IBM xSeries 306m Types 8849 and 8491

IBM

User's Guide

IBM xSeries 306m Types 8849 and 8491

IBM

User's Guide

Note:

Before using this information and the product it supports, be sure to read the general information in "Notices," on page 51.

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.

v

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

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

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

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

Statement 1:

DANGER

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

To Connect:	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.

Statement 4:

≥ 18 kg (39.7 lb)   ≥ 32 kg (70.5 lb)   ≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power
supply do not turn off the electrical current supplied to the device. The device
also might have more than one power cord. To remove all electrical current
from the device, ensure that all power cords are disconnected from the power
source.
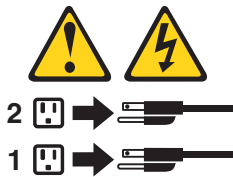
Statement 8:

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

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

Statement 10:

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

>82 kg (180 lb)

Attention: 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.

Chapter 1. The xSeries 306m Types 8849 and 8491 server

The IBM® xSeries® 306m Type 8849 and Type 8491 server is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, and flexibility.

Performance, ease of use, and reliability 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 business needs.

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 Enterprise 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 5.

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

Related documentation

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

*   *Installation Guide*

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

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

    This printed document contains instructions for installing the server in a rack.
*   *Problem Determination and Service Guide*

    This document is in PDF on the IBM *xSeries 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 *xSeries Documentation* CD.

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

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

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

1. Go to http://www.ibm.com/support/.
2. Under **Search technical support**, type **xSeries 306m** and click **Search**.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

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

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.

Table 1. Features and specifications

Microprocessor:	Power supply:	Heat output:

One Intel® LGA 775 Pentium® IV w/ 1024 KB (minimum) Level-2 cache
Note: Use the Configuration/Setup Utility program to determine the type and speed of the microprocessor.
 	
Memory:
• Minimum: 512 MB
• Maximum: 8 GB
• Type: PC4200, 533 MHz, ECC, DDR II unbuffered SDRAM DIMMs only
• Slots: Four dual inline
• Supports 512 MB, 1 GB, and 2 GB DIMMs
 	
Drives:
 	
CD/DVD: Ultrabay Enhanced
 	
Expansion bays:
 	
Two 3.5-inch slim-high bays for hard disk drives.
• Hot-swap models: Supports maximum of two serial-attached SCSI (SAS) drives or two serial ATA (SATA) drives
• Simple-swap models: Supports maximum of two SATA drives
 	
Expansion slots:
• Two 66/100 MHz/64-bit PCI-X slots
• Upgradable to one PCI Express x8 slot and one 66/100 MHz/64-bit PCI-X slot
 	
Video controller:
• ATI RN50B video on system board
• Compatible with SVGA and VGA
• 16 MB DDR video memory
	350 watt (110 or 220 V ac auto-sensing)
	
	Size:
	• Height: 43 mm (1.70 inches)
	• Depth: 559 mm (22 inches)
	• Width: 440 mm (17.32 inches)
	• Maximum weight: 12.7 kg (28 lb) depending on your configuration
	
	Integrated functions:
	• Two Broadcom NetXtreme™ GB Ethernet controllers on the system board with Wake on LAN® support
	• Serial port
	• Four USB ports (two on front and two on rear of server)
	• Keyboard port
	• Mouse port
	
	Hard disk controllers:
	• Serial ATA (SATA) controller with integrated RAID (simple-swap SATA models)
	• Serial-attached SCSI (SAS) controller with integrated RAID (hot-swap SAS/SATA models)
	
	Acoustical noise emissions:
	• Sound power, idling: 65 decibel maximum
	• Sound power, operating: 65 decibel maximum
	
	Environment:
	• Air temperature:
	  – Server on: 10° to 35°C (50.0° to 95.0°F); altitude: 0 to 914 m (2998.7 ft)
	  – Server off: -40° to 60°C (-104° to 140°F); maximum altitude: 2133 m (6998.0 ft)
	• Humidity:
	  – Server on: 8% to 80%
	  – Server off: 8% to 80%
		Approximate heat output in British thermal units (Btu) per hour:
		• Minimum configuration: 341 Btu (100 watts) per hour
		• Maximum configuration: 1024 Btu (300 watts) per hour
		
		Electrical input:
		• Sine-wave input (47-63 Hz) required
		• 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: 0.102 kVA
		  – Maximum: 0.55 kVA
		
		Notes:
		
		1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.
		
		2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

What your server offers

The server uses the following features and technologies:

- **Baseboard management controller**

  The baseboard management controller 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. Critical errors are also included in the error log.

- **IBM Director**

  IBM Director is a workgroup-hardware-management tool that you can use to centrally manage xSeries servers. For more information, see the IBM Director documentation on the *IBM Director* CD.

- **IBM Enterprise 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 memory bus supports up to 8 GB of system memory. The memory controller supports error correcting code (ECC) for up to four industry-standard PC4200, 533 MHz, ECC, double-data-rate (DDR) II unbuffered synchronous dynamic random access memory (SDRAM) 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 32-bit Windows® operating system. The ServerGuide program detects installed hardware options 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 33.

- **Integrated network support**

  The server comes with an integrated Intel Gigabit controller, which supports connection to a 10-Mbps, 100-Mbps, or 1000-Mbps network. For more information, see "Configuring the Gigabit Ethernet controllers" on page 48.

- **Large data-storage capacity**

  The server supports up to two 25.4-mm (1-inch) slim-high, 3.5-inch hard disk drives (Serial Advanced Technology Attachment (SATA) or serial-attached SCSI (SAS), depending on server model).

- **ServeRAID™ support**

  The server supports ServeRAID adapters to create redundant array of independent disks (RAID) configurations.

- **Systems-management capabilities**

  The server supports an optional IBM Remote Supervisor Adapter II. When this adapter is used with the integrated baseboard management controller that comes with the server, you can manage the functions of the server locally and remotely. The Remote Supervisor Adapter II also provides system monitoring, event recording, and dial-out alert capability.

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:

- Advanced Configuration and Power Interface (ACPI)
- Advanced Desktop Management Interface (DMI) features
- Intelligent Platform Management Interface (IPMI) 1.5 support providing secure remote power on/power off and seven standard alerts for components such as fans, voltage, and thermals
- Automatic restart after power failure
- Auto-restart initial program load (IPL)
- Boot-block recovery
- Built-in, menu-driven configuration and setup programs
- Cooling fans with speed-sensing capability
- Customer-upgradeable basic input/output system (BIOS) code
- ECC memory
- Error codes and messages
- Menu-driven diagnostic programs on CD
- Monitoring support for temperature, voltage, and fan speed
- Parity checking on the SAS bus and PCI bus
- Power-on self-test (POST)
- Read-only memory (ROM) checksums
- SDRAM with serial presence detect (SPD)
- Server management
- Standby voltage for system management features and monitoring
- System error log (with an optional Remote Supervisor Adapter II installed)
- Vital product data (VPD); includes information stored in nonvolatile memory for easier remote viewing
- Wake on LAN

IBM Director

With IBM Director, a network administrator can perform the following tasks:

- View the hardware configuration of remote systems, in detail
- Monitor the usage and performance of critical components, such as microprocessors, disks, and memory
- Centrally manage individual or large groups of IBM and non-IBM Intel-based servers, desktop computers, workstations, and mobile computers on a variety of platforms

IBM Director provides a comprehensive entry-level workgroup hardware manager. Key features include:

- Advanced self-management capabilities for maximum system availability
- Multiple operating-system platform support, including Microsoft® Windows 2000 Server, Windows XP Professional, Red Hat Linux, SUSE LINUX, and Novell

NetWare. For a complete list of operating systems that support IBM Director, see the IBM Director Compatibility Document. This document is in Portable Document Format (PDF) at http://www.ibm.com/servers/eserver/xseries/ systems_management/sys_migration/ibmdiragent.html. It is updated every 6 to 8 weeks.

- Support for IBM and non-IBM servers, desktop computers, workstations, and mobile computers
- Support for systems-management industry standards
- Integration into leading workgroup and enterprise systems-management environments
- Ease of use, training, and setup

IBM Director also provides an extensible platform that supports advanced server tools that are designed to reduce the total cost of managing and supporting networked systems. By deploying IBM Director, you can achieve reductions in ownership costs through the following benefits:

- Reduced downtime
- Increased productivity of IT personnel and users
- Reduced service and support costs

For more information about IBM Director, see the *IBM Director* CD that comes with the server, the IBM Director documentation on the CD, and the IBM xSeries Systems Management Web page at http://www.ibm.com/servers/eserver/xseries/ systems_
management/xseries_sm.html, which presents an overview of IBM Systems Management and IBM Director.

The Update*Xpress* program

The Update*Xpress* program is available for most xSeries servers and server options. It detects supported and installed device drivers and firmware in the server and installs available updates. You can download the Update*Xpress* program from the Web at no additional cost, or you can purchase it on a CD. To download the program or purchase the CD, go to http://www.ibm.com/servers/eserver/xseries/ systems_management
/sys_migration/xpress.html.

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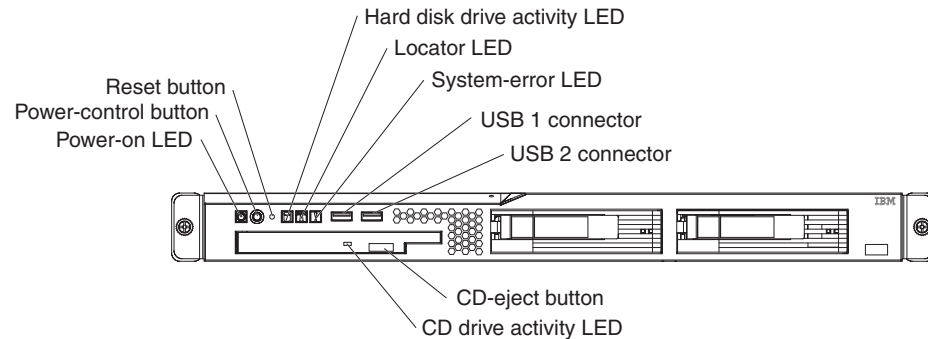
Power-on LED: When this LED is lit, it indicates that the server is turned on. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed.

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

Power-control button: Press this button to turn the server on and off manually. A power-control-button shield comes installed around the button to prevent the server from being turned off accidentally. You can remove this disk-shaped shield if you prefer.

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

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

Locator LED: When this LED is lit, it has been lit remotely by the system administrator to aid in visually locating the server.

System-error LED: When this LED is lit, it indicates that a system error has occurred.

USB connectors: Connect a USB device to either of these connectors.

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

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

Rear view

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

Ethernet 1 transmit / receive
activity LED

Ethernet 2 speed LED

Ethernet 1 speed LED

Ethernet 2 transmit / receive
activity LED
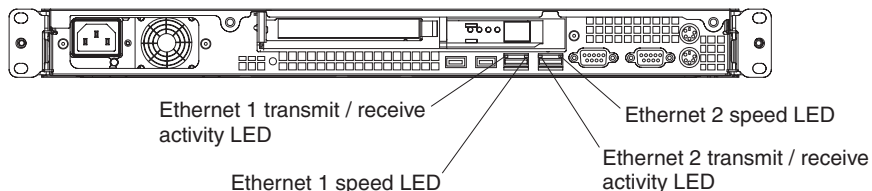
Ethernet transmit/receive activity LED: This LED is on each Ethernet connector. When this LED is lit, it indicates that there is activity between the server and the network.

Ethernet speed LED: This LED is on each Ethernet connector. When this LED is lit, it indicates that the Ethernet network speed is 1 Gbps. When this LED is off, it indicates that the Ethernet network speed is 10 Mbps or 100 Mbps.

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

Mouse connector
Keyboard connector
Power-cord connector

USB 1 connector
USB 2 connector

Serial connector
Video connector
Ethernet 2 connector
Ethernet 1 connector
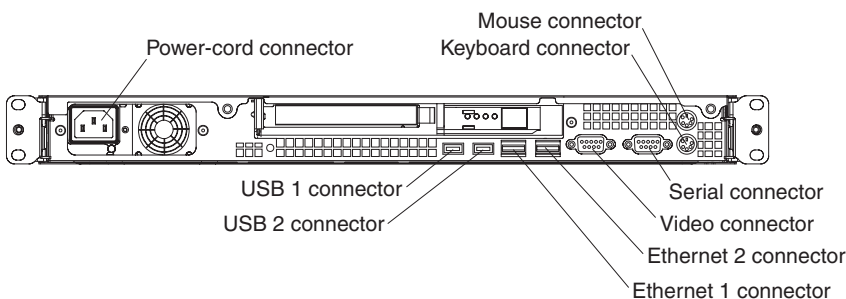
Power-cord connector: Connect the power cord to this connector.

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

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

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

Video connector: Connect a monitor to this connector.

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

USB connector: Connect a USB device to either of these connectors.

Server power features

When the server is connected to an ac power source but is not turned on, the operating system does not run, and all core logic except for the service processor (the mini-baseboard management controller or optional Remote Supervisor Adapter II) is shut down; however, the server can respond to requests from the service processor, such as a remote request to turn on the server.

Attention: 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.

Turning on the server

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

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If the server is connected to an Advanced System Management interconnect network that contains at least one server with an optional Remote Supervisor Adapter or Remote Supervisor Adapter II installed, the server can be turned on from the Remote Supervisor Adapter or Remote Supervisor Adapter II user interface.
- If your operating system supports the systems-management software for an optional Remote Supervisor Adapter II, the systems-management software can turn on the server.
- 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 ac power, the server can respond to requests from the service processor, such as a remote request to turn on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.

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

Statement 5:

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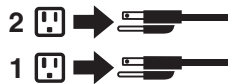
The server can be turned off in any of the following ways:

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.

- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.

- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.

- If the server is connected to an Advanced System Management interconnect network that contains at least one server with an optional Remote Supervisor Adapter or Remote Supervisor Adapter II installed, the server can be turned off from the Remote Supervisor Adapter or Remote Supervisor Adapter II user interface.

- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned off from the Remote Supervisor Adapter II user interface.

- The integrated system management 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 options

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

Server components

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

Riser-card Assembly

DIMM

SAS/SATA controller (some models)

System board

Heat sink

SAS/SATA backplane (some models)

Air baffle

SATA simple-swap back panel (some models)

Air deflector

Fans

Power supply

CD/DVD drive

Hot-swap hard disk drive (some models)

SAS filler

Fans

Simple-swap SATA hard disk drive (some models)

SATA filler

Bezel

11
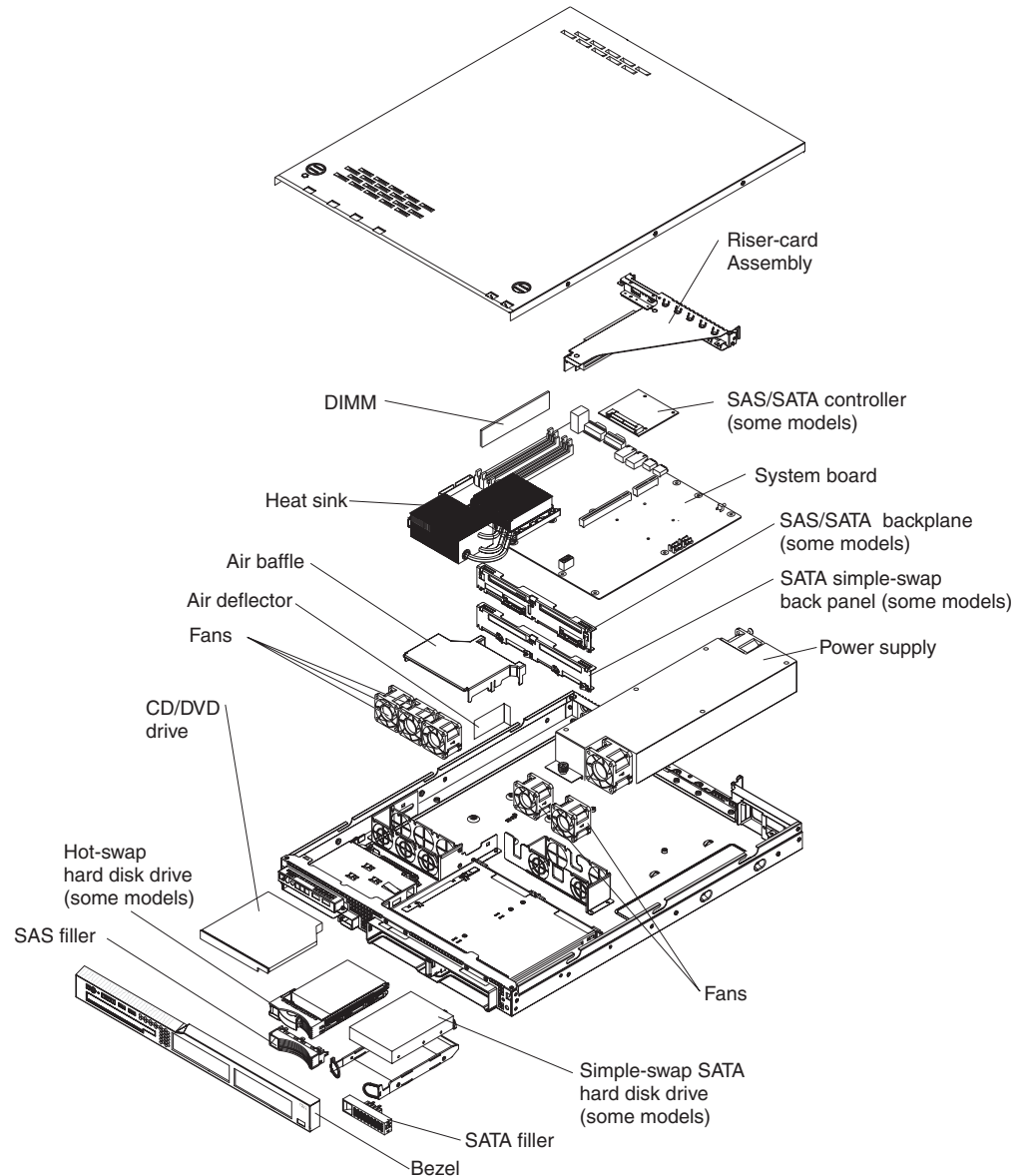
System-board internal connectors

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

- Riser-card connectors
- SAS/SATA controller card connector
- Wake on LAN connector
- SATA 2 connector
- SATA 0 connector
- Power connector
- Front USB connector
- Operator information panel connector
- Hot-swap SAS/SATA backplane connector
- Power connector
- Fan 5 connector
- Fan 4 connector
- Microprocessor connection
- Fan 3 connector
- Fan 2 connector
- Fan 1 connector
- IDE connector
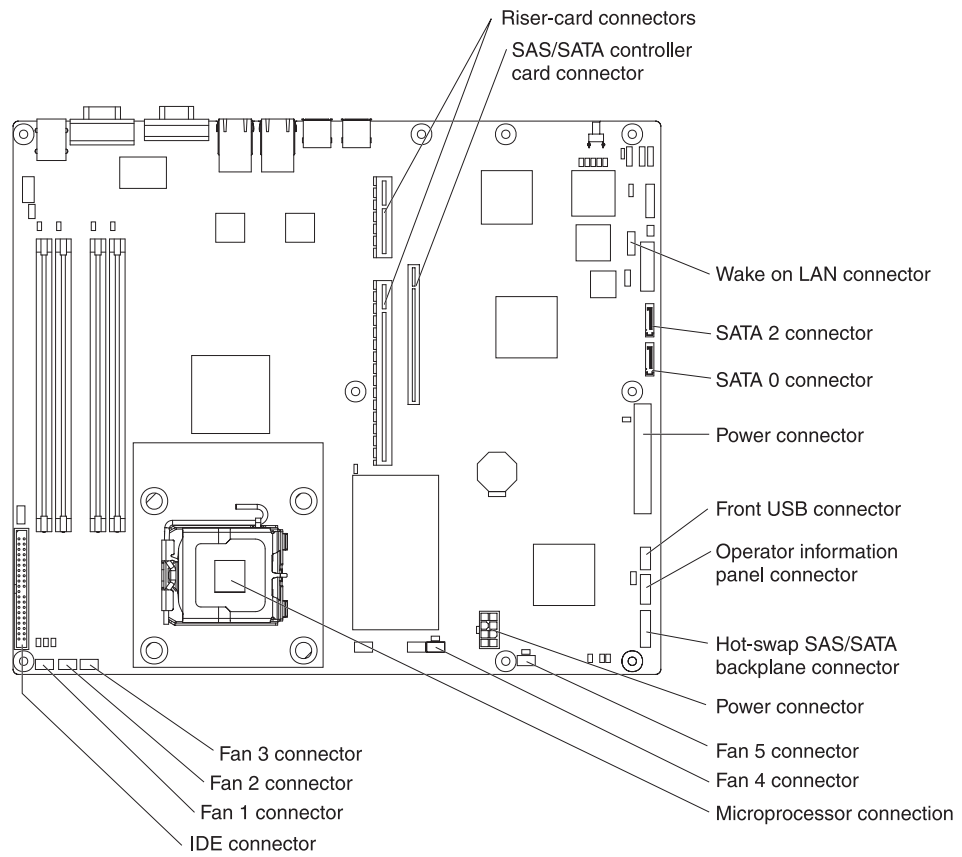
System-board switches and jumpers

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

Disable mBMC

Boot block
recovery jumper

Clear CMOS jumper
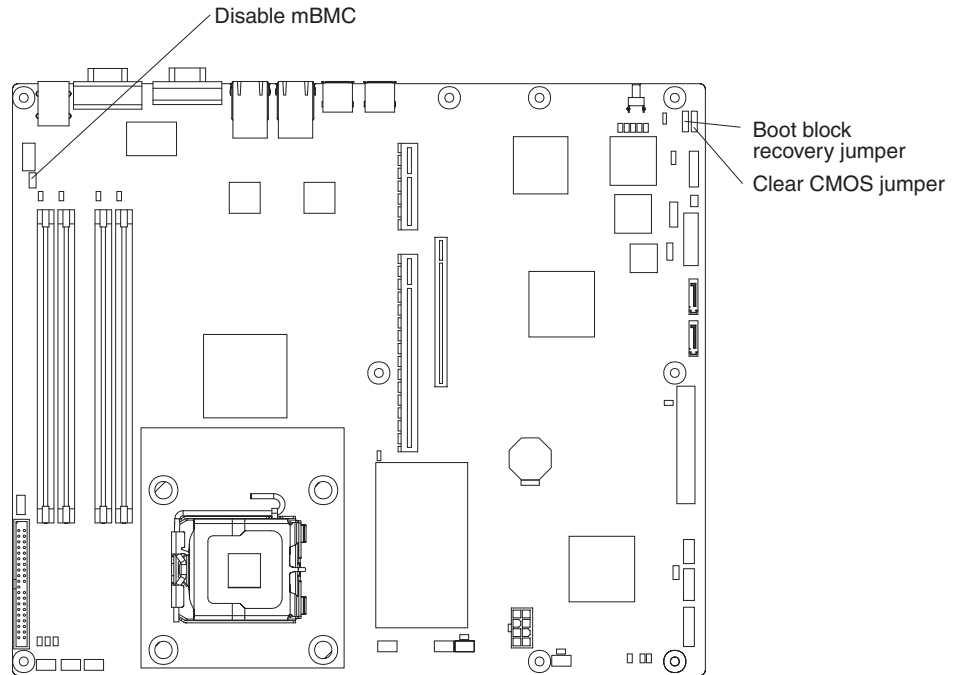
The following illustration identifies the pins on a jumper and shows the location of pin 1.

3

2

Pin 1 mark 1
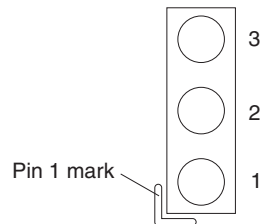
Table 2. Switch and jumper settings

Component	Settings
CMOS jumper (JP3)	• Pins 1 and 2: Keep CMOS data (default) • Pins 2 and 3: Clear the CMOS data, which clears the power-on password and administrator password
Boot block jumper (JP4)	• Pins 1 and 2: Normal (default) • Pins 2 and 3: Boot from boot block.
Mini-BMC jumper (JP6)	• Pins 2 and 3: Normal (default) • Pins 1 and 2: Disable the mini-BMC. Use this setting when a service processor adapter other than the optional Remote Supervisor Adapter II is installed.

System-board external connectors

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

Keyboard/mouse
connector

Serial connector

Video connector

Ethernet 2 connector

Ethernet 1 connector

USB 2 connector

USB 1 connector
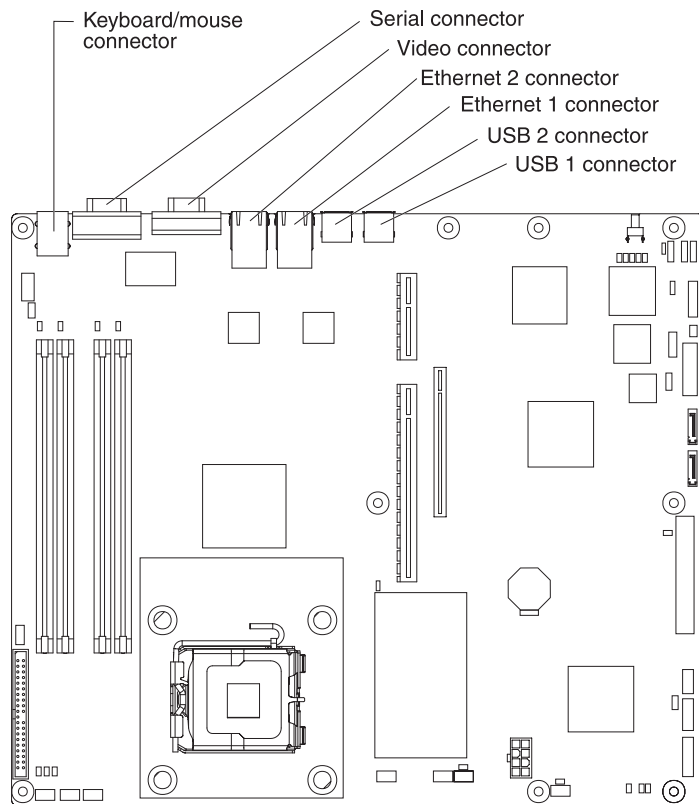
System-board LEDs

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

Baseboard management
controller status LED

DIMM 4 error LED
DIMM 3 error LED
DIMM 2 error LED
DIMM 1 error LED

Standby power
LED

Fan 3 error LED
Fan 2 error LED
Fan 1 error LED

Voltage regulator
error LED

Fan 5 error LED

Fan 4 error LED
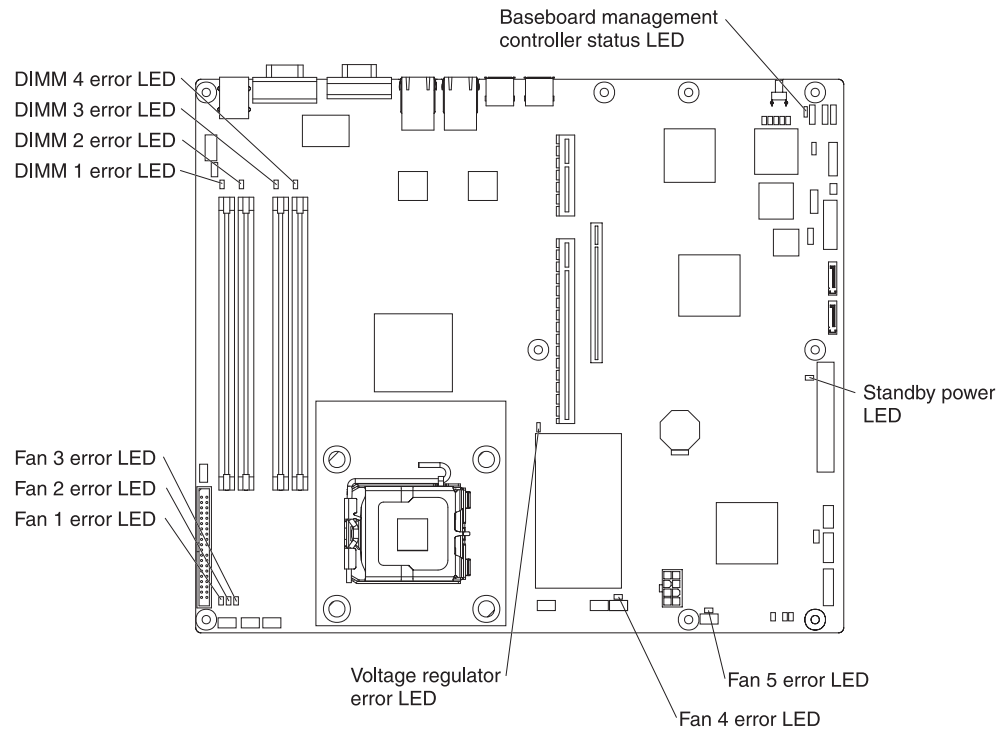
Table 3. System-board LEDs

LED	Description
Error LEDs	The associated component has failed.
Baseboard management controller status LED	This LED flashes to indicate that the mini-BMC is functioning normally.
Standby power LED	This LED is lit whenever the server is connected to ac power.

System-board option connectors

The following illustration shows the connectors for user-installable options.

DIMM 1 connector

DIMM 2 connector

DIMM 3 connector

DIMM 4 connector

Remote Supervisor
Adapter connector

Battery connector
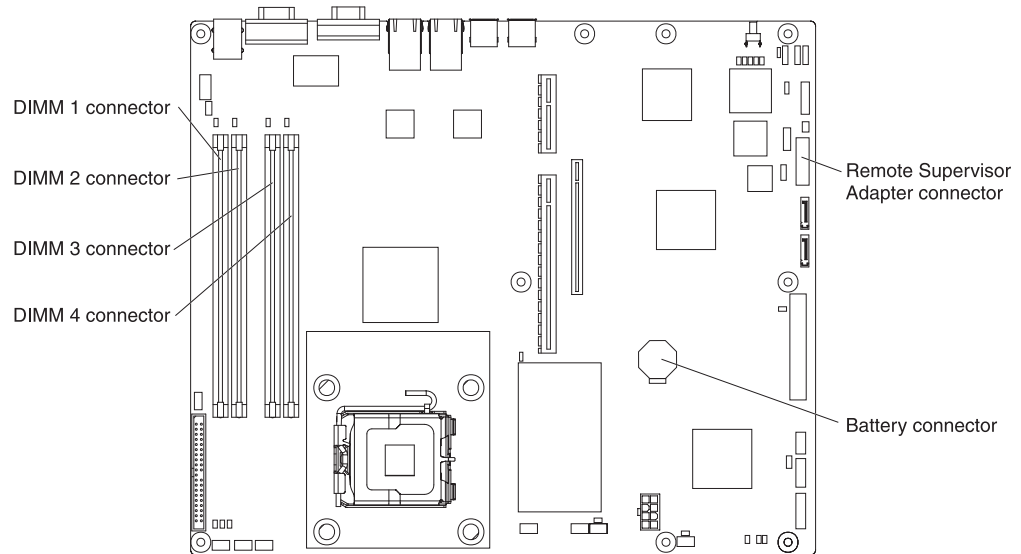
The following illustration shows the location of the PCI-X slots on the riser-card
assembly.

PCI-X slot 1
64-bit 3.3 V 66/100 MHz

PCI-X slot 2
64-bit 3.3 V 66/100 MHz
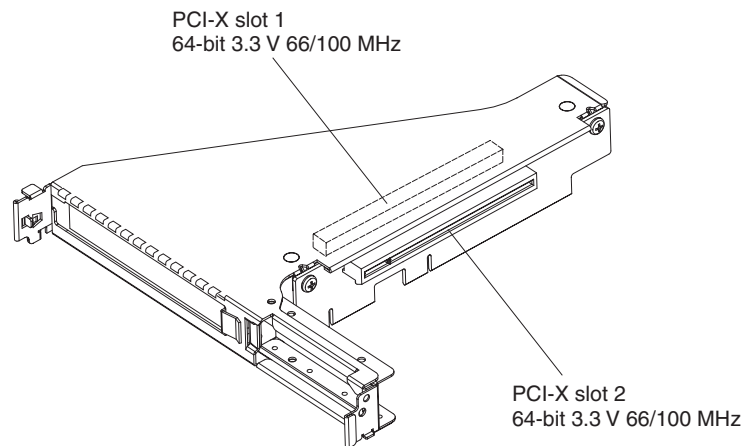
The following illustration shows the location of the PCI-X and PCI Express slots on
the riser-card assembly option.

PCI-X slot 1
64-bit 3.3 V 66/100 MHz

PCI Express x8 slot
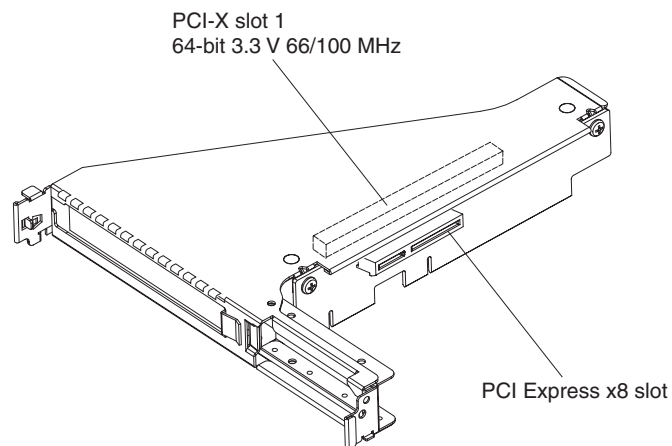
Installation guidelines

Before you install options, read the following information:

- Read the safety information that begins on page v and the guidelines in "Handling static-sensitive devices" on page 18. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-plug Universal Serial Bus (USB) devices.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported options for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

System reliability guidelines

To help ensure proper 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 turning on the server.

Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.

- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.

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 but is not required. For example, wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part 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.
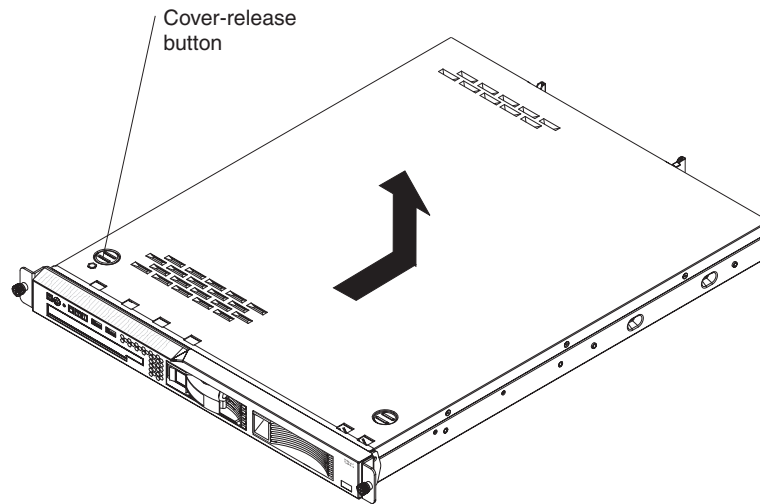
Removing the cover

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. Turn off the server and all attached devices (see "Turning off the server" on page 9).
3. Disconnect all external cables and power cords.

4. Remove the server from the rack and place it on a flat, non-conductive surface.

Cover-release
button

5. Press the cover-release button.
6. Slide the cover back approximately 1.27 cm (0.5 inches); then, lift it off the
   server.

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

Installing an adapter

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

- Locate the documentation that comes with the adapter and follow those
  instructions in addition to the instructions in this section. If you have to change
  switch settings or jumper settings on the adapter, follow the instructions that
  come with the adapter.
- The adapter slots are on the riser-card assembly. You must first remove the
  riser-card assembly to access the adapter slots.
- Depending on the riser-card assembly in the server, the server contains either
  two peripheral component interconnect-extended (PCI-X) adapter slots or one
  PCI-X slot and one PCI Express slot. See the ServerProven® list at
  http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of
  riser-card assemblies and adapters that you can use with the server.
- You can install one full-height three-quarter-length adapter in expansion slot 1
  and one low-profile half-length adapter in expansion slot 2.
- The server supports the following adapters:
    - PCI-X: 3.3 V or universal adapters
   - PCI Express: PCI Express x8 1.0a adapters

  Note: If you use a legacy PCI adapter (32 bit/33 MHz) or a slower-speed PCI-X
  adapter in a hot-swap SAS/SATA system, the hard-disk drive performance will be
  degraded.
- The server uses a rotational interrupt technique to configure PCI-X adapters so
  that you can install PCI-X adapters that do not support sharing of PCI-X
  interrupts.

- The optional Remote Supervisor Adapter II can be installed only in PCI-X slot 1.
- You can install an optional RAID controller to enable you to configure the internal hard disk drives into disk arrays. See your RAID controller option documentation for complete instructions for installing a RAID controller and for additional information about RAID controllers.

  Note: Some operating systems, such as SCO 6.0 and UnixWare 7.14, do not support RAID. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ to determine whether a supported operating system supports RAID.

- The optional ServeRAID -7t SATA controller can be installed only in PCI-X slot 2. The low-profile bracket that comes with the controller is required for you to install the controller.
- The optional ServeRAID 8i controller can be installed only in PCI-X slot 2. The low-profile bracket that comes with the controller is required for you to install the controller. Remove the large expansion-slot bracket that comes preinstalled on the controller, and install the low-profile bracket.
- The server scans the PCI-X slots to assign system resources. If you have not changed the default startup sequence, the server starts the devices in the following order: the CD drive first; then, depending on the model, the PCI-X slots 1 and 2, or the PCI-X slot and the PCI Express slot, and then the integrated Ethernet controllers.
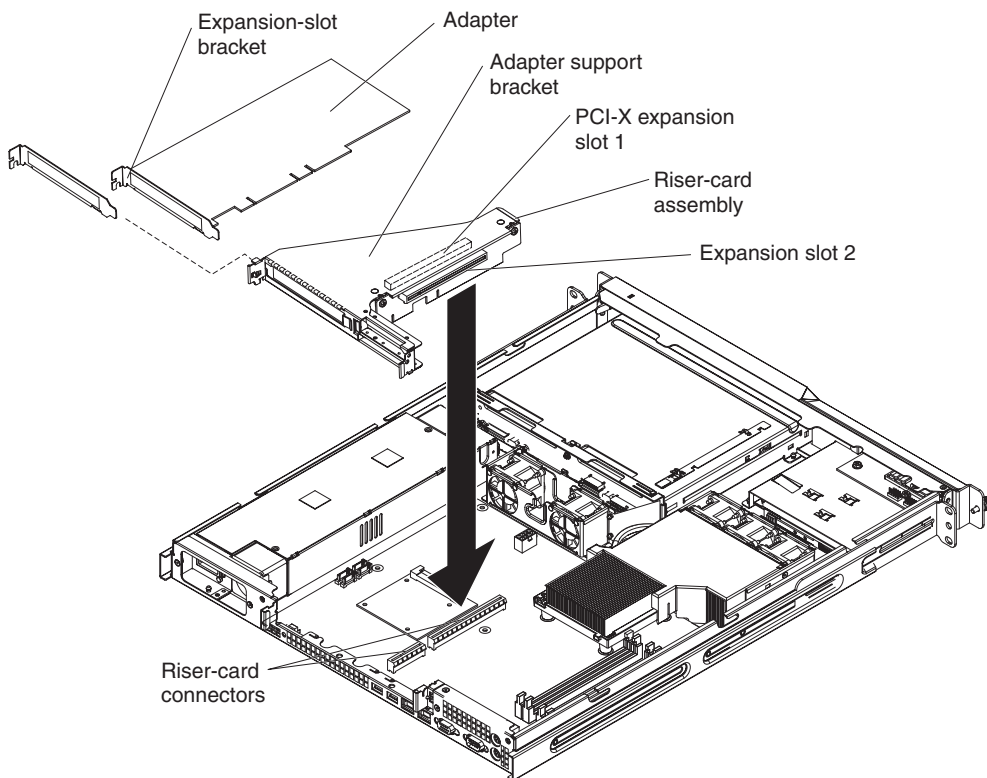
To install an adapter, complete the following steps:

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 the power cord and all external cables.
3. Remove the cover (see "Removing the cover" on page 18).

Riser-card
assembly
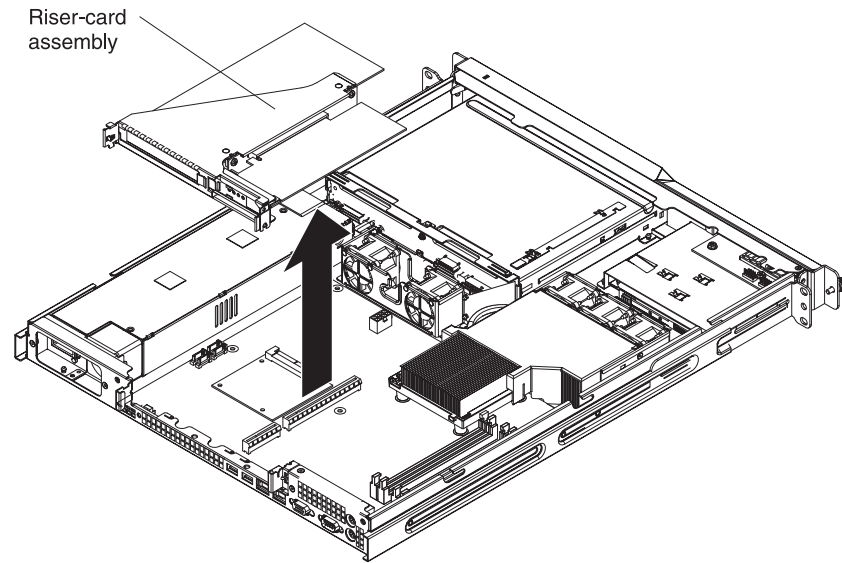
4. Grasp the riser-card assembly at the rear edge and lift to remove the riser-card assembly. Place the riser-card assembly on a flat, static-protective surface.

5. Remove the expansion-slot cover on the slot that you intend to use.

   Attention: PCI expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions characteristics of the server and ensures proper cooling of server components.

6. Touch the static-protective package that contains the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.

7. Place the adapter, component side up, on a flat, static-protective surface and set any jumpers or switches as described by the adapter manufacturer, if necessary.

8. If the adapter is a ServeRAID 8i controller, complete the following steps to install the low-profile expansion-slot bracket on the adapter:

   a. Unscrew the two screws that hold the large expansion-slot bracket on the adapter.

   b. Remove the large bracket.

   c. Install the low-profile (small) expansion-slot bracket in the same position on the adapter.

   d. Reinstall the two screws that you removed in step 8a.

   Attention: When you install an adapter, make sure that it is completely and correctly seated in the expansion slot in the riser card. Incomplete insertion might cause damage to the riser card, system board, or the adapter when you turn on the server.

9. To install the adapter in the riser-card assembly, carefully grasp the adapter by its top edge or upper corners, and align it with the expansion slot; then, press the adapter *firmly* into the expansion slot.

10. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you reinstall the riser-card assembly.

11. Carefully align the riser-card assembly with the guides on the rear of the server and with the riser-card connectors on the system board; then, press down on

the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connectors on the system board.

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 30.

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.

Attention: To avoid damage to the hard disk drive connectors, make sure that the cover is in place and fully closed whenever you install or remove a hard disk drive.

Installing a simple-swap Serial ATA hard disk drive

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server before removing or installing a simple-swap hard disk drive.

To install a simple-swap Serial ATA hard disk drive, complete the following steps.

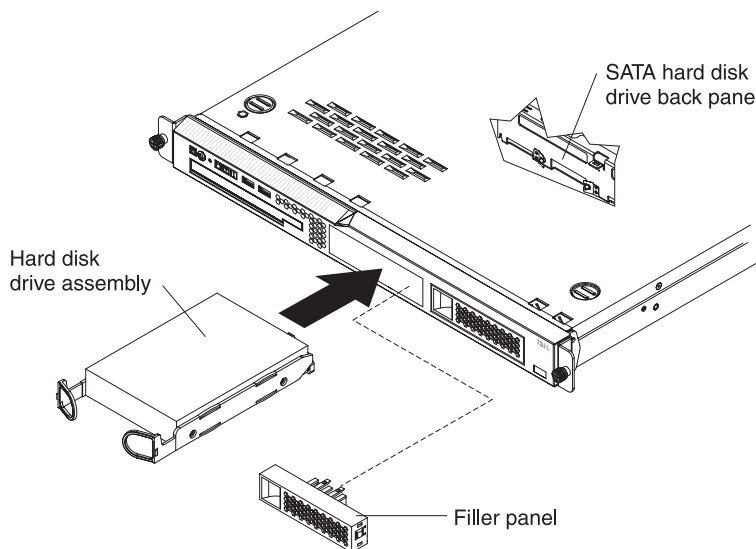**Note:** If you have only one hard disk drive, install it in the left drive bay.

Attention: To avoid damage to the hard disk drive connectors, make sure that the cover is in place and fully closed whenever you install or remove a hard disk drive.

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Make sure that the server cover is in place and fully closed.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Remove the filler panel from the bay.
5. Pull the loops of the drive tray toward each other, and slide the drive into the server until the drive connects to the back panel.
6. Release the loops of the drive tray.
7. Insert the filler panel into the bay to cover the drive.

If you have other options to install, do so now. Otherwise, go to "Completing the installation" on page 30.

Note: If the server has a RAID controller or adapter, you might have to reconfigure the disk arrays after installing hard disk drives. See the documentation that comes with the adapter for more information.

To remove a simple-swap SATA drive from the bay, 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. Pull the loops of the drive tray toward each other and pull the tray out of the bay.

Installing a hot-swap hard disk drive

The server hot-swap models support either two SAS hard disk drives or two SATA hard disk drives. The installation procedure is the same for either type of drive. The illustrations in this procedure show SAS drives.

To install a hot-swap hard disk drive, complete the following steps.

Note: If you have only one hard disk drive, install it in the left drive bay.

Drive-tray assembly

Drive handle
(in open position)

Filler panel
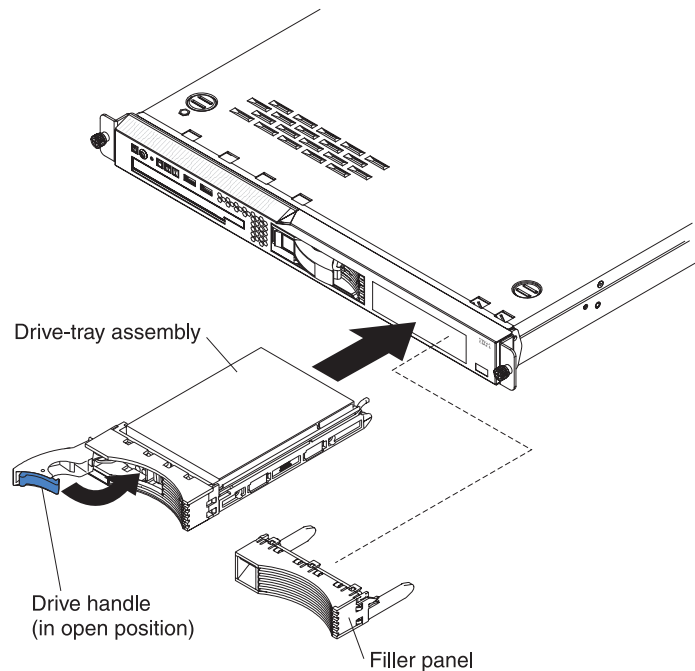
Attention: To avoid damage to the hard disk drive connectors, make sure that the cover is in place and fully closed whenever you install or remove a hard disk drive.

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Make sure that the server cover is in place and fully closed.
3. Remove the filler panel from the bay.

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

4. Install the hard disk drive in the hot-swap bay:
   a. Make sure that the tray handle is open (that is, perpendicular to the front of 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 make sure that the hard disk drive is operating correctly. If the amber hard disk drive status LED for a drive is lit continuously, that drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.

If you have other options to install, do so now. Otherwise, go to "Completing the installation" on page 30.

Replacing a CD or DVD drive

To remove a CD or DVD drive, complete the following steps.
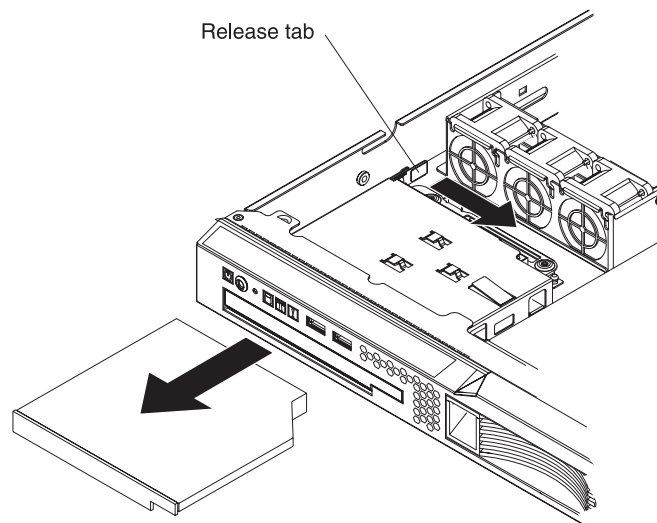
Release tab

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 cords and all external cables. Remove the cover (see "Removing the cover" on page 18).
3. Press the release tab (the rear of the drive-retention clip) toward the drive to release the clip; then, while pressing the tab, pull the drive out of the bay.

   Note: You might have to push the right-rear corner of the drive toward the front of the server to move the drive initially.

Drive retention clip

Alignment pins
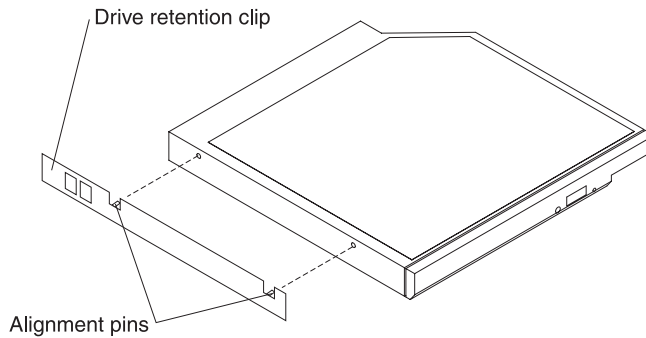
4. Remove the retention clip from the drive.

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

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Make sure that the server and peripheral devices are turned off, and that the power cords and all external cables are disconnected. Remove the cover (see "Removing the cover" on page 18).
3. Follow the instructions that come with the drive to set any jumpers or switches.

Drive retention clip

Alignment pins

4. Attach the drive retention clip to the side of the drive.
5. Slide the drive into the CD/DVD drive bay until the drive clicks into place.

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 30.
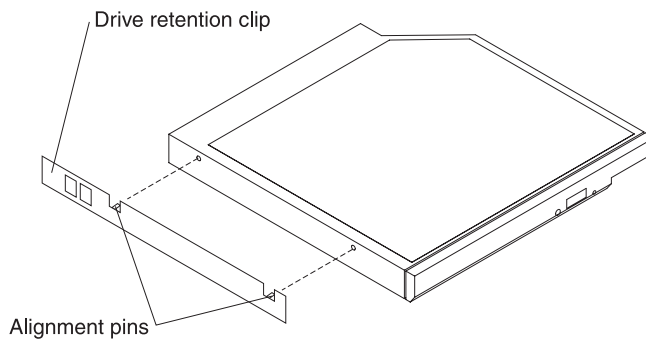
Installing a memory module

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 512 MB, 1 GB, and 2 GB DIMMs, for a maximum of 8 GB of system memory. See the ServerProven list at http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of memory modules you can use with the server.
- The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The BIOS displays the total amount of installed memory and the amount of configured memory.
- The server comes with one 512 MB DIMM installed in DIMM connector 1. If one DIMM is installed, when you install an additional DIMM, it must be installed in DIMM connector 3, and it must be the same size, speed, type, and technology as

the DIMM that is installed in DIMM connector 1. You can mix compatible DIMMs from various manufacturers. The third and fourth DIMMs must be installed as a pair, in DIMM connectors 2 and 4.

- If you install a pair of DIMMs in DIMM connectors 2 and 4, they do not have to be the same size, speed, type, and technology as the DIMMs that are installed in DIMM connectors 1 and 3. However, the size, speed, type, and technology of the DIMMs that you install in DIMM connectors 2 and 4 must match each other.
- Install only 1.8 V, 240-pin, double-data-rate II (DDR II), PC4200, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC4200 SDRAM unbuffered DIMM specification.
- If you install a pair of 2 GB DIMMs and a pair of other-size DIMMs, the 2 GB DIMMs must be installed as the first pair (in DIMM connectors 1 and 3).
- When you restart the server after adding or removing a DIMM, a message is displayed indicating that the memory configuration has changed.
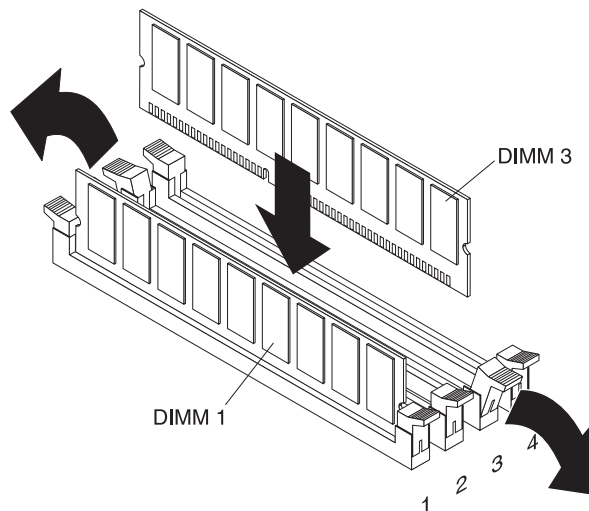
To remove a DIMM, complete the following steps:

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. Remove the cover (see "Removing the cover" on page 18).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
3. Open the retaining clip on each end of the DIMM connector.
4. Lift the DIMM out of the connector.

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. Remove the cover (see "Removing the cover" on page 18).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
3. Open the retaining clip on each end of the DIMM connector.

4. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

5. Turn the DIMM so that the DIMM keys align correctly with the slot.

6. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 30.

Replacing a fan

The server comes with five replaceable fans.

To replace any of the five replaceable fans, 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 server from the rack and place it on a flat, non-conductive surface.

4. Remove the cover (see "Removing the cover" on page 18).

5. Reconnect all external cables and the power cord; then, turn on the server.

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

6. Determine which fan to replace by checking the LEDs on the system board (to determine which LED represents which fan, see "System-board LEDs" on page 15); a lit LED indicates the fan to replace.

   **Note:** For more information about the LEDs, see the *Problem Determination and Service Guide* on the IBM *xSeries Documentation* CD.

7. Turn off the server; then, disconnect the power cord and all external cables again.

8. Remove the failed fan from the server:

   a. Disconnect the fan cable from the system board.

   b. Grasp the top of the fan with your index finger and thumb and lift the fan out of the server.

Fan 1
Fan 2
Fan 3
Fan 4
Fan 5
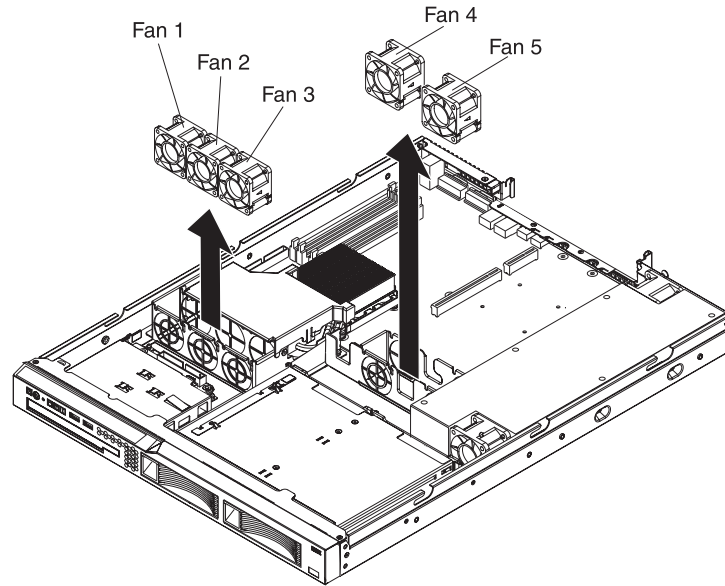
9. Position the replacement fan so that the airflow arrow on the side of the fan is pointing toward the rear of the server.

   Note: Correct airflow is from the front to the rear of the server.

Fan
Fan bracket cable channel
Fan bracket
Fan bracket cable slot
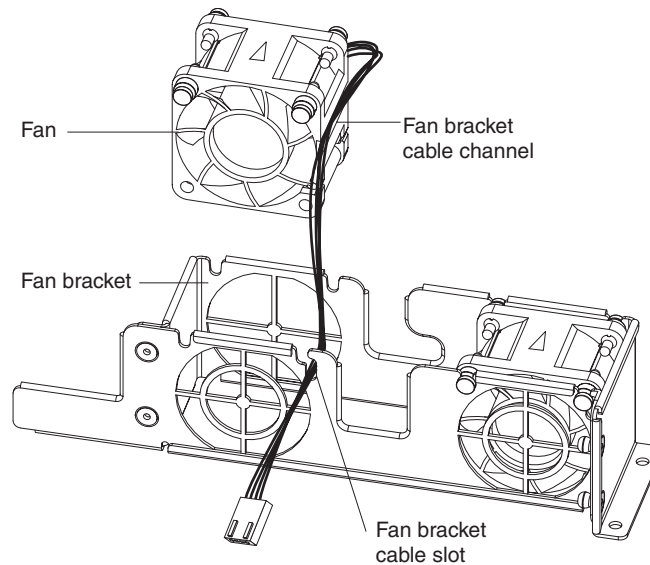
10. To install the replacement fan in the bracket, complete the following steps:
    a. Make sure that the fan cable sits in the channel on the side of the fan.
    b. In the location from which you removed the failed fan, route the fan cable into its slot in the fan bracket top.
    c. Insert the fan into the bracket.
    d. Make sure that each of the blue soft tabs on the fan is fully seated in its slot in the fan bracket.
11. Connect the replacement fan cable to the system board.

If you have other options to install, do so now. Otherwise, go to "Completing the installation" on page 30.

Replacing the riser-card assembly

The server comes with one riser-card assembly that contains two PCI-X connectors. You can replace the riser-card assembly with one that contains one PCI-X connector and one PCI Express connector. See the ServerProven list at http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of riser-card assemblies that you can use with the server.
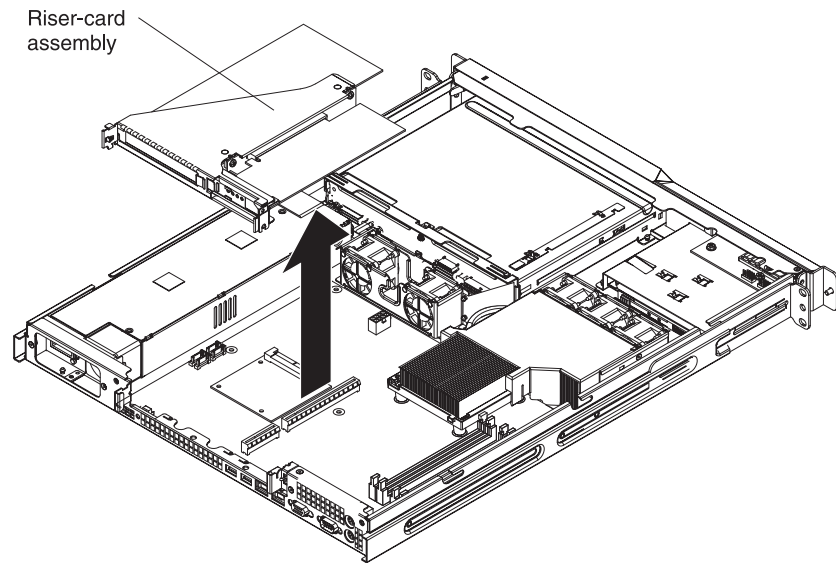
Complete the following steps to replace the riser-card assembly.

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 server from the rack and place it on a flat, non-conductive surface.
4. Remove the cover (see "Removing the cover" on page 18).
5. Grasp the riser-card assembly at the rear edge and lift to remove it from the server. Place the riser-card assembly on a flat, static-protective surface.
6. Remove the adapters from the riser-card assembly.

   Note: You might have to disconnect the internal cables from the adapters temporarily.
7. Insert the adapters in the new riser-card assembly (see "Installing an adapter" on page 19 for adapter-handling instructions). Reconnect any cables that you disconnected in step 6.
8. Carefully align the riser-card assembly with the guides on the rear of the server and with the riser-card connectors on the system board; then, press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connectors on the system board.

If you have other options to install, do so now. Otherwise, go to "Completing the installation" on page 30.

Completing the installation

To complete the installation, complete the following steps:

1. Reinstall the cover. See "Installing the cover" for more information.
2. Install the server in the rack cabinet. See the *Rack Installation Instructions* that come with the server for detailed information about how to install the server in a rack cabinet.

   Attention:

   • Install the server only in a rack cabinet that has perforated doors.

   • Do not leave open space above or below an installed server in the rack cabinet. To help prevent damage to server components, always install a filler panel to cover the open space and to help ensure proper air circulation. See the documentation that comes with the rack cabinet for more information.

3. Connect the cables and power cords. For more information, see "Connecting the cables."
4. Update the server configuration. See "Updating the server configuration" on page 31 for more information.

Installing the cover

To install the cover, place it into position and slide it forward.
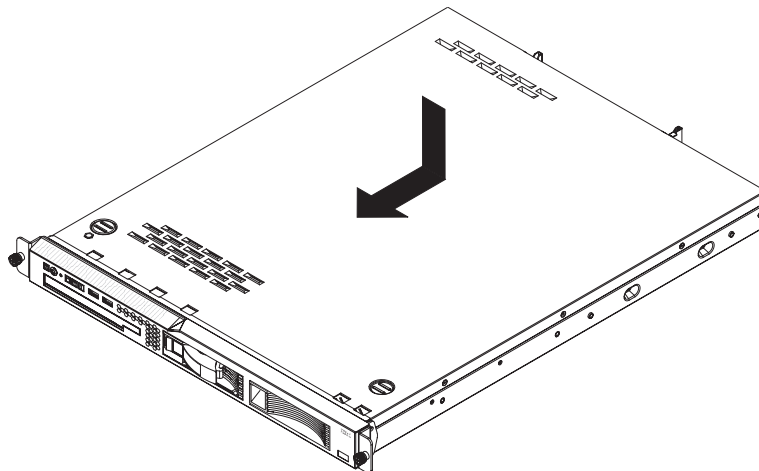
Connecting the cables

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

Front

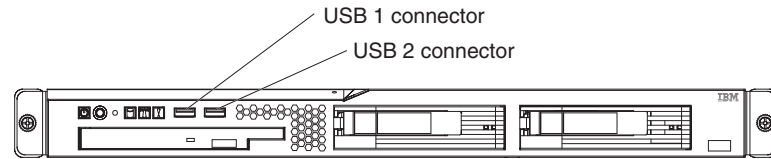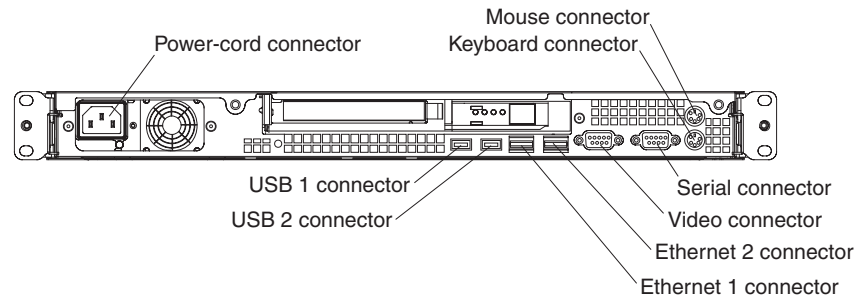USB 1 connector
USB 2 connector

Rear

Mouse connector
Power-cord connector
Keyboard connector

USB 1 connector
USB 2 connector
Serial connector
Video connector
Ethernet 2 connector
Ethernet 1 connector

You must turn off the server before connecting or disconnecting 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 options. Use these identifiers to connect the cables to the correct connectors.

If the server comes with an installed operating system, see the documentation that comes with the operating system for additional cabling instructions.

There is one keyboard connector on the back of the server. Use this connector to connect the server to a keyboard or optional console switch. You can also connect a USB keyboard to the server by using one of the USB connectors. After you install a USB keyboard, you might have to use the Configuration/Setup Utility program to enable keyboardless operation and prevent the POST error message 301 from being displayed during startup. For information about how to connect a USB keyboard to the server, see the documentation that comes with the keyboard. If the server cables and connector panel have color-coded connections, match the color of the cable end with the color of the connector. For example, match a blue cable end with a blue panel connector, a red cable end with a red connector, and so on.

Updating the server configuration

When you start the server for the first time after you add or remove an internal option or external SAS device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. For more information, see Chapter 3, "Configuring the server," on page 33.

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

If the server has a RAID configuration that uses the SAS/SATA controller card with integrated RAID (hot-swap SATA or SAS models only) or the integrated Serial ATA controller with HostRAID support (simple-swap SATA models only) and you have installed or removed a hard disk drive, you might have to reconfigure the disk arrays. See the RAID documentation on the IBM *ServeRAID 8i (Adaptec HostRAID) Support* CD for information about reconfiguring the disk arrays.

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

For information about configuring the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controllers" on page 48.

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."

- **Configuration/Setup Utility program**

  The Configuration/Setup Utility program is part of the basic input/output system (BIOS). Use it to configure serial port assignments, change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this utility program, see "Using the Configuration/Setup Utility program" on page 35.

- **SAS/SATA Configuration Utility program**

  Use the SAS/SATA Configuration Utility program to configure devices that are attached to the SAS/SATA controller (hot-swap SAS/SATA models only). For information about using this program, see "Using the SAS/SATA Configuration Utility program (hot-swap SAS/SATA models only)" on page 41.

- **Adaptec® HostRAID™ configuration programs**

  Use the Array Configuration Utility within the Adaptec RAID Configuration Utility programs to configure the integrated Serial ATA (SATA) controller or the SAS/SATA controller with integrated RAID and the devices that are attached to it. For more information about using these utility programs, see "Using the Adaptec HostRAID configuration programs" on page 42.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controllers, see "Configuring the Gigabit Ethernet controllers" on page 48.

- **IBM Director**

  IBM Director is a workgroup-hardware-management tool that you can use to centrally manage xSeries servers. If you plan to use IBM Director to manage the server, you must check for the latest applicable IBM Director updates and interim fixes. For information about updating IBM Director, see "Updating IBM Director" on page 48. For more information about IBM Director, see the IBM Director documentation on the *IBM Director* CD that comes with 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 hardware options 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: The ServerGuide program works only with 32-bit Windows operating systems.

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
- ServeRAID Manager program, which configures your ServeRAID adapter or
  integrated SAS/SATA controller with RAID capabilities
- 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 SAS RAID adapter, controller, or integrated SAS/SATA controller with
  RAID capabilities 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 hardware options and provides updated device drivers for most
  adapters and devices
- Provides diskette-free installation for supported Windows operating systems
- Includes an online readme file with links to tips for your hardware and
  operating-system installation

Setup and configuration overview

When you use the *ServerGuide Setup and Installation* CD, you do not need setup
diskettes. You can use the CD to configure any supported IBM server model. The
setup program provides a list of tasks that are required to set up 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 decide not to use 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/support/.
2. Under **Search technical support**, type **xSeries 306m**, and click **Search**.
3. Select the installation instructions for your operating system.

Using the Configuration/Setup Utility program

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

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords
- 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 log
- Change interrupt request (IRQ) settings
- Enable USB keyboard and mouse support

• Resolve configuration conflicts

Starting the Configuration/Setup Utility program

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

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

Configuration/Setup Utility menu choices

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

• **System Summary**

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

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

• **System Information**

Select this choice to view information about the server, such as the machine type and model of the server, the serial number, the system UUID, the system board identifier, and the revision level or issue date of the BIOS code stored in electrically erasable programmable ROM (EEPROM). When you make changes through other options in the Configuration/Setup Utility program, some of those changes are reflected in the system information; you cannot change settings directly in the system information.

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

• **Devices and I/O Ports**

Select this choice to view or change assignments for devices and input/output (I/O) ports, to configure remote console redirection, and to enable or disable integrated Ethernet controllers and all standard ports (such as serial and USB). If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device). If you disable the integrated Ethernet controller and no Ethernet adapter is installed, the server will have no Ethernet capability. If you disable the integrated USB controller, the server will have no USB capability; to maintain USB capability, make sure that **Enabled** is selected for the **USB Support** and **USB 2.0 Support** options.

Note: If **USB Support** is disabled and a Remote Supervisor Adapter II is installed, the Remote Supervisor Adapter II remote keyboard, remote mouse, remote disk, OS watchdog, and in-band management functions are also disabled.

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

• **Date and Time**

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

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

- **System Security**

  Select this choice to set passwords. See "Passwords" on page 39 for more information.

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

  – **Administrator Password**

    Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If an administrator password is set, the full Configuration/Setup Utility menu is available only if you type the administrator password at the password prompt. For more information, see "Administrator password" on page 40.

  – **Power-on Password**

    Select this choice to set or change a power-on password. See "Power-on password" on page 39 for more information.

- **Start Options**

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

  The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds. If the server has Wake on LAN hardware and software and the operating system supports Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. For example, you can define a startup sequence that checks for a CD or DVD in the CD or DVD drive, then checks the hard disk drive, and then checks a network adapter.

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

- **Advanced Setup**

  Select this choice to change settings for advanced hardware features.

  Important: The server might malfunction if these options are incorrectly configured. Follow the instructions on the window carefully.

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

  – **Power button**

    Select this choice to enable or disable the power-control button.

  – **Wake-up from**

    Select this choice to choose Normal or the power-control button as the Wake-up control.

  – **CPU Options**

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

  – **PCI Bus Control**

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

  – **Baseboard Management Controller (BMC) setting**

    Select this choice to change settings for the mini-BMC controller.

    - **IPMI Specification Version**
      This is a nonselectable menu item that displays the IPMI version.

    - **BMC Hardware/Firmware Version**
      This is a nonselectable menu item that displays the BMC firmware version.

    - **System Event Logging**
      Enable or disable system event logging. **Enabled** is the default setting.

- **Clear System Event Log**
  Enable or disable clearing the system event log. **Disable** is the default setting.
- **Existing Event Log number** This is a nonselectable menu item that displays the number of entries in the system event log.
- **BIOS POST Watchdog**
  Enable or disable the mini-BMC POST watchdog. **Disable** is the default setting.
- **POST Watchdog Timeout**
  Set the mini-BMC POST watchdog timeout value. **5 minutes** is the default setting.
- **System Event Log**
  Select this choice to view the mini-BMC system event log, which contains all system-error and warning messages that have been generated. Use the arrow keys to move between pages in the log. If an optional IBM Remote Supervisor Adapter II is installed, the full text of the error messages is displayed; otherwise, the log contains numeric error codes and minimal text. Run the diagnostic programs to get more information about error codes that occur. See the *Problem Determination and Service Guide* on the IBM *xSeries Documentation* CD for instructions. Select **Clear System Event Log** to clear the BMC system event log.
- **LAN Settings**
  Select this choice to view the mini-BMC MAC address, IP address, subnet mask, and gateway address.

• **Error Logs**

  Select this choice to view or clear error logs.

  – **POST Error Log**

  Select this choice to view the three most recent error codes and messages that the system generated during POST.

  – **System Event/Error Log**

  Select this choice to view the combined log of POST error messages and system event messages. If an optional IBM Remote Supervisor Adapter II is installed, the full text of the system event error messages is displayed; otherwise, the log contains numeric error codes and minimal text. You can use the arrow keys to move between pages in the error log.

  Run the diagnostic programs to get more information about error codes that occur. See the *Problem Determination and Service Guide* on the IBM *xSeries Documentation* CD for instructions.

  Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the system event/error log. This log does not clear itself, and if it begins to fill up, the system-error LED will be lit. Also, after you complete a repair or correct an error, clear the system event/error log to turn off the system-error LED on the front of the server.

  To clear the system event/error log, press Enter while viewing a log entry.

• **Save Settings**

  Select this choice to save the changes that you have made in the settings.

• **Restore Settings**

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

• **Load Default Settings**

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

- **Exit Setup**

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

Passwords

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

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

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

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

Power-on password

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

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

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

- If an administrator password is set, type the administrator password at the password prompt (see "Administrator password" on page 40). Start the Configuration/Setup Utility program and reset the power-on 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 *xSeries Documentation* CD.
- Change the position of the clear CMOS jumper on the system board to bypass the power-on password check. See "Resetting passwords" on page 40 for additional information.

Attention: Before changing any switch settings or moving any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information that begins on page v. Do not change settings or move jumpers on any system-board switch or jumper block that is not shown in this document.

Administrator password

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

If you forget the administrator password, you can reset it after you change the position of the clear CMOS jumper. See "Resetting passwords" for additional information.

Resetting passwords

If you forget the user or administrator password, you can move the clear-CMOS jumper block on the system board to pins 2 and 3, to clear CMOS memory and bypass the power-on or administrator password check. The jumper location is shown in the following illustration.
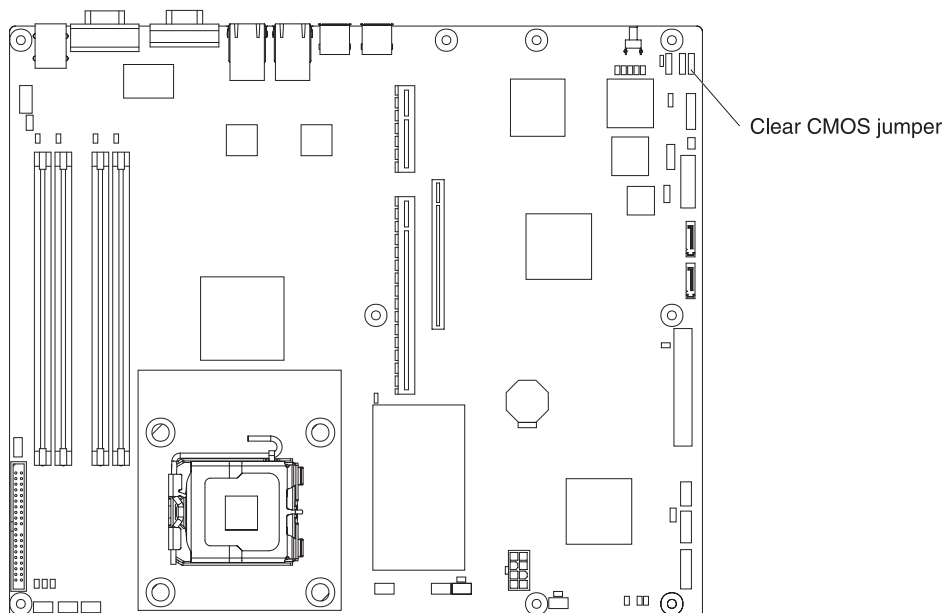
To clear CMOS and reset the passwords, complete the following steps:

1. Review the safety information that begins on page v.
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, non-conductive surface.
4. Remove the cover. See "Removing the cover" on page 18 for instructions.
5. Remove the riser-card assembly. See "Installing an adapter" on page 19 for instructions.
6. Move the clear-CMOS jumper block from pins 1 and 2 to pins 2 and 3.
7. Install the riser-card assembly and the cover and connect the server to a keyboard, monitor, and mouse; then, connect the server to a power source.
8. Turn on the server. You can now start the Configuration/Setup Utility program and either delete the old password or set a new power-on or administrator password.

9. Save the configuration and repeat step 2 on page 40.

10. Move the clear-CMOS jumper block back to pins 1 and 2 and reinstall the riser-card assembly and cover; then, disconnect all power cords and external cables again.

11. Replace the server in the rack and connect the external cables and power cords; then, turn on the server.

Using the SAS/SATA Configuration Utility program (hot-swap SAS/SATA models only)

Important: A configuration conflict (error code 1801) might occur if SATA RAID and SAS/SATA RAID are both enabled. If you are enabling SAS/SATA RAID, make sure that the **SATA RAID Enable** option in the Configuration/Setup Utility program is disabled (for more information, see "Enabling the Serial ATA HostRAID feature" on page 43.

Use the SAS/SATA Configuration Utility program to configure hot-swap SAS or SATA devices. The SAS/SATA Configuration Utility program is available on hot-swap SATA or SAS models only.

Starting the SAS/SATA Configuration Utility program

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

1. Turn on the server.

2. When the prompt `<<< Press <CTRL><A> for Adaptec RAID Configuration Utility! >>>` appears, press Ctrl+A. If you have set an administrator password, you are prompted to type the password.

3. To select a choice from the menu, use the arrow keys.

4. Use the arrow keys to select the channel for which you want to change settings.

5. To change the settings of the selected items, follow the instructions on the screen. Be sure to press Enter to save your changes.

SAS/SATA Configuration Utility menu choices

The following choices are on the SAS/SATA Configuration Utility menu:

- **Array Configuration Utility**

  Select this choice to create, manage, or delete arrays, add or delete a hot-spare drive, or initialize drives.

- **SerialSelect Utility**

  Note: This choice appears on a hot-swap SAS or SATA system only. It does not appear on a simple-swap SATA system.

  Select this choice to configure the controller interface definitions or to configure the physical transfer and SAS address of the selected drive.

- **Disk Utilities**

  Select this choice to format a disk or verify the disk media. For SAS disks, you can also turn on the indicator LED on the disk, set the disk to be bootable, change the write cache settings, or set the connection rate. Select a device from the list and read the instructions on the screen carefully before making a selection.

Using the Adaptec HostRAID configuration programs

Use the Adaptec RAID Configuration Utility programs and SAS/SATA Configuration Utility to add RAID level-0 and level-1 functionality to the integrated Serial ATA (SATA) controller (simple-swap models) or the SAS/SATA controller (hot-swap models). RAID level-0 (striping) causes the drives to be seen as a single volume, and improves performance. RAID level-1 (mirroring) causes the contents of one drive to be copied to the other drive to create redundancy, so that if one drive fails, no data is lost. Be sure to use these programs as described in this document. Use these programs to perform the following tasks:

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

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

- The SAS/SATA controller with integrated RAID (hot-swap models) or the integrated SATA controller (simple-swap models) with integrated RAID support RAID level-0 and level-1. An optional ServeRAID controller provides additional RAID levels.
- 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 controller, you must use the IBM *ServeRAID Support* CD that comes with the ServeRAID option.
- If you install a different type of RAID controller (adapter) in the server, use the method that is described in the instructions that come with the adapter to view or change SAS settings for attached devices.

Using the Adaptec RAID Configuration Utility programs (for Serial ATA HostRAID)

Use the Array Configuration Utility, in the Adaptec RAID Configuration Utility programs, to add RAID level-0 and level-1 functionality to the integrated SATA controller (simple-swap models). This utility is part of the BIOS.

Note: To add RAID functionality to a hot-swap SATA model, see "Using the SAS/SATA Configuration Utility program (for SAS/SATA HostRAID)" on page 44.

For additional information about using the Adaptec RAID Configuration Utility programs, see the documentation on the IBM *ServeRAID-8e (Adaptec HostRAID) Support* CD. If this CD did not come with the server, you can download it from http://www.ibm.com/support/.

The integrated SATA RAID feature (SATA HostRAID) comes disabled by default. You must enable it and install the device drivers before you can use it. The SATA RAID feature configuration utilities, device drivers, and information are available on the *ServeRAID-8e (Adaptec HostRAID) Support* CD.

Enabling the Serial ATA HostRAID feature

Important: A configuration conflict (error code 1801) might occur if SATA RAID and SAS/SATA RAID are both enabled. If you are enabling the Serial ATA HostRAID feature, make sure that the **RAID Support** option in the SAS/SATA Configuration Utility program is disabled (for more information, see "Enabling the SAS HostRAID feature" on page 44.

To enable the SATA RAID feature, complete the following steps:

1. Turn on the server.
2. When the prompt `Press F1 for Configuration/Setup` appears, press F1. If you have set an administrator password, you are prompted to type the password.
3. Select **Devices and I/O Ports --> Advanced Chipset Control --> Serial ATA**.
4. Select **SATA Controller Mode Option**. Change the value to **Enhanced**.
5. Scroll down and select **SATA RAID Enable**.
6. Select **Enabled**.
7. Press Esc; then, select **Yes** to save your changes.

Using the Serial ATA HostRAID feature

The instructions in this section are for using the Array Configuration Utility program to access and perform an initial RAID level-1 configuration. If you install a RAID adapter, use the method described in the instructions that come with the adapter to view or change settings for the attached devices.

For additional information about using the Array Configuration Utility program to create, configure, and manage arrays, see the documentation on the *ServeRAID-8e (Adaptec HostRAID) Support* CD.

Configuring the controller: To use the Array Configuration Utility program to configure a level-1 RAID for the server, complete the following steps.

1. Turn on the server.
2. When the prompt `Press <CTRL><A> for Adaptec RAID Configuration Utility` appears, press Ctrl+A.

   Note: If the prompt `<<< Press <CTRL><A> for Adaptec RAID Configuration Utility! >>>` does not appear, start the Configuration/Setup Utility (see "Starting the Configuration/Setup Utility program" on page 36), select **Devices and I/O Ports --> Advanced Chipset Control --> Serial ATA** and make sure that the Serial ATA options are set to the following values:

Native Mode Operation:	**Auto**
SATA Controller Mode Option:	**Enhanced**
SATA RAID	**Enabled**

3. Select **Array Configuration Utility (ACU)**.
4. Select **Create Array**.
5. From the list of ready drives, select the two drives that you want to group into the array.
6. When you are prompted to select the RAID level, select **RAID-1**.
7. (Optional) Type an identifier for the array.
8. When you are prompted for the array build method, select **Quick Int**.
9. Follow the instructions on the screen to complete the configuration, and select **Done** to exit.

10. Restart the server.

Viewing the configuration: To view information about the Serial ATA controller, complete the following steps:

1. Start the Array Configuration Utility.
2. From the Array Configuration Utility window, select **Manage Arrays**.
3. Select an array and press Enter.
4. Press Esc to exit from the program.

Using the SAS/SATA Configuration Utility program (for SAS/SATA HostRAID)

Use the SAS/SATA Configuration Utility to add RAID level-0 and level-1 functionality to the SAS/SATA controller (hot-swap models only). This utility is part of the BIOS.

Note: To add RAID functionality to the integrated SATA controller (simple-swap models), see "Using the Adaptec RAID Configuration Utility programs (for Serial ATA HostRAID)" on page 42.

The integrated SAS/SATA RAID feature comes disabled by default. You must enable it and install the device drivers before you can use it. The SAS RAID configuration utilities, device drivers, and information are available on the *ServeRAID-8e (Adaptec HostRAID) Support* CD. If this CD did not come with the server, you can download it from http://www.ibm.com/support/.

Enabling the SAS HostRAID feature

Important: A configuration conflict (error code 1801) might occur if SATA RAID and SAS/SATA RAID are both enabled. If you are enabling the SAS HostRAID feature, make sure that the **SATA RAID Enable** option in the Configuration/Setup Utility program is disabled (for more information, see "Enabling the Serial ATA HostRAID feature" on page 43.

To enable the SAS HostRAID feature, complete the following steps:

1. Turn on the server.
2. When the message `Press <CTRL><A> for SAS/SATA Configuration Utility` appears, press Ctrl+A.
3. Select **SerialSelect Utility**; then, select **Controller Configuration**.
4. Select **RAID Support**.
5. Select **Enabled**.
6. Press Esc; then, select **Yes** to save the changes.

Using the SAS/SATA HostRAID feature

The instructions in this section describe how to access the SAS/SATA HostRAID feature (hot-swap models only) from the SAS/SATA Configuration Utility program and perform an initial RAID level-1 configuration. If you install a RAID adapter in the server, use the method that is described in the instructions that come with the adapter to view or change SAS settings for attached devices.

For additional information about how to use the SAS/SATA HostRAID feature, see the documentation on the *ServeRAID-8e (Adaptec HostRAID) Support* CD.

Configuring the controller: To use the SAS HostRAID feature to configure a RAID level-1 array on the server, complete the following steps:

1. Turn on the server.
2. When the message `Press <CTRL><A> for SAS/SATA Configuration Utility` appears, press Ctrl+A.
3. Select **Array Configuration Utility (ACU)**.
4. Select **Create Array**.
5. From the list of ready drives, select the two drives that you want to group into the array.
6. When you are prompted to select the RAID level, select **RAID-1**.
7. (Optional) Type an identifier for the array.
8. When you are prompted for the array build method, select **Quick Int**.
9. Follow the instructions on the screen to complete the configuration; then, select **Done** to exit.
10. Restart the server.

Viewing the configuration: To view information about the SAS/SATA controller, complete the following steps:
1. Start the SAS/SATA Configuration Utility program.
2. From the SAS/SATA Configuration Utility window, select **Manage Arrays**.
3. Select an array and press Enter.
4. To exit from the program, press Esc.

Using the baseboard management controller

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

Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the system event/error log. This log does not clear itself, and if it begins to fill up, the system-error LED will be lit. Also, after you complete a repair or correct an error, clear the system event/error log to turn off the system-error LED on the front of the server.

The baseboard management controller also provides the command-line interface (IPMI Shell) remote server management capabilities through the OSA SMBridge management utility program. The command-line interface provides direct access to server management functions through the IPMI 1.5 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.

Installing the OSA SMBridge management utility program

Complete the following steps to install the OSA SMBridge management utility program on a server running a Windows operating system:
1. Go to http://www.ibm.com/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.
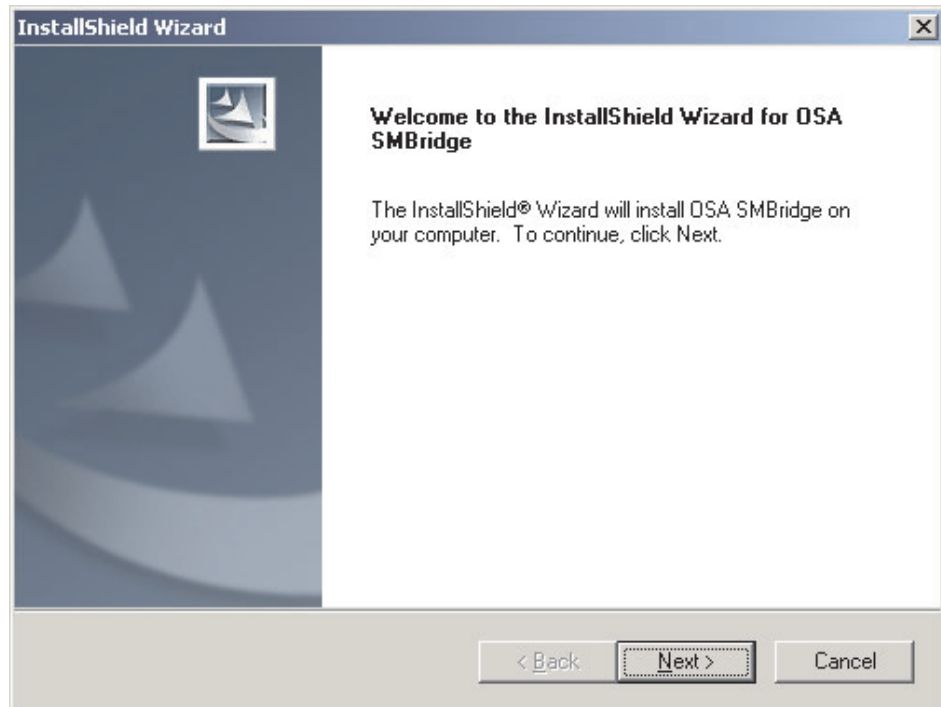
3. Follow the prompts to complete the installation.

   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.

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

1. Go to http://www.ibm.com/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.

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 osabmcutil-1.0-i386.rpm`

6. Follow the prompts to complete the installation. When the installation is complete, the utility copies files to the following directories:
   /etc/init.d/smbridge
   /etc/smbridge.cfg
   /ect/sol/oem.cfg
   /usr/sbin/smbconfig
   /usr/bin/smbconfig
   /usr/sbin/ipmish

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

> smbridge status
> smbridge start
> smbridge stop
> smbridge restart

Using the baseboard management controller utility programs

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

Using the baseboard management controller configuration utility program

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

Go to http://www.ibm.com/support/ to download the utility program; then, copy the bmc_cfg.exe file to a configuration utility diskette.

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

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

Using the baseboard management controller firmware update utility program

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

Go to http://www.ibm.com/support/ to download the utility program; then, copy the Flash.exe file to a firmware update diskette.

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

To update the firmware, 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 CLI (command-line interface) remote management capabilities.

Use CLI mode to remotely perform power-management and system identification control functions over a LAN interface from a command-line interface. Use CLI mode also to remotely view the System Event/Error log.

Use the following commands in CLI mode:

- **connect**

  Connect to the LAN. Type `connect -ip` *ip_address* `-u` *username* `-p` *password*.

- **identify**

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

- **power**

  Turn the server on and off remotely.

- **reboot**

  Force the server to restart.

- **sel**

  Perform operations with the System Event/Error log.

- **sysinfo**

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

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. For device drivers and information about configuring the Ethernet controllers, see the *Intel Ethernet Software* CD that comes with the server. 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/support/.
2. Under **Search technical support**, type **xSeries 306m**, and click **Search**.
3. In the **Additional search terms** field, type `ethernet`, and click **Go**.

Updating IBM Director

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

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

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

1. Check for the latest version of IBM Director:

   a. Go to http://www.ibm.com/servers/eserver/xseries/systems_management/
      xseries_
      sm/dwnl.html.

b. If the drop-down list shows a newer version of IBM Director than what comes with the server, follow the instructions on the Web page to download the latest version.

2. Install IBM Director.

3. Download and install any applicable updates or interim fixes for the server:

   a. Go to http://www.ibm.com/support/.

   b. Click **Downloads and drivers**.

   c. From the **Category** list, select **xSeries (Intel and AMD processor-based)**.

   d. From the **Sub-category** list, select **xSeries 306m** and click **Continue**.

   e. In the **Search within results** field, type `director` and click **Search**.

   f. Select any applicable update or interim fix that you want to download.

   g. Click the link for the executable (.exe) file to download the file, and follow the instructions in the readme file to install the update or interim fix.

   h. Repeat steps 3f and 3g for any additional updates or interim fixes that you want to install.

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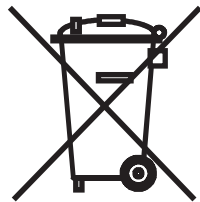
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Part Number: 31R1675

Printed in USA