



# System x3850

Type 8864

## Installation Guide

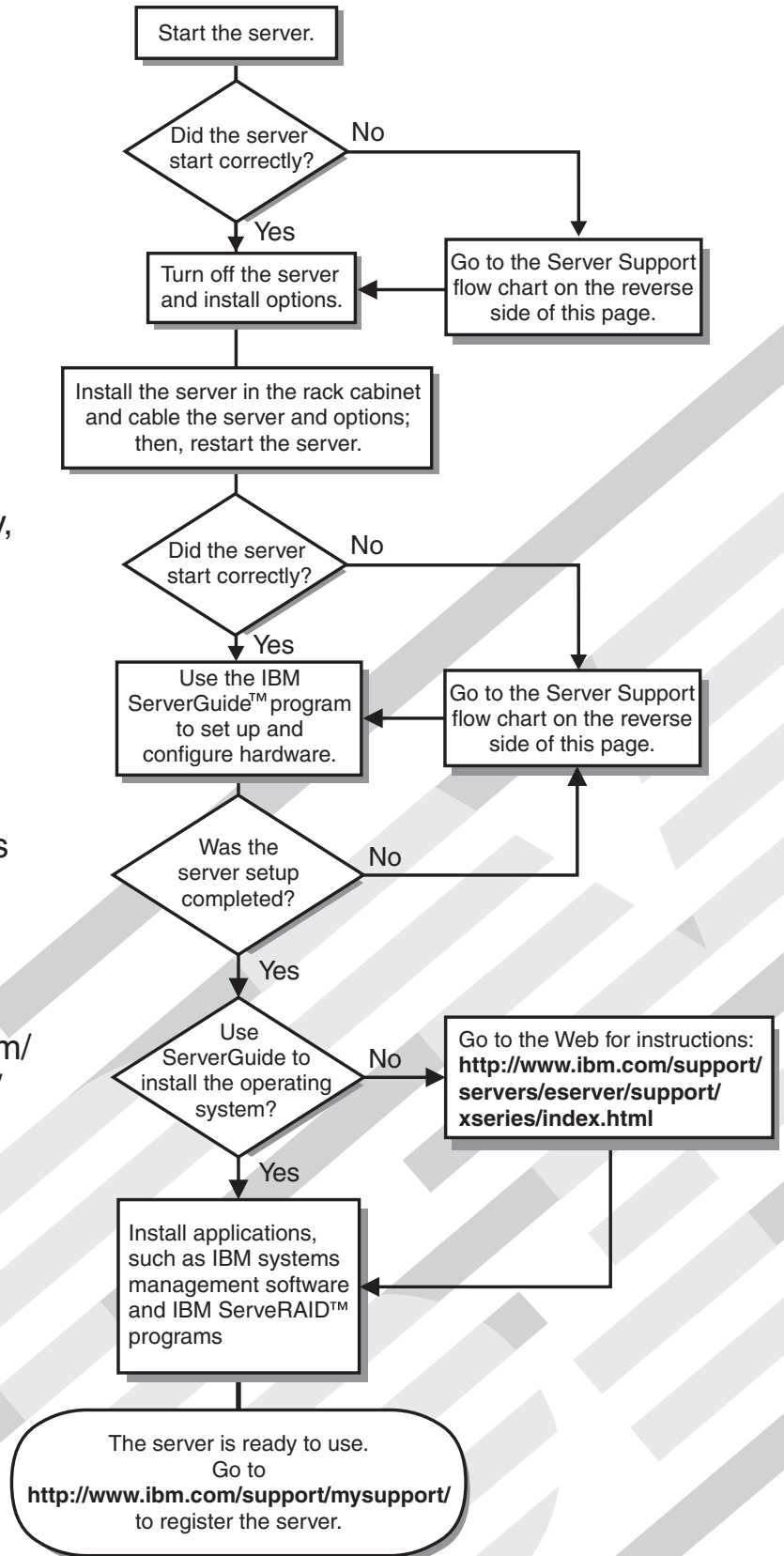
### Welcome.

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

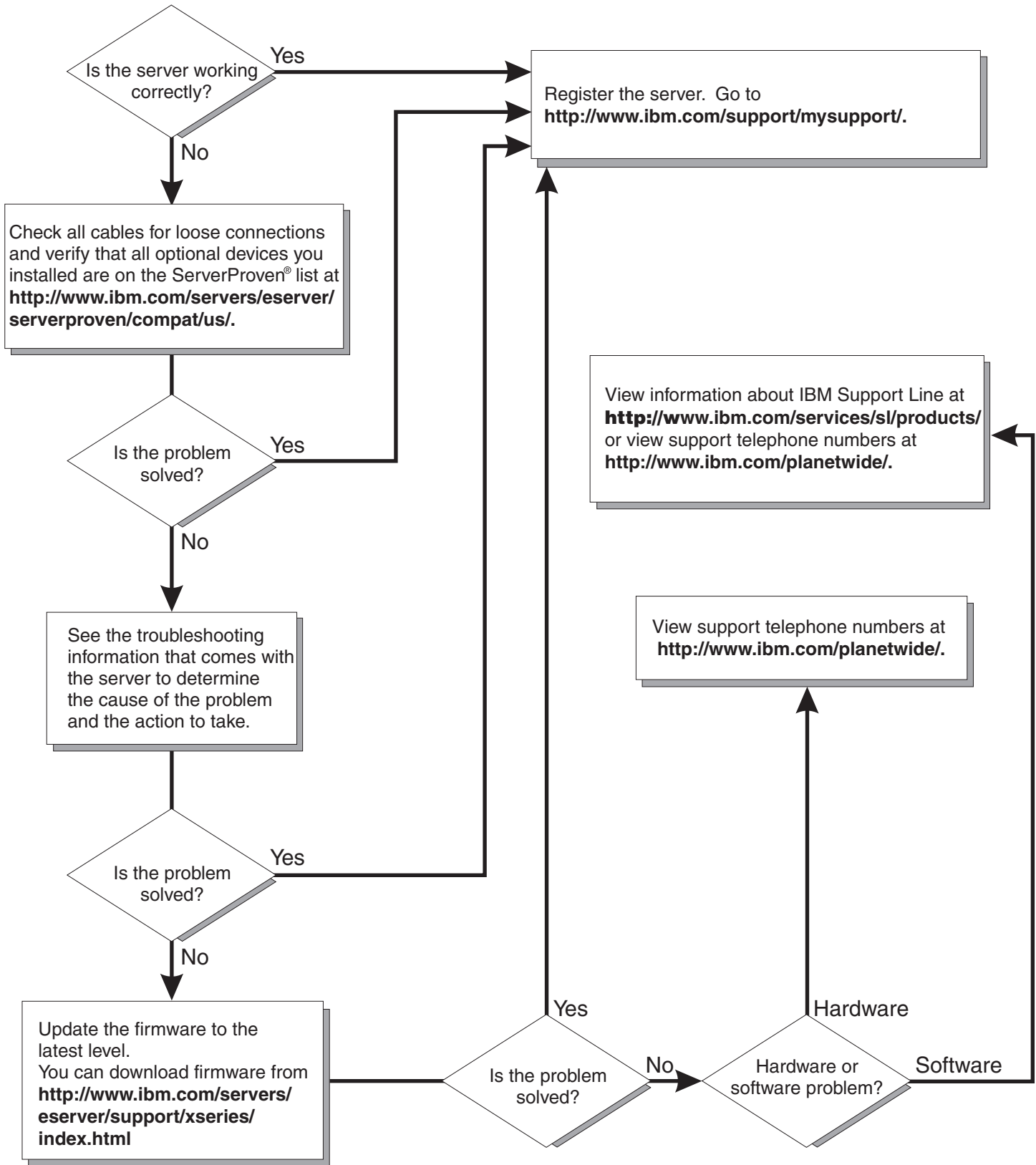
This server *Installation Guide* contains information for setting up and configuring your server.

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

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



# Server Support



IBM System x3850 Type 8864



# Installation Guide

**Note:** Before using this information and the product it supports, read the general information in “Notices” on page 69, and the *Warranty and Support Information* document on the IBM System x Documentation CD.

**Fifth Edition (September 2006)**

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# Contents

<b>Safety</b> . . . . .	v
<b>Chapter 1. Introduction</b> . . . . .	1
The IBM System x Documentation CD . . . . .	2
Hardware and software requirements . . . . .	2
Using the Documentation Browser . . . . .	2
Notices and statements used in this document. . . . .	3
Features and specifications . . . . .	4
Major components of the System x3850 server . . . . .	5
<b>Chapter 2. Installing options</b> . . . . .	7
Installation guidelines . . . . .	7
System reliability guidelines . . . . .	8
Working inside the server with the power on . . . . .	8
Handling static-sensitive devices . . . . .	9
Installing a hot-swap hard disk drive . . . . .	10
Installing additional memory modules . . . . .	11
Installing a memory module . . . . .	12
Installing a memory card . . . . .	14
Installing an additional microprocessor . . . . .	16
Installing an adapter . . . . .	20
Installing the Remote Supervisor Adapter II SlimLine . . . . .	20
Installing a ServeRAID-8i . . . . .	20
Installing a hot-plug adapter . . . . .	21
Completing the installation. . . . .	23
Connecting the cables . . . . .	23
Updating the server configuration . . . . .	24
<b>Chapter 3. Server controls, connectors, LEDs, and power</b> . . . . .	25
Front view . . . . .	25
Rear view . . . . .	26
Server power features . . . . .	28
Turning on the server . . . . .	28
Turning off the server . . . . .	28
<b>Chapter 4. Configuring the server</b> . . . . .	31
Using the ServerGuide Setup and Installation CD . . . . .	31
Using the Configuration/Setup Utility program . . . . .	31
Installing and using the baseboard management controller utility programs . . . . .	32
Enabling and configuring SOL using the OSA SMBridge management utility program . . . . .	32
Installing the OSA SMBridge management utility program . . . . .	41
Using the baseboard management controller utility programs . . . . .	42
Using the SAS/SATA Configuration Utility program . . . . .	44
Using the ServeRAID configuration programs. . . . .	44
Using the PXE boot agent utility program . . . . .	44
<b>Chapter 5. Updating IBM Director</b> . . . . .	47
<b>Chapter 6. Solving problems</b> . . . . .	49
Diagnostic tools overview . . . . .	49
POST beep codes . . . . .	49
POST error codes. . . . .	50

ServerGuide problems . . . . .	52
Troubleshooting charts . . . . .	53
CD/DVD drive problems . . . . .	53
General problems . . . . .	53
Hard disk drive problems . . . . .	53
Intermittent problems. . . . .	54
Keyboard, mouse, or pointing-device problems . . . . .	54
Memory problems . . . . .	55
Microprocessor problems . . . . .	56
Monitor problems . . . . .	56
Option problems . . . . .	57
Power problems . . . . .	58
Serial port problems . . . . .	58
Software problems . . . . .	59
Universal Serial Bus device problems . . . . .	60
Video problems. . . . .	60
Light path diagnostics . . . . .	60
Diagnosing problems using light path diagnostics . . . . .	61
Light path diagnostics panel . . . . .	61
<b>Appendix. Getting help and technical assistance . . . . .</b>	<b>67</b>
Before you call . . . . .	67
Using the documentation . . . . .	67
Getting help and information from the World Wide Web . . . . .	68
Software service and support . . . . .	68
Hardware service and support . . . . .	68
IBM Taiwan product service . . . . .	68
<b>Notices . . . . .</b>	<b>69</b>
Trademarks . . . . .	69
Important notes. . . . .	70
Product recycling and disposal . . . . .	71
Battery return program . . . . .	72
Electronic emission notices . . . . .	73
Federal Communications Commission (FCC) statement . . . . .	73
Industry Canada Class A emission compliance statement . . . . .	73
Australia and New Zealand Class A statement . . . . .	73
United Kingdom telecommunications safety requirement. . . . .	73
European Union EMC Directive conformance statement. . . . .	74
Taiwanese Class A warning statement . . . . .	74
Chinese Class A warning statement . . . . .	74
Japanese Voluntary Control Council for Interference (VCCI) statement . . . . .	74
<b>Index . . . . .</b>	<b>75</b>

# Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

**Important:**

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

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

Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with 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.

**Statement 4:**



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



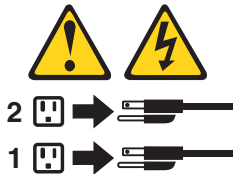
≥ 55 kg (121.2 lb)

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

**Statement 5:**



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



**Statement 8:**



**CAUTION:**

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



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

**Statement 26:**



**CAUTION:**

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



# Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up your IBM® System x3850 server and basic instructions for installing some options. More detailed instructions for installing options are in the *User's Guide* on the IBM System x™ Documentation CD, which comes with the server. This document contains information about:

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

If firmware and documentation updates are available, you can download them from the IBM Web site. The server might have features that are not described in the documentation that comes with the server, and the documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. To check for updates, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>, select **System x3850** from the **Hardware** list, and click **Go**. For firmware updates, click the **Download** tab. For documentation updates, click the **Install and use** tab, and click **Product documentation**.

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

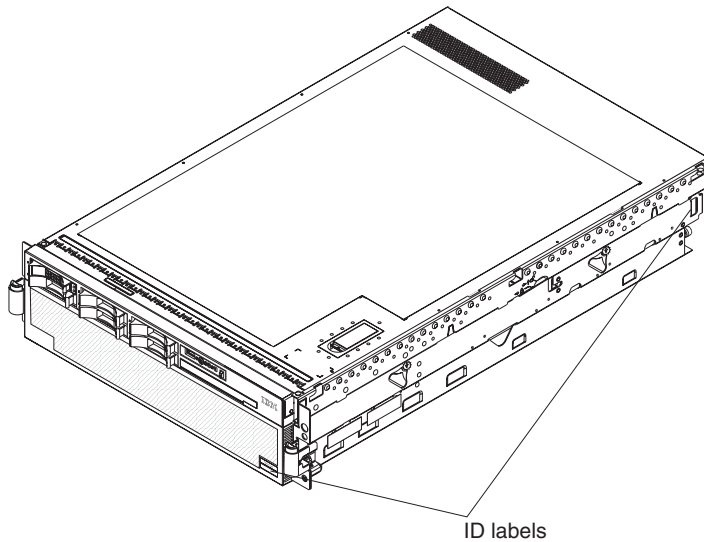
The server comes with an IBM *ServerGuide™ Setup and Installation* CD to help you configure the hardware, install device drivers, and install the operating system.

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

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

<b>Product name</b>	IBM System x3850 server
<b>Machine type</b>	8864
<b>Model number</b>	_____
<b>Serial number</b>	_____

The model number and serial number are on the ID labels, one located on the lower-right front of the bezel and the other at the rear of the right side, as shown in the following illustration.



For a list of supported options for the server, go to the ServerProven<sup>®</sup> Web site at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

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

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## The IBM System x Documentation CD

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

### Hardware and software requirements

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

- Microsoft<sup>®</sup> Windows<sup>®</sup> XP, Windows 2000, or Red Hat Linux.
- 100 MHz microprocessor.
- 32 MB of RAM.
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems.

### Using the Documentation Browser

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

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

- If Autostart is enabled, insert the CD into the CD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:

- If you are using a Windows operating system, insert the CD into the drive and click **Start --> Run**. In the **Open** field, type

```
e:\win32.bat
```

where *e* is the drive letter of the drive, and click **OK**.

- If you are using Red Hat Linux, insert the CD into the drive; then, run the following command from the `/mnt/cdrom` directory:

```
sh runlinux.sh
```

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

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

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

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

---

## Notices and statements used in this document

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

The following notices and statements are used in this document:

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

## Features and specifications

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

Table 1. Features and specifications

<p><b>Microprocessor:</b></p> <ul style="list-style-type: none"> <li>• Intel® Xeon™</li> <li>• 1 MB Level-2 cache</li> <li>• 667 MHz front-side bus (FSB)</li> <li>• Support for up to four microprocessors</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: 2 GB depending on server model, expandable to 32 GB</li> <li>• Type: 333 MHz, registered, ECC, PC2-3200 double data rate (DDR) II, SDRAM</li> <li>• Sizes: 1 GB or 2 GB in pairs</li> <li>• Connectors: Two-way interleaved, four dual inline memory module (DIMM) connectors per memory card</li> <li>• Maximum: Four memory cards, each card containing two pairs of PC2-3200 DDRII DIMMS</li> </ul> <p><b>Drives:</b></p> <ul style="list-style-type: none"> <li>• Slim DVD-ROM: IDE</li> <li>• Serial Attached SCSI (SAS) hard disk drives</li> </ul> <p><b>Expansion bays:</b></p> <ul style="list-style-type: none"> <li>• Six SAS, 2.5-inch bays</li> <li>• One 12.7-mm removable-media drive bay (DVD-ROM drive installed)</li> </ul> <p><b>Expansion slots:</b></p> <ul style="list-style-type: none"> <li>• Four PCI Express x8 hot-plug slots</li> <li>• Two PCI-X 2.0 hot-plug 266 MHz/64-bit slots</li> </ul> <p><b>Upgradeable microcode:</b></p> <p>System BIOS, diagnostics, service processor, BMC, and SAS microcode</p>	<p><b>Power supply:</b></p> <ul style="list-style-type: none"> <li>• Standard: One dual-rated power supply <ul style="list-style-type: none"> <li>– 1300 watts at 220 V ac input</li> <li>– 650 watts at 110 V ac input</li> </ul> </li> <li>• Upgradeable to two power supplies (hot-swappable at 220 V ac only)</li> </ul> <p><b>Size:</b></p> <ul style="list-style-type: none"> <li>• 3U</li> <li>• Height: 128.35 mm (5.05 in.)</li> <li>• Depth: 715 mm (28.15 in.)</li> <li>• Width: 440 mm (17.32 in.)</li> <li>• Weight: approximately 38.5 kg (85 lb) when fully configured or 31.75 kg (70 lb) minimum</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</li> <li>• IBM EXA-32 Chipset with integrated memory and I/O controller</li> <li>• Service processor support for Remote Supervisor Adapter II SlimLine</li> <li>• Light path diagnostics</li> <li>• Three Universal Serial Bus (USB) ports <ul style="list-style-type: none"> <li>– Two on rear of server</li> <li>– One on front of server</li> </ul> </li> <li>• Broadcom 5704C dual 10/100/1000 Gigabit Ethernet controllers</li> <li>• ATI 7000-M video <ul style="list-style-type: none"> <li>– 16 MB video memory</li> <li>– SVGA compatible</li> </ul> </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: 6.6 bel declared</li> <li>• Sound power, operating: 6.6 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: <ul style="list-style-type: none"> <li>- 10° to 35°C (50° to 95°F); altitude: 0 to 914 m (3000 ft). If the server has a dual-core microprocessor, at maximum power reduce the 35°C by 1°C per 300 m above sea level, or the microprocessor might throttle to remain within the internal thermal specifications.</li> <li>- 10° to 32°C (50° to 90°F); altitude: 914 m to 2133 m (7000 ft.)</li> </ul> </li> <li>– Server off: 8% to 80%</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>Electrical input:</b></p> <ul style="list-style-type: none"> <li>• Sine-wave input (50-60 Hz) required</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: 0.08 kVA</li> <li>– Maximum: 1.6 kVA</li> </ul> </li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.</li> <li>2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.</li> </ol>
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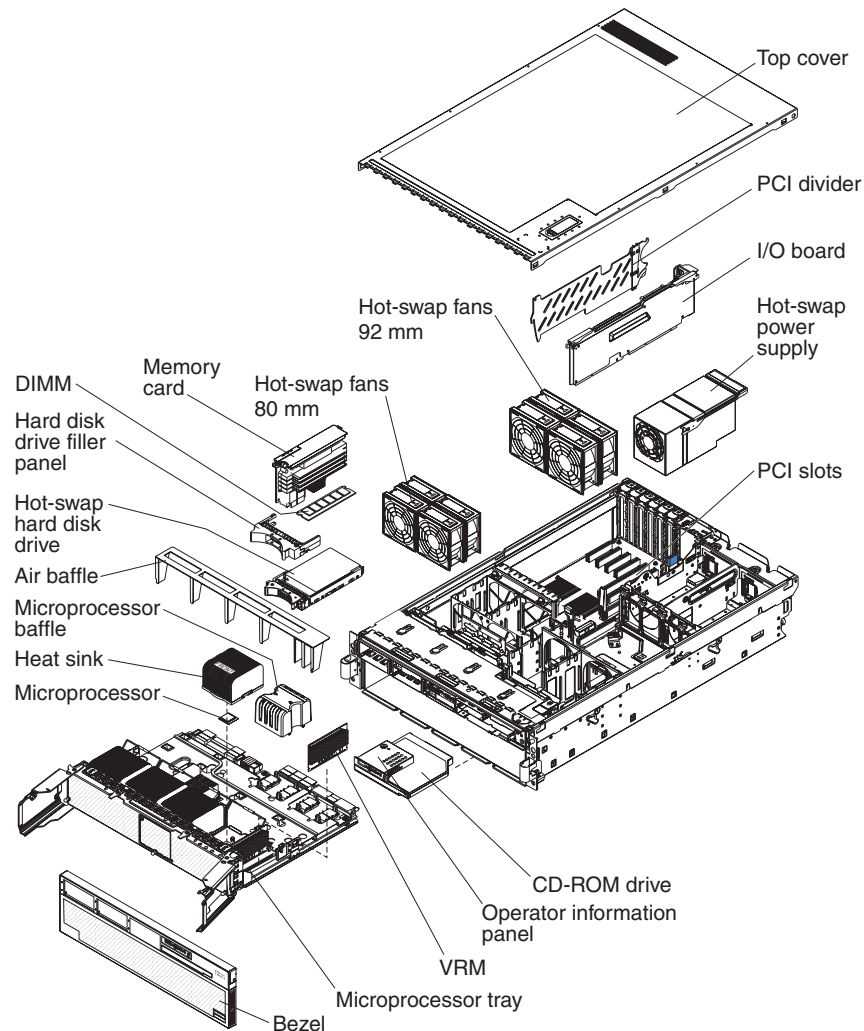


## Major components of the System x3850 server

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

Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

The following illustration shows the major components in the server.





---

## Chapter 2. Installing options

This chapter provides basic instructions for installing hardware options in the server. These instructions are intended for users who are experienced with setting up IBM server hardware. If you need more detailed instructions, see the *User's Guide* on the IBM *System x Documentation CD*.

---

### Installation guidelines

Before you begin installing options, read the following information:

- Read the safety information that begins on page v, the guidelines in “Working inside the server with the power on” on page 8, and “Handling static-sensitive devices” on page 9. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>, select **System x3850** from the **Hardware** list, click **Go**, and then click the **Download** tab. For additional information about tools for updating, managing, and deploying firmware, see the System x and xSeries® Tools Center at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.
- Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 6, “Solving problems,” on page 49 for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you 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, hot-plug adapters, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

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

## System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not run the server without the air baffle installed. Operating the server without the air baffle might cause the microprocessor or microprocessors to overheat.
- Microprocessor sockets 2, 3, and 4 always contain either a microprocessor baffle or a microprocessor and heat sink.

## Working inside the server with the power on

The server supports 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:

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

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

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

## Handling static-sensitive devices

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

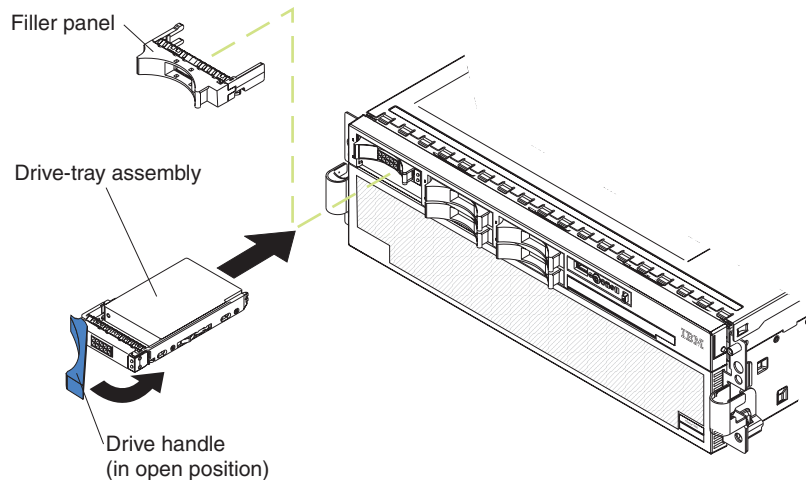
To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

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

---

## Installing a hot-swap hard disk drive

The following illustration shows how to install a hot-swap hard disk drive.



Complete the following steps to install a hot-swap hard disk drive:

1. Read the safety information beginning on page v, and “Installation guidelines” on page 7.
2. Remove the filler panel from one of the empty hot-swap bays.
3. Make sure that the tray handle is open; then, install the hard disk drive into the hot-swap bay.

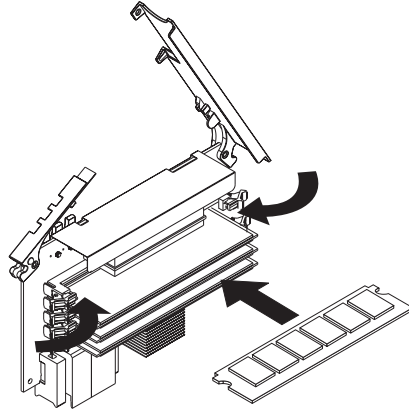
### Notes:

1. When you turn on the server, check the hard disk drive status LEDs to make sure that the hard disk drive is operating correctly.  
If the amber hard disk drive status LED for a drive is lit continuously, that drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.
2. If the server will be configured for RAID operation using an optional ServeRAID™ controller, you must configure the disk arrays before installing the operating system. See the ServeRAID documentation on the *IBM ServeRAID Support CD* for additional information about RAID operation and complete instructions for using ServeRAID Manager.

---

## Installing additional memory modules

The following illustration shows how to install a DIMM on a memory card.



The following notes describe information that you must consider when installing DIMMs:

- You can configure your server to use memory mirroring and memory scrubbing. For detailed information about configuring your server and using this feature, see the *User's Guide* on the *IBM System x Documentation CD*.
- To use the hot-add and hot-swap memory features, you must reconfigure your server using the Configuration/Setup Utility program. See the *User's Guide* on the *IBM System x Documentation CD* for additional information.
- There must be at least one memory card with one pair of DIMMs installed for the server to operate.
- When you install additional DIMMs on a memory card, be sure to install them in pairs. All the DIMM pairs on each memory card must be the same size, and type.
- Install the DIMMs on each memory card in the order shown in the following table. You must install at least one pair of DIMMs on each memory card. See the *User's Guide* on the *IBM System x Documentation CD* for additional memory configuration installation sequences.

Table 2. Memory card installation sequence for performance configuration

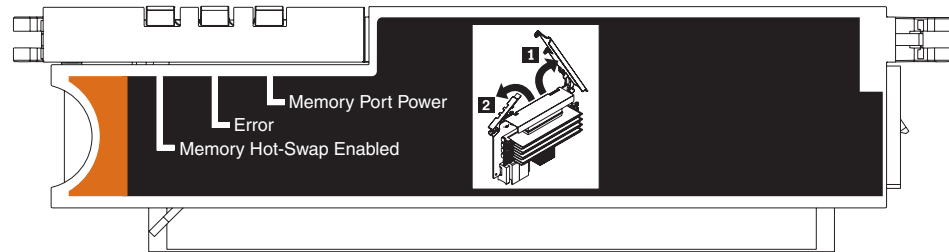
Memory card order	Memory card	DIMM pair
First	1	1 and 3
Second	2	1 and 3
Third	3	1 and 3
Fourth	4	1 and 3
Fifth	1	2 and 4
Sixth	2	2 and 4
Seventh	3	2 and 4
Eighth	4	2 and 4

**Note:** Add odd numbered DIMMs to each available memory card first, then add the even numbered pairs.

- If memory mirroring is enabled, you can hot-replace one memory card at a time on each memory power bus.

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

The following illustration shows the LEDs on the memory card:



**Memory Hot-Swap Enabled LED:** When this LED is lit, it indicates that hot-swap memory is enabled.

**Error LED:** When this LED is lit, it indicates that a DIMM or memory card has failed.

**Memory Port Power LED:** When this LED is off, it indicates that power is removed from the port and that you can remove the memory card to replace a failed memory card or DIMM.

## Installing a memory module

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

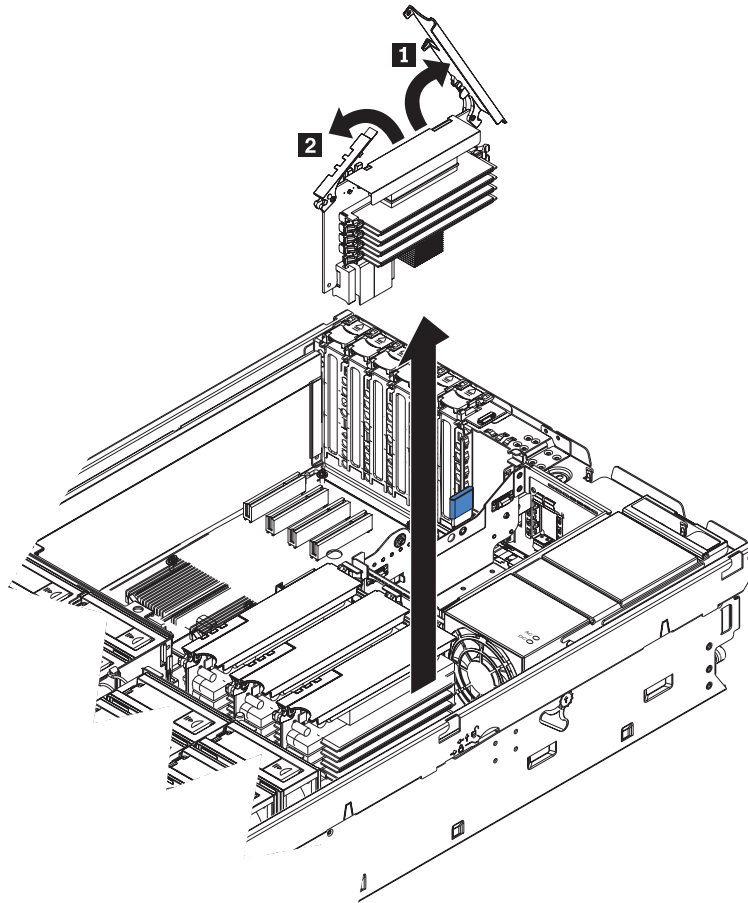
Complete the following steps to install additional memory modules:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. If you are not hot-swapping a DIMM, turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.

**Attention:** When moving the memory card, do not allow it to impact any components or structures inside the server.

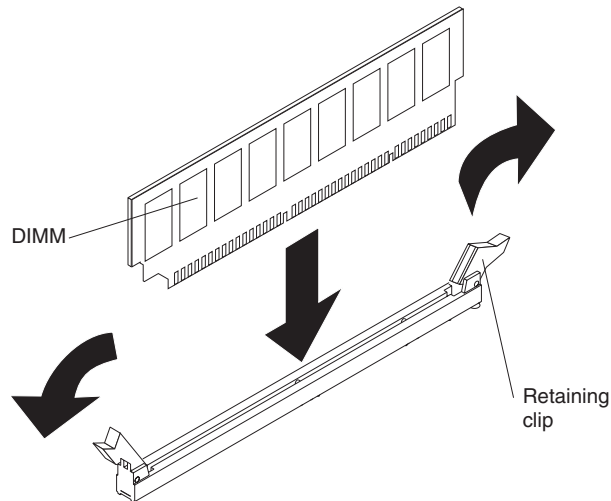
If you are hot swapping a DIMM, make sure that the Memory Hot-Swap Enabled LED is lit.





3. Remove the memory card.
  - a. Open the memory card retention levers ( **1** and **2** ) on the top of the memory card.
  - b. While holding the retention levers open, lift the memory card out of the server.
4. Place the memory card on a flat non-conductive surface with the DIMM connectors facing up.

**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. 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.
9. Repeat steps 5 on page 13 through 8 to install the second DIMM of the pair.

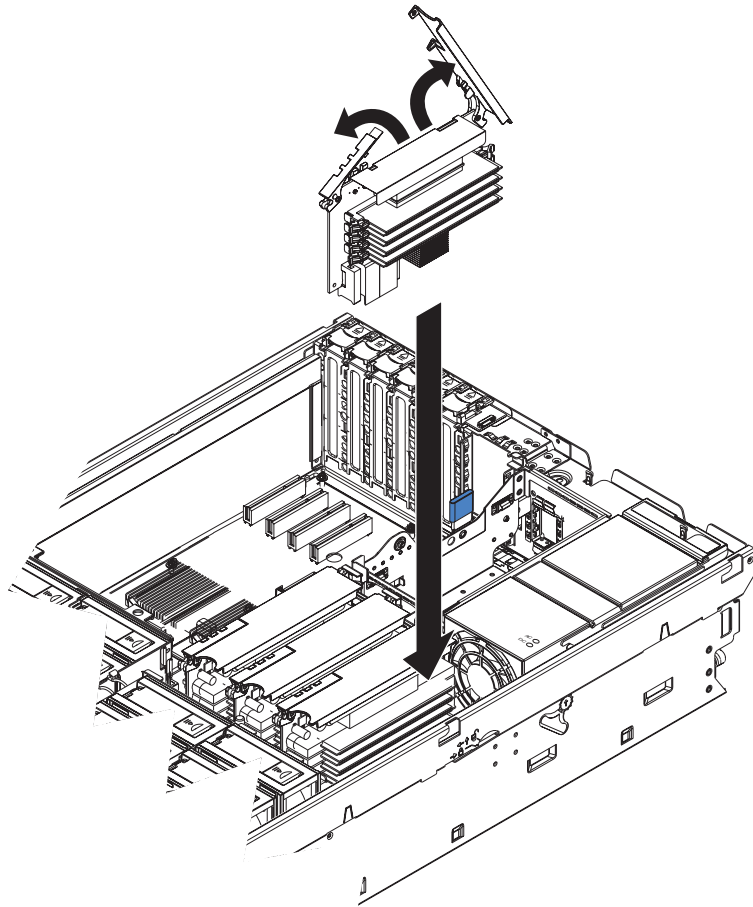
## Installing a memory card

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

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

Complete the following steps to install a memory card in the server:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. Make sure that the locking levers on the edge of the memory card are fully open. Insert the memory card into the memory card connector.



3. Press the memory card into the connector and close the locking levers.

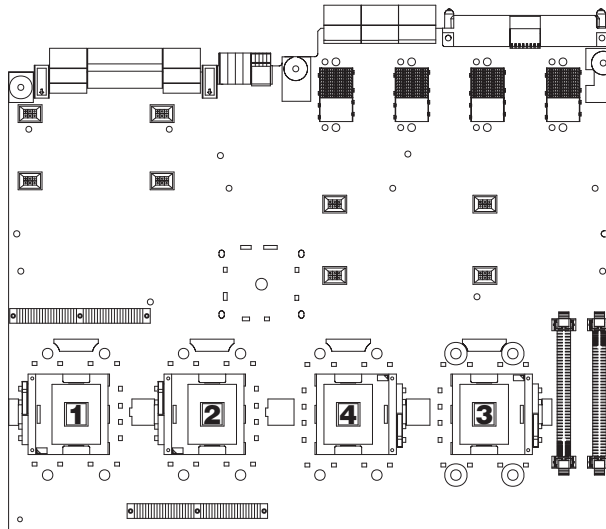
If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 23.

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## Installing an additional microprocessor

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

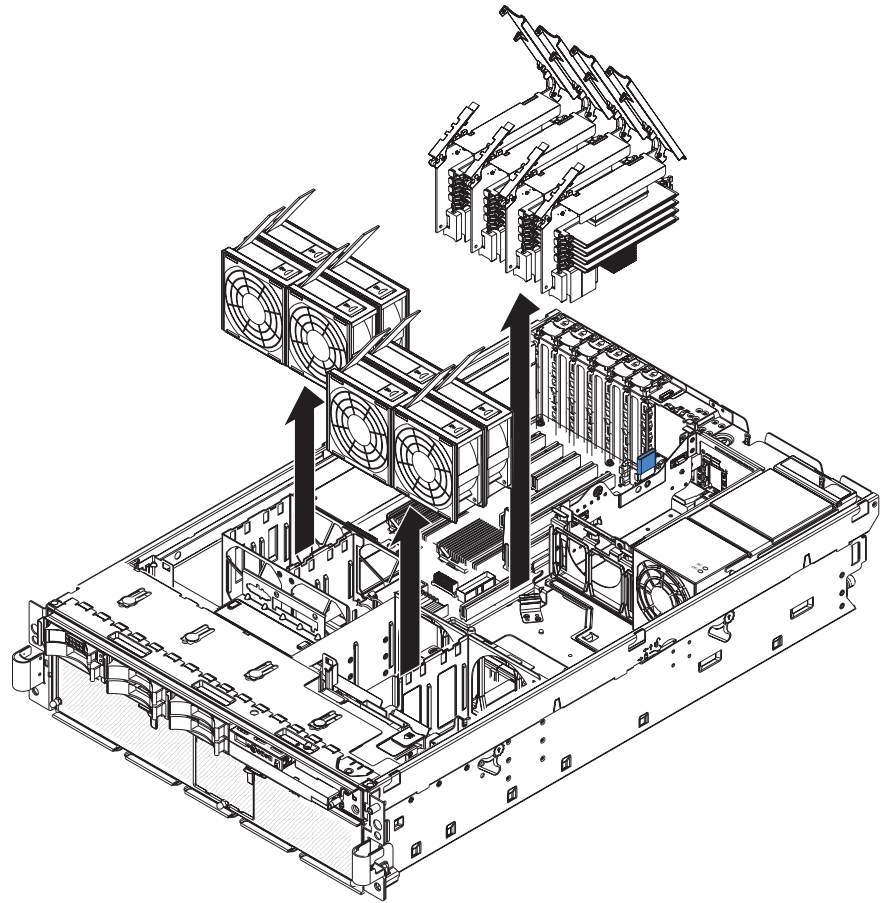
- The voltage regulators for microprocessors 1 and 2 are integrated on the microprocessor board; the VRMs for microprocessors 3 and 4 come with the microprocessor options and must be installed on the microprocessor board.
- Each microprocessor socket must be populated with either a microprocessor baffle or a heat sink and microprocessor to ensure the server operates properly.
- Install the microprocessors in the order shown in the following illustration.



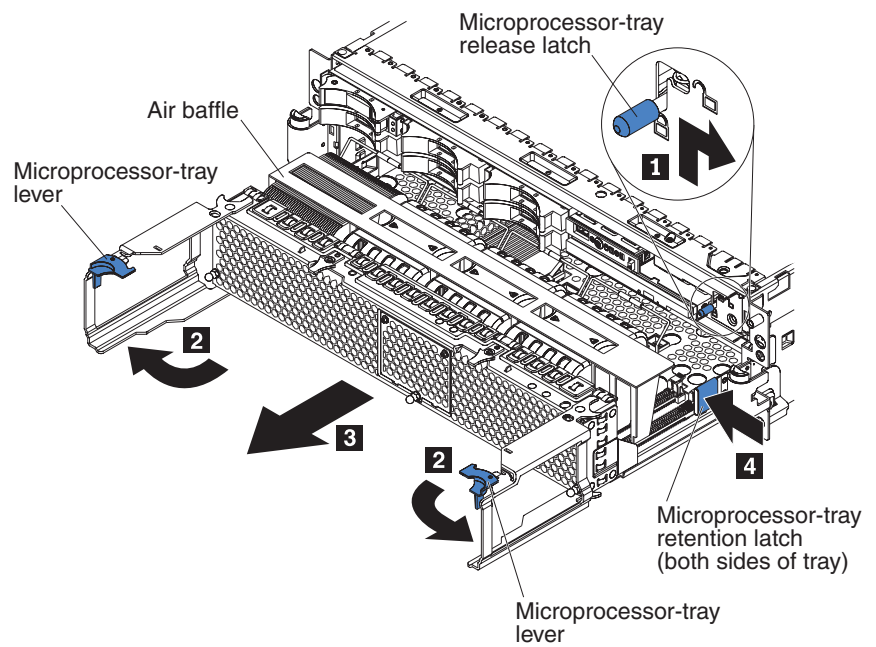
Complete the following steps to install an additional microprocessor:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and any USB cable that might be connected to the USB port on the front of the server. Remove the server cover and bezel.

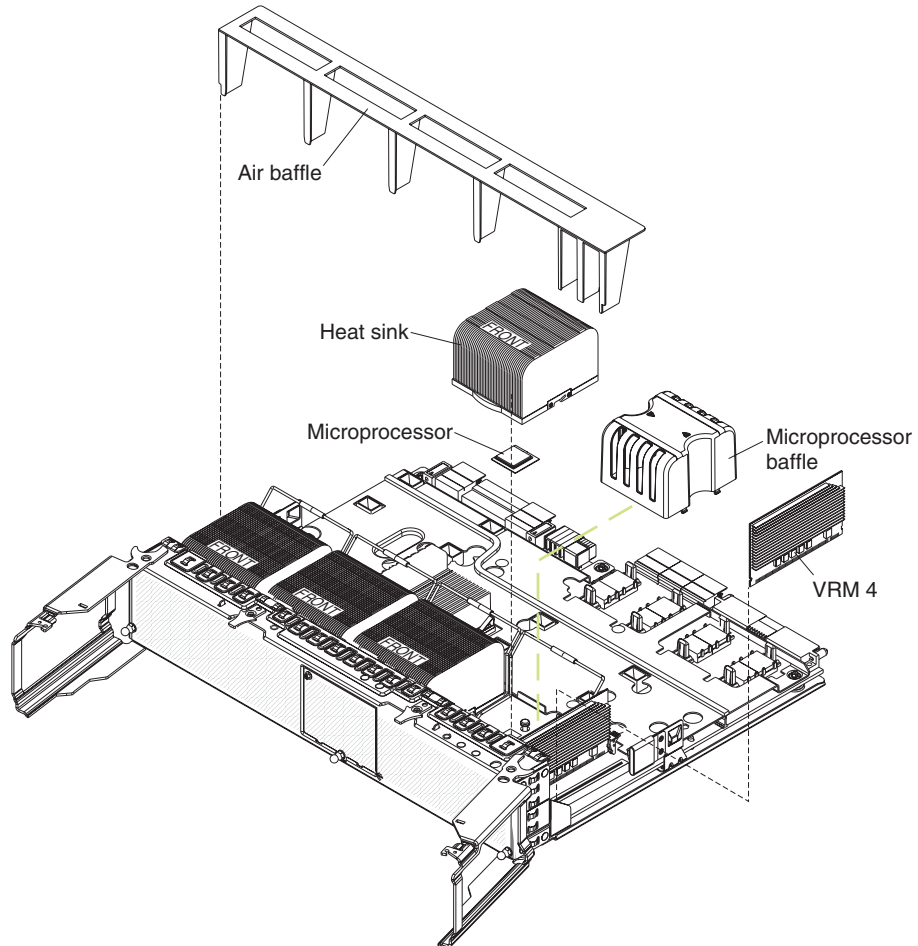
**Attention:** When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling static-sensitive devices” on page 9.



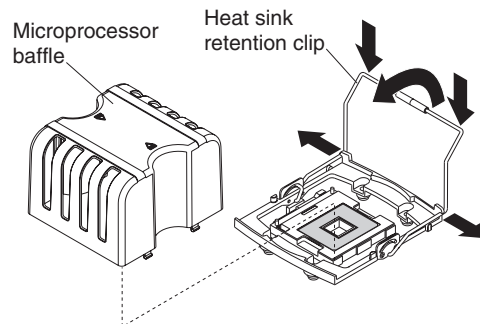
3. Remove all fans from the server
4. Remove all memory cards from the server.
5. Remove the microprocessor tray:
  - a. Open the microprocessor-tray release latch ( **1** ).



- b. Open the microprocessor-tray levers ( **2** ).
  - c. Pull out the microprocessor tray ( **3** ) until it stops and then reposition your hands to grasp the body of the tray.
  - d. Press in on the release latches on each side of the tray ( **4** ); then, pull the tray out the rest of the way.
6. Lift the air baffle out of the microprocessor tray.

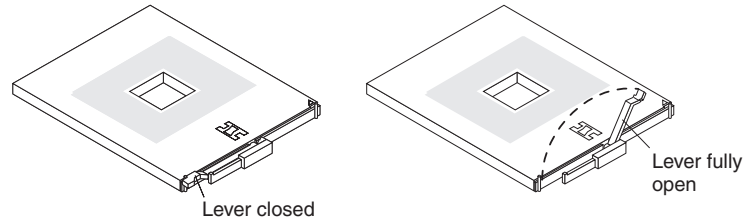


7. Remove the microprocessor baffle from a microprocessor socket and store it for future use. If you remove a microprocessor you must install a microprocessor baffle to prevent the server from over heating.



8. Open the heat sink retention clip.
- a. Press down on one side of the heat sink retention clip to release it from the side of the socket; then, repeat the process on the opposite side.

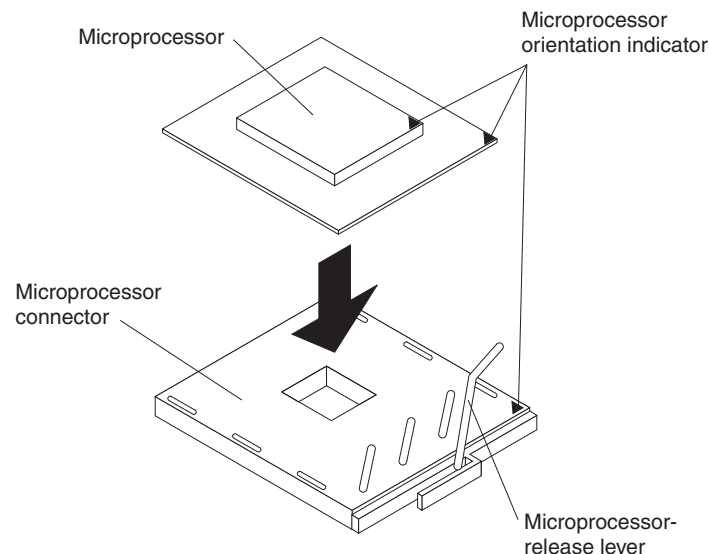
- b. Rotate the heat sink retention clip forward to its fully open position.
9. Remove the protective cover, tape, or label from the surface of the microprocessor socket, if any is present.
10. Lift the microprocessor-release lever to the fully-open position (approximately 135° angle).



11. Touch the static-protective package that contains the new microprocessor to any unpainted metal surface on the outside of the server; then, remove the microprocessor from the package.

**Attention:** To avoid bending the pins on the microprocessor, do not use excessive force when pressing it into the socket.

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



13. Close the microprocessor-release lever to secure the microprocessor.
14. Remove the heat sink from its package and remove the cover from the bottom of the heat sink.
15. Position the heat sink above the microprocessor; then, press the heat sink into place and close the heat-sink release lever.

**Note:** If you are installing an additional microprocessor in microprocessor socket 3 or 4, a VRM must also be installed.

16. If necessary, install a VRM in the proper connector.
17. Reinstall the microprocessor tray in the server:
  - a. Install the air baffle in the microprocessor tray.
  - b. Place the air baffle on top of the heat sinks and the microprocessor baffles
  - c. Make sure that the microprocessor-tray release latch is open; then, push the microprocessor tray into the server.

- d. Close the tray levers and make sure they are securely latched.
- e. Close the microprocessor-tray release latch.
- f. Reinstall the fans and memory cards in the server.

If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 23.

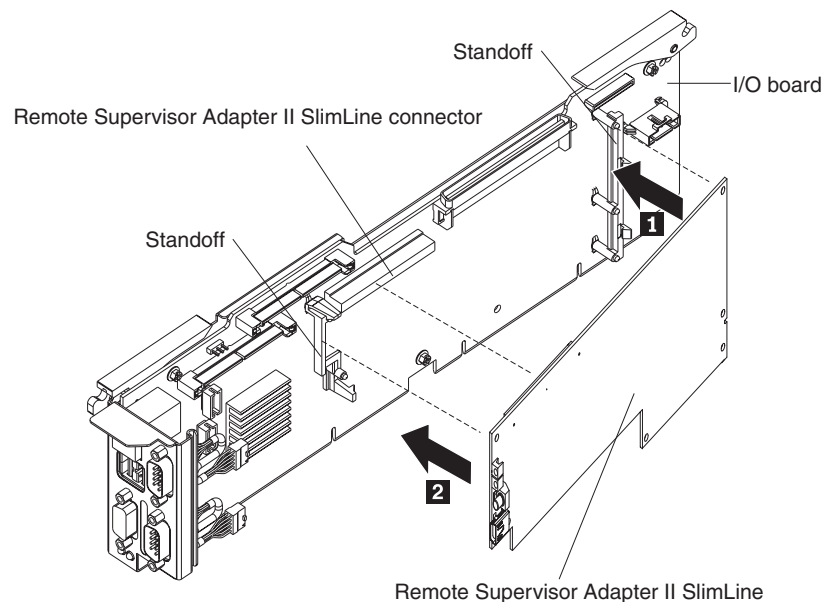
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## Installing an adapter

The following describes how to install adapters in the server.

### Installing the Remote Supervisor Adapter II SlimLine

The optional IBM Remote Supervisor Adapter II SlimLine must be installed in its dedicated connector on the I/O board. The following illustration shows how to install the Remote Supervisor Adapter II SlimLine.



Complete the following steps to install a Remote Supervisor Adapter II SlimLine.

1. Insert the rear **1** of the adapter into the rear standoff; then, rotate the front **2** of the adapter into the front standoff.
2. Press the Remote Supervisor Adapter II SlimLine firmly into the connector.

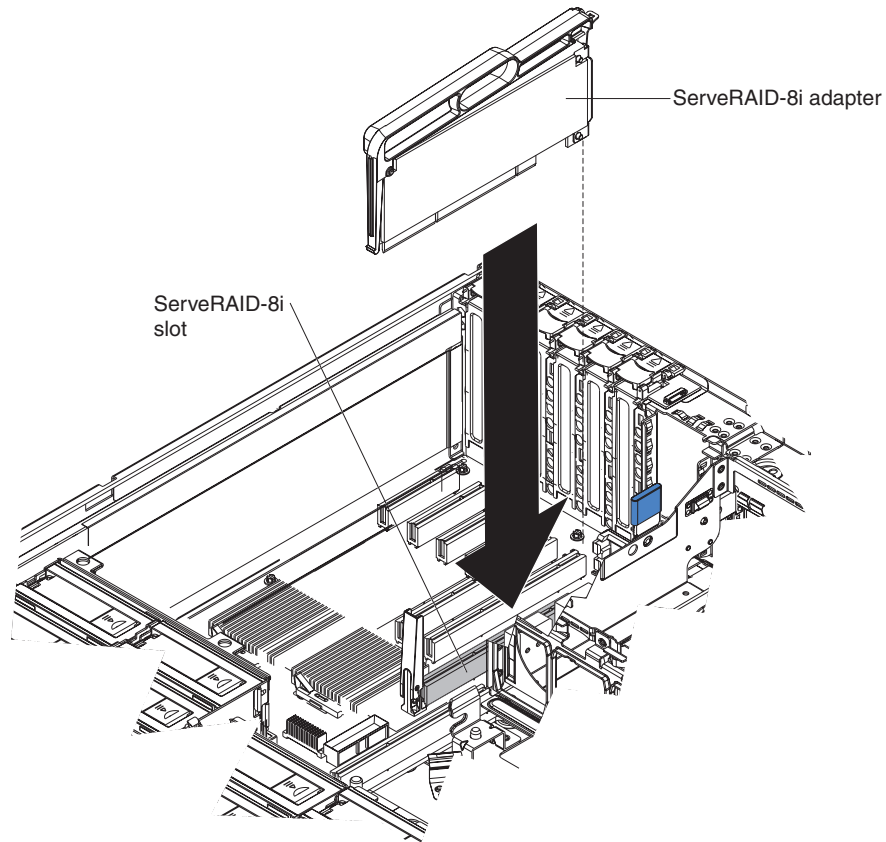
### Installing a ServeRAID-8i

If you are installing an optional ServeRAID-8i, review the following information:

- The ServeRAID-8i can be installed only in a dedicated slot on the PCI board.
- The ServeRAID-8i adapter is not cabled to the server and no rerouting of the SAS cables is required.



The following illustration shows how to install a ServeRAID-8i adapter.



For more detailed instructions or information, see the *User's Guide* on the IBM *System x Documentation CD*.

## Installing a hot-plug adapter

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

The PCI bus configuration is as follows:

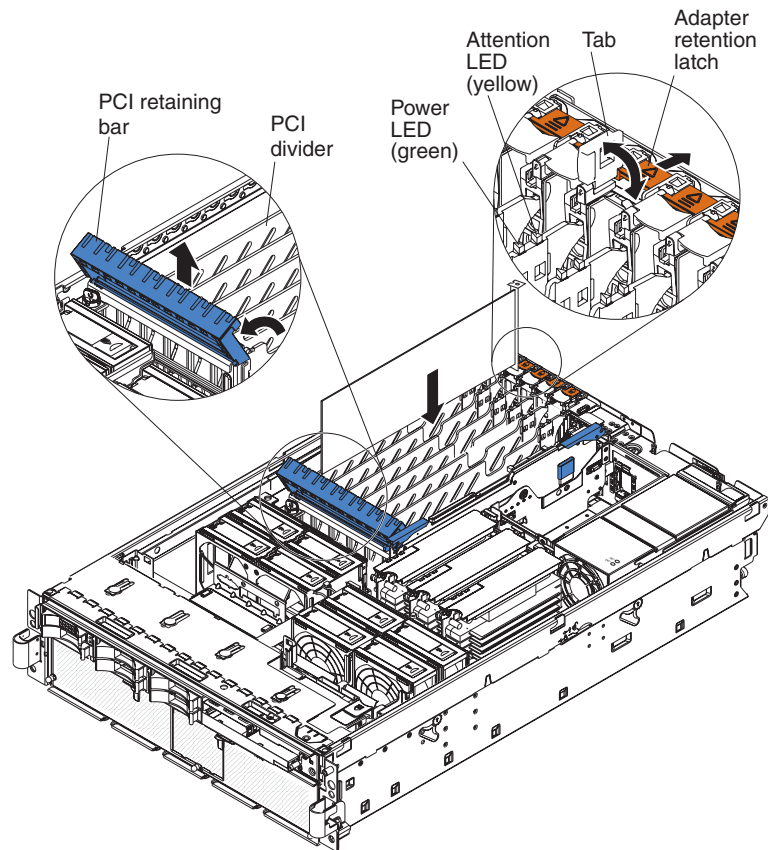
- Hot-plug, full-length PCI-X 2.0 266 MHz/64-bit slot 1 and slot 2.
- Hot-plug, full-length PCI Express x8 (x8 lanes) slot 3 through slot 6.

To install a hot-plug PCI adapter, complete the following steps.

### Notes:

1. For hot-pluggable adapters, make sure that the PCI hot-plug device driver is installed. For details, see the documentation that comes with the adapter. For more detailed instructions and information about installing PCI adapters, see the section about installing options in the *User's Guide* on the IBM *System x Documentation CD*.
2. The supported versions of Red Hat® Enterprise Linux®, SUSE Linux Enterprise Server, and NetWare do not support the use of the hot-plug feature with the PCI Express slots. Install the necessary operating system updates from the vendor, when available.

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. Remove the server cover and determine which PCI expansion slot you will use for the adapter.



3. See the documentation that comes with the adapter for instructions on setting jumpers or switches and for cabling.

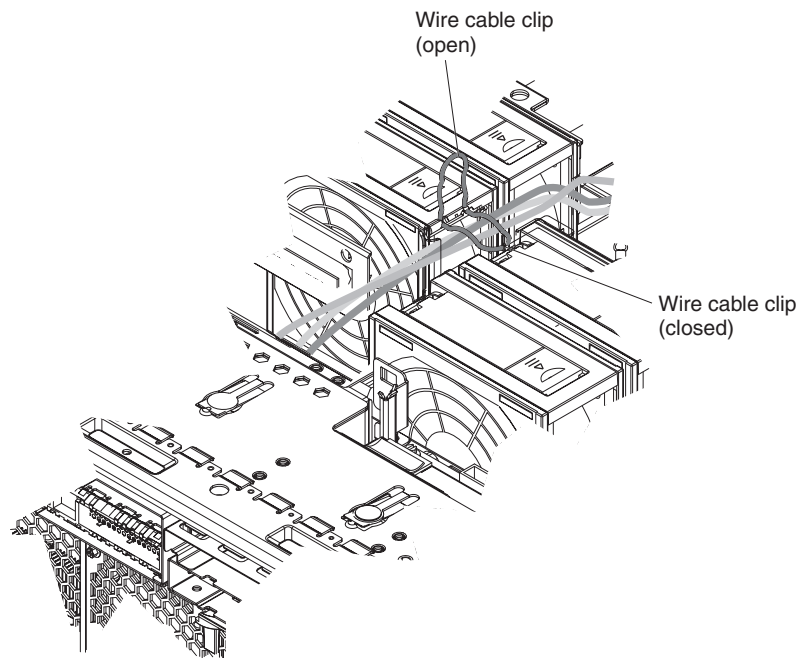
**Note:** Route adapter cables before you install the adapter.

4. Install the adapter:
  - a. Open the blue adapter guide by lifting the front edge.
  - b. Push the orange adapter retention latch toward the rear of the server and open the tab. The power LED for the slot turns off.
  - c. Remove the expansion-slot cover.
  - d. Carefully grasp the adapter by its top edge or upper corners, and align it with the connector on the PCI board.
  - e. If necessary, remove the adapter guide before installing a full-length adapter.
  - f. Press the adapter *firmly* into the adapter connector.
  - g. Push down on the blue PCI retaining bar to stabilize the adapter.
  - h. Close the tab; then, push down on the orange adapter retention latch until it clicks into place, securing the adapter.
5. Connect any required cables to the adapter.

If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 23.

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## Completing the installation



Complete the following steps to complete the installation:

1. Make sure all internal cables are properly routed and are held in place by the wire cable clip in the center of the server.
2. Install the top cover.
3. Install the server in a rack. See the *Rack Installation Instructions* that come with the server for complete rack installation and removal instructions.
4. Connect the cables and power cords. See “Connecting the cables” for more information.

## Connecting the cables

You must turn off the server (see “Turning off the server” on page 28) before connecting any cables to or disconnecting any cables from the server.

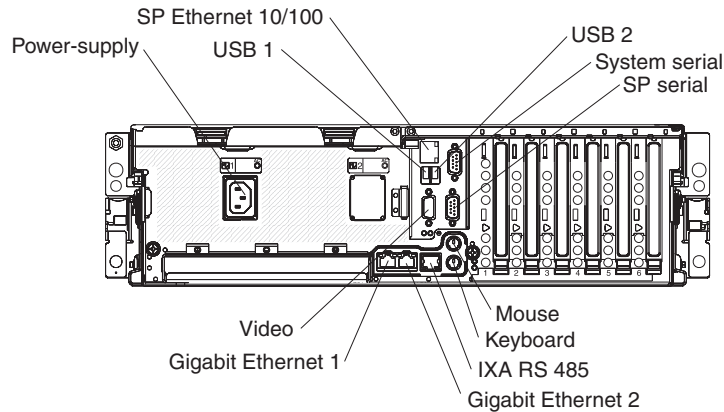
See the documentation that comes with optional devices for additional cabling instructions. It might be easier for you to route cables before you install certain options.

Cable identifiers are printed on the cables that come with the server and options. Use these identifiers to connect the cables to the correct connectors.

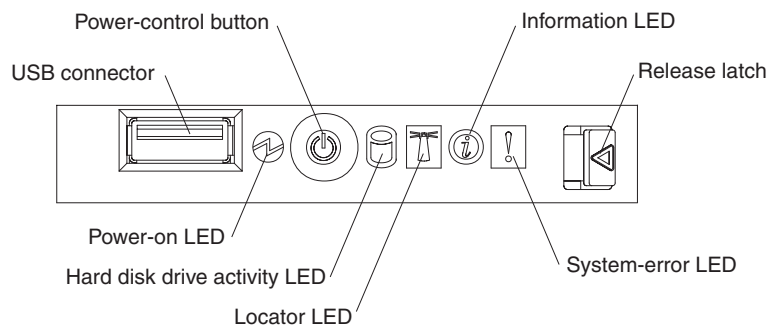
For details about the location and function of the input and output connectors, see Chapter 3, “Server controls, connectors, LEDs, and power,” on page 25.

The following illustrations show the locations of the input and output connectors on the server. Detailed cabling instructions are in the *Rack Installation Instructions* that come with the server.

## Rear view



## Front view



## Updating the server configuration

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

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

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

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

For information about setting up, configuring, and using the Remote Supervisor Adapter II SlimLine, see the *Remote Supervisor Adapter II SlimLine User's Guide* that comes with the adapter.

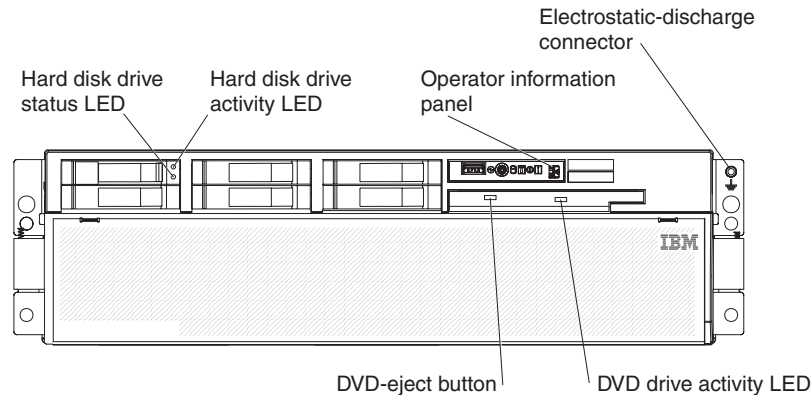
For information about configuring the integrated Gigabit Ethernet controller, see the *User's Guide* on the IBM System x Documentation CD.

## Chapter 3. Server controls, connectors, LEDs, and power

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

### Front view

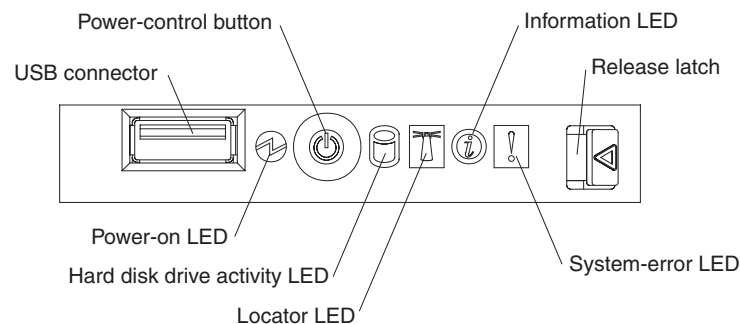
The following illustration shows the controls, LEDs, and connectors on the front of the server.



**Hard disk drive status LED:** If a ServerRAID-8i adapter is installed, when this LED is lit it indicates that the associated hard disk drive has failed. If 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:** On some server models, each hot-swap hard disk drive has an activity LED. When this LED is flashing, it indicates that the drive is in use.

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



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

- **USB connector:** Connect a USB device to this connector.
- **Power-control button:** Press this button to turn the server on and off manually. A power-control-button shield comes with the server.
- **Information LED:** When this LED is lit, it indicates that an error or warning message has been written to the system event log.
- **Release latch:** Slide this latch to the left to access the light path diagnostics panel.

- **System-error LED:** When this LED is lit, it indicates that a system error has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error.
- **Locator LED:** When this LED is lit, it has been lit remotely by the system administrator to aid in visually locating the server.
- **Hard disk drive activity LED:** When this LED is flashing, it indicates that a SAS hard disk drive is in use.
- **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.

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

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

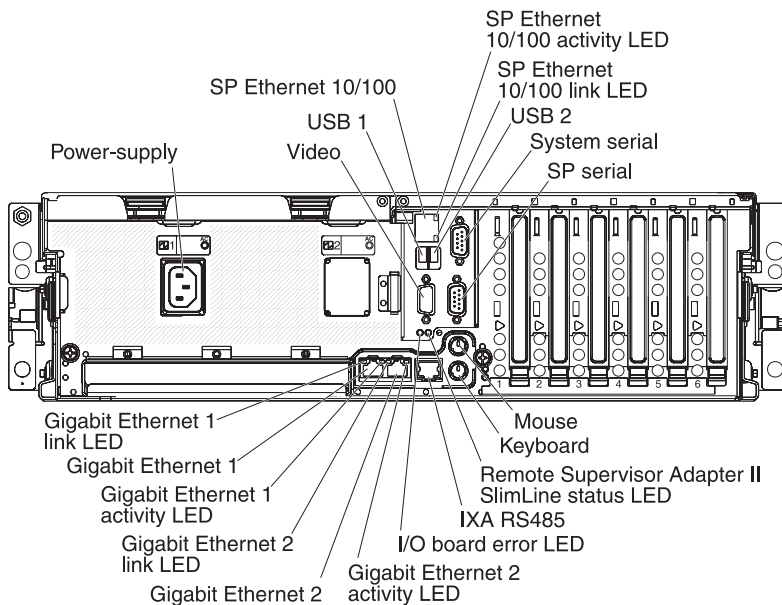
**DVD drive activity LED:** When this LED is lit, it indicates that the DVD is in use.

**Electrostatic-discharge connector:** Connect an electrostatic-discharge wrist strap to this connector.

---

## Rear view

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



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

**Video connector:** Connect a monitor to this connector.

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

**SP Ethernet 10/100 connector:** Use this connector to connect the service processor to a network.

**SP Ethernet 10/100 activity LED:** This LED is on the SP Ethernet 10/100 connector. When this LED is lit, it indicates that there is activity between the server and the network.

**SP Ethernet 10/100 link LED:** This LED is on the SP Ethernet 10/100 connector. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

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

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

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

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

**Keyboard connector:** Connect a keyboard to this connector.

**Remote Supervisor Adapter II SlimLine error LED:** This LED is on the I/O board and is visible on the rear of the server. When this LED is lit, it indicates that there is a problem with the Remote Supervisor Adapter II SlimLine.

**IXA RS485 connector:** Use this connector to connect to an iSeries™ server when an Integrated xSeries Adapter (IXA) is installed.

**I/O board error LED:** This LED is on the I/O board and is visible on the rear of the server. When this LED is lit, it indicates that there is a problem with the I/O board.

**Gigabit Ethernet 2 activity LED:** This LED is on the Gigabit Ethernet 2 connector. When this LED flashes, it indicates that there is activity between the server and the network.

**Gigabit Ethernet 2 connector:** Use this connector to connect the server to a network.

**Gigabit Ethernet 2 link LED:** This LED is on the Gigabit Ethernet 2 connector. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

**Gigabit Ethernet 1 activity LED:** This LED is on the Gigabit Ethernet 1 connector. When this LED flashes, it indicates that there is activity between the server and the network.

**Gigabit Ethernet 1 connector:** Use this connector to connect the server to a network.

**Gigabit Ethernet 1 link LED:** This LED is on the Gigabit Ethernet 1 connector. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

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## Server power features

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

### Turning on the server

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

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If the server is connected to an Advanced System Management interconnect network that contains at least one server with an optional Remote Supervisor Adapter II SlimLine installed, the server can be turned on from the Remote Supervisor Adapter II SlimLine user interface.
- If your operating system supports the systems-management software for an optional Remote Supervisor Adapter II SlimLine, the systems-management software can turn on the server.
- If your operating system supports the Wake on LAN<sup>®</sup> feature, the Wake on LAN feature can turn on the server.

### Turning off the server

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

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



**Statement 5:**



**CAUTION:**

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



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

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If the server is connected to an Advanced System Management interconnect network that contains at least one server with an optional Remote Supervisor Adapter II SlimLine installed, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.
- If an optional Remote Supervisor Adapter II SlimLine is installed in the server, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- You can turn off the server through a request from the service processor.



---

## Chapter 4. Configuring the server

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

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

- Configuration/Setup Utility program
- Baseboard management controller utility programs
- SAS/SATA Configuration Utility program
- ServeRAID Manager
- PXE boot utility program

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

---

### Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides programs to detect the server model and installed hardware options, configure the server hardware, provide device drivers, and help you install the operating system. For information about the supported operating-system versions, see the label on the CD. If the *ServerGuide Setup and Installation* CD did not come with the server, you can download the latest version from <http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html>.

Complete the following steps to start the *ServerGuide Setup and Installation* CD:

1. Insert the CD, and restart the server. If the CD does not start, see “ServerGuide problems” on page 52.
2. Follow the instructions on the screen to:
  - a. Select your language.
  - b. Select your keyboard layout and country.
  - c. View the overview to learn about ServerGuide features.
  - d. View the readme file to review installation tips about your operating system and adapter.
  - e. Start the setup and hardware configuration programs.
  - f. Start the operating-system installation. You will need your operating-system CD.

---

### Using the Configuration/Setup Utility program

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

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

- Set passwords and security settings

Complete the following steps to start the Configuration/Setup Utility program:

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

---

## Installing and using the baseboard management controller utility programs

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 BMC system event 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 2.0 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.

**Note:** The server Ethernet ports are set to DHCP by default. The BMC MAC address can be found on a tag on the front of the server. Once you have deployed the server, remove the tag so that it does not impede airflow through the front of the server.

For more information about IPMI 2.0, see the *Intelligent Platform Management Interface Specification (IPMI Specification)*, version 2.0, available at <http://www.intel.com>.

## 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 code and enable the operating system for an SOL connection.

### Updating and configuring the BIOS

To update and configure the BIOS code to enable SOL, complete the following steps.

1. Update the BIOS code:
  - a. Download the latest version of the BIOS code from <http://www.ibm.com/servers/eserver/support/xseries/index.html>.

- b. Update the BIOS code, following the instructions that come with the update file that you downloaded.
2. Configure the BIOS settings:
  - a. Restart the server and press F1 when 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 Active**: Enabled
    - **Remote Console COM Port**: COM 2
    - **Remote Console Baud Rate**: 19200
    - **Remote Console Data Bits**: 8
    - **Remote Console Parity**: None
    - **Remote Console Stop Bits**: 1
    - **Remote Console Text Emulation**: ANSI
    - **Remote Console Keyboard Emulation**: ANSI
    - **Remote Console Active After Boot**: Enabled
    - **Remote Console Flow Control**: Hardware
  - d. Press Esc twice to exit the **Remote Console Redirection** and **Devices and I/O Ports** sections of the Configuration/Setup Utility program.

**Note:** Do not use Planar Ethernet 1 for PXE/DHCP booting or installation.
  - e. Select **Start Options**; then, set **Planar Ethernet PXE/DHCP** to one of the following settings:
    - **Disabled**
    - **Planar Ethernet 2**. If you set **Planar Ethernet PXE/DHCP** to **Planar Ethernet 2**, you must also set **Run PXE only on selected Planar NIC** to **Enabled**.
  - f. Press Esc to exit the **Start Options** section of the Configuration/Setup Utility program.
  - g. Select **Save Settings**; then, press Enter.
  - h. Press Enter to confirm.
  - i. Select **Exit Setup**; then, press Enter.
  - j. Make sure that **Yes, exit the Setup Utility** is selected; then, press Enter.

## Configuring Linux

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.

### *Configuring Red Hat Enterprise Linux ES 2.1:*

**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.

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

**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 ttyS1 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:

```
ttyS1
```

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

1. 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 the line.
  - c. Comment out the message=/boot/message line by adding a # at the beginning of the 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=ttyS1,19200n8 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=ttyS1,19200n8 "
```

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

### Original /etc/lilo.conf contents

```
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
```

### 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=ttyS1,19200n8 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=ttyS1,19200n8 "
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 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=ttyS1,19200 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=ttyS1,19200
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=ttyS1,19200 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=ttyS1,19200
    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 completing 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.

To configure the general Linux parameters for SOL operation with the SLES 8.0 operating system, complete the following steps.

**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 ttyS1 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:  
ttyS1
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=ttyS1,19200 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=ttyS1,19200  
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>gfxmanu (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>
<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.</p>	

Modified /boot/grub/menu.lst contents	Notes
<pre>#gfxmanu (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=ttyS1,19200 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
<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.</p>	

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

### Configuring a Microsoft Windows operating system

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

1. 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 the server.
  - b. In the Boot Entries section, locate the boot entry ID for the section with an OS friendly name of the Windows operating system. 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. 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 the 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
<pre> 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 </pre>

### Modified bootcfg program output

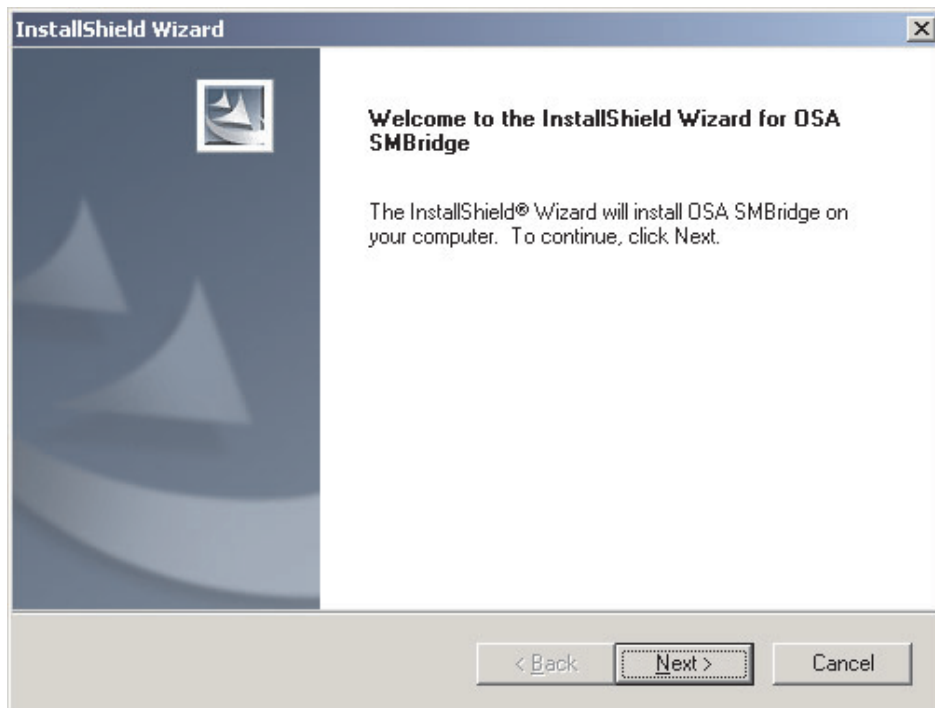
```
Boot Loader Settings
-----
timeout: 30
default: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
redirect: COM1
redirectbaudrate: 19200
Boot Entries
-----
Boot entry ID: 1
OS Friendly Name: Windows Server 2003, Standard
Path: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
OS Load Options: /fastdetect /redirect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

You must restart the Windows 2003 operating system after completing 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/servers/eserver/support/xseries/index.html>, 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.

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

1. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>, 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
```

where `xx` is the release level being installed.

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/smbridged`  
`/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.

Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html> to download the utility program; then, copy the `bmc_cfg.exe` file to a configuration utility diskette on a USB diskette drive.

To start the baseboard management controller configuration utility program, complete the following steps:

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 program to download a baseboard management controller firmware update. The firmware update utility program updates the baseboard management controller firmware 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 updating the BIOS code.

To update the firmware, download the Linux or Windows operating-system update package that is available from <http://www.ibm.com/servers/eserver/support/xseries/index.html>. If you have installed the OSA device driver and IBM Mapping layer, the update can be done without a reboot. Otherwise, extract to a firmware update diskette on a USB diskette drive and reboot.

### 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 BMC system event 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 BMC system event log.
- **sol**  
Configure the SOL function.
- **sysinfo**  
Display system information that is related to the server and the globally unique identifier (GUID).

---

## Using the SAS/SATA Configuration Utility program

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

1. Turn on the server.
2. When the prompt <<< Press <CTRL><A> for Adaptec SAS/SATA Configuration Utility! >>> appears, press Ctrl+A.
3. To select a choice from the menu, use the arrow keys.
4. Follow the instructions on the screen to change the settings of the selected items, and press Enter.

---

## Using the ServeRAID configuration programs

A ServeRAID controller enables you to configure multiple physical hard disk drives to operate as logical drives in a disk array. The controller comes with a CD containing the ServeRAID Manager program and the ServeRAID Mini-Configuration program, which you can use to configure the ServeRAID controller. For information about these programs, see the documentation that comes with the ServeRAID controller and the *User's Guide* on the *IBM System x Documentation* CD. If your server comes with an operating system installed, such as Microsoft Windows 2000 Datacenter Server, see the software documentation that comes with the server for configuration information.

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## Using the PXE boot agent utility program

The Preboot Execution Environment (PXE) boot agent utility program is part of the BIOS code. You can use it to specify the startup order of devices and enable or disable operating-system wake-up support.

**Note:** The server does not support changing the network boot protocol or specifying the startup order of devices through the PXE boot agent utility program.

Complete the following steps to start the PXE boot agent utility program:

1. Turn on the server.
2. When the Initializing Intel (R) Boot Agent Version X.X.XX PXE 2.0 Build XXX (WfM 2.0) prompt appears, press Ctrl+S. You have 2 seconds (by default) to press Ctrl+S after the prompt appears. If the prompt does not appear, use the Configuration/Setup Utility program to enable the Ethernet PXE/DHCP option.
3. Use the arrow keys and press Enter to select a choice from the menu.



4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.



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## Chapter 5. Updating IBM Director

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

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

1. Check for the latest version of IBM Director:
  - a. Go to [http://www.ibm.com/servers/eserver/xseries/systems\\_management/xseries\\_sm/dwnl.html](http://www.ibm.com/servers/eserver/xseries/systems_management/xseries_sm/dwnl.html).
  - b. If a newer version of IBM Director than what comes with the server is shown in the drop-down list, follow the instructions on the Web page to download the latest version.
2. Install the IBM Director program.
3. Download and install any applicable updates or interim fixes for the server:
  - a. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>.
  - b. From the **Hardware** list, select **System x3850**.
  - c. From the **Software** list, select the operating environment of the server and click **Go**.
  - d. Under **Fixes and drivers**, select the choice for your operating system.
  - e. Select any applicable update or interim fix that you want to download.
  - f. Click the file link for the executable file to download the file, and follow the instructions in the readme file to install the update or interim fix.
  - g. Repeat steps 3e and 3f for any additional updates or interim fixes that you want to install.



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## Chapter 6. Solving problems

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

If you cannot locate and correct the problem using the information in this chapter, see “Getting help and technical assistance,” on page 67, the *Problem Determination and Service Guide* on the IBM System x Documentation CD, and the “Server Support” flowchart in the front of this document.

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### Diagnostic tools overview

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

- **POST beep codes**

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

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

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

- **Troubleshooting charts**

These charts list problem symptoms and steps to correct the problems. See “Troubleshooting charts” on page 53 for more information.

- **Diagnostic programs and error messages**

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

- **Light path diagnostics**

Use light path diagnostics to diagnose system errors quickly. See “Light path diagnostics” on page 60 for more information.

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### POST beep codes

POST emits one beep to signal successful completion. If POST detects a problem during startup, other beep codes might occur. Use the following beep code descriptions to help diagnose and solve problems that are detected during startup.

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

**One beep**

POST was completed successfully without finding any errors.

**Two short beeps**

The server configuration has changed.

**Other beep codes**

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

## POST error codes

The following table provides an abbreviated list of the error codes and messages that might appear during POST. See the *Problem Determination and Service Guide* on the IBM System x Documentation CD for more information about the POST error codes and messages. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html> to check for updated technical information.

Error code	Description	Action
162	Device configuration error.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program, select <b>Load Default Settings</b>, and save the settings.</li> <li>2. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. Failing device</li> <li>c. I/O board</li> </ol> </li> <li>3. Remove the battery for 60 minutes; then, reinstall the battery and restart the server.</li> <li>4. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.</li> </ol>
163	Real-time clock error.	<ol style="list-style-type: none"> <li>1. Run the Configuration/Setup Utility program, select <b>Load Default Settings</b>, make sure the date and time are correct, and save the settings.</li> <li>2. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. I/O board</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>
289	A DIMM has been disabled by the user or by the system.	<ol style="list-style-type: none"> <li>1. If the DIMM was disabled by the user, run the Configuration/Setup Utility program and enable the DIMM.</li> <li>2. Make sure that the DIMM is installed correctly.</li> <li>3. Reseat the DIMM.</li> <li>4. Replace the DIMM.</li> </ol>
301	Keyboard or keyboard controller error.	<ol style="list-style-type: none"> <li>1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup.</li> <li>2. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Keyboard connection</li> <li>b. I/O board</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>

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

Error code	Description	Action
303	Keyboard controller error.	<ol style="list-style-type: none"> <li>1. Reseat the following components: <ol style="list-style-type: none"> <li>a. I/O board</li> <li>b. Keyboard connection</li> </ol> </li> <li>2. Replace the components listed in step 1 one at a time, in the order shown, restarting the server each time.</li> </ol>
00019xxx	Microprocessor x is not functioning or failed the built-in self-test; check VRM and processor LEDs.	<p>Make sure that microprocessor x is installed correctly. If the problem remains, replace microprocessor x.</p> <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 x</li> <li>b. Microprocessor tray</li> </ol> </li> <li>2. Replace the components listed in step 1 one at a time, in the order shown, restarting the server each time.</li> </ol> <p>If a microprocessor or the microprocessor tray must be replaced, call for service.</p>
00180xxx	A PCI adapter has requested memory resources that are not available.	<ol style="list-style-type: none"> <li>1. Change the order of the adapters in the PCI slots. Make sure that the boot device is positioned early in the scan order.</li> <li>2. Make sure that the settings for the PCI adapter and all other adapters in the Configuration/Setup Utility program are correct. If the memory resource settings are not correct, change them.</li> <li>3. If all memory resources are being used, remove an adapter to make memory available to the PCI adapter. Disabling the BIOS on the adapter should correct the error. See the documentation that comes with the adapter.</li> </ol>
012980xx 012981xx	No update data for microprocessor x	<ol style="list-style-type: none"> <li>1. Make sure that all microprocessors have the same cache size.</li> <li>2. Update the BIOS code again.</li> <li>3. (Trained service technician only) Reseat microprocessor x</li> <li>4. (Trained service technician only) Replace microprocessor x</li> </ol>
I9990305	An operating system was not found.	<ol style="list-style-type: none"> <li>1. Make sure that a bootable operating system is installed.</li> <li>2. Run the diagnostic programs.</li> <li>3. Reseat the following components: <ol style="list-style-type: none"> <li>a. Hard disk drive</li> <li>b. SAS backplane</li> <li>c. Cable</li> <li>d. I/O board</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>

## ServerGuide problems

The following table lists problem symptoms and suggested solutions.

Table 3. ServerGuide Setup and Installation CD

Symptom	Action
<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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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>	
<p>The <i>ServerGuide Setup and Installation</i> CD will not start.</p>	<ul style="list-style-type: none"> <li>• Make sure that the server supports the ServerGuide program and has a startable (bootable) CD (or DVD) drive.</li> <li>• If the startup (boot) sequence settings have been altered, make sure that the CD drive is first in the startup sequence.</li> <li>• If more than one CD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.</li> </ul>
<p>The RAID program cannot view all installed drives, or the operating system cannot be installed.</p>	<ul style="list-style-type: none"> <li>• Make sure that there are no duplicate IDs or IRQ assignments.</li> <li>• Make sure that the hard disk drive is connected correctly.</li> </ul>
<p>The operating-system installation program continuously loops.</p>	<p>Make more space available on the hard disk.</p>
<p>The ServerGuide program will not start the operating-system CD.</p>	<p>Make sure that the operating-system CD is supported by the ServerGuide program. See the <i>ServerGuide Setup and Installation</i> CD label for a list of operating-system versions that support the ServerGuide program.</p>
<p>The operating system cannot be installed; the option is not available.</p>	<p>Make sure that the operating system is supported on the server. If the operating system is supported, either there is no logical drive defined (RAID systems) or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.</p>



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## Troubleshooting charts

The following tables list problem symptoms and suggested solutions. See the *Problem Determination and Service Guide* on the *IBM System x Documentation CD* for more detailed troubleshooting charts. If you cannot find the problem in these charts, run the diagnostic programs. If you have run the diagnostic programs, or if running the tests does not reveal the problem, call for service.

### CD/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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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 CD/DVD drive is not recognized.	Make sure that: <ul style="list-style-type: none"><li>• The IDE channel to which the CD/DVD drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. If the server has a single IDE channel, only the primary channel can be used.</li><li>• All cables are installed correctly.</li><li>• The correct device driver is installed for the CD/DVD drive.</li></ul>

### 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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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.	Call for service.

### 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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li><li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li></ul>	
Symptom	Action
Not all drives are recognized by the hard disk drive diagnostic test (the Fixed Disk test).	<ol style="list-style-type: none"><li>1. Remove the first drive that is not recognized and run the hard disk drive diagnostic test again.</li><li>2. If the remaining drives are recognized, replace the drive that you removed with a new one.</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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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 stops responding during the hard disk drive diagnostic test.	<ol style="list-style-type: none"> <li>1. Remove the hard disk drive that was being tested when the server stopped responding and try the diagnostic test again.</li> <li>2. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.</li> </ol>
The hard disk drives are not detected while the operating system is starting.	Make sure that the SAS backplane is enabled in the Configuration/Setup Utility program.

## Intermittent problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<p>Make sure that:</p> <ul style="list-style-type: none"> <li>• All cables and cords are connected securely to the rear of the server and attached devices.</li> <li>• When the server is turned on, air is flowing from the rear of the server at the fan grille. If there is no airflow, the fans are not working. This can cause the server to overheat and shut down.</li> <li>• The SAS bus and devices are configured correctly and the last external device in each SAS chain is terminated correctly.</li> </ul> <p>If the problem remains, call for service.</p>

## Keyboard, mouse, or pointing-device problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
All or some keys on the keyboard do not work.	<ul style="list-style-type: none"> <li>• Make sure that the keyboard cable is securely connected to the server and that the keyboard and mouse cables are not reversed.</li> <li>• Make sure that the server and the monitor are turned on.</li> <li>• Try using another keyboard.</li> </ul> <p>If the problem remains, call for service.</p>

<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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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 mouse or pointing device does not work.	<ul style="list-style-type: none"> <li>• Make sure that the mouse or pointing-device cable is securely connected to the server and that the keyboard and mouse cables are not reversed.</li> <li>• Make sure that the mouse device drivers are installed correctly.</li> <li>• Try using another mouse or pointing device.</li> </ul> <p>If the problem remains, call for service.</p>

## Memory problems

<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
The amount of system memory displayed is less than the amount of installed physical memory.	<p>Make sure that:</p> <ul style="list-style-type: none"> <li>• The DIMMs are seated correctly.</li> <li>• You have installed the correct type and capacity of memory.</li> <li>• You have installed the DIMMs in the correct slots, in the correct order.</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> <p>Look in the POST error log for error message 289:</p> <ul style="list-style-type: none"> <li>• If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM.</li> <li>• If the DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM.</li> <li>• If this error remains, replace the DIMM.</li> </ul> <p>If the problem remains, call for service.</p>

## 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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
The server emits a continuous tone during POST.	<p>(Trained service technician only) The startup (boot) microprocessor is not working correctly. Make sure that the startup microprocessor is seated correctly in socket 1.</p> <p>If the startup microprocessor must be replaced, call for service.</p>

## Monitor problems

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

<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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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 screen is blank.	<p>Make sure that:</p> <ul style="list-style-type: none"> <li>• The server power cord is connected to the server and a working electrical outlet.</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> </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> feature in the <b>Start Options</b> of the Configuration/Setup Utility program is enabled (its default setting), you must restart the server three times to force the BIOS to reset the configuration settings to the default configuration (the memory connector or bank of connectors enabled).</p> <p>If the problem remains, call for service.</p>
Only the cursor appears.	Call for service.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	<p>Make sure that:</p> <ul style="list-style-type: none"> <li>• The monitor cable is connected.</li> <li>• You have installed the necessary device drivers for the application programs.</li> </ul> <p>If the problem remains, call for service.</p>

<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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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 monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<p>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.</p> <p><b>Attention:</b> Moving a color monitor while it is turned on might cause screen discoloration.</p> <p>Move the device and the monitor at least 300 mm (12 in.) apart, and turn on the monitor.</p> <p><b>Note:</b> Non-IBM monitor cables might cause unpredictable problems.</p> <p>If the problem remains, call for service.</p>
Wrong characters appear on the screen.	<p>If the wrong language is displayed, update the BIOS code with the correct language.</p> <p>If the problem remains, call for service.</p>

## Option 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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
An IBM option that was just installed does not work.	<p>Make sure that:</p> <ul style="list-style-type: none"> <li>• The option is designed for the server. See the “Server Support” flowchart for information about obtaining ServerProven compatibility information from the World Wide Web.</li> <li>• You followed the installation instructions that come with the option.</li> <li>• The option is installed correctly.</li> <li>• You have not loosened any other installed options or cables.</li> <li>• You have updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration.</li> </ul> <p>If the problem remains, call for service.</p>

<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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
An IBM option that used to work does not work now.	<ul style="list-style-type: none"> <li>• Make sure that all of the option hardware and cable connections are secure.</li> <li>• If the option comes with test instructions, use those instructions to test the option.</li> <li>• If the failing option is a SAS device, make sure that: <ul style="list-style-type: none"> <li>– The cables for all external SAS options are connected correctly.</li> <li>– The last device in each SAS chain, or the end of the SAS cable, is terminated correctly.</li> <li>– Any external SAS devices are turned on. You must turn on external SAS devices before turning on the server.</li> </ul> </li> </ul> <p>If the problem remains, call for service.</p>

## Power 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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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 does not turn on.	<ul style="list-style-type: none"> <li>• Make sure that the server power cord is connected to the server and a working electrical outlet.</li> <li>• Make sure that the type of memory that is installed is supported by the server and is installed in the correct order.</li> <li>• Make sure that the microprocessors are installed in the correct sockets.</li> <li>• If you just installed an option, remove it, and restart the server. If the server now turns on, you might have installed more options than the power supply supports.</li> <li>• Make sure the memory cassette is fully seated and the locking handle is all the way down.</li> </ul> <p>If the problem remains, call for service.</p>
The server does not turn off.	<p>Determine whether you are using an ACPI or non-ACPI operating system.</p> <p>If you are using a non-ACPI operating system, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. Press Ctrl+Alt+Delete.</li> <li>2. Turn off the server by using the power-control button. You might need to press and hold the power-control button for 5 seconds to force the server to turn off.</li> </ol> <p>If the problem remains or if you are using an ACPI operating system, call for service.</p>

## Serial port problems

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

<ul style="list-style-type: none"> <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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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.	<p>Make sure that:</p> <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 you installed one, is seated correctly.</li> </ul> <p>If the problem remains, call for service.</p>
A serial device does not work.	<p>Make sure that:</p> <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> </ul> <p>If the problem remains, call for service.</p>

## 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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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.	<p>To determine if the problem is caused by the software, make sure that:</p> <ul style="list-style-type: none"> <li>• Your server has the minimum memory needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, 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> <p>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.</p> <p>If the problem remains, contact your place of purchase of the software.</p>

## Universal Serial Bus device problems

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

Symptom	Action
A USB device does not work.	<p>Make sure that:</p> <ul style="list-style-type: none"> <li>• You are not trying to use a USB device during POST if a standard (non-USB) keyboard is connected to the keyboard connector. If a standard (non-USB) keyboard is connected to the keyboard connector, the USB is disabled, and no USB device will work during POST.</li> <li>• The correct USB device driver is installed.</li> <li>• Your operating system supports USB devices.</li> </ul> <p>If the problem remains, call for service.</p>

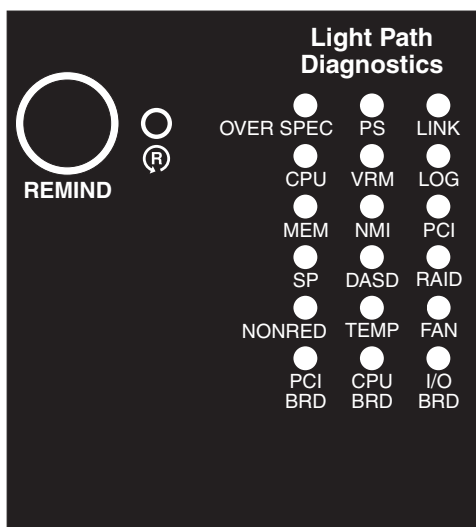
## Video problems

See “Monitor problems” on page 56.

## Light path diagnostics

Use light path diagnostics to diagnose system errors. The light path diagnostics panel is inside the light path diagnostics drawer, on the right front of the server. To access the light path diagnostics panel, slide the latch to the left on the front of the light path diagnostics drawer.

The following illustration shows the controls and LEDs on the light path diagnostics panel.



To acknowledge a system error but not take immediate action, press the remind button and place light path diagnostics in remind mode. When the server is in remind mode, the system-error LED on the front of the server flashes. If a new failure occurs, the system-error LED is lit again.



Press the reset button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button.

The server is designed so that LEDs remain lit when the server is connected to an ac power source but is not turned on, provided that the power supply is operating correctly. This feature helps you to isolate the problem when the operating system is shut down.

Any memory, microprocessor, and VRM LED can be lit again without ac power after you remove the microprocessor tray so that you can isolate a problem. After ac power has been removed from the server, power remains available to these LEDs for up to 24 hours.

To view the memory, microprocessor, and VRM LEDs, press and hold the light-path-diagnostics button on the memory card, or microprocessor board to light the error LEDs.

The LEDs that were lit while the server was running will be lit again while the button is pressed.

## Diagnosing problems using light path diagnostics

LEDs in three locations on the server are available to help you diagnose problems that might occur during installation. Use them in the following order:

1. **Operator information panel** - Look at this panel first. If an error has occurred, the information LED or the system-error LED is lit.
2. **Light path diagnostics panel** - Move the latch on the right front of the operator information panel to access the light path diagnostics panel. Note any LEDs that are lit, and then close the panel. For LED locations, see the illustration on page 48.
3. **LEDs inside the server** - To identify the component that is causing the error, note the lit LED beside or on the component.

## Light path diagnostics panel

The following table lists the LEDs on the light path diagnostics panel, the problems that they indicate, and actions to solve the 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 the parts listing in the <i>Problem Determination and Service Guide</i> to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</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 LED also lit	Description	Action
All LEDs off (the power LED is lit; the information LED might be lit).		No action necessary.

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

Lit light path diagnostics LED with the system-error LED also lit	Description	Action
OVERSPEC	There is insufficient power to power the system. The NON RED and LOG LEDs might also be lit.	<ol style="list-style-type: none"> <li>1. Add an optional power supply if only one power supply is installed.</li> <li>2. Use 220 V ac input power.</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> <li>5. Use 220 V ac instead of 110 V ac.</li> </ol>
PS	<p>A power supply has failed or has been removed.</p> <p><b>Note:</b> In a redundant power configuration, the dc power LED on one power supply might be off.</p>	<ol style="list-style-type: none"> <li>1. Reinstall the removed power supply.</li> <li>2. Check the individual power-supply LEDs to find the failing power supply.</li> <li>3. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Failing 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> <li>5. If a 240 V ac fault has occurred, ac power must be removed before dc power can be restored.</li> </ol>
LINK	Reserved	
CPU	<p>A microprocessor has failed, is missing, or has been improperly installed.</p> <p><b>Note:</b> Make sure that the microprocessors are installed in the correct sequence; see “Installing an additional microprocessor” on page 16.</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 microprocessor tray.</li> <li>3. Reseat the following components:               <ol style="list-style-type: none"> <li>a. (Trained service technician only) Failing microprocessor</li> <li>b. Microprocessor tray</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. (Trained service technician only) Failing microprocessor</li> <li>b. (Trained service technician only) Microprocessor tray</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 the parts listing in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Lit light path diagnostics LED with the system-error LED also lit	Description	Action
VRM	A VRM has failed or is missing.	<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 microprocessor tray.</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> <li>c. Microprocessor tray</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) Microprocessor tray</li> </ol> </li> </ol>
LOG	Information is present in the BMC log and system-error log. One or both logs may be full or close to full.	<ol style="list-style-type: none"> <li>1. The system-error log is 75% full; save the log if necessary and clear it.</li> <li>2. Check the log for possible errors.</li> </ol>
MEM	Memory failure. <b>Note:</b> The error LED on the memory card is also lit.	<ol style="list-style-type: none"> <li>1. Remove the memory card with the lit error LED on the top of the card; then, press the light path button on the memory card to identify the failed card or 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. Memory board</li> <li>b. DIMM</li> <li>c. (Trained service technician only) Microprocessor tray</li> </ol> </li> </ol>
NMI	A hardware error has been reported to the operating system. <b>Note:</b> The PCI or MEM LED might also be lit.	<ol style="list-style-type: none"> <li>1. See the BMC log and the system-error log.</li> <li>2. If the PCI LED is lit, follow the instructions for that LED.</li> <li>3. If the MEM LED is lit, follow the instructions for that LED.</li> <li>4. Restart the server.</li> </ol>

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

Lit light path diagnostics LED with the system-error LED also lit	Description	Action
PCI	A PCI adapter has failed. <b>Note:</b> The error LED next to the failing adapter on the PCI board is also lit.	<ol style="list-style-type: none"> <li>1. See the BMC log or the system-error log.</li> <li>2. Reseat the following components:               <ol style="list-style-type: none"> <li>a. Failing adapter</li> <li>b. I/O board</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>
SP	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.</li> <li>3. Replace the Remote Supervisor Adapter II SlimLine.</li> </ol>
DASD	A hard disk drive has failed or has been removed. <b>Note:</b> The error LED on the failing hard disk drive is also lit.	<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 6x cable</li> <li>d. I/O board</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>
RAID	The RAID adapter (ServeRAID 8i) has indicated a fault.	<ol style="list-style-type: none"> <li>1. See the BMC log or the system-error log.</li> <li>2. Reseat the following components:               <ol style="list-style-type: none"> <li>a. RAID adapter</li> <li>b. Hard disk drives</li> <li>c. I/O board</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>
NONRED	The server is operating with nonredundant power. If a power supply or its ac power source fails, the system will be over spec. <b>Note:</b> The LOG LED might also be lit.	<ol style="list-style-type: none"> <li>1. If the PS LED on the light path diagnostics panel is lit, follow the instructions for that LED.</li> <li>2. Replace the failing power supply.</li> <li>3. Remove optional devices.</li> <li>4. Use 220 V ac instead of 110 V ac.</li> </ol>

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

Lit light path diagnostics LED with the system-error LED also lit	Description	Action
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>1. See the BMC log or the system-error log for the source of the fault.</li> <li>2. Make sure that the airflow of the server is not blocked.</li> <li>3. If a fan LED is lit, reseal the fan.</li> <li>4. Replace the fan for which the LED is lit.</li> <li>5. Make sure that the room is neither too hot nor too cold see “Environment” in “Features and specifications” on page 4.</li> <li>6. If one of the VRDs indicates “hot,” ac power must be removed before dc power can be restored.</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. If an individual fan LED is lit, replace the fan.</li> <li>3. Reseat the microprocessor tray.</li> <li>4. (Trained service technician only) Replace the microprocessor tray.</li> </ol>
PCI BRD	The PCI board has failed.	<ol style="list-style-type: none"> <li>1. (Trained service technician only) Reseat the PCI board assembly.</li> <li>2. (Trained service technician only) Replace the PCI board assembly.</li> </ol>
CPU BRD	The microprocessor tray has failed.	<ol style="list-style-type: none"> <li>1. Reseat the microprocessor tray.</li> <li>2. (Trained service technician only) Replace the microprocessor tray.</li> </ol>
I/O BRD	The I/O board has failed.	<ol style="list-style-type: none"> <li>1. Reseat the I/O board.</li> <li>2. Replace the I/O board.</li> </ol>



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## Appendix. Getting help and technical assistance

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

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### Before you call

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

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

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

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

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

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### Using the documentation

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

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## Getting help and information from the World Wide Web

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

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

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## 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).

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## Hardware service and support

**Important:** When you call for service, you will be asked to provide the four-digit machine type of your system, which is 8864.

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.

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## 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



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## Important notes

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

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

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

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

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

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

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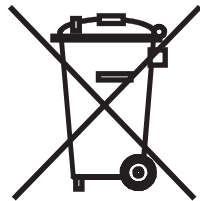
Some software may differ from its retail version (if available), and may not include user manuals or all program functionality.

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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>.



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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.

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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/batteryrecycle.shtml> or contact your local waste disposal facility.

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

**For Taiwan:** Please recycle batteries.



**For the European Union:**



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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.

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## Electronic emission notices

### Federal Communications Commission (FCC) statement

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

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

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

### Industry Canada Class A emission compliance statement

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

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

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

### Australia and New Zealand Class A statement

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

### United Kingdom telecommunications safety requirement

#### Notice to Customers

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

## European Union EMC Directive conformance statement

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

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

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

## Taiwanese Class A warning statement

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

## Chinese Class A warning statement

聲 明  
此為 A 級產品。在生活環境中，該產品可能會造成無線電干擾。在這種情況下，可能需要用戶對其干擾採取切實可行的措施。

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

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス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。

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# Index

## A

- adapter
  - installing
    - hot-plug 20
    - Remote Supervisor Adapter II SlimLine 20
    - ServeRAID 20
- attention notices 3

## B

- baseboard management controller utility programs 42
- bays 4
- beep codes 49

## C

- cabling
  - external 23
  - routing 23
  - the server 23
- cache 4
- caution statements 3
- Class A electronic emission notice 73
- codes
  - beep 49
  - error 50
- command-line interface
  - commands
    - identify 43
    - power 43
    - sel 43
    - sysinfo 43
- components 5
- Configuration/Setup Utility program 31
- configuring hardware 31
- connectors
  - front 23
  - rear 23
- CPU BRD LED 65
- CPU LED 62

## D

- danger statements 3
- DASD LED 64
- dimensions 4
- documentation CD 2
- drive
  - installing 10
- drives 4
- DVD drive
  - activity LED 26
  - eject button 26
  - problems 53

## E

- electrical input 4
- electronic emission Class A notice 73
- electrostatic-discharge connector 26
- error messages, POST 50
- Ethernet
  - connector 27
  - transmit/receive activity LED 27
- expansion bays 4
- expansion slots 4
- external
  - cabling 23

## F

- FAN LED 65
- FCC Class A notice 73
- features 4
- filler panel, hard disk drive bay 10
- firmware code, updating 42
- firmware updates 1

## G

- Gigabit Ethernet connector 27

## H

- hard disk drive
  - problems 53
  - status LED 25
- hot-plug adapter.
  - See adapter
- hot-swap drive
  - installing 10

## I

- I/O board error LED 27
- I/O BRD LED 65
- IBM Director 47
- identify command 43
- important notices 3
- installation
  - adapter 20
  - completing 23
  - hard disk drive 10
  - memory 11
  - microprocessor 16
- integrated
  - baseboard management controller utility programs 42
- integrated functions 4
- intermittent problems 54

## K

keyboard  
connector 27  
problems 54

## L

LEDs 26  
LEDs, light path  
CPU 62  
CPU BRD 65  
DASD 64  
FAN 65  
I/O BRD 65  
LINK 62  
LOG 63  
MEM 63  
NMI 63  
NONRED 64  
OVERSPEC 62  
PCI 64  
PCI BRD 65  
PS 62  
RAID 64  
SP 64  
TEMP 65  
VRM 63  
light path diagnostics  
LEDs 61  
link LED 27  
LINK LED 62  
LOG LED 63

## M

MEM LED 63  
memory 4  
installing 11  
problems 55  
microprocessor 4  
installing 16  
problems 56  
monitor problems 56  
mouse  
connector 27  
problems 55

## N

NMI LED 63  
noise emissions 4  
NONRED LED 64  
notes 3  
notes, important 70  
notices  
electronic emission 73  
FCC, Class A 73  
notices and statements 3

## O

online documentation 1  
operator information panel 25  
option problems 57  
OSA SMBridge management utility program  
enabling and configuring 32  
installing 41  
OVERSPEC LED 62

## P

PCI BRD LED 65  
PCI LED 64  
pointing device problems 55  
POST error messages 50  
power  
control button 25  
control-button shield 25  
cord connector 26  
LED 26  
problems 58  
power requirement 4  
power supply 4  
Preboot Execution Environment boot agent utility  
program 44  
problems  
DVD drive 53  
general 53  
hard disk drive 53  
intermittent 54  
keyboard 54  
memory 55  
microprocessor 56  
mouse 54  
option 57  
pointing device 55  
power 58  
serial port 59  
software 59  
solving 49  
USB device 60  
programs  
baseboard management utility 32  
Configuration/Setup Utility 31  
PXE boot agent utility 44  
SAS/SATA Configuration Utility 44  
ServeRAID Manager 44  
ServerGuide 31  
PS LED 62  
PXE boot agent utility program 44

## R

rack installation 2  
RAID configuration programs 44  
RAID controller 20  
RAID LED 64  
Remote Supervisor Adapter II SlimLine error LED 27  
reset button 61



## S

- SAS
  - activity LED 26
- SAS/SATA Configuration Utility program 44
- serial connector 27
- serial over LAN
  - commands
    - connect 43
    - identify 43
    - power 43
    - reboot 44
    - sel get 44
    - sol 44
    - sysinfo 44
- serial port problems 59
- ServerRAID configuration programs 44
- ServerGuide 31
  - error symptoms 52
- ServerGuide CD 1
- size 4
- slots 4
- software problems 59
- solving problems 49
- SP LED 64
- specifications 4
- Standby mode 28
- statements and notices 3
- system-error LED 26

## W

- weight 4

## T

- TEMP LED 65
- trademarks 69
- transmit/receive activity LED, Ethernet 27
- troubleshooting chart 53
- turning off the server 28
- turning on the server 28

## U

- United States electronic emission Class A notice 73
- United States FCC Class A notice 73
- Universal Serial Bus (USB) problems 60
- updating the firmware code 42
- USB connector 25, 26, 27
- using
  - baseboard management controller utility programs 32
  - Configuration/Setup Utility program 31
  - PXE boot agent utility program 44
  - SAS/SATA Configuration Utility program 44
  - ServerRAID Manager 44
  - ServerGuide 31

## V

- video connector 26
- VRM LED 63







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