IBM System x3610 Type 7942

User's Guide

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User's Guide

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

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

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

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

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

Statement 1:

DANGER

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

To Connect:	To Disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 2:

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

Do not:
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

Statement 3:

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

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

DANGER

> **Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.**
>
> **Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.**

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

Statement 4:
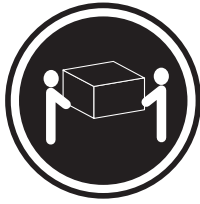
≥ 18 kg (39.7 lb)   ≥ 32 kg (70.5 lb)   ≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

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

2

1

Statement 8:

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

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

Statement 26:

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

Statement 27:

CAUTION:
Hazardous moving parts are nearby.

This server is suitable for use on an IT power-distribution system whose maximum phase-to-phase voltage is 240 V under any distribution fault condition.

Important: This product is not suitable for use with visual display workplace devices according to Clause 2 of the German Ordinance for Work with Visual Display Units.

Chapter 1. The System x3610 Type 7942 server

The IBM® System x3610 Type 7942 server is a 2-U[1]-high server that is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, and flexibility.

The server has six 3.5-inch hard disk drive bays. You can install the following hard disk drive configurations in the server:
- Six hot-swap SAS hard disk drives
- Six hot-swap SATA hard disk drives

Performance, ease of use, reliability, and expansion capabilities were key considerations in the design of the server. These design features make it possible for you to customize the system hardware to meet your needs today and provide flexible expansion capabilities for the future.

The server comes with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

The server contains IBM X-Architecture® technologies, which help increase performance and reliability. For more information, see "What your server offers" on page 4 and "Reliability, availability, and serviceability features" on page 6.

You can obtain up-to-date information about the server and other IBM server products at http://www.ibm.com/systems/x/.

Related documentation

This *User's Guide* contains general information about the server, including how to install supported optional devices and how to configure the server. The following documentation also comes with the server:
- *Installation Guide*

  This document is in Portable Document Format (PDF) on the IBM *System x®*
  Documentation CD. It contains instructions for setting up the server and basic
  instructions for installing some optional devices.
- *Warranty and Support Information*

  This document is in PDF on the IBM *System x Documentation* CD. It contains
  information about the terms of the warranty and getting service and assistance.
- *Safety Information*

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

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

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1. Racks are measured in vertical increments of 1.75 inches each. Each increment is called a "U". A 1-U-high device is 1.75 inches tall.

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- *Problem Determination and Service Guide*

  This document is in PDF on the IBM *System x Documentation* CD. It contains information to help you solve problems yourself, and it contains information for service technicians.

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

The System x and xSeries® Tools Center is an online information center that contains information about tools for updating, managing, and deploying firmware, device drivers, and operating systems. The System x and xSeries Tools Center is at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

The server might have features that are not described in the documentation that comes with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the IBM Web site. To check for updated documentation and technical updates, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3610** and click **Continue**.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

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

Racks are marked in vertical increments of 4.45 cm (1.75 inches). Each increment is referred to as a unit, or "U." A 1-U-high device is 1.75 inches tall.

Notes:

1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use.

2. The sound 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.

Table 1. Features and specifications

Microprocessor:	Expansion slots:	Environment:

• One Intel® LGA 771 dual core or quad core, depending on the server model:
  – Dual core: Xeon 5100 series, or later
  – Quad core: Xeon 5300 series, or later
• Support for up to two microprocessors
• Support for Intel Extended Memory 64 Technology (EM64T)
 	
Note:
• Use the BIOS Setup Utility program to determine the type and speed of the microprocessor.
• See http://www.ibm.com/servers/ eserver/serverproven/compat/us/ for a list of supported microprocessors.
 	
Memory:
• Six DIMM connectors
• Minimum: 512 MB
• Maximum: 16 GB
• Type: Registered double-data-rate 2 (DDR2) dual inline memory modules (DIMMs)
• Sizes: 512 MB, 1 GB, 2 GB, or 4 GB
• Chipkill™ supported on x4 memory
 	
Drives:
 	
CD/DVD: SATA
 	
Expansion bays:
• Six 3.5-inch hard disk drive bays, containing one of the following configurations:
  – SAS: Up to six 3.5-inch hot-swap SAS hard disk drives
  – SATA: Up to six 3.5-inch hot-swap SATA hard disk drives
• One 5.25-inch Ultrabay Enhanced bay
	• Two PCI Express x8 slots, low-profile
	• Two PCI 3.3 v or 5 v half-length slots, low-profile
	
	Fans:
	
	Three
	
	Power supplies:
	• 600 watts (100 - 240 V ac)
	• Minimum: One
	• Maximum: Two - provide redundant power
	
	Size (2 U):
	• Height: 85.4 mm (3.36 in.)
	• Depth: 705 mm (27.8 in.)
	• Width: 443.6 mm (17.5 in.)
	• Weight: approximately 21.09 kg (46.5 lb) to 29.03 kg (64 lb) depending upon configuration
	
	Integrated functions:
	• Baseboard management controller
	• Two Broadcom 5722 Gigabit Ethernet controllers with Wake on LAN® support
	• One SAS RAID controller that supports RAID levels 0, 1, 1E
	• One serial port
	• Six Universal Serial Bus (USB) ports (two on front and four on rear of server), v2.0 supporting v1.1
	• One VGA video port
	• One PS/2 mouse port
	• One PS/2 keyboard port
	• Two Ethernet ports
	• One systems-management port
	
	Note: In messages and documentation, the term *service processor* refers to the baseboard management controller.
	
	Video controller:
	• ASPEED Technology AST1100
		• Air temperature:
		  – Server on: 10° to 35°C (50.0° to 95.0°F); altitude: 0 to 914.4 m (3000 ft). Decrease system temperature by 0.75°C for every 1000-foot increase in altitude.
		  – Server off: 10° to 43°C (50.0° to 109.4°F); maximum altitude: 2133 m (7000 ft)
		  – Shipment: -40° to +60°C (-40° to 140°F); maximum altitude: 2133 m (7000 ft)
		• Humidity:
		  – Server on/off: 8% to 80%
		  – Shipment: 5% to 100%
		
		Acoustical noise emissions:
		• Declared sound power, idle: 6.8 bel
		• Declared sound power, operating: 6.8 bel
		
		Heat output:
		
		Approximate heat output in British thermal units (Btu) per hour:
		• Minimum configuration: 1230 Btu per hour (360 watts)
		• Maximum configuration: 3312 Btu per hour (970 watts)
		
		Electrical input:
		• Sine-wave input (50-60 Hz) required
		• Input voltage range automatically selected
		• Input voltage low range:
		  – Minimum: 100 V ac
		  – Maximum: 127 V ac
		• Input voltage high range:
		  – Minimum: 200 V ac
		  – Maximum: 240 V ac
		• Input kilovolt-amperes (kVA) approximately:
		  – Minimum: 0.29 kVA
		  – Maximum: 1.00 kVA

What your server offers

The server uses the following features and technologies:

- **Baseboard management controller**

  The baseboard management controller (BMC) provides basic service-processor environmental monitoring functions. If an environmental condition exceeds a threshold or if a system component fails, the baseboard management controller lights LEDs to help you diagnose the problem.

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

- **IBM X-Architecture technology**

  IBM X-Architecture technology combines proven, innovative IBM designs to make your Intel®-processor-based server powerful, scalable, and reliable. For more information, see http://www.ibm.com/servers/eserver/xseries/xarchitecture/ enterprise/index.html.

- **Large system-memory capacity**

  The server supports up to 16 GB of system memory. The memory controller supports up to 6 registered 512 MB, 1 GB, 2 GB, and 4GB DDR2 dual inline memory modules (DIMMs).

- **IBM *ServerGuide*™ *Setup and Installation* CD**

  The *ServerGuide Setup and Installation* CD that comes with the server provides programs to help you set up the server and install a Windows® operating system. The ServerGuide program detects installed optional hardware devices and provides the correct configuration programs and device drivers. For more information about the *ServerGuide Setup and Installation* CD, see "Using the ServerGuide Setup and Installation CD" on page 47.

  Note: If the *ServerGuide Setup and Installation* CD did not come with your server, you can download the necessary device drivers from the IBM Web site. See the instructions on page 17.

- **Integrated network support**

  The server comes with two integrated Broadcom Gigabit Ethernet controllers, which support connection to a 10-Mbps, 100-Mbps, or 1000-Mbps network. For more information, see "Configuring the Gigabit Ethernet controllers" on page 62.

- **Large data-storage and hot-swap capability**

  The server supports up to six slim, 3.5-inch hard disk drives in the hard disk drive bays. With the hot-swap feature, you can add, remove, or replace hard disk drives without turning off the server.

- **PCI Express adapter capabilities**

  The server has two slots for low-profile PCI Express x8 adapters. The server also has two slots for low-profile PCI adapters.

- **Redundant power capabilities**

  The server supports up to two 600-watt ac power supplies, which provide redundancy for a typical configuration. If the maximum load on the server is less than 600 watts and a problem occurs with one of the power supplies, the other power supply can meet the power requirements.

Reliability, availability, and serviceability features

Three important computer design features are reliability, availability, and serviceability (RAS). The RAS features help to ensure the integrity of the data that is stored in the server, the availability of the server when you need it, and the ease with which you can diagnose and repair problems.

The server has the following RAS features:
- Automatic error retry and recovery
- Automatic restart after a power failure
- Baseboard management controller (service processor)
- Built-in monitoring for fan, power, temperature, voltage, and power-supply redundancy
- Chipkill memory protection
- Error codes and messages
- Error correcting code (ECC) L2 cache and system memory
- Cooling fans with speed-sensing capability
- Hot-swap hard disk drives
- Information LED panel
- Menu-driven setup, system configuration, and redundant array of independent disks (RAID) configuration programs
- Parity checking or CRC checking on the serially-attached SCSI (SAS) bus and PCI buses
- Power management: compliance with Advanced Configuration and Power Interface (ACPI)
- Power-on self-test (POST)
- Redundant Ethernet capabilities with failover support
- Redundant power supplies
- Remote system problem-determination support
- Standby voltage for systems-management features and monitoring
- Startup (boot) from LAN through Preboot Execution Environment (PXE) boot agent utility or dynamic host configuration protocol/boot protocol (DHCP/BOOTP)
- System auto-configuring from the configuration menu
- System error logging (POST and service processor)
- Systems-management monitoring through the Inter-Integrated Circuit (I^2C) bus
- Upgradeable POST, BIOS, diagnostics, service processor (BMC) microcode, and read-only memory (ROM) resident code, locally or over the LAN
- Vital product data (VPD) on system board and power supplies
- Wake on LAN capability

Server controls, LEDs, and power

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

Front view

The following illustration shows the controls, light-emitting diodes (LEDs), and connectors on the front of the server. Hot-swap SAS drives are shown in this illustration.
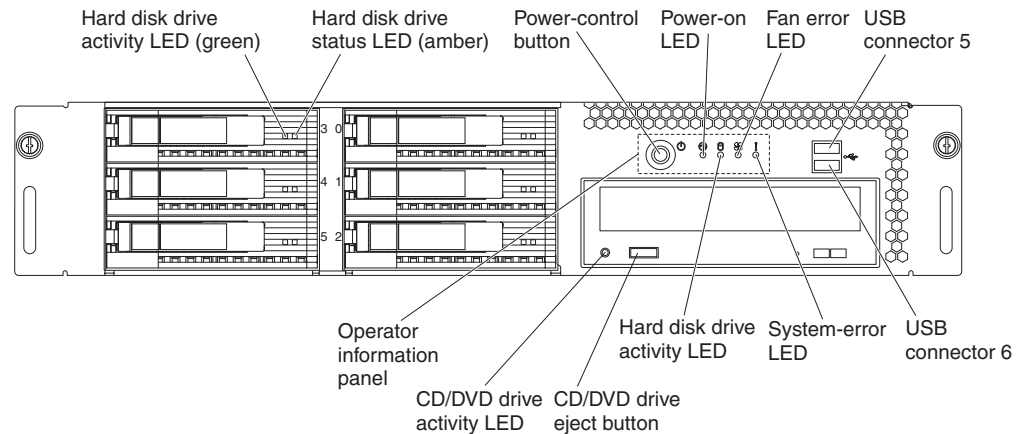
Hard disk drive activity LED: Each hot-swap hard disk drive has an activity LED. When this LED is flashing, it indicates that the drive is in use.

Hard disk drive status LED: On some server models, each hot-swap hard disk drive has a status LED. When this LED is lit, it indicates that the drive has failed. When this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt as part of a RAID configuration. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

Operator information panel: This panel contains controls and LEDs.

The following controls, LEDs, and connectors are on the operator information panel:
- **Power-control button:** Press this button to turn the server on and off manually. A power-control-button shield comes installed on the server to prevent the server from being turned off accidentally.
- **Power-on LED:** When this LED is lit, it indicates that the server is turned on. When this LED is off, it indicates that the server is turned off, or that power is not present, or that the power supply or the LED itself has failed.

  Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.
- **Hard disk drive activity LED:** When this LED is flashing, it indicates that a hard disk drive is in use.
- **Fan error LED:** When this LED is lit, it indicates that a fan has failed.
- **System-error LED:** When this LED is lit, it indicates that a system error has occurred. An error LED (amber) on the system board that is lit or an LED on the hard disk drive backplane or system board that is off when it should be on can help isolate the error.

USB connectors: Connect a USB device, such as USB mouse, keyboard, or other USB device, to either of these connectors.

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

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

Chapter 1. The System x3610 Type 7942 server   **7**

Rear view

The following illustration shows the connectors and LEDs on the rear of the server.
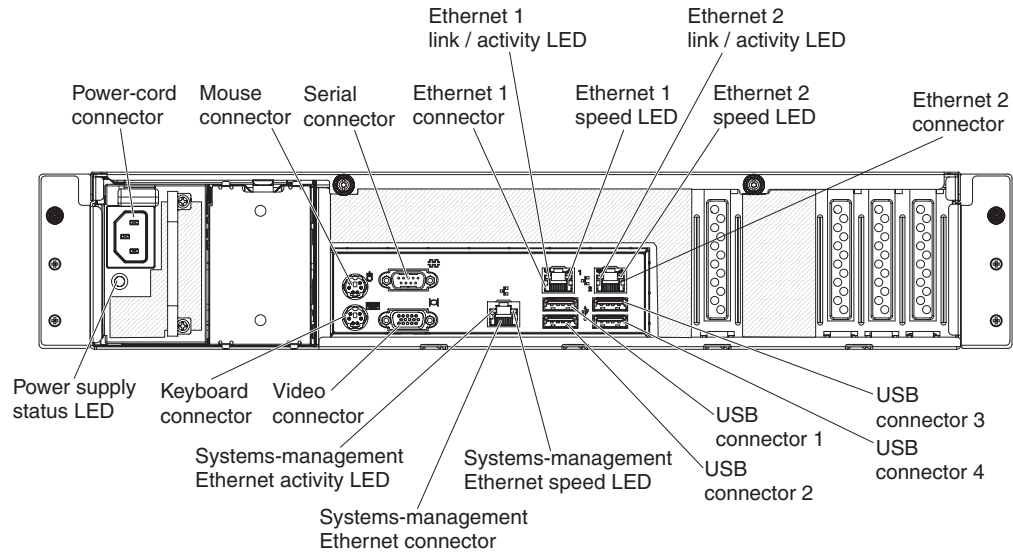
Power-cord connector: Connect the power cord to this connector.

Mouse connector: Connect a PS/2 mouse to this connector.

Serial connector: Connect a 9-pin serial device to this connector. The BMC can take control of the serial port to perform text console redirection and to redirect serial traffic, using Serial over LAN (SOL).

Ethernet connectors: Use either of these connectors to connect the server to a network.

Ethernet link/activity LED: This LED is on each Ethernet connector. When this LED is lit, it indicates that there is an active link connection on the 10BASE-T, 100BASE-TX, or 1000BASE-TX interface for the Ethernet port. When this LED is flashing, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port.

Ethernet speed LED: When this LED is lit and is amber, it indicates that the Ethernet network speed is 1 Gbps. When this LED is lit and is green, it indicates that the Ethernet network speed is 10 Mbps or 100 Mbps.

USB connectors: Connect a USB device, such as USB mouse, keyboard, or other USB device, to any of these connectors.

Systems-management Ethernet speed LED: When this LED is lit and is amber, it indicates that the Ethernet network speed is 1 Gbps. When this LED is lit and is green, it indicates that the Ethernet network speed is 10 Mbps or 100 Mbps.

Systems-management Ethernet connector: Use this connector to connect the server to a network for systems-management information control.

Systems-management Ethernet activity LED: When this LED is flashing, it indicates that the server is transmitting to or receiving signals from the network for systems-management information control that is connected to the systems-management Ethernet port.

Video connector: Connect a monitor to this connector.

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

Power supply status LED: When the power supply status LED is green (lit or flashing), it indicates that sufficient ac power is coming into the power supply through the power cord and that the power supply is functional. When the power supply status LED is amber (lit or flashing), it indicates a problem with the power supply. If the LED is amber, see the "Diagnostics" section of the *Problem Determination and Service Guide*.

Server power features

When the server is connected to a power source but is not turned on, the operating system does not run, and all core logic except for the service processor (the baseboard management controller) 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 is lit to indicate that the server is connected to power but is not turned on.

Turning on the server

Approximately 5 seconds after the server is connected to power, the power-control button becomes active, and one or more fans might start running to provide cooling while the server is connected to power. You can turn on the server and start the operating system by pressing the power-control button.

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

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

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI options.

Turning off the server

When you turn off the server and leave it connected to 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 power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.
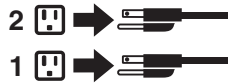
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:

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

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

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

Chapter 2. Installing optional devices

This chapter provides detailed instructions for installing optional hardware devices in the server.

Server components

The following illustrations show the major components in the server. The illustrations in this document might differ slightly from your hardware.

Cover

Air-baffle insert

Air duct

Low-profile adapter

Heat sink

DIMM

System board

Microprocessor

Fan

Hot-swap SAS backplane

Fan-bracket assembly

Power supply

Hot-swap hard disk drive

Hot-swap hard disk drive filler
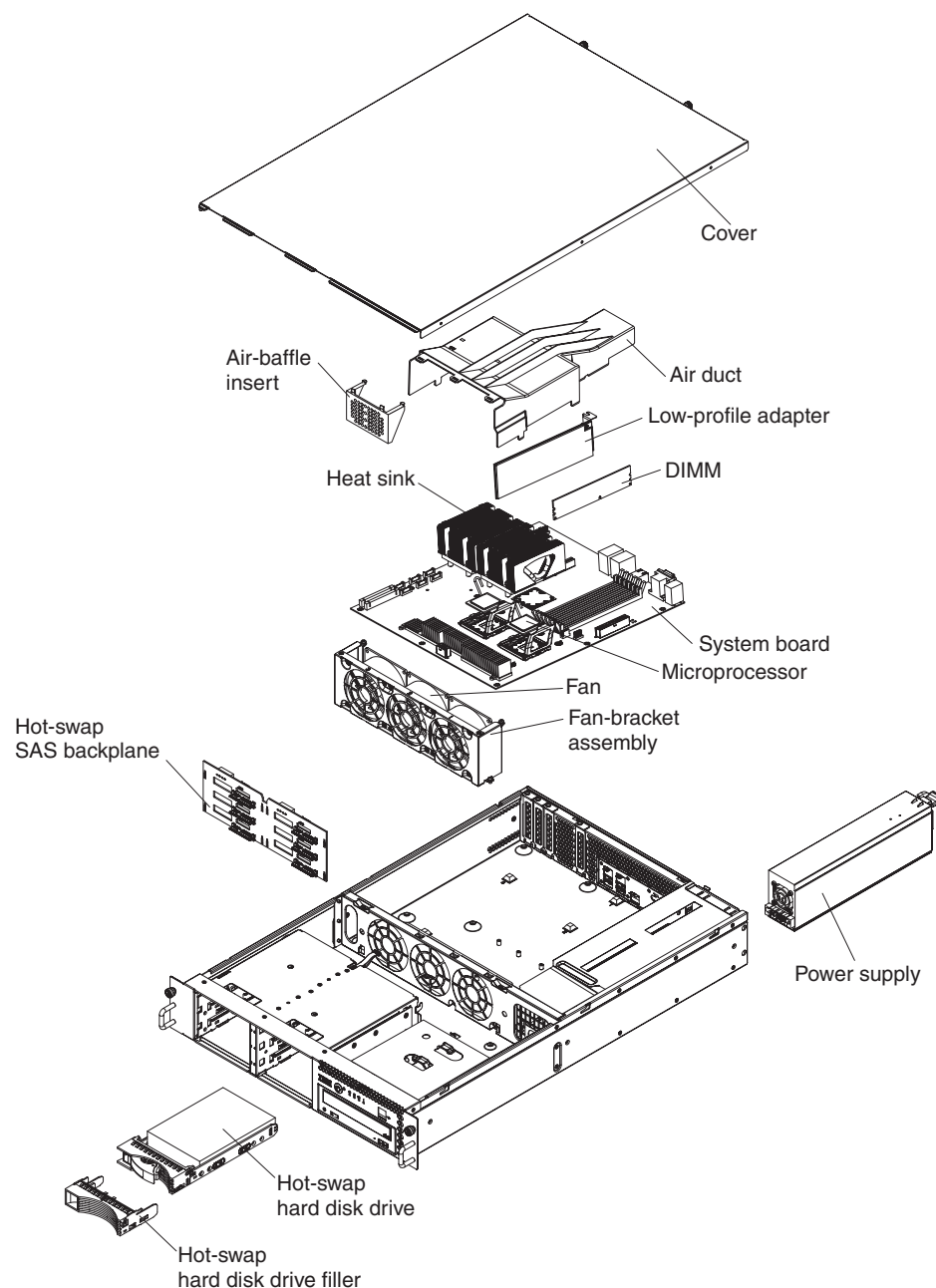
System-board optional-device connectors

The following illustration shows the connectors on the system board for user-installable optional devices.
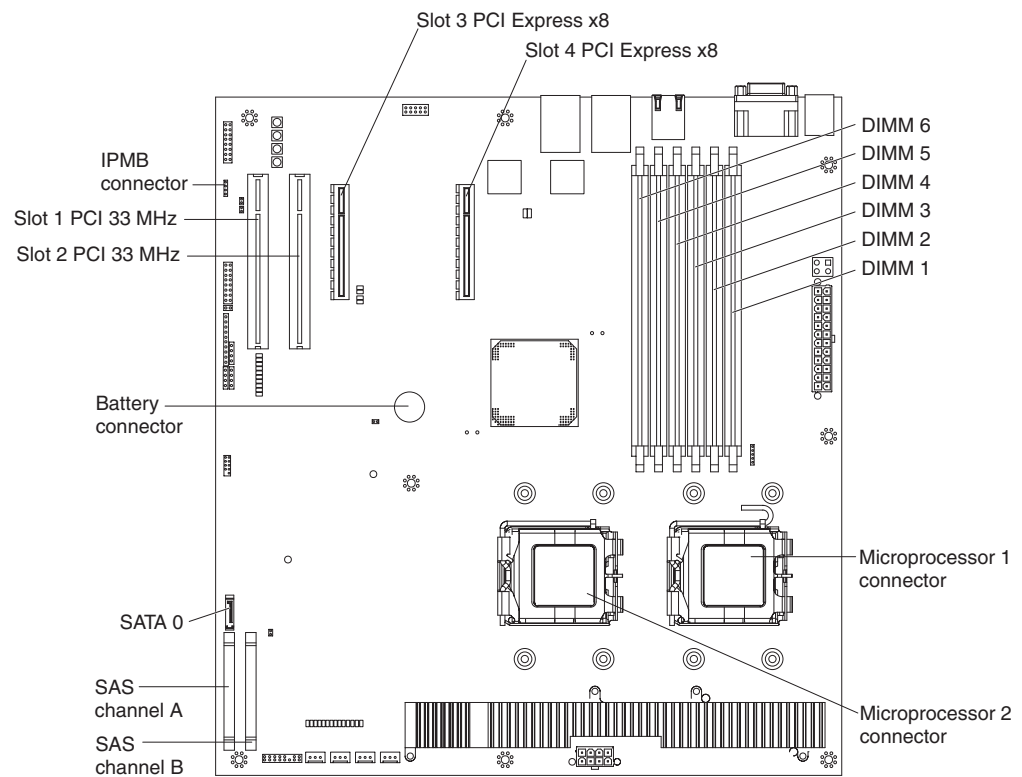
System-board internal cable connectors

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

Power connector
(4 pin)

Power connector
(24 pin)

Front USB

Power connector
(P8)

Thermal-
sensor
cable
connector

Operator
information
panel

Fan 4

Fan 3

Fan 2

Fan 1

Power connector
(8 pin)
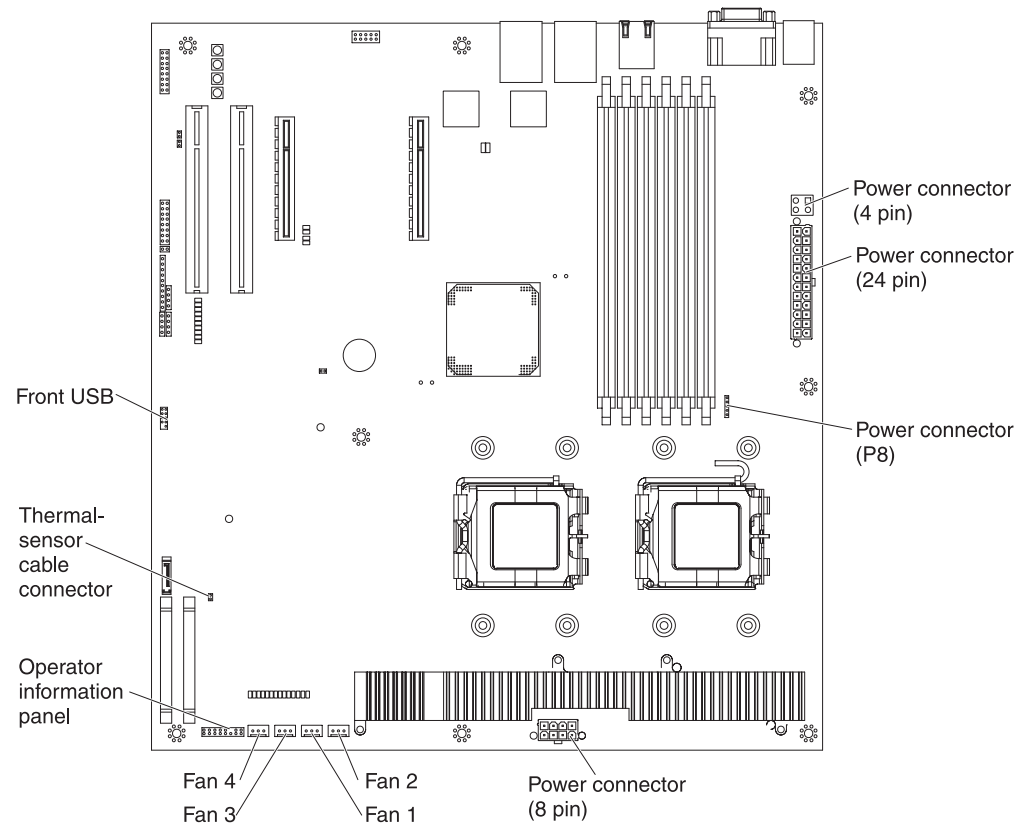
System-board external connectors

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

Ethernet 2/ USB 3 and 4

Ethernet 1/ USB 1 and 2

System-management Ethernet

Serial/video

Mouse/keyboard
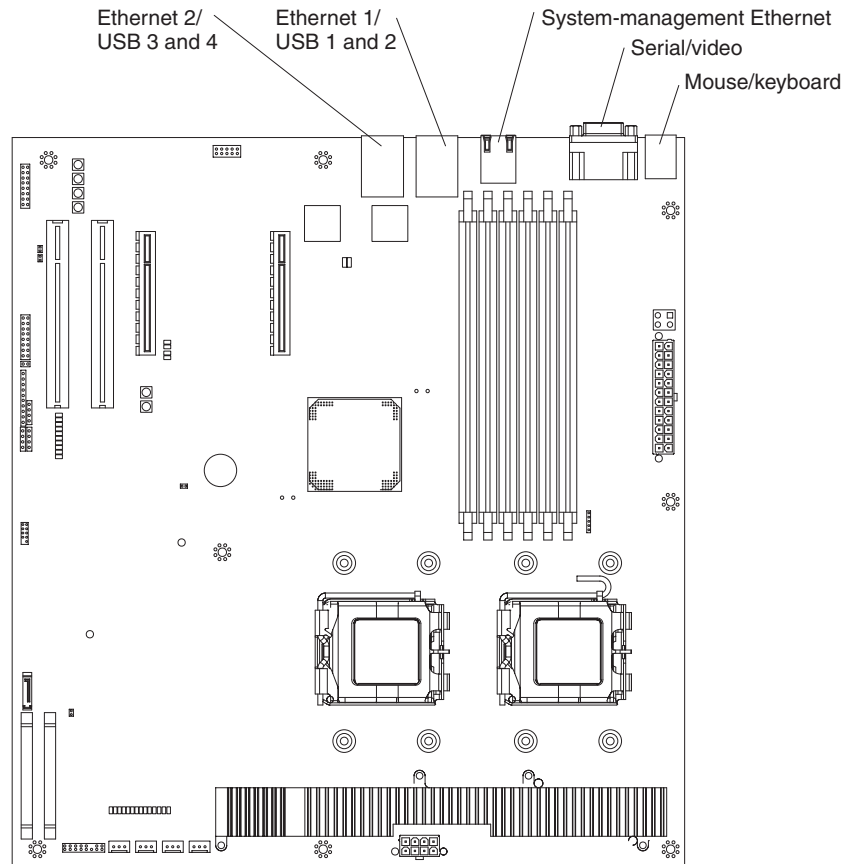
System-board switches

The following illustration shows the switches (buttons) on the system board.

Any switches or jumpers on the system board that are not shown in the illustration are reserved.

Table 2 describes the function of each switch on the system board.

Table 2. System-board switches

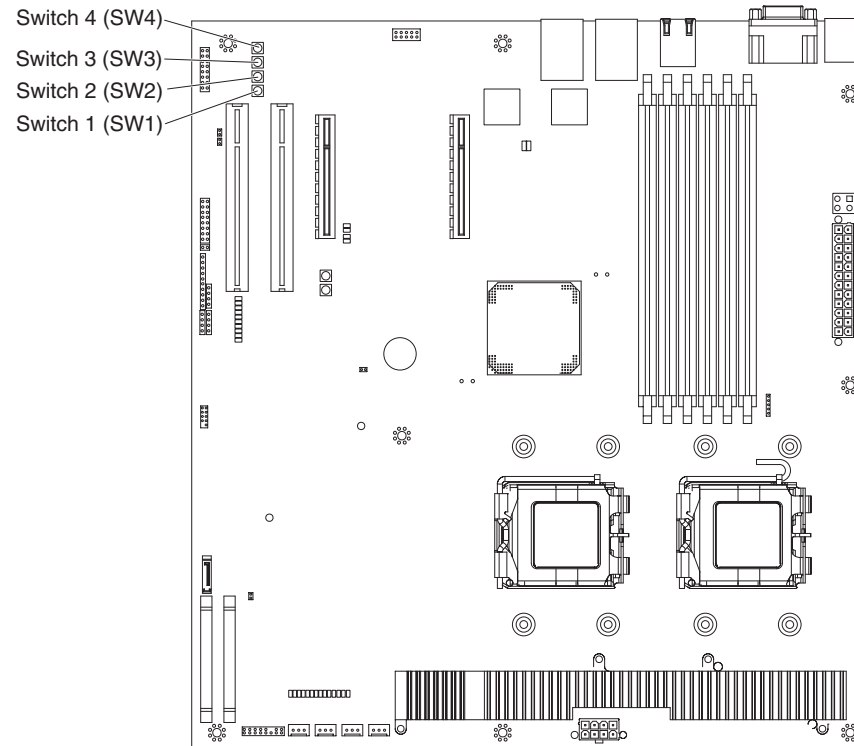| Switch number	Switch (button) description
4	**Reset**. When this button is pressed, it causes the server to reset the system board configuration and restart. This button is functional only when power is connected to the server and the server is running. **Note:** Do not press this button unless explicitly directed to do so by IBM Service.
3	**Power-on**. When this button is pressed, it functions the same as the power-control button on the front of the server. Depending on the state of the server, press this button once to turn the server on or off, or press the button for 4 seconds to force power off. This button is functional only when power is connected to the server.
2	Clear CMOS. When this button is pressed, it clears the CMOS data, which clears the user password. This button is functional only when the server is connected to power but turned off.
1	**NMI**. When this button is pressed, it issues a nonmaskable interrupt (NMI) to the server. This button is functional only when power is connected to the server and the server is running.

Important: Before pressing any button on the system board, follow the precautions in "Working inside the server with the power on" on page 20.

System-board LEDs

Attention: Be careful when sliding the server out of the rack to look at the system-board LEDs. If the cables on the rear of the server are too short (do not have enough slack in them), they might be pulled out of the server or broken. To view the LEDs when the cables are too short, you must turn off the server and peripherals, remove the cables from the server, remove the server from the rack, place it on a flat, static-protective surface, reconnect the cables and turn on the server; then, try to recreate the error.

Statement 27:

CAUTION:
Hazardous moving parts are nearby.

The following illustration shows the light-emitting diodes (LEDs) on the system board.
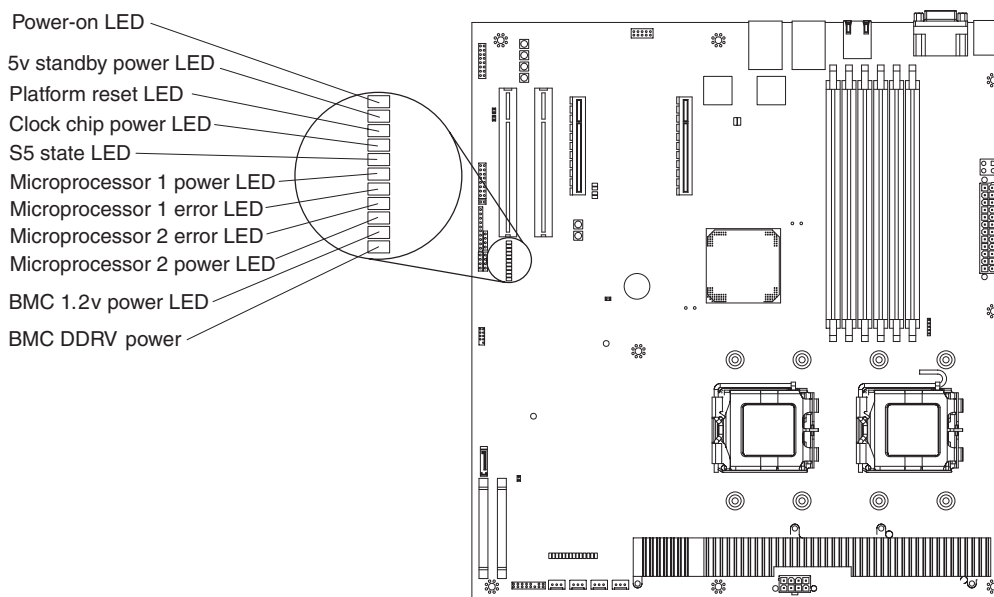
Note: A system-board error LED (amber) indicates a problem with the associated component. An LED that is off when it should be on can indicate a problem with the associated component.

Table 3. System-board LEDs

LED	Description
Power-on LED	The system board is receiving power (the power supply is on and 3.3 volts is active; the system power-on sequence has started or completed).

Table 3. System-board LEDs (continued)

LED	Description
5v standby power LED	Standby power for 5v circuits and devices is present (the 5v standby power rail is active).
Platform reset LED	System board reset is active.
Clock chip power LED	Power good is asserted to the clock chip (the real-time clock has power).
S5 state LED	The server is in the S5 state (ac power is present but the server is not turned on).
Microprocessor 1 power LED	The socket for microprocessor 1 is receiving power.
Microprocessor 1 error LED	An internal error has occurred on microprocessor 1 (CPU0).
Microprocessor 2 error LED	An internal error has occurred on microprocessor 2 (CPU1).
Microprocessor 2 power LED	The socket for microprocessor 2 is receiving power.
BMC power 1.2 v LED	The baseboard management controller (BMC) is receiving 1.2 v power. (The 1.2 v standby power rail is good; a stable 1.2 v rail is available.)
BMC power DDRV LED	The BMC is receiving DDR power. (The 2.5 v standby power rail is good; a stable 2.5 v rail is available.)

Hard disk drive backplane LEDs

The following illustration shows the light-emitting diodes (LEDs) on the hard disk drive backplane.
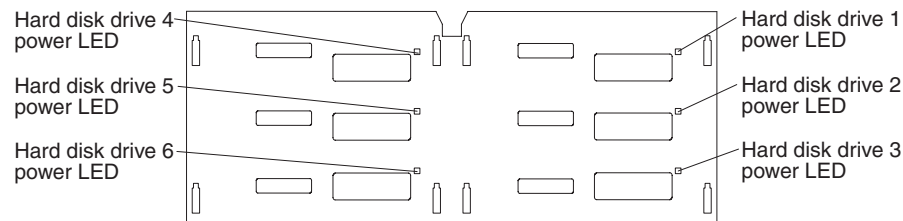
Table 4. Hard disk drive backplane LEDs

Power LEDs	Description
Flashing amber	The hard disk drive in the associated bay is powering up or is being built as part of a RAID configuration.
Flashing green	The hard disk drive is active (reading or writing data)
Off	The drive is not receiving power, the drive is not functioning, or a drive is not installed in the bay.

Installation guidelines

Before you install optional devices, read the following information:

- Read the safety information that begins on page v and the guidelines in "Handling static-sensitive devices" on page 20. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known

issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, complete the following steps:

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3610** to display the matrix of downloadable files for the server.

For additional information about tools for updating, managing, and deploying firmware, see the System x and xSeries Tools Center at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

- Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts. If the server is not working correctly, see "Solving problems" in the *Installation Guide* on the IBM *System x Documentation* CD for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- 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-plug Universal Serial Bus (USB) devices. However, you must turn off the server before performing any steps that involve removing or installing adapter cables or non-hot-swap optional devices or components.
- 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 system cooling and system reliability, make sure that the following requirements are met:

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not operate the server without the air duct installed. Operating the server without the air duct might cause the microprocessors to overheat.
- The air duct always contains the air-baffle insert over microprocessor socket 2, or microprocessor socket 2 always contains a microprocessor and heat sink.

Working inside the server with the power on

Statement 27:

CAUTION:
Hazardous moving parts are nearby.

You might be instructed to turn on the server while the cover is off, to look at system-board or backplane LEDs, or to press a button on the system board. Follow these guidelines when you work inside a server that is turned on:

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before 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 surface on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.

- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Removing the cover

The following illustration shows how to remove the cover.

Cover release thumb screws
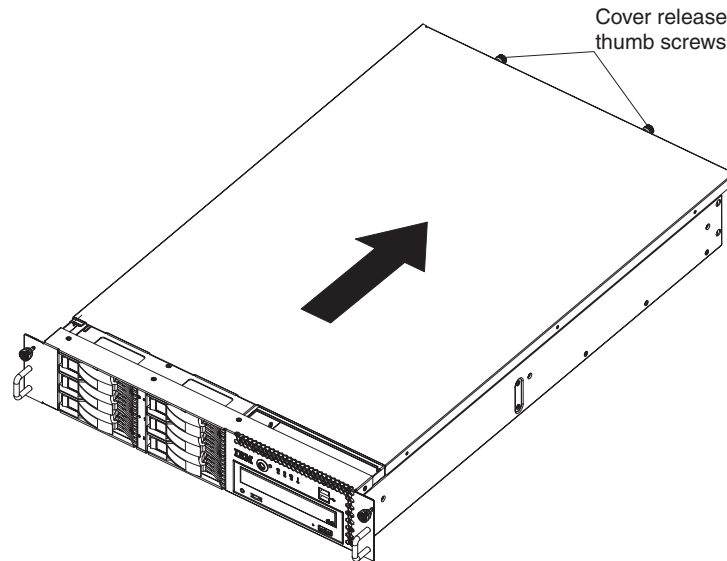
Important: Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts. If the server is not working correctly, see the *Problem Determination and Service Guide* for diagnostic information.

To remove the cover, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. If you are planning to install or remove a microprocessor, memory module, PCI adapter, fan bracket, battery, or other non-hot-swap optional device, turn off the server and all attached devices and disconnect all external cables and power cords (see "Turning off the server" on page 9).
3. Loosen the rack-release thumbscrews at the front of the server; then, pull the server out of the rack enclosure until both slide rails lock.

   **Note:** You can reach the cables on the back of the server when the server is in the locked position.
4. Loosen the cover-release thumbscrews at the rear of the server. Lift the cover off the server and set the cover aside.

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

Removing the air duct

When you work with some optional devices, you must first remove the air duct to access certain components or connectors on the system board. The following illustration shows how to remove the air duct.
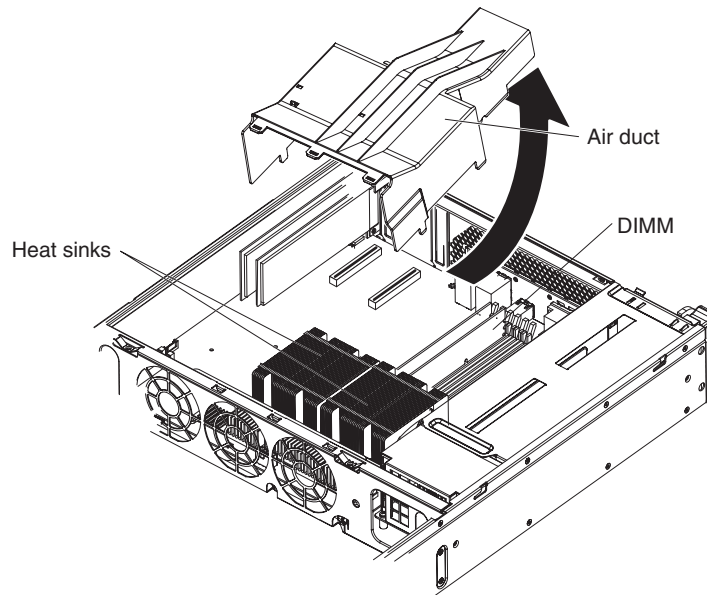
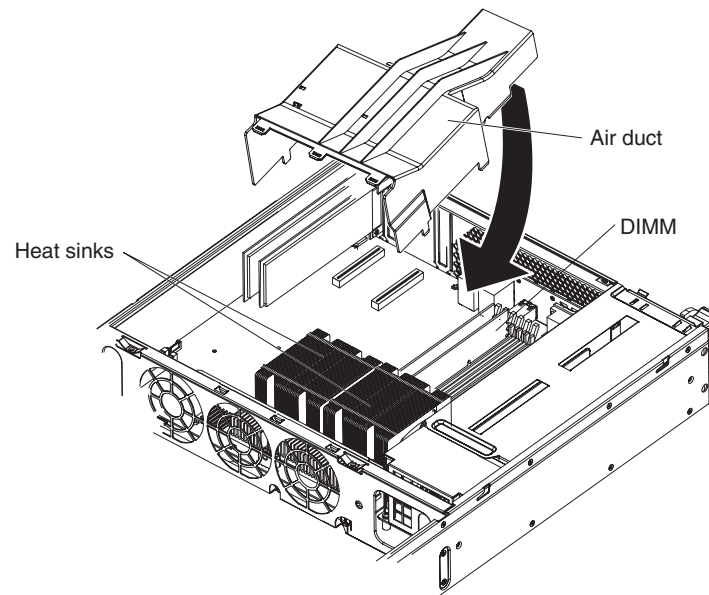To remove the air duct, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables (see "Turning off the server" on page 9).
3. Remove the cover (see "Removing the cover" on page 21).
4. Lift the rear of the air duct slightly and pull it toward the rear of the server to release the air-duct tabs from the slots on the fan bracket assembly.
5. Lift the air duct out of the server.

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

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.
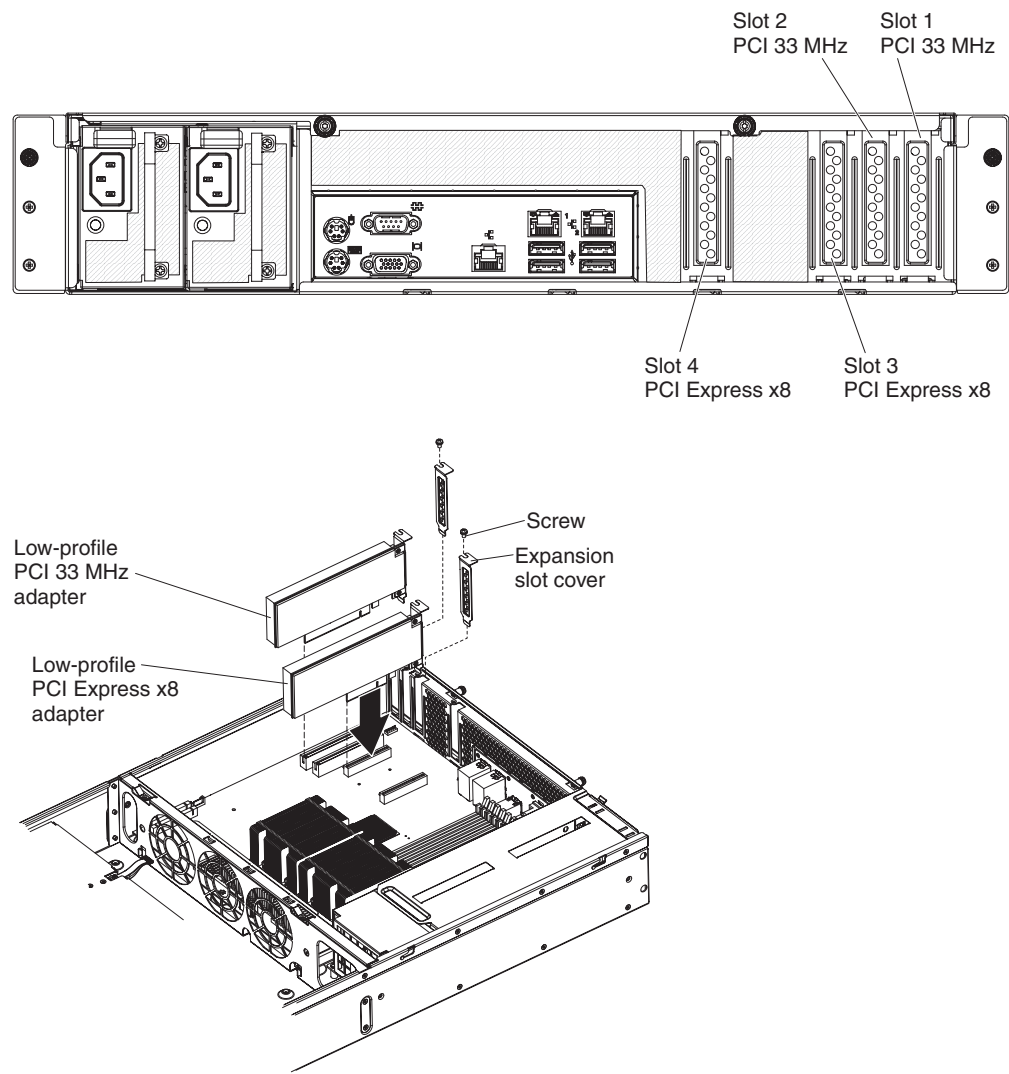
Installing the air duct

To install the air duct, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.

2. Make sure that the server and peripheral devices are turned off (see "Turning off the server" on page 9) and that all power cords and external cables are disconnected.

3. Make sure that the cover has been removed (see "Removing the cover" on page 21).

4. Tilt the front of the air duct down and align the tabs on the air duct with the slots in the fan-bracket assembly.

5. Lower the rear of the air duct into the server.

   Attention: For proper cooling and airflow, replace the air duct before you turn on the server. Operating the server with an air duct removed might damage server components.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Installing an adapter

Slot 4
PCI Express x8

Slot 3
PCI Express x8

Screw

Expansion
slot cover

Low-profile
PCI 33 MHz
adapter

Low-profile
PCI Express x8
adapter

The following notes describe the types of adapters that the server supports and other information that you must consider when installing an adapter:

- You can install only low-profile adapters in the adapter slots on the system board.
- The PCI bus configuration is as follows (see "System-board optional-device connectors" on page 12 for a system-board view of the slots):
  - Non-hot-plug, low-profile PCI Express x8, slot 4
  - Non-hot-plug, low-profile PCI Express x8, slot 3
  - Non-hot-plug, low-profile, half-length, 33 MHz, 3.3 V / 5V PCI, slot 2
  - Non-hot-plug, low-profile, half-length, 33 MHz, 3.3 V / 5V PCI, slot 1
- The system scans devices in the following order, if you have not changed the default boot precedence: PCI slot 3 (PCI Express), PCI slot 4 (PCI Express), integrated Ethernet 1, integrated Ethernet 2, PCI slot 1, PCI slot 2, integrated SAS controller.

To install an adapter, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.

2. Turn off the server and peripheral devices and disconnect all power cords and external cables (see "Turning off the server" on page 9).
3. Remove the cover (see "Removing the cover" on page 21).
4. Determine which expansion slot you will use for the adapter.
5. Remove the screw that holds the expansion-slot cover and slide the cover out of the expansion slot.
6. Install the adapter in the expansion slot.
7. Install the screw that holds the adapter in the expansion slot.
8. Connect any required cables to the adapter.

   Attention:
   • When you route cables, do not block any connectors or the ventilated space around any of the fans.
   • Make sure that cables are not routed on top of components.
   • Make sure that cables are not pinched by the server components.
9. Perform any configuration tasks that are required for the adapter.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Removing an adapter

To remove an adapter, complete the following steps.
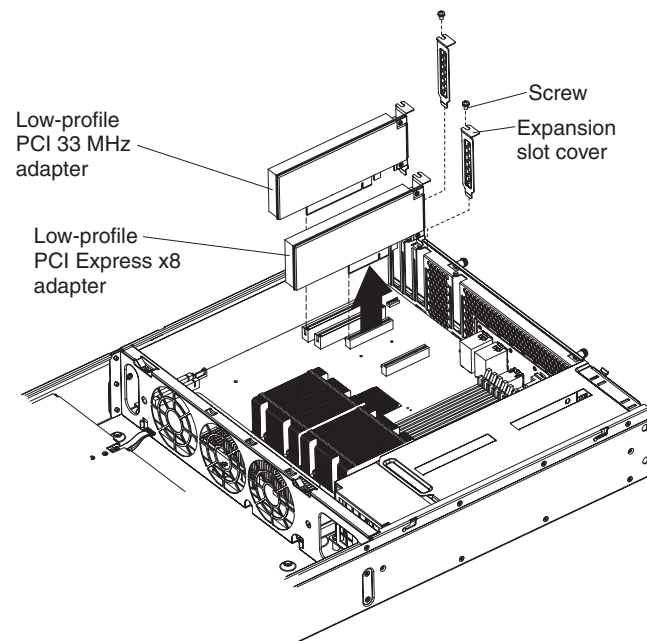
1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables (see "Turning off the server" on page 9).
3. Remove the cover (see "Removing the cover" on page 21).
4. Disconnect any cables from the adapter.
5. Remove the screw that holds the adapter in the slot.

6. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the PCI slot.

7. If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.
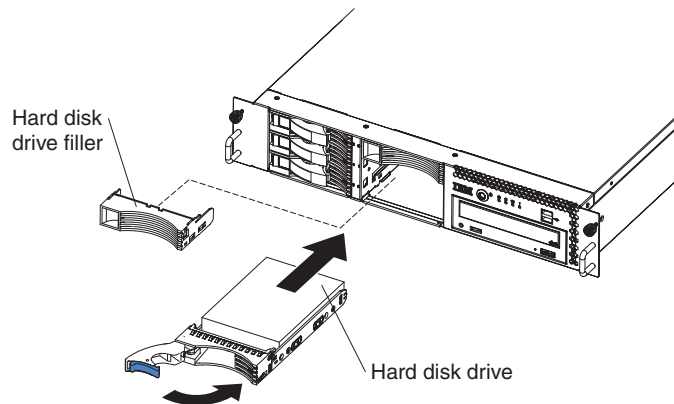
Installing a hard disk drive

Locate the documentation that comes with the hard disk drive and follow those instructions in addition to the instructions in this chapter.

Important: Do not install a SCSI hard disk drive in this server; install only SAS or SATA hard disk drives.

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

- The server supports six slim 3.5-inch hard disk drives. For a list of supported 3.5-inch hard disk drives, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

- All hard disk drives in the server should have the same throughput speed rating. Mixing hard disk drives with different speed ratings will cause all drives to operate at the lower throughput speed.

- The ID that is assigned to each bay is printed on the front of the server.

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

Hard disk drive filler

Hard disk drive

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

Attention: To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each bay.

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.

2. Remove the filler panel from one of the empty hard disk drive bays (insert your finger into the depression at the left side of the filler panel and pull it away from the server).

3. Install the hard disk drive in the hard disk drive bay:

    a. Make sure that the tray handle is open (that is, perpendicular to the drive).

    b. Align the drive assembly with the guide rails in the bay.

    c. Gently push the drive assembly into the bay until the drive stops.

    d. Push the tray handle to the closed (locked) position.

e. Check the hard disk drive status LED to verify 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.

Note: You might have to reconfigure the disk arrays after you install hard disk drives. See "Using the RAID configuration programs" on page 50.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Removing a hard disk drive
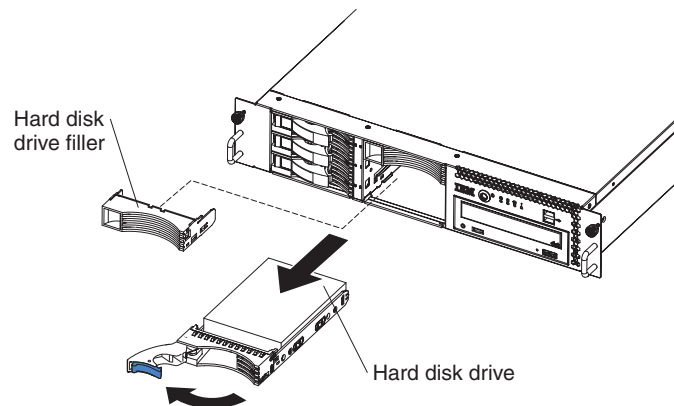
To remove a hot-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Move the handle on the drive to the open position (perpendicular to the drive).
3. Pull the hot-swap drive assembly from the bay.

   Note: You might have to reconfigure the disk arrays after you remove a hard disk drive.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Installing a microprocessor

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

• The server supports certain Intel Xeon® dual-core or quad-core flip-chip land grid array 771 (FC-LGA 771) microprocessors, which are designed for the LGA771 socket. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported microprocessors.

  Important: Dual-core and quad-core microprocessors are not interchangeable and cannot be used in the same server. For example, if the server has a dual-core microprocessor, you cannot install a quad-core microprocessor as the second microprocessor. Use the BIOS Setup Utility program to determine the type and speed of the microprocessor that is currently installed in the server.

At the time of this publication, the following IBM System x3610 server models come with quad-core microprocessors:

– 7942 - 42x
– 7942 - 62x

- The server supports up to two microprocessors. If the server comes with one microprocessor, you can install a second microprocessor.
- Both microprocessors must have the same cache size and type, front-side bus frequency, and clock speed. Microprocessor internal and external clock frequencies must be identical.
- Read the documentation that comes with the microprocessor to determine whether you must update the basic input/output system (BIOS) code for the server. To download the most current level of BIOS code and many other code updates for your server, complete the following steps:
  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **System x3610** to display the matrix of downloadable files for the server.
- (Optional) Obtain an SMP-capable operating system. For a list of supported operating systems and optional devices, see http://www.ibm.com/servers/eserver/ serverproven/compat/us/.
- To order additional microprocessor optional devices, contact your IBM marketing representative or authorized reseller.
- The microprocessor speeds are automatically set for this server; therefore, you do not have to set any microprocessor frequency-selection jumpers or switches.
- If you have to replace a microprocessor, call for service.
- If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink.
- Do not remove the first microprocessor from the system board to install the second microprocessor.

See "System-board optional-device connectors" on page 12 for the location of the microprocessor connectors.

The following illustration shows how to install the second microprocessor on the system board.

Note: For simplicity, certain components are not shown in this illustration.
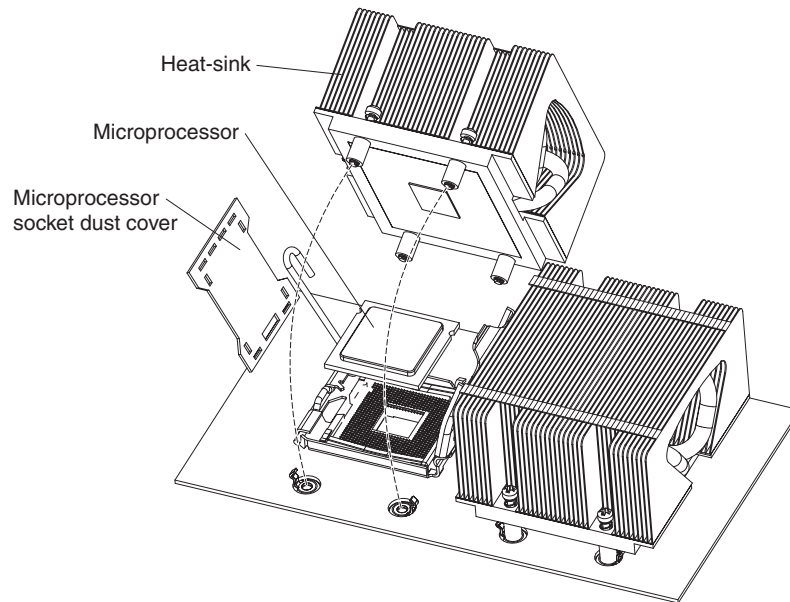

Attention:

- A startup (boot) microprocessor must always be installed in microprocessor connector 1 on the system board.
- To ensure correct server operation when you install an additional microprocessor, use microprocessors that have the same cache size and type, front-side bus frequency, and clock speed. Microprocessor internal and external clock frequencies must be identical.

To install an additional microprocessor, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the server and disconnect all power cords and external cables (see "Turning off the server" on page 9).
3. Remove the server cover (see "Removing the cover" on page 21).
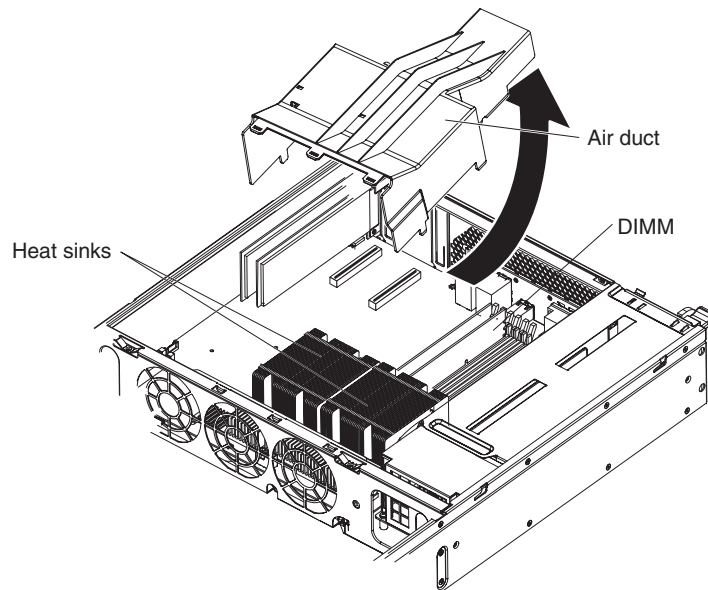
4. Remove the air duct (see "Removing the air duct" on page 22).
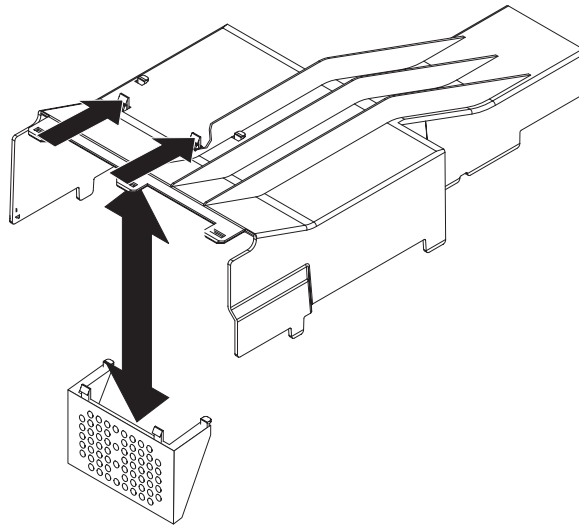
5. Remove the air-baffle insert from the air duct:

   a. From the top of the air duct, push the tabs of the air-baffle insert toward the rear of the air duct until they are free from the slots in the air duct.

   b. Push the air-baffle insert down and out of the air duct.

6. Locate the second microprocessor connector on the system board.

7. Install the microprocessor:

   a. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.
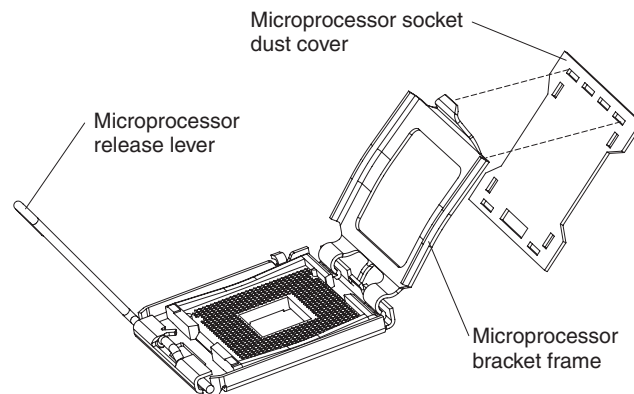
   b. Remove the protective dust cover, tape, or label from the surface of the microprocessor socket, if one is present.

   c. Rotate the microprocessor release lever on the socket from its closed and locked position until it stops in the fully open position.

   d. Lift the microprocessor bracket frame to the open position.

Attention:

- Handle the microprocessor carefully, by the edges only. Dropping the microprocessor during installation or removal can damage the contacts. Also, contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
- Do not use excessive force when you press the microprocessor into the socket.
- Make sure that the microprocessor is correctly aligned and positioned in the socket before you try to close the lever.
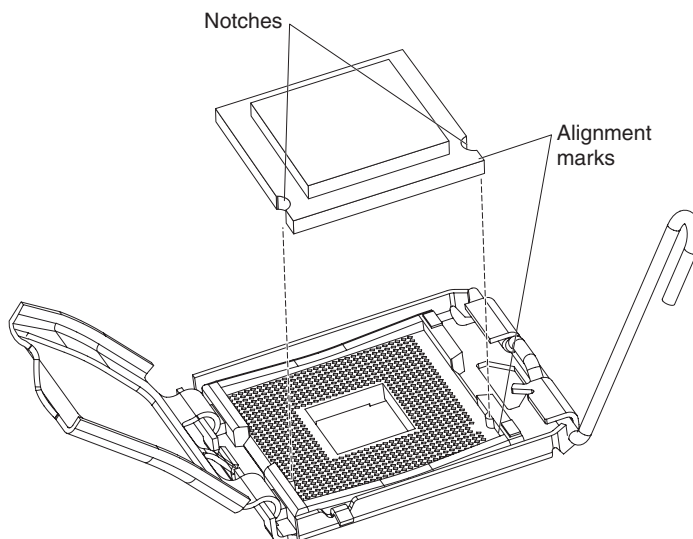
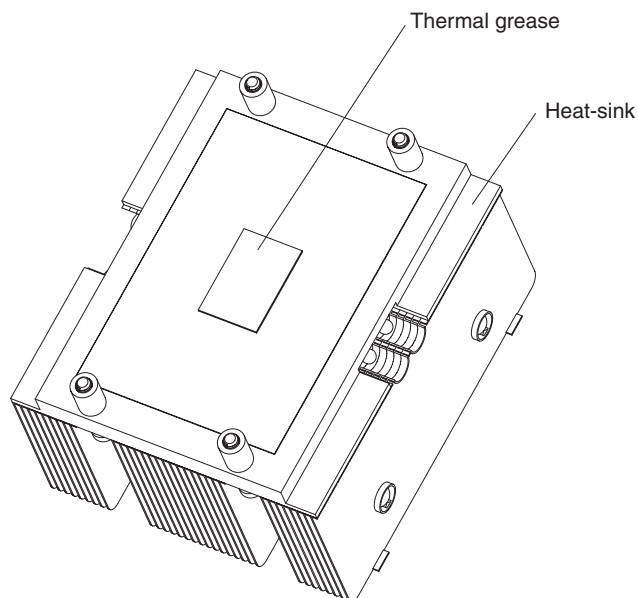e. Align the microprocessor with the socket (note the alignment mark and the position of the notches); then, carefully place the microprocessor on the socket. Close the microprocessor bracket frame.

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

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

8. Install a heat sink on the microprocessor.

Attention: Do not touch the thermal grease on the bottom of the heat sink or set down the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it.

Thermal grease

Heat-sink

a. Remove the plastic protective cover from the bottom of the heat sink.

b. Align the heat sink above the microprocessor with the thermal-grease side down.

Heat-sink

Microprocessor
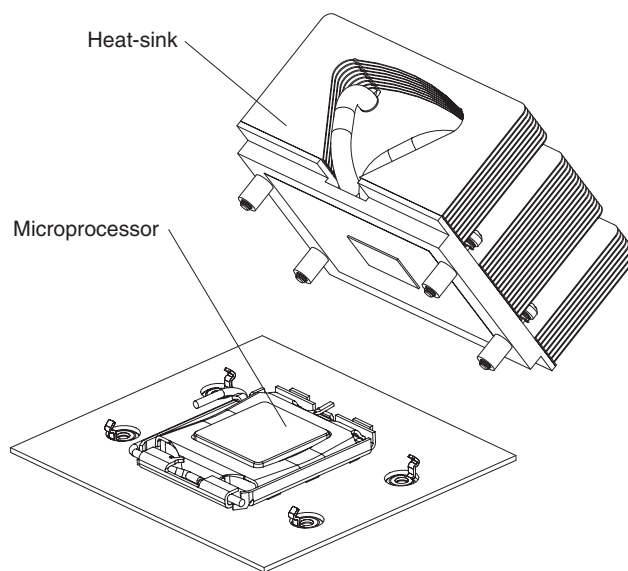
c. Press down firmly on the heat sink until it is seated securely.

d. Tighten the four screws that secure the heat sink to the system board.

9. Install the air duct (see "Installing the air duct" on page 23).

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Installing a memory module

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

- The server supports up to 6 registered 512 MB, 1 GB, 2 GB, and 4 GB DDR2 DIMMs, for a maximum of 16 GB of system memory. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of memory modules that you can use with the server.

  Note: Because some memory is reserved for system operation, the actual usable memory size that is reported by the operating system is less than the total installed size.

- The server comes with a minimum of one 512 MB DIMM, in DIMM connector 1. When you install additional DIMMs, you must install the DIMMs in the order shown in the following tables, to maintain performance.

Table 5. DIMM installation sequence, non-interleaved

DIMM	DIMM connectors
1st	1
2nd	3
3rd	5

Table 6. DIMM installation sequence, interleaved

DIMM pair	DIMM connectors
1st	1 and 2
2nd	3 and 4
3rd	5 and 6
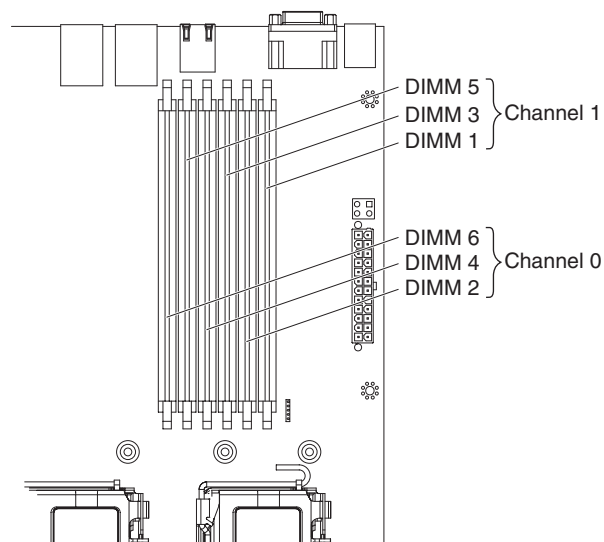
- Each DIMM in a pair must be the same size, speed, type, and technology to ensure that the server will operate correctly.
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.

DIMM Population Rule

Notes:

1. Single rank 4 GB memory is not supported.
2. A rank is defined as an area or block of 64 bits that is created by using some or all of the chips on a DIMM. For an ECC DIMM, a memory rank is a block of 72 data bits (64 bits plus 8 ECC bits).

Table 7. DIMM Configurations

Configuration	Channel 0 DIMM 6	Channel 1 DIMM 5	Channel 0 DIMM 4	Channel 1 DIMM 3	Channel 0 DIMM 2	Channel 1 DIMM 1
1	X	X	Dual rank	Dual rank	Dual rank	Dual rank
2	Single rank	Single rank	Single rank	Single rank	Dual rank	Dual rank
3	Single rank	Single rank	Single rank	Single rank	Single rank	Single rank

DIMM installation priority:

1. Channel 0 DIMM 2 or channel 1 DIMM 1
2. Channel 0 DIMM 4 or channel 1 DIMM 3
3. Channel 0 DIMM 6 or channel 1 DIMM 5

To install a DIMM, complete the following steps.
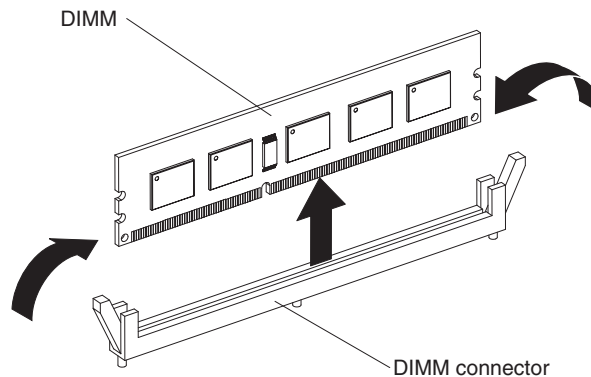
1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see "Removing the cover" on page 21).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
4. Remove the air duct (see "Removing the air duct" on page 22).
5. Open the retaining clip on each end of the DIMM connector.
6. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
7. Turn the DIMM so that the DIMM keys align correctly with the connector.
8. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.
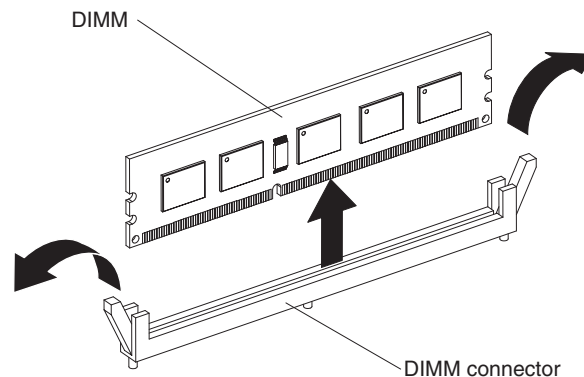
Important: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Removing a memory module

To remove a DIMM, complete the following steps.

DIMM

DIMM connector

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see "Removing the cover" on page 21).
4. Remove the air duct over the DIMMs (see "Removing the air duct" on page 22).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
5. Open the retaining clip on each end of the DIMM connector.
6. Lift the DIMM out of the connector.
7. Replace the DIMM or remove the second DIMM of the pair.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Installing a power supply

The server supports a maximum of two ac power supplies.

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.

Power supply

Power supply filler

Release lever

Release latch
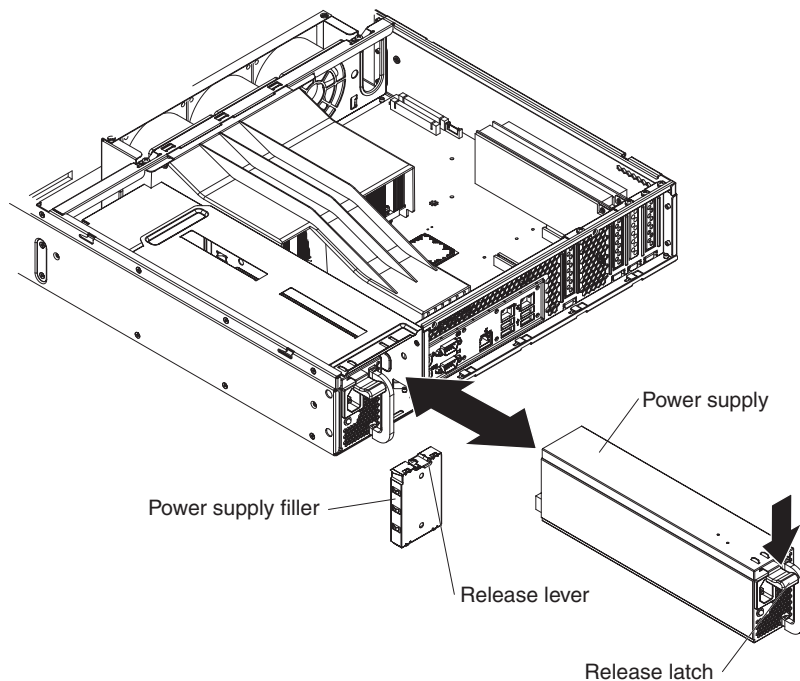
To install an ac power supply, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.

2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.

3. Remove the power-supply blank from the empty power-supply bay by pinching the side clip and pulling the power-supply blank from the bay. Save the power-supply blank in case you remove the power supply at a later time.

   Important: During normal operation, each power-supply bay must contain either a power supply or power-supply blank for proper cooling.

4. Slide the ac power supply into the bay until the retention latch clicks into place.

5. Connect the power cord for the new ac power supply to the power-cord connector on the power supply.

   The following illustration shows the ac power-supply connectors on the back of the server.

Power-cord
connector

Power supply
status LED   Power
                supply 1   Power
                               supply 2
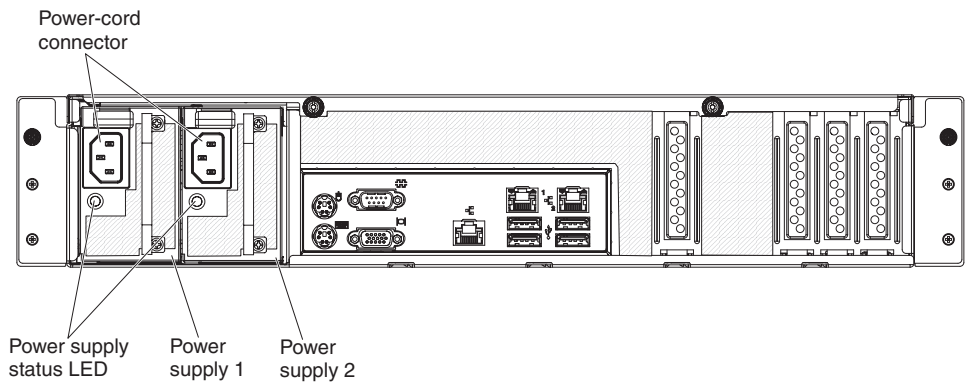
6. Route the power cord through the power-supply handle and through any cable clamps on the rear of the server, to prevent the power cord from being accidentally pulled out when you slide the server in and out of the rack.

7. Connect the power cord to a properly grounded electrical outlet.

8. Make sure that the power supply status LED on the power supply is lit and is green, indicating that the power supply is operating correctly.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Removing a power supply

Important: If the server has two power supplies and you remove either of them, the server will not have redundant power.

Release latch
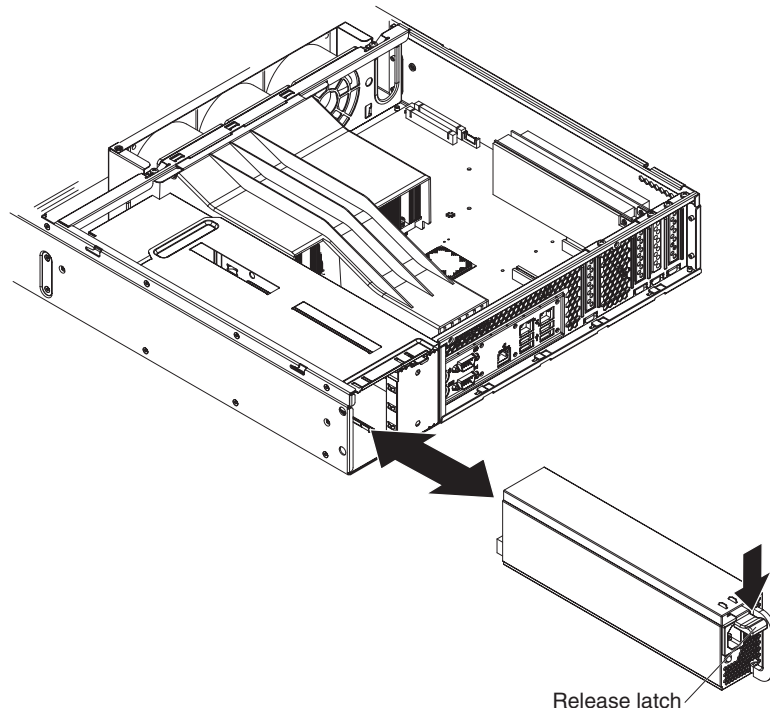
To remove a power supply, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the server and peripheral devices.
3. Disconnect the power cords from the power supplies.
4. Grasp the handle of the power supply that you are removing.
5. Press the orange release latch down and hold it down.
6. Pull the power supply part of the way out of the bay.
7. Release the release latch; then, support the power supply and pull it the rest of the way out of the bay.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Installing a fan

For proper cooling, the server requires that all three fans are functioning.

Attention: To ensure proper server operation, if a fan fails, replace it as soon as possible.

To replace a fan, replace the fan-bracket assembly. See the *Problem Determination and Service Guide* for instructions for removing and installing the fan-bracket assembly.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Removing a fan

The server comes with three replaceable fans.

**Attention:** To ensure proper server operation, if a fan fails, replace it as soon as possible.

To replace a fan, replace the fan-bracket assembly. See the instructions in the *Problem Determination and Service Guide*.

If you have other optional devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 39.

Cabling the hot-swap hard disk drive backplane

If for any reason you disconnected the SAS power and signal cables from the hot-swap hard disk drive SAS backplane or the system board, be sure to reconnect the cables as shown in the following illustration.
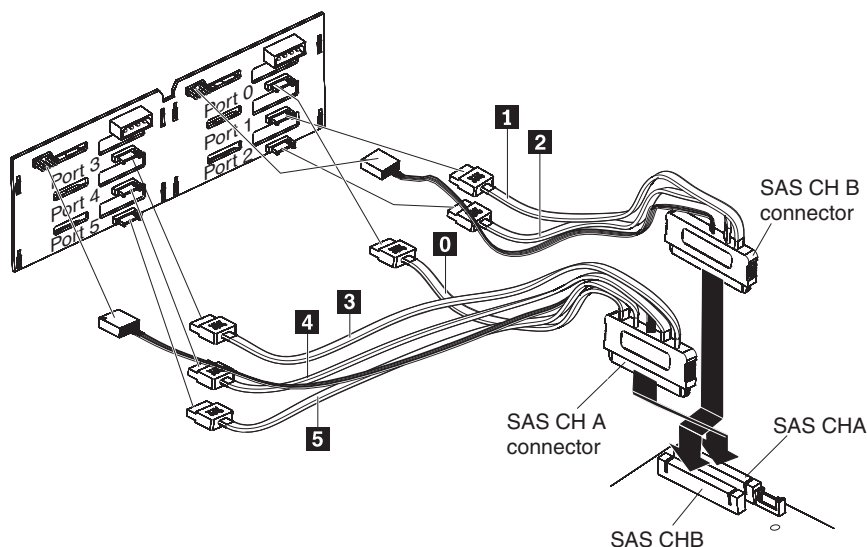
1. Connect the SAS power and signal cables to the backplane as shown in the illustration. Each signal cable has a numbered label on it. Be sure to connect the cable that is labeled "0" to port 0 on the backplane, cable "1" to port 1, and so on.

2. Route the other end of the cables along the front of the fans to the left side of the server and through the opening in the fan bracket assembly to the SAS connectors on the system board. See "System-board optional-device connectors" on page 12 for the locations of the SAS channel A and SAS channel B connectors on the system board.

3. Connect the SAS CH A cable connector to the SAS CHA connector on the system board. Connect the SAS CH B cable connector to the SAS CHB connector on the system board. Note that you must cross the cables to connect them to the correct system-board connectors.

Completing the installation

To complete the installation, complete the following steps:

1. If you disconnected any hard disk drive SAS signal or power cables from the hard disk drive backplane or the system board, reconnect the cables (see "Cabling the hot-swap hard disk drive backplane").

2. If you removed the air duct, replace the air duct (see "Installing the air duct" on page 23).

3. If you removed the server cover, replace the cover (see "Installing the cover" on page 40).

4. Install the server in a rack. See the *Rack Installation Instructions* that come with the server for complete rack installation and removal instructions.

5. To attach peripheral devices and connect the power cords, see "Connecting the cables" on page 40.

6. If necessary, configure the server for any changes (see "Updating the server configuration" on page 41).

Installing the cover
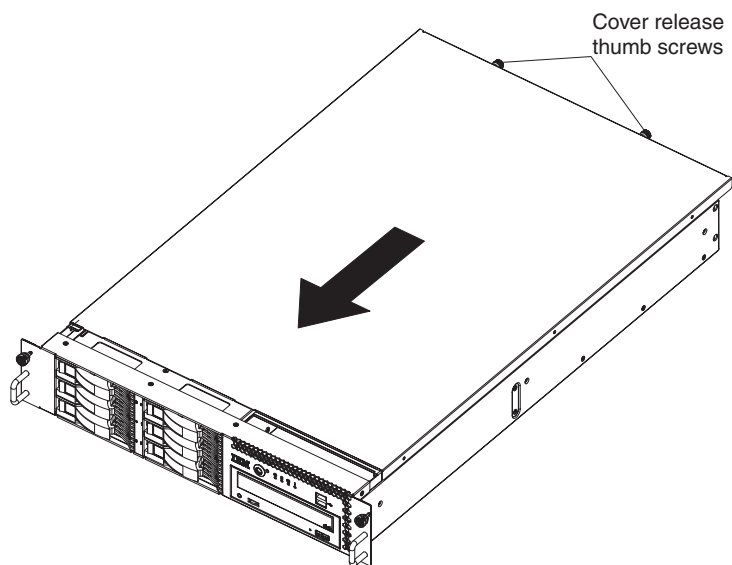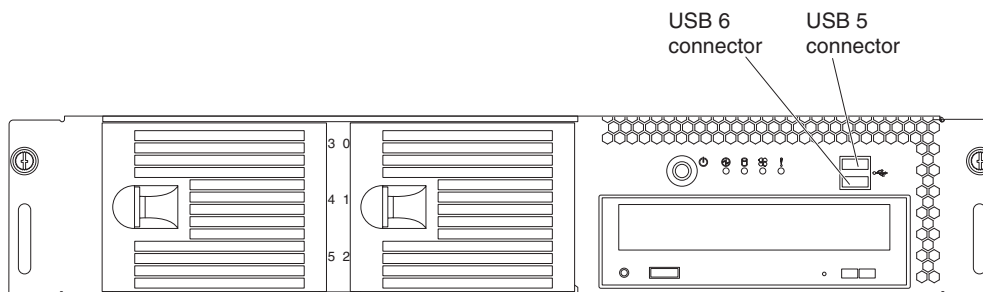

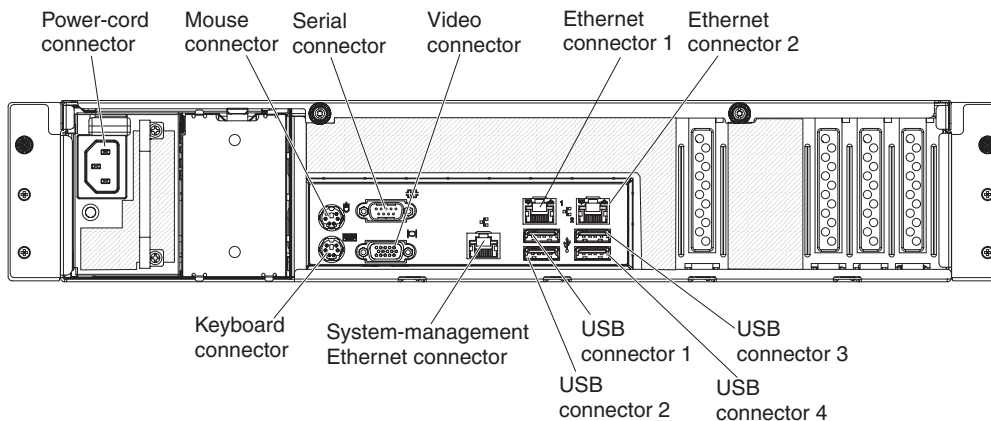To install the cover, place it into position and slide it forward; then, tighten the cover-release thumbscrews.

Connecting the cables

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

Front view

Rear view

You must turn off the server before you connect or disconnect cables from the server.

See the documentation that comes with any external devices for additional cabling instructions. It might be easier for you to route cables before you connect the devices to the server.

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

Updating the server configuration

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

The server comes with at least one dual-core microprocessor, which enables the server to operate as a symmetric multiprocessing (SMP) server. You might have to upgrade the operating system to support SMP. For more information, see "Using the ServerGuide Setup and Installation CD" on page 47 and the operating-system documentation.

If you have installed or removed a hard disk drive, see "Using the RAID configuration programs" on page 50 for information about reconfiguring the disk arrays.

For information about configuring the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controllers" on page 62.

Chapter 3. Configuring the server

The following configuration programs and capabilities come with the server:

- **IBM *ServerGuide Setup and Installation* CD**

  The ServerGuide program provides software-setup tools and installation tools that are designed for the server. Use this CD during the installation of the server to configure basic hardware features and to simplify the installation of your operating system. For information about using this CD, see "Using the ServerGuide Setup and Installation CD" on page 47.

  Note: If the *ServerGuide Setup and Installation* CD did not come with your server, you can download the necessary device drivers from the IBM Web site. See the instructions on page 17.

- **BIOS Setup Utility program**

  The BIOS Setup Utility program is part of the basic input/output system (BIOS). Use it to configure hardware such as serial port assignments, change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, configure the LAN connections for IPMI, view and clear error logs, and set passwords. For information about using this program, see "Using the BIOS Setup Utility program" on page 43.

- **RAID configuration programs**

  - **LSI Logic Configuration Utility program**

    Use the LSI Logic Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays. For information about using this program, see "Using the LSI Logic Configuration Utility program" on page 50.

  - **LSI Logic MegaRAID Storage Manager program**

    Use LSI Logic MegaRAID Storage Manager program to monitor and manage the disk-array subsystem after you install the operating system. For information about using this program, see "Using the LSI Logic MegaRAID Storage Manager program" on page 50.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controllers, see "Configuring the Gigabit Ethernet controllers" on page 62.

- **Baseboard management controller utility programs**

  Use these programs to configure the baseboard management controller, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using these programs, see "Using the baseboard management controller" on page 50.

Using the BIOS Setup Utility program

Use the BIOS Setup Utility program to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords
- Set and change the startup characteristics of the server and the order of startup devices (startup-drive sequence)
- Set and change settings for advanced hardware features

- View and clear the error and event logs
- Resolve configuration conflicts

Starting the BIOS Setup Utility program

To start the BIOS Setup Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt `Press F1 for BIOS Setup` appears, press F1. If you have set both a user password and a supervisor password, you must type the supervisor password to access the full BIOS Setup Utility menu. If you do not type the supervisor password, a limited BIOS Setup Utility menu is available.
3. Select the settings to view or change.

BIOS Setup Utility menu choices

The following choices are on the BIOS Setup Utility main window taskbar. Depending on the version of the BIOS code, some taskbar choices might differ slightly from these descriptions.

- **Main**

  Select this choice to view system information, such as the machine type and model, serial number, UIID, system board identifier, asset tag number; information about the BIOS, microprocessors, system memory size; and to view or change the system date and time. This is the default page that is displayed when you start the BIOS Setup Utility program.

- **Advanced**

  Select this choice to view or configure advanced features for the server hardware and software.

  – **CPU configuration**

    Configure advanced features for the microprocessors.

  – **SATA configuration**

    View each recognized SATA device, and configure SATA as disabled, enhanced or compatible.

  – **Super I/O configuration**

    Select the base address for the serial port used by the Super I/O chipset.

  – **USB configuration**

    View the USB configuration and enable or disable USB functions and legacy USB support.

  – **ACPI configuration**

    View and change the settings in the Advanced Configuration And Power Interface (ACPI), such as whether to enable support for the advanced programmable interrupt controller (APCI).

  – **APM configuration**

    View and change the settings in the advanced power management (APM) configuration, such as whether the server should automatically restart when ac power is restored.

  – **Event log configuration**

    View the event log, clear the event log, or enable or disable PCI Express advanced error logging.

  – **IPMI configuration**

    View and change the settings in the intelligent platform management interface (IPMI) configuration: view the version of IPMI and the version of BMC

firmware; view and change the addresses and subnet mask for the LAN configuration; view or clear the BMC system event log; specify whether the BMC resets the server or powers down the server in the event the operating system crashes or fails to respond (enable or disable the BMC watchdog timer action).

– **Remote Access configuration**

Configure the type of remote access and the parameters for remote access, such as the serial port and mode used.

– **Memory settings**

View recognized DIMMs and enable a DIMM after it replaces a failed DIMM.

– **NMI auto reboot**

Configure whether the server automatically restarts when it receives a non-maskable interrupt.

- **PCIPnP**

  Select this choice to view or change advanced settings for the PCI bus and plug and play (PnP) interface. You can change the master latency timer value, clear non-volatile RAM, specify whether BIOS or the operating system should configure all the devices in the server, and enable or disable the integrated SAS controller.

- **Boot**

  Select this choice to specify the server startup options, including the boot device sequence, type, and priority.

- **Security**

  Select this choice to specify the supervisor password and user (power-on) password.

- **Chipset**

  Select this choice to specify the advanced options for the memory controller chipset.

- **Exit**

  Select this choice to save your changes and exit the BIOS Setup Utility program, discard your changes and exit, discard your changes without exiting the program, or to load the default values for all the setup options.

Passwords

From the **Security** choice, you can set, change, and delete a user (power-on) password and a supervisor password.

If you set only a user password, you must type the user password to complete the system startup.

A supervisor password is intended to be used by a system administrator; it limits access to the configuration choices. If you set only a supervisor password, you do not have to type a password to complete the system startup, but you must type the supervisor password to access all the BIOS Setup Utility program configuration choices.

If you set a user password for a user and a supervisor password for a system administrator, you can type either password to complete the system startup. A system administrator who types the supervisor password has access to the full BIOS Setup Utility program configuration choices; the system administrator can give the user authority to set, change, and delete the user password. A user who types

the user password has access to only the limited BIOS Setup Utility program configuration choices; the user can set, change, and delete the user password, if the system administrator has given the user that authority.

User password

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

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

- If a supervisor password is set, type the supervisor password at the password prompt (see "Supervisor password"). Start the BIOS Setup Utility program and reset the user password.
- Remove the battery from the server and then reinstall it. For instructions for removing the battery, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.
- While the server is connected to power but is not turned on, press the clear CMOS button on the system board to bypass the user password check. See "Resetting passwords" for additional information.

Supervisor password

If a supervisor password is set, you must type the supervisor password for access to the full BIOS Setup Utility settings. You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the password.

If you forget the supervisor password, you can reset it after you press the clear CMOS button. See "Resetting passwords" for additional information.

Resetting passwords

If you forget the user or supervisor password, you can press the clear-CMOS switch (button) on the system board, to clear CMOS memory and bypass the user or supervisor password check. The clear-CMOS switch is switch 2 (SW2) on the system board. The switch location is shown in the following illustration.

Switch 4 (SW4)
Switch 3 (SW3)
Switch 2 (SW2)
Switch 1 (SW1)
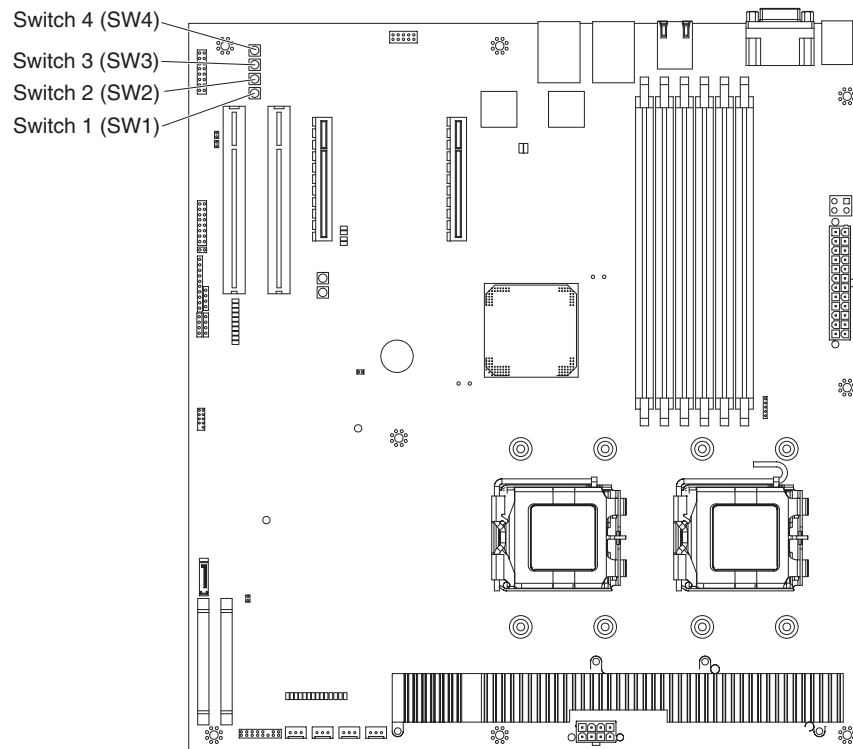
To clear CMOS and reset the passwords, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Connect the external cables and power cords.
5. Remove the cover. See "Removing the cover" on page 21 for instructions.
6. Press the clear-CMOS button (SW2) once.
7. Install the cover.
8. Turn on the server. You can now start the BIOS Setup Utility program and either delete the old password or set a new user or supervisor password.
9. Save the configuration and turn off the server; then, disconnect all power cords and external cables again.
10. Replace the server in the rack and connect the external cables and power cords; then, turn on the server.

Using the ServerGuide Setup and Installation CD

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

Note: If the *ServerGuide Setup and Installation* CD did not come with your server, you can download the necessary device drivers from the IBM Web site. See the instructions on page 17.

If a later version of the ServerGuide program is available, you can download a free image of the *ServerGuide Setup and Installation* CD, or you can purchase the CD. To download the image, go to the IBM ServerGuide Web page at http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html. To purchase the latest *ServerGuide Setup and Installation* CD, go to the ServerGuide fulfillment Web site at http://www.ibm.com/servers/eserver/xseries/systems_management/sys_migration/serverguide/sub.html.

The ServerGuide program has the following features:
- An easy-to-use interface
- Diskette-free setup, and configuration programs that are based on detected hardware
- Device drivers that are provided for your server model and detected hardware
- Operating-system partition size and file-system type that are selectable during setup

ServerGuide features

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

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

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

Setup and configuration overview

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

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

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

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

Typical operating-system installation

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

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

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

Installing your operating system without ServerGuide

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. From the menu on the left side of the page, click **System x support search**.
4. From the **Task** menu, select **Install**.
5. From the **Product family** menu, select **System x3610**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents

Using the RAID configuration programs

Use the LSI Logic Configuration Utility program and the LSI Logic MegaRAID Storage Manager program to configure and manage redundant array of independent disks (RAID) arrays. The following notes describe information that you must consider:

- The SATA connectors on the system board support RAID level-0, level-1, and level-1E.
- An optional ServeRAID controller can provide additional RAID support to the hot-swap drives.
- Hard disk drive capacities affect how you create arrays. Drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- To help ensure signal quality, do not mix drives with different speeds and data rates.
- To update the firmware and BIOS code for an optional ServeRAID SAS controller, you must use the IBM *ServeRAID Support* CD that comes with the ServeRAID optional device.

Using the LSI Logic Configuration Utility program

Use the LSI Logic Configuration Utility programs to perform the following tasks:

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

To start the LSI Logic Configuration Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt `Press CTRL-C to start LSI Logic Configuration Utility...` appears, press Ctrl+C. If you have set a supervisor password, you are prompted to type the password.
3. Use the arrow keys to select the controller for which you want to change settings. Use the Help function to see instructions and available actions for this screen.
4. To change the settings of the selected items, follow the instructions on the screen.
5. When you have finished changing settings, press Esc to exit the program; select Save to save the settings that you have changed.

Using the LSI Logic MegaRAID Storage Manager program

Use the LSI Logic MegaRAID Storage Manager program to monitor and manage the disk-array subsystem connected to the integrated SAS controller with RAID capabilities and the optional ServeRAID controller device. The LSI Logic MegaRAID Storage Manager program, device drivers, and information come with the server.

Using the baseboard management controller

Note: You can update the baseboard management controller (BMC) firmware to the latest version by logging into the BMC and applying the IPMI code image file from the Web server. See "Updating the baseboard management controller firmware" on page 51 for the instructions to update the BMC firmware.

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

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

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

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

- **Serial over LAN**

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

Updating the baseboard management controller firmware

Complete the following steps to log in to the BMC and update the firmware:

1. Get the IP address of the BMC from the BIOS Setup Utility program (select **Advanced → IPMI Configuration → LAN Configuration → IP Address**).
2. Enter the IP address of the BMC in your Web browser **Address** field. The resulting BMC Firmware Update dialog displays the current version of the BMC firmware.
3. In the BMC Firmware Update dialog, enter your user name and password.
4. For **Image Type**, make sure that **IPMI** is selected.
5. For **Update Type**, select **Update**.
6. For **Firmware Image**, browse to the IPMI code image file for Web updating, and select the file; then, click **Apply**. A `Firmware Updating...` message is displayed while the files are being updated.
7. When the `Firmware Update Successful...` message is displayed, click **Reboot**.
8. After the BMC has rebooted with the updated firmware, log in to the BMC again to see the version number of the updated BMC firmware.

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; update and configure the baseboard management controller (BMC) firmware; update and configure the Ethernet controller firmware; and enable the operating system for an SOL connection.

BIOS update and configuration

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/systems/support/

b. Update the BIOS code, following the instructions that come with the update file that you downloaded.

2. Update the BMC firmware:

a. Download the latest version of the BMC firmware from http://www.ibm.com/systems/support/

b. Update the BMC firmware, following the instructions that come with the update file that you downloaded.

3. Configure the BIOS settings:

a. When you are prompted to start the BIOS Setup Utility program, restart the server and press F1.

b. In the BIOS Setup Utility program, make sure that the following remote access items have the following values:

- Remote access: Enabled
- Serial port number: COM1
- Base address, IRQ: 3F8h, 4
- Serial port mode: 19200 8,n,1
- Flow control: None
- Redirection after BIOS POST: Always
- Terminal type: ANSI
- VT-UTF8 combo key support: Enabled
- Sredir memory display delay: No delay

Linux configuration

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

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

Red Hat Enterprise Linux ES 4 configuration:

Note: This procedure is based on a default installation of Red Hat Enterprise Linux ES 4. 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 you are using the Red Hat Enterprise Linux ES 4 operating system, complete the following steps.

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

1. Add the following line to the end of the `# Run gettys in standard runlevels` section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.

   `7:2345:respawn:/sbin/agetty -h ttyS0 19200 vt102`

2. Add the following line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:

   `ttyS0`

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

1. Modify the /etc/lilo.conf file:

    a. Add the following text to the end of the first `default=linux` line

       `-Monitor`

    b. Comment out the `map=/boot/map` line by adding a # at the beginning of this line.

    c. Comment out the `message=/boot/message` line by adding a # at the beginning of this line.

    d. Add the following line before the first `image=` line:

       `# This will allow you to only Monitor the OS boot via SOL`

    e. Add the following text to the end of the first `label=linux` line:

       `-Monitor`

    f. Add the following line to the first `image=` section. This enables SOL.

       `append="console=ttyS0,19200n8 console=tty1"`

    g. Add the following lines between the two `image=` sections:

       ```
       # This will allow you to Interact with the OS boot via SOL
       image=/boot/vmlinuz-2.4.9-e.12smp
           label=linux-Interact
           initrd=/boot/initrd-2.4.9-e.12smp.img
           read-only
           root=/dev/hda6
           append="console=tty1 console=ttyS0,19200n8 "
       ```

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

Original /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=ttyS0,19200n8 console=tty1"
# This will allow you to Interact with the OS boot via SOL
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux-Interact
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
    append="console=tty1 console=ttyS0,19200n8 "
image=/boot/vmlinuz-2.4.9-e.12
    label=linux-up
    initrd=/boot/initrd-2.4.9-e.12.img
    read-only
    root=/dev/hda6
```

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

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

GRUB configuration: If you are using GRUB, modify the /boot/grub/grub.conf file:

1. Comment out the `splashimage=` line by adding a `#` at the beginning of this line.
2. Add the following line before the first `title=` line:
   ```
   # This will allow you to only Monitor the OS boot via SOL
   ```
3. Append the following text to the first `title=` line:
   ```
   SOL Monitor
   ```
4. Append the following text to the `kernel/` line of the first `title=` section:
   ```
   console=ttyS0,19200 console=tty1
   ```
5. Add the following five lines between the two `title=` sections:
   ```
   # This will allow you to Interact with the OS boot via SOL
   title Red Hat Linux (2.4.9-e.12smp) SOL Interactive
        root (hd0,0)
   kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=tty1
   ```

```
                    console=ttyS0,19200
                    initrd /initrd-2.4.9-e.12smp.img
```

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

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

Original /boot/grub/grub.conf contents

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

Modified /boot/grub/grub.conf contents

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

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

SUSE SLES 9.0 configuration:

Note: This procedure is based on a default installation of SUSE Linux Enterprise Server (SLES) 9.0. The file names, structures, and commands might be different for other versions of SUSE Linux.

Configure the general Linux parameters for SOL operation when using the SLES 9.0 operating system.

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

1. Add the following line to the end of the `# getty-programs for the normal runlevels` section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.

   `7:2345:respawn:/sbin/agetty -h ttyS0 19200 vt102`

2. Add the following line after the `tty6` line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:

   `ttyS0`

3. 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=tty0`

   e. Add the following four lines between the first two `title` sections:

      ```
      # This will allow you to Interact with the OS boot via SOL
      title linux SOL Interactive
          kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791
          console=tty1 console=ttyS0,19200
          initrd (hd0,1)/boot/initrd
      ```

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

Original /boot/grub/menu.lst contents	Notes

```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```
 ``` kernal (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```
	
	1
	
	1

Note 1: The kernel line is shown with a line break. In your file, the entire entry must all be on one line.

Modified /boot/grub/menu.lst contents	Notes

```#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=ttyS0,19200```
 ``` initrd (hd0,1)/boot/initrd```
	
	1

Modified /boot/grub/menu.lst contents	Notes
| ```
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
``` | 1 |
| **Note 1:** The kernel line is shown with a line break. In your file, the entire entry must all be on one line. | |

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

Microsoft Windows 2003 Standard Edition configuration

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

To configure the Windows 2003 operating system for SOL operation, complete the following steps. 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 your server.

   b. In the `Boot Entries` section, locate the boot entry ID for the section with an OS friendly name of Windows Server 2003, Standard. Write down the boot entry ID for use in the next step.

2. To enable the Microsoft Windows Emergency Management System (EMS), at a Windows command prompt, type

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

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

3. Verify that the EMS console is redirected to the COM1 serial port:

   a. Type `bootcfg` at a Windows command prompt; then, press Enter to display the current boot options for your server.

   b. Verify the following changes to the bootcfg settings:

   - In the `Boot Loader Settings` section, make sure that `redirect` is set to `COM1` and that `redirectbaudrate` is set to `19200`.

   - In the `Boot Entries` section, make sure that the `OS Load Options:` line has `/redirect` appended to the end of it.

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

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

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

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

Installing the OSA SMBridge management utility program

Important: To obtain maximum benefit from the OSA SMBridge management utility program, install and load the program *before* problems occur.

To install the OSA SMBridge management utility program on a server running a Windows operating system, complete the following steps:

1. Go to http://www.ibm.com/systems/support/ and 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/systems/support/. Download the utility program and create the OSA BMC Management Utility CD.

2. Insert the OSA BMC Management Utility CD into the drive.

3. Type `mount/mnt/cdrom`.

4. Locate the directory where the installation RPM package is located and type `cd/mnt/cdrom`.

5. Type the following command to run the RPM package and start the installation:

   ```
   rpm -I've 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/Liscense.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 sensor data record/field replaceable unit (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.

Note: You must attach an optional USB diskette drive to the server to run this program.

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 and apply a baseboard management controller firmware update and SDR/FRU data update. The firmware update utility program updates the baseboard management controller firmware and SDR/FRU data only and does not affect any device drivers.

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

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

Using the OSA SMBridge management utility program

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

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

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

Use the following commands in CLI mode:

– **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*.

– **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).

Configuring the Gigabit Ethernet controllers

The Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10-Mbps, 100-Mbps, or 1-Gbps network and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. To download device drivers from the IBM Web site, see the instructions on page 17. To find updated information about configuring the controllers, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.

3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3610** and click **Continue**.

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

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

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

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

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

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

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

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

Battery return program

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

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

For Taiwan: Please recycle batteries.

For the European Union:

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

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

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

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

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

This notice is provided in accordance with Royal Decree 106/2008 of Spain: The retail price of batteries, accumulators, and power cells includes the cost of the environmental management of their waste.

For California:

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

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

Chinese Class A warning statement

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

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