD. If the VRD has failed, the system board must be replaced by an trained service technician.</p>	<ol style="list-style-type: none"> <li>1. Check the BMC log or the system-error log to determine the reason for the lit LED (for a VRM).</li> <li>2. Find the failing or missing VRM by checking the LEDs on the system board.</li> <li>3. Install any missing VRMs.</li> <li>4. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Failing VRM</li> <li>b. (Trained service technician only) Microprocessor associated with the VRM</li> </ol> </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. Failing VRM</li> <li>b. (Trained service technician only) Microprocessor associated with the VRM</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
SERVICE PROCESSOR BUS	There is a fault in the Remote Supervisor Adapter II SlimLine.	<ol style="list-style-type: none"> <li>1. Reseat the Remote Supervisor Adapter II SlimLine.</li> <li>2. Update the firmware for the Remote Supervisor Adapter II SlimLine (see “Updating the firmware” on page 13).</li> <li>3. Replace the Remote Supervisor Adapter II SlimLine.</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, System x3500 Type 7977,” on page 41 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.

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
MEMORY	Memory failure. <b>Note:</b> The error LED on the DIMM is also lit.	<ol style="list-style-type: none"> <li>1. Remove the DIMM that has the lit error LED; then, press the light path diagnostics button on the DIMM to identify the failed DIMM.</li> <li>2. Reseat the DIMM.</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. DIMM</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
DASD/RAID	A hard disk drive, integrated SAS controller, or integrated RAID error has occurred.  <b>Notes:</b> <ol style="list-style-type: none"> <li>1. The error LED on the failing hard disk drive is also lit.</li> <li>2. Check the BMC event log for a ServeRAID-8k or RAID error.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reinstall the removed drive.</li> <li>2. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Failing hard disk drive</li> <li>b. SAS hard disk drive backplane</li> <li>c. SAS signal and power cables</li> <li>d. ServeRAID-8k adapter</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 hard disk drive</li> <li>b. SAS hard disk drive backplane</li> <li>c. SAS signal and power cables</li> <li>d. ServeRAID-8k adapter</li> <li>e. (Trained service technician only) System board</li> </ol> </li> </ol>
FAN	A fan has failed or has been removed. <b>Note:</b> A failing fan can also cause the TEMP LED to be lit.	<ol style="list-style-type: none"> <li>1. Reinstall the removed fan.</li> <li>2. Reseat the fan.</li> <li>3. If an individual fan LED is lit, replace the fan.</li> <li>4. (Trained service technician only) Replace the system board.</li> </ol>
PCI BUS	A PCI adapter has failed.	<ol style="list-style-type: none"> <li>1. See the BMC log or the system-error log (see “Error logs” on page 100).</li> <li>2. Reseat the failing 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>

<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, System x3500 Type 7977,” on page 41 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>		
Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
NMI	<p>A hardware error has been reported to the operating system.</p> <p><b>Note:</b> The PCI or MEM LED might also be lit.</p>	<ol style="list-style-type: none"> <li>See the BMC log and the system-error log (see “Error logs” on page 100).</li> <li>If the PCI LED is lit, follow the instructions for that LED.</li> <li>If the MEM LED is lit, follow the instructions for that LED.</li> <li>Restart the server.</li> </ol>

## Power-supply LEDs

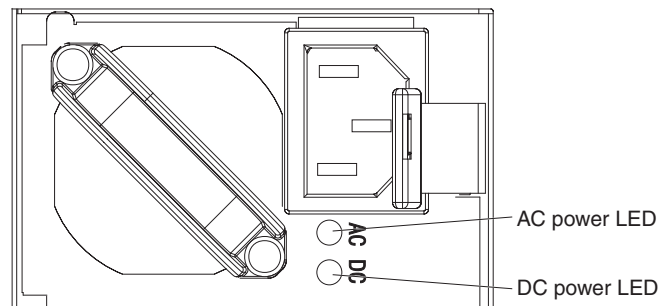
The following minimum configuration is required for the DC LED on the power supply to be lit:

- Power supply
- Power backplane
- Power cord

The following minimum configuration is required for the server to start:

- One microprocessor
- Two 512 MB DIMMs on the DIMM
- One power supply
- Power backplane
- Power cord
- ServeRAID SAS adapter
- System board assembly

The following illustration shows the locations of the power-supply LEDs.



The following table describes the problems that are indicated by various combinations of the power-supply LEDs and the power-on LED on the operator information panel and suggested actions to correct the detected 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, System x3500 Type 7977,” on page 41 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.

Power-supply LEDs		Operator information panel power-on LED	Description	Action
AC	DC			
Off	Off	Off	No power to the server, or a problem with the ac power source.	<ol style="list-style-type: none"> <li>1. Check the ac power to the server.</li> <li>2. Make sure that the power cord is connected to a functioning power source.</li> <li>3. Remove one power supply at a time.</li> </ol>
Lit	Off	Off	DC source or power supply power problem.	<ol style="list-style-type: none"> <li>1. Make sure that the system board is connected to the power backplane.</li> <li>2. Remove and replace one power supply at a time.</li> <li>3. View the system-error log (see “Error logs” on page 100).</li> </ol>
Lit	Lit	Off	Standby power problem.	<ol style="list-style-type: none"> <li>1. View the system-error log (see “Error logs” on page 100).</li> <li>2. Remove one power supply at a time.</li> <li>3. (Trained service technician only) Replace the power backplane.</li> </ol>
Lit	Lit	Flashing	System power-on problem.	<ol style="list-style-type: none"> <li>1. View the system-error log (see “Error logs” on page 100).</li> <li>2. Press the power-control button on the operator information panel.</li> <li>3. Remove the optional Remote Supervisor Adapter II SlimLine, and try to turn on the server.</li> <li>4. (Trained service technician only) Replace the system board.</li> </ol>
Lit	Lit	Lit	The power is good.	No action is necessary.

## Diagnostic programs, messages, and error codes

The 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 140.

## 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 the prompt F1 for Configuration/Setup is displayed, press F1.

4. From the Configuration/Setup Utility menu, select **Start Options**.
5. From the **Start Options** menu, select **Startup Sequence Options**.
6. Note the device that is selected as the first startup device. Later, you must restore this setting.
7. Select **DVD-ROM** as the first startup device.
8. Press Esc two times to return to the Configuration/Setup Utility menu.
9. Insert the IBM *Enhanced Diagnostics* CD in the CD drive.
10. Select **Save & Exit Setup** and follow the prompts. The diagnostics will load.
11. 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 Attached 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 not connected to the integrated SAS controller.
- The server contains SATA or IDE hard disk drives not connected to the integrated SAS controller.

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 140.

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 multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 123 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 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 summary test log when the tests are completed, select **Utility** from the top of the screen and then select **View Test Log**. To view a detailed test log, press TAB while you view the summary test log. The test-log data is maintained only while you are running the diagnostic programs. When you exit from the diagnostic programs, the test log is cleared.

To save the test log to a file on a diskette or to the hard disk, click **Save Log** on the diagnostic programs screen and specify a location and name for the saved log file.

### Notes:

1. To create and use a diskette, you must add an optional external diskette drive to the server.
2. 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.

## 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 140 for more information.

<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, System x3500 Type 7977,” on page 41 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
001-198-000	Test aborted.	<ol style="list-style-type: none"> <li>Check the diagnostic logs for messages that indicate the cause of the error, and take the indicated action.</li> <li>From the diagnostic programs, run Quick Memory Test All Banks; then, if an error is detected, take the indicated action.</li> <li>Reinstall and, if necessary, update the BIOS code on the server; then, run the test again (see “Updating the firmware” on page 13).</li> </ol>
001-250-001	Failed system board ECC	(Trained service technician only) Replace system board.
001-292-000	Core system: failed/CMOS checksum failed.	Load the BIOS default settings by using the Configuration/Setup Utility program, and run the test again (see “Using the Configuration/Setup Utility program” on page 14).
005-xxx-000	Failed video test.	<ol style="list-style-type: none"> <li>Reseat the video adapter, if one is installed.</li> <li>(Trained service technician only) Replace the system board.</li> </ol>
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	Remote Supervisor Adapter II SlimLine installed <i>or</i> USB device connected during USB test.	<ol style="list-style-type: none"> <li>If a Remote Supervisor Adapter II SlimLine is installed as an option, remove it and run the test again.</li> <li>Remove all USB devices and run the test again.</li> <li>(Trained service technician only) Replace the system board.</li> </ol>
035-285-001	Adapter Communication Error	<ol style="list-style-type: none"> <li>Update the RAID controller firmware.</li> <li>Reseat, and if necessary replace the controller.</li> </ol>
035-286-001	Adapter CPU Test Error	<ol style="list-style-type: none"> <li>Update the RAID controller firmware.</li> <li>Reseat, and if necessary replace the controller.</li> </ol>
035-287-001	Adapter Local RAM Test Error	<ol style="list-style-type: none"> <li>Update the RAID controller firmware.</li> <li>Reseat, and if necessary replace the controller.</li> </ol>
035-288-001	Adapter NVSRAM Test Error	<ol style="list-style-type: none"> <li>Update the RAID controller firmware.</li> <li>Reseat, and if necessary replace the controller.</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, System x3500 Type 7977,” on page 41 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
035-289-001	Adapter Cache Test Error	<ol style="list-style-type: none"> <li>1. Update the RAID controller firmware.</li> <li>2. Reseat, and if necessary replace the controller.</li> </ol>
035-292-001	Adapter Parameter Set Error	<ol style="list-style-type: none"> <li>1. Update the RAID controller firmware.</li> <li>2. Reseat, and if necessary replace the controller.</li> </ol>
035-230-001	Battery Low	Replace the battery module on the controller.
035-231-001	Abnormal Battery Temperature or Battery Status Unknown	Replace the battery module on the controller.
089-xxx-00n	Failed microprocessor or optional microprocessor test. <b>Note:</b> n = APIC id of the microprocessor	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the following components microprocessor 1.</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 1</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
166-051-000	System Management: Failed. Unable to communicate with ASM. It may be busy. Run the test again.	<ol style="list-style-type: none"> <li>1. Update the firmware (BIOS, service processor, and diagnostics; see “Updating the firmware” on page 13).</li> <li>2. Run the diagnostic test again.</li> <li>3. Correct other error conditions (including failed systems-management tests and items that are logged in the Remote Supervisor Adapter II SlimLine system-error log) and retry.</li> <li>4. Disconnect all server and device power cords from the server, wait 30 seconds, reconnect the power cords, and retry.</li> <li>5. Reseat the Remote Supervisor Adapter II SlimLine.</li> <li>6. Replace the Remote Supervisor Adapter II SlimLine.</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, System x3500 Type 7977,” on page 41 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
166-060-000	System Management: Failed. Unable to communicate with ASM. It may be busy. Run the test again.	<ol style="list-style-type: none"> <li>1. Update the firmware (BIOS, service processor, and diagnostics; see “Updating the firmware” on page 13).</li> <li>2. Run the diagnostic test again.</li> <li>3. Correct other error conditions (including failed systems-management tests and items that are logged in the Remote Supervisor Adapter II SlimLine system-error log) and retry.</li> <li>4. Disconnect all server and device power cords from the server, wait 30 seconds, reconnect the power cords, and retry.</li> <li>5. Reseat the Remote Supervisor Adapter II SlimLine.</li> <li>6. Replace the Remote Supervisor Adapter II SlimLine.</li> </ol>
166-070-000	System Management: Failed. Unable to communicate with ASM. It may be busy. Run the test again.	<ol style="list-style-type: none"> <li>1. Update the firmware (BIOS, service processor, and diagnostics; see “Updating the firmware” on page 13).</li> <li>2. Run the diagnostic test again.</li> <li>3. Correct other error conditions (including failed systems-management tests and items that are logged in the Remote Supervisor Adapter II SlimLine system-error log) and retry.</li> <li>4. Disconnect all server and device power cords from the server, wait 30 seconds, reconnect the power cords, and retry.</li> <li>5. Reseat the Remote Supervisor Adapter II SlimLine.</li> <li>6. Replace the Remote Supervisor Adapter II SlimLine.</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, System x3500 Type 7977,” on page 41 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
166-198-000	BIOS cannot detect ASM. Reseat ASM adapter in correct slot; ASM restart failure. Unplug and cold boot server to reset ASM.	<ol style="list-style-type: none"> <li>1. Run the diagnostic test again.</li> <li>2. Correct other error conditions (including other failed systems-management tests and items that are logged in the Remote Supervisor Adapter II SlimLine system-error log) and retry.</li> <li>3. Disconnect all server and device power cords from the server, wait 30 seconds, reconnect the power cords, and retry.</li> <li>4. Reseat the Remote Supervisor Adapter II SlimLine.</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. Remote Supervisor Adapter II SlimLine</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
166-201-000	ISMP indicates I2C errors on bus X.	(Trained service technician only) Replace the system board.
166-201-001	ISMP indicates I2C errors on bus P.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the power backplane.</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) Power backplane</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
166-201-002	ISMP indicates I2C errors on bus I.	(Trained service technician only) Replace the system board.
166-201-003	ISMP indicates I2C errors on bus C.	(Trained service technician only) Replace the system board.
166-201-004	ISMP indicates I2C errors on bus M.	<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>

- 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, System x3500 Type 7977,” on page 41 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
166-201-005	ISMP indicates I2C errors on bus S.	<ol style="list-style-type: none"> <li>1. Reseat the SAS hard disk drive backplane cables.</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. SAS hard disk drive backplane</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
166-201-006	ISMP indicates I2C errors on bus O.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the operator information panel.</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. Operator information panel</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
166-201-007	ISMP indicates I2C errors on bus M0.	<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>
166-201-008	ISMP indicates I2C errors on bus M1.	<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>
166-260-000	ASM restart failure.	<ol style="list-style-type: none"> <li>1. Disconnect all server and device power cords from the server, wait 30 seconds, reconnect the power cords, and retry.</li> <li>2. Reseat the Remote Supervisor Adapter II SlimLine.</li> <li>3. Replace the Remote Supervisor Adapter II SlimLine.</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, System x3500 Type 7977,” on page 41 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
166-342-000	System management BIST indicates failed tests.	<ol style="list-style-type: none"> <li>1. Disconnect all server and device power cords from the server, wait 30 seconds, reconnect the power cords, and retry.</li> <li>2. Reseat the Remote Supervisor Adapter II SlimLine.</li> <li>3. Replace the Remote Supervisor Adapter II SlimLine.</li> </ol>
166-400-000	ISMP Self Test Result failed tests: xxx where xxx=flash, ROM, or RAM.	<ol style="list-style-type: none"> <li>1. Disconnect all server and device power cords from the server, wait 30 seconds, reconnect the power cords, and retry.</li> <li>2. Update the BMC firmware (see “Updating the firmware” on page 13).</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>
166-400-100	DMC Self Test Result failed tests: xxx where xxx=flash, ROM, or RAM.	<ol style="list-style-type: none"> <li>1. Disconnect all server and device power cords from the server, wait 30 seconds, reconnect the power cords, and retry.</li> <li>2. Update the BIOS code, BMC, service processor, and diagnostics firmware (see “Updating the firmware” on page 13).</li> </ol>
180-197-000	SCSI ASPI driver not installed.	<ol style="list-style-type: none"> <li>1. Remove the RAID adapter, if one is installed, and run the test again.</li> <li>2. Reseat the SAS hard disk drive backplane cables.</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. SAS hard disk drive backplane</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
180-198-000	Test aborted.	Check other errors in summary log for more details
180-358-000	Ethernet failure.	<ol style="list-style-type: none"> <li>1. Enable Ethernet in the Configuration/Setup Utility program.</li> <li>2. Update the Ethernet firmware.</li> <li>3. (Trained service technician only) Replace the system board</li> </ol>
180-361-003	Failed fan LED test.	<ol style="list-style-type: none"> <li>1. Reseat the fan.</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. Fan</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, System x3500 Type 7977,” on page 41 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
180-xxx-000	Diagnostics LED failure.	Run the diagnostic LED test for the failing LED.
180-xxx-001	Failed front LED panel test.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the operator information LED assembly 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. (Trained service technician only) Operator information LED assembly cable</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
180-xxx-002	Failed diagnostics LED panel test.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the operator information LED assembly 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. (Trained service technician only) Operator information LED assembly cable</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
180-xxx-005	Failed SCSI backplane LED test.	<ol style="list-style-type: none"> <li>1. Reseat the SAS hard disk drive backplane 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. SAS hard disk drive backplane cable</li> <li>b. SAS hard disk drive backplane</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
180-xxx-007	Failed power supply fan LED test.	<ol style="list-style-type: none"> <li>1. Reseat the power supply.</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. Power supply</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
180-xxx-008	Failed I/O board LED test.	(Trained service technician only) Replace the system board.
201-198-000	Memory Test Aborted: Could not run the test; suspect system board error.	<ol style="list-style-type: none"> <li>1. Restart the server.</li> <li>2. Run the diagnostic test again.</li> <li>3. Reinstall the diagnostic programs (see “Updating the firmware” on page 13).</li> <li>4. (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, System x3500 Type 7977,” on page 41 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
201-198-00n	Memory Test Aborted: Could not run the test. <b>Note:</b> n = 1-9 (programming error).	<ol style="list-style-type: none"> <li>1. Restart the server.</li> <li>2. Run the diagnostic test again.</li> <li>3. Reinstall the diagnostic programs (see “Updating the firmware” on page 13 “Updating the firmware” on page 13).</li> </ol>
201-xxx-n99	Failed Memory Test <b>Notes:</b> <ol style="list-style-type: none"> <li>1. n = 1-6 (DIMM pair)</li> <li>2. 99 = Both DIMMs in the pair failed</li> </ol>	<ol style="list-style-type: none"> <li>1. Reseat the DIMM pair.</li> <li>2. Replace the DIMM pair.</li> </ol>
202-xxx-00n	Failed system cache test. <b>Note:</b> n = APIC id of the microprocessor	<ol style="list-style-type: none"> <li>1. Reseat microprocessor n.</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 n</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
215-xxx-000	Failed DVD test.	<ol style="list-style-type: none"> <li>1. Run the test again with a different DVD.</li> <li>2. Reseat the following components: <ol style="list-style-type: none"> <li>a. DVD drive</li> <li>b. Front panel assembly</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. DVD drive</li> <li>b. (Trained service technician only) Front panel assembly</li> </ol> </li> </ol>
217-xxx-000	Failed fixed disk test. <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> <li>1. Reseat hard disk drive 1.</li> <li>2. Replace hard disk drive 1.</li> </ol>
217-xxx-001	Failed fixed disk test. <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> <li>1. Reseat hard disk drive 2.</li> <li>2. Replace hard disk drive 2.</li> </ol>
217-xxx-002	Failed fixed disk test. <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> <li>1. Reseat hard disk drive 3.</li> <li>2. Replace hard disk drive 3.</li> </ol>
217-xxx-003	Failed fixed disk test. <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> <li>1. Reseat hard disk drive 4.</li> <li>2. Replace hard disk drive 4.</li> </ol>
217-xxx-004	Failed fixed disk test. <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> <li>1. Reseat hard disk drive 5.</li> <li>2. Replace hard disk drive 5.</li> </ol>



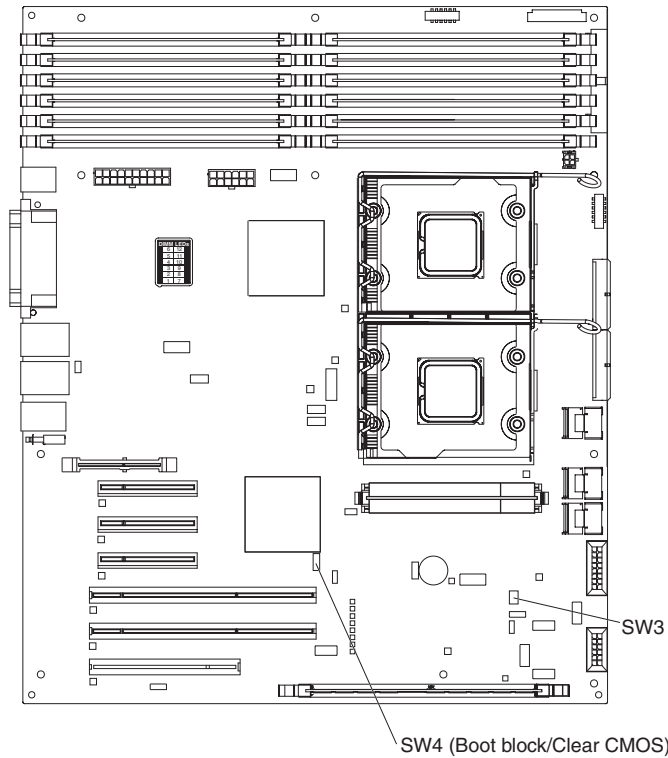
<ul style="list-style-type: none"> <li>Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>See Chapter 3, “Parts listing, System x3500 Type 7977,” on page 41 to determine which components are customer replaceable units (CRU) and 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
217-xxx-005	Failed fixed disk test. <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> <li>Reseat hard disk drive 6.</li> <li>Replace hard disk drive 6.</li> </ol>
217-198-xxx	Could not establish drive parameters.	<ol style="list-style-type: none"> <li>Check the drive cables and terminators.</li> <li>Reseat the hard disk drive.</li> <li>Replace the hard disk drive.</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>Reseat the keyboard</li> <li>Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>Keyboard</li> <li>(Trained service technician only) System board</li> </ol> </li> </ol>
302-xxx-xxx	Failed mouse test.	<ol style="list-style-type: none"> <li>Reseat the mouse.</li> <li>Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>Mouse</li> <li>(Trained service technician only) System board</li> </ol> </li> </ol>
305-xxx-xxx	Failed video monitor test.	<ol style="list-style-type: none"> <li>Reseat the monitor.</li> <li>Replace the following components one at a time, in the order shown, restarting the server each time:               <ol style="list-style-type: none"> <li>Monitor</li> <li>(Trained service technician only) System board</li> </ol> </li> </ol>
405-xxx-000	Failed Ethernet test on controller on I/O board.	<ol style="list-style-type: none"> <li>Make sure that Ethernet is not disabled in the Configuration/Setup Utility program and that the code is at the latest level.</li> <li>(Trained service technician only) System board</li> </ol>

## 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:

- Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 57.
- Turn off the server and all attached devices; then, disconnect all power cords and external cables.

3. Unlock and remove the side cover (see “Removing the left-side cover and bezel” on page 57).
4. Locate SW4 on the system board and remove any adapters that impede access to the switches.



5. Toggle switch 1 (boot block) on SW4 to On.
6. Replace any adapters that you removed; then, install the side cover (see “Removing the left-side cover and bezel” on page 57).
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 side cover (see “Removing the left-side cover and bezel” on page 57).
12. Remove any adapters that impede access to the boot block recovery switch.
13. Toggle the jumper of pin 1 (boot block/clear CMOS) on SW4 to Off.
14. Replace any adapters that you removed; then, install the side cover (see “Removing the left-side cover and bezel” on page 57).
15. Lock the side cover if you unlocked it during removal.
16. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

The following table describes the function of each switch on the system board.

Table 7. Switches on SW4

Switch number	Description
1	<p>Boot block:</p> <ul style="list-style-type: none"> <li>• Leave the switch in the Off position for normal mode.</li> <li>• Move the switch to the On position to enable the system to recover if the BIOS code becomes damaged.</li> </ul> <p>See “Recovering from a BIOS update failure” on page 149 for more information.</p>
2	<p>Clear CMOS:</p> <ul style="list-style-type: none"> <li>• Leave the switch in the Off position to keep the CMOS data.</li> <li>• Move the switch to the On position to clear the CMOS data, which clears the power-on password and administrator password.</li> </ul>

## System-error log messages

A system-error log is generated only if a Remote Supervisor Adapter II SlimLine is installed. The system-error log can contain messages of three types:

- Information** Information messages do not require action; they record significant system-level events, such as when the server is started.
- Warning** Warning messages do not require immediate action; they indicate possible problems, such as when the recommended maximum ambient temperature is exceeded.
- Error** Error messages might require action; they indicate system errors, such as when a fan is not detected.

Each message contains date and time information, and it indicates the source of the message (POST/BIOS or the service processor).

**Note:** The BMC log, which you can view through the Configuration/Setup Utility program, also contains many information, warning, and error messages.

In the following example, the system-error log message indicates that the server was turned on at the recorded time.

```

-----
Date/Time: 2002/05/07 15:52:03
DMI Type:
Source: SERVPROC
Error Code: System Complex Powered Up
Error Code:
Error Data:
Error Data:
-----

```

The following table describes the possible system-error log messages and suggested actions to correct the detected 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, System x3500 Type 7977,” on page 41 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.

System-error log message	Action
1.5V Calgary PLL Power Good Fault	(Trained service technician only) Replace the PCI-X board.
1.5V Power Good Fault	(Trained service technician only) Replace the PCI-X board.
1.8V Calgary 1 HSSIB Power Good Fault	(Trained service technician only) Replace the PCI-X board.
1.8V Calgary 2 HSSIB Power Good Fault	(Trained service technician only) Replace the PCI-X board.
1.8V Fault	<ol style="list-style-type: none"> <li>1. If the light path diagnostics VRM LED is lit, replace the failing VRM.</li> <li>2. Reseat the following components: <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. Power backplane</li> </ol> </li> <li>3. Replace the components listed in step 2, one at a time, in the order shown, restarting the server each time.</li> </ol>
2.5V Calgary HSSIB Power Good Fault	(Trained service technician only) Replace the PCI-X board.
2.5V Calgary PLL Power Good Fault	(Trained service technician only) Replace the PCI-X board.
3.3V Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the Remote Supervisor Adapter II SlimLine, if one is present.</li> <li>2. (Trained service technician only) Replace the PCI-X board.</li> </ol>
5V Aux Power Good Fault	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Disconnect the cable that connects the operator information LED assembly to the system board.</li> <li>2. Replace the system board.</li> <li>3. (Trained service technician only) Replace the PCI-X board.</li> </ol>
5V Power Good Fault	(Trained service technician only) Disconnect the monitor and all USB devices from the server; then, replace the PCI-X board.
12V A Bus Fault	<ol style="list-style-type: none"> <li>1. Replace the PCI-X board.</li> <li>2. (Trained service technician only) Replace the power backplane.</li> </ol>
12V B Bus Fault	<ol style="list-style-type: none"> <li>1. Reseat the following components: <ol style="list-style-type: none"> <li>a. Disk drives</li> <li>b. SAS hard disk drive backplane cables</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. Disk drives</li> <li>b. SAS hard disk drive backplane</li> <li>c. (Trained service technician only) Power backplane</li> <li>d. (Trained service technician only) PCI-X board</li> </ol> </li> </ol>

<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, System x3500 Type 7977,” on page 41 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>	
System-error log message	Action
12V C Bus Fault	<ol style="list-style-type: none"> <li>1. Reseat the adapters.</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. Adapters</li> <li>b. (Trained service technician only) PCI-X board</li> <li>c. (Trained service technician only) Power backplane</li> <li>d. (Trained service technician only) System board</li> </ol> </li> </ol>
12V D Bus Fault	<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) Power backplane</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
12V E Bus Fault	<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) Power backplane</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
12V Planar Fault	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Replace the power backplane cable.</li> <li>2. (Trained service technician only) Replace the system board</li> </ol>
12V Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. (Trained service technician only) Replace the power-supply docking cable (see “Power-supply docking cable” on page 73).</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>
Application Posted Alert to ASM	Information only
Backplane Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. (Trained service technician only) Replace the power-supply docking cable (see “Power-supply docking cable” on page 73).</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>
Board 2.5V Power Good Fault	(Trained service technician only) Replace the system board
Calgary Core 1.5V Power Good Fault	(Trained service technician only) Replace the system board.
CEC Card Power Good Fault	(Trained service technician only) Replace the PCI-X board.
CPU %d IERR detected, the system has been restarted	<p>Information only; if the message remains:</p> <ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessors.</li> <li>2. Reseat the microprocessor VRMs, if any are present.</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, System x3500 Type 7977,” on page 41 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.

System-error log message	Action
CPU %d IERR, the CPU has been disabled	Information only; if the message remains: <ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessors.</li> <li>2. Reseat the microprocessor VRMs, if any are present.</li> <li>3. (Trained service technician only) Replace the microprocessor.</li> </ol>
CPU %d non-critical over temperature warning	<ol style="list-style-type: none"> <li>1. Make sure that the fans have good airflow and are not obstructed.</li> <li>2. (Trained service technician only) Reseat the microprocessor heat sink.</li> </ol>
CPU %d non-recoverable over temperature fault	<ol style="list-style-type: none"> <li>1. Make sure that the fans have good airflow and are not obstructed.</li> <li>2. (Trained service technician only) Reseat the microprocessor heat sink.</li> </ol>
CPU removal detected	Informational only; if the message remains: <ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessors.</li> <li>2. Reseat the microprocessor VRMs, if any are present.</li> </ol>
CPU X Over Temperature	<ol style="list-style-type: none"> <li>1. Check all fans and remove any obstacles from the path of the airflow.</li> <li>2. Make sure that the room temperature is within the recommended range.</li> <li>3. Make sure that the microprocessor heat sinks are correctly seated.</li> </ol>
Ethernet Data Rate modified from <value1> to <value2> by user <USERID>	Information only
Ethernet Duplex setting modified from <value1> to <value1> by user <USERID>	Information only
Ethernet interface <value> by user <USERID>	Information only
Ethernet locally administered MAC address modified from x:x:x:x:x:x	Information only
Ethernet MTU setting modified from x to y by user <USERID>	Information only
Fan X Failure (X of 1-8)	<ol style="list-style-type: none"> <li>1. Make sure that nothing is blocking the fan.</li> <li>2. Check the physical connection and make sure that the fan is correctly seated.</li> <li>3. Replace fan X.</li> </ol>
Fan X not detected (X of 1-8)	<ol style="list-style-type: none"> <li>1. Make sure that nothing is blocking the fan or power supply.</li> <li>2. Check the physical connection and make sure that the fan is correctly seated.</li> <li>3. Replace fan X.</li> </ol>
Front Panel is not plugged in	<ol style="list-style-type: none"> <li>1. Make sure that the operator information panel cables are correctly connected (verify LED activity).</li> <li>2. Replace the operator information panel.</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, System x3500 Type 7977,” on page 41 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.

System-error log message	Action
Hard Drive X Fault	<ol style="list-style-type: none"> <li>1. Run diagnostics.</li> <li>2. Reseat the following components: <ol style="list-style-type: none"> <li>a. Hard disk drive</li> <li>b. SAS backplane</li> </ol> </li> <li>3. Replace the components listed in step 2, one at a time, in the order shown, restarting the server each time.</li> </ol>
Hard drive X removal detected	Reseat hard disk drive X and restart the server.
Hostname set to <value> by user <USERID>	Information only
Hot plug card is not plugged in	<ol style="list-style-type: none"> <li>1. Make sure that the PCI or PCI-X cables are correctly connected.</li> <li>2. Reseat the failing hot-plug cable or adapter.</li> <li>3. Replace the failing hot-plug cable or adapter.</li> </ol>
Hurricane SMI 1.2V Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
Hurricane Vtt MR 1.5V Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
Hvtt IB 1.8V Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
Hvtr IB 2.5V Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
IB MR Reg 1.8V Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
Invalid CPU configuration	(Trained service technician only) Make sure that the microprocessors have been installed in the correct order (see “System board and microprocessor” on page 90).
Invalid Fan configuration	Replace any missing or failed fans.
IP address of default gateway modified from x.x.x.x	Information only
IP address of network interface modified from x.x.x.x	Information only
IP subnet mask of network interface modified from x.x.x.x	Information only

- 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, System x3500 Type 7977,” on page 41 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.

System-error log message	Action
Loader Watchdog Triggered	<ol style="list-style-type: none"> <li>1. Reconfigure the loader watchdog timer to have a higher value (twice the normal operating-system boot time).</li> <li>2. Install the Remote Supervisor Adapter II SlimLine device driver for the operating system.</li> <li>3. Disable the loader watchdog.</li> <li>4. Check the integrity of the installed operating system.</li> <li>5. Reinstall the operating system with the applicable device drivers.</li> </ol>
Machine check asserted	<ol style="list-style-type: none"> <li>1. Reseat the DIMM.</li> <li>2. Replace the DIMM.</li> </ol>
Machine check asserted for Card or Link - SPINT	<ol style="list-style-type: none"> <li>1. Reseat the DIMM.</li> <li>2. Replace the DIMM.</li> </ol>
Memory Card x inserted	Information only; if the message remains: <ol style="list-style-type: none"> <li>1. Make sure that the DIMM lever is securely latched.</li> <li>2. Reseat the DIMM.</li> </ol>
Memory Card x removed	Information only; if the message remains: <ol style="list-style-type: none"> <li>1. Make sure that the DIMM lever is securely latched.</li> <li>2. Reseat the DIMM.</li> </ol>
Multiple fan failures	Replace any missing or failed fans or power supplies.
OS Watchdog Triggered	<ol style="list-style-type: none"> <li>1. Reconfigure the operating-system watchdog timer to have a higher value.</li> <li>2. Reinstall the Remote Supervisor Adapter II SlimLine device driver for the operating system.</li> <li>3. Disable the operating-system watchdog.</li> <li>4. Check the integrity of the installed operating system.</li> <li>5. Reinstall the operating system with applicable device drivers.</li> </ol>
PCI-X Card Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the Remote Supervisor Adapter II SlimLine, if one is present.</li> <li>2. Replace the system board.</li> <li>3. (Trained service technician only) Replace the PCI-X board.</li> </ol>
POST Watchdog Triggered	<ol style="list-style-type: none"> <li>1. Reconfigure the POST watchdog timer to have a higher value (consistent with the time it takes to complete POST).</li> <li>2. Disable the POST watchdog.</li> </ol>
Power Good Fault detected by DIMM %d.	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. Replace the DIMMs.</li> <li>3. (Trained service technician only) Replace the power backplane.</li> <li>4. (Trained service technician only) Replace the system board.</li> </ol>



<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, System x3500 Type 7977,” on page 41 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>	
System-error log message	Action
Power Supply %d Temperature Warning	<ol style="list-style-type: none"> <li>1. Make sure that the power-supply fans have good airflow and are not obstructed.</li> <li>2. Make sure that the room temperature is within the recommended range (see “Environment” in “Features and specifications” on page 3).</li> <li>3. Replace the power supply.</li> </ol>
Power supply current exceeded max spec value	<ol style="list-style-type: none"> <li>1. Install another power supply (if possible) and make sure that the ac power cords are correctly connected.</li> <li>2. Remove devices that consume an extraordinary amount of power.</li> <li>3. (Trained service technician only) Replace the power backplane.</li> </ol>
Power Supply X 12V Over Current Fault	<ol style="list-style-type: none"> <li>1. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. power-supply docking cable</li> </ol> </li> <li>2. Replace the following components:               <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
Power Supply X 12V Over Voltage Fault	<ol style="list-style-type: none"> <li>1. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. power-supply docking cable</li> </ol> </li> <li>2. Replace the following components:               <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
Power Supply X 12V Under Voltage Fault	<ol style="list-style-type: none"> <li>1. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. power-supply docking cable</li> </ol> </li> <li>2. Replace the following components:               <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
Power Supply X AC Power Removed	<ol style="list-style-type: none"> <li>1. Connect the ac power cord to power supply X.</li> <li>2. Replace power supply X.</li> </ol>
Power Supply X Current Fault	<ol style="list-style-type: none"> <li>1. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. power-supply docking cable</li> </ol> </li> <li>2. Replace the following components:               <ol style="list-style-type: none"> <li>a. Power supply</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, System x3500 Type 7977,” on page 41 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.

System-error log message	Action
Power Supply X DC Good Fault	<ol style="list-style-type: none"> <li>1. If the system power present LED is lit, reduce the server to the minimum configuration (see “Solving undetermined problems” on page 161) and replace components one at a time to isolate the fault.</li> <li>2. Reseat the following components: <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. power-supply docking cable</li> </ol> </li> <li>3. Replace the following components: <ol style="list-style-type: none"> <li>a. Power supply</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
Power Supply X Removed	<ol style="list-style-type: none"> <li>1. Reseat power supply X.</li> <li>2. Replace power supply X.</li> <li>3. (Trained service technician only) Replace the power backplane.</li> </ol>
Power Supply X Temperature Fault	<ol style="list-style-type: none"> <li>1. Make sure that the fan air intake areas are clear and well ventilated.</li> <li>2. Make sure that all fans are installed and functioning.</li> <li>3. Reseat power supply X.</li> <li>4. Replace power supply X.</li> </ol>
QA Cache 1.8V Power Good Fault	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessors.</li> <li>2. Reseat the microprocessor VRMs, if any are present.</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>
QA Vcc PLL Power Good Fault	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessors.</li> <li>2. Reseat the microprocessor VRMs, if any are present.</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>
QB Cache Power Good Fault	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessors.</li> <li>2. Reseat the microprocessor VRMs, if any are present.</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>
QB Vcc PLL Power Good Fault	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessors.</li> <li>2. Reseat the microprocessor VRMs, if any are present.</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>
Remote Login Successful. Login ID:	Information only
Resetting system due to an unrecoverable error	Check the following light path diagnostics LEDs for faults: <ol style="list-style-type: none"> <li>1. Microprocessors</li> <li>2. DIMMs</li> <li>3. Memory card</li> <li>4. System board</li> </ol>
SCSI 1.8V Power Good Fault	(Trained service technician only) Replace the system board.
Single fan failure	Replace any missing or failed fans or power supplies.

<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, System x3500 Type 7977,” on page 41 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>	
System-error log message	Action
SMI reported a Machine Check on Memory Card = %d	<ol style="list-style-type: none"> <li>1. Reseat the DIMM.</li> <li>2. Replace the DIMM.</li> </ol>
Software NMI	Make sure that the system software is operating correctly and does not conflict with other software; the system software has created a software NMI.
System Approaching Maximum Power Consumption	<ol style="list-style-type: none"> <li>1. Install another power supply (if possible) and make sure that the ac power cords are correctly connected.</li> <li>2. Remove devices that consume an extraordinary amount of power.</li> <li>3. (Trained service technician only) Replace the power backplane.</li> </ol>
System Boot Failed	<ol style="list-style-type: none"> <li>1. Check the POST/BIOS boot checkpoint indicator and see the applicable documentation. See “Checkpoint codes (trained service technicians only)” on page 116.</li> <li>2. Make sure that the DIMMs are correctly connected and seated and that they are functional.</li> <li>3. Attempt to start the server from the BIOS backup page.</li> </ol>
System Complex Powered Down	Information only
System Complex Powered Up	Information only
System-error log full	Clear the event log.
System log 75% full	Information only
System Memory Error	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs.</li> <li>2. Replace the DIMMs.</li> </ol>
System Running Nonredundant Power	<ol style="list-style-type: none"> <li>1. Install another power supply (if possible) and make sure that the ac power cords are correctly connected.</li> <li>2. Remove devices that consume an extraordinary amount of power.</li> <li>3. (Trained service technician only) Replace the power backplane.</li> </ol>
User <USERID> attempting to power/reset server	Information only
Video 1.8V Power Good Fault	(Trained service technician only) Replace the system board.
Video 2.5V Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat the Remote Supervisor Adapter II SlimLine, if one is present.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
Video Core 1.8V Power Good Fault	(Trained service technician only) Replace the system board.
VRM X Power Good Fault	<ol style="list-style-type: none"> <li>1. Reseat VRM.</li> <li>2. Replace VRM.</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>

<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, System x3500 Type 7977,” on page 41 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>	
System-error log message	Action
Vtt Power Good Fault	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the microprocessors.</li> <li>2. Reseat the microprocessor VRMs, if any are present.</li> <li>3. (Trained service technician only) Replace the system board.</li> </ol>

## 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 161 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.

## 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 the Ethernet controller is set 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 129.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the password switch 2 (SW4) to override the power-on password and clear the CMOS memory; see “Internal LEDs, connectors, and jumpers” on page 8.

Check the LEDs on all the power supplies (see “Power-supply LEDs” on page 137). If the LEDs indicate that the power supplies are 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 1 GB (two 512 MB DIMMs).
  - Service processor.

The following minimum configuration is required for the server to start:

- One microprocessor
- Two 512 MB DIMMs
- One power supply
- Power backplane
- Power cord

- ServeRAID SAS adapter
  - System board assembly
4. Turn on the server. If the problem remains, suspect the following components in the following order:
    - a. Power backplane
    - b. Memory
    - c. Microprocessor
    - d. System board

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 PCI-X 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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## Problem determination tips

Because of the variety of hardware and software combinations that you can encounter, use the following information to assist you in problem determination. If possible, have this information available when you request assistance from IBM.

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
  - Does the server fail the diagnostic tests?
  - What occurs? When? Where?
  - Does the failure occur on a single server or on multiple servers?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - What changes, if any, were made before the configuration failed?
  - Is this the original reported failure?
- 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
- Diagnostic program type and version level
- Configuration option settings
- Operating-system control-file setup

See Appendix A, “Getting help and technical assistance,” on page 165 for information about calling IBM for service.





---

## Appendix A. Getting help and technical assistance

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

---

### Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in Chapter 5, "Diagnostics," on page 95.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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

---

### Using the documentation

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

---

### Getting help and information from the World Wide Web

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

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

---

## Software service and support

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

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

---

## Hardware service and support

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

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

---

## IBM Taiwan product service

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

IBM Taiwan product service contact information:

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

---

## Appendix B. Notices

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## Important notes

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

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 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 can vary depending on operating environments.

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

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

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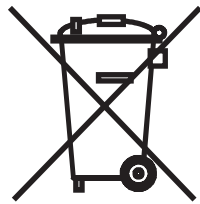
Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

---

## Product recycling and disposal

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

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



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

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

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

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

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

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

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---

## Battery return program

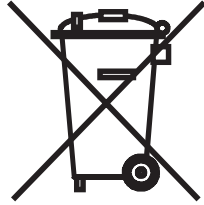
This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area.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

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

**For Taiwan:** Please recycle batteries.



**For the European Union:**



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

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

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

バッテリーあるいはバッテリー用のパッケージには、EU 諸国に対する廃電気電子機器指令 2006/66/EC のラベルが貼られています。この指令は、バッテリーと蓄電池、および廃棄バッテリーと蓄電池に関するものです。この指令は、使用済みバッテリーと蓄電池の回収とリサイクルの骨子を定めているもので、EU 諸国にわたって適用されます。このラベルは、使用済みになったときに指令に従って適正な処理をする必要があることを知らせるために種々のバッテリーに貼られています。

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

**For California:**

Perchlorate material – special handling may apply. See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.



---

## Electronic emission notices

### Federal Communications Commission (FCC) statement

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

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

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

### Industry Canada Class A emission compliance statement

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

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

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

### Australia and New Zealand Class A statement

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

### United Kingdom telecommunications safety requirement

#### Notice to Customers

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

### European Union EMC Directive conformance statement

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

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN



55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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

European Community contact:  
IBM Technical Regulations  
Pascalstr. 100, Stuttgart, Germany 70569  
Telephone: 0049 (0)711 785 1176  
Fax: 0049 (0)711 785 1283  
E-mail: tjahn@de.ibm.com

## Taiwanese Class A warning statement

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

## Chinese Class A warning statement

中华人民共和国“A类”警告声明

声 明

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

## Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用する  
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策  
を講ずるよう要求されることがあります。

VCCI-A



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