System x3200 M2 Types 4367 and 4368

User's Guide

System x3200 M2 Types 4367 and 4368

User's Guide

Note:

Before using this information and the product it supports, read the general information in “Notices,” on page 75, and the *Warranty and Support Information* document on the IBM *System x Documentation* CD.

Second Edition (July 2008)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

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

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

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

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

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

Do not:

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

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

Statement 3:

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

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

DANGER

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

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

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

Statement 4:

≥ 18 kg (39.7 lb)

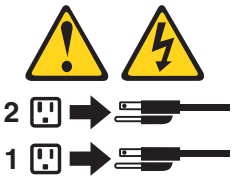
≥ 32 kg (70.5 lb)

≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

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



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 12:

CAUTION:
The following label indicates a hot surface nearby.

Statement 13:

DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 15:

CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Chapter 1. The System x3200 M2 server

The IBM® System x3200 M2, Machine Types 4367 and 4368 server is a 5-U-high, high-performance server. It is ideally suited for networking environments that require superior microprocessor performance, improved systems management, and flexible memory and data management.

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

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

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

Related documentation

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

- *Installation Guide*
  This printed document contains instructions for setting up the server and basic instructions for installing some optional devices.
- *Warranty and Support Information*
  This document is in Portable Document Format (PDF) on the IBM *System x™ Documentation* CD. It contains information about the terms of the warranty and getting service and assistance.
- *Safety Information*
  This document is in PDF on the IBM *System x Documentation* CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.
- *Problem Determination and Service Guide*
  This document is in PDF on the IBM *System x Documentation* CD. It contains information to help you solve problems yourself, and it contains information for service technicians.

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

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

1. Racks are measured in vertical increments of 4.45 cm (1.75 inches) each. Each increment is called a ″U.″ A 1-U-high device is 1.75 inches tall.

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From **Product family** menu, select **System x3200 M2**, and click **Continue**.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

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

Table 1. Features and specifications

Microprocessor:
- Supports one Intel® Core™ 2 Duo dual-core or Xeon™ dual-core or quad-core microprocessor
  Note: Intel Virtualization Technology (VT) is not available on the Core 2 Duo E4600; however, these microprocessors can only run paravirtualization.
- 2 MB, 6 MB, or 12 MB Level-2 cache
- 800, 1066, or 1333 MHz front-side bus (FSB)

Memory:
- Minimum: 512 MB
- Maximum: 8 GB
- Types: PC2-5300 or PC2-6400, ECC unbuffered double-data-rate 2 (DDR2) 667 or 800 MHz SDRAM
- Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved

Drives (depending on the model):
- Diskette (optional): External or internal USB FDD drive and memory key
- Hard disk drive: Hot-swap SAS, hot-swap SATA, or simple-swap SATA
- One of the following SATA attached optical drives:
  - DVD-ROM
  - Multiburner (optional)

Drive bays (depending on the model):
- Two 5.25 in. half-high bays (one optical drive installed)
- One 3.5 in. slim-high removable-media drive bay (optional diskette drive)
- Four 3.5 in. or 2.5 in. slim-high hard disk drive bays (some models)
- Eight 2.5 in. slim-high hard disk drive bays (some models)

PCI expansion slots (depending on the model):
- One PCI Express x8 slot
- One PCI Express x4 slot (x4 slot with x1 electrical)
- One PCI-X 64-bit/133 MHz slot
  Note: This PCI-X slot is enabled when an optional PCI-X enablement card is installed in the mini-PCI slot on the system board. When no mini-PCI-X enablement card installed, this slot has no function.
- Two PCI 32-bit/33 MHz slots

Fans:
Three speed-controlled fans.

Power supply:
One of the following power supplies:
- One or two redundant 430-watt (90-240 V ac)
- One non-redundant 401-watt (90-240 V ac)

Size:
- Height: 438 mm (17.25 in.)
- Depth: 540 mm (21.25 in.)
- Width: 216 mm (8.5 in.)
- Weight: 16.3 kg (36 lb) to 25.2 kg (56 lb) depending upon configuration

Integrated functions:
- Mini-baseboard management controller (mini-BMC)
- Broadcom BCM5722 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet port
- One internal single-channnel (four ports per channel) SAS/SATA controller (mini-PCI slot)
- Two serial ports
- One parallel port
- Six-port Serial ATA controller
- Eight Universal Serial Bus (USB) v2.0 ports (two on front and four on rear, one internal for optional tape drive, and one internal for optional Remote Supervisor Adapter II SlimLine)
- Onboard ATI ES1000 video controller
  - Compatible with SVGA and VGA
  - 64 MB DDR2 SDRAM video memory

Diagnostic LEDs:
- Fans
- Hard disk drives
- Memory
- Microprocessor
- PCI slots
- Power supply
- VRD

Acoustical noise emissions:
- Sound power, idling: 5.0 bel
- Sound power, operating: 5.3 bel

Environment:
- Air temperature:
  - Server on: 10° to 35°C (50° to 95°F) Altitude: 0 to 914.4 m (3000 ft)
  - Server on: 10° to 32°C (50° to 89.6°F) Altitude: 914.4 m (3000 ft) to 2133.6 m (7000 ft)
  - Server off: 10° to 43°C (50° to 109.4°F) Maximum altitude: 2133.6 m (7000 ft)
  - Shipping: -40° to 60°C (-40° to 140°F)
- Humidity (operating and storage):
  - Server on: 8% to 80%
  - Server off: 8% to 80%

Heat output:
Approximate heat output in British thermal units (Btu) per hour:
- Minimum configuration: 630 Btu per hour (185 watts)
- Maximum configuration: 1784 Btu per hour (523 watts)

Electrical input:
- Sine-wave input (50 or 60 Hz) required
- Input voltage and frequency ranges automatically selected
- Input voltage low range:
  - Minimum: 100 V ac
  - Maximum: 127 V ac
- Input voltage high range:
  - Minimum: 200 V ac
  - Maximum: 240 V ac
- Input kilovolt-amperes (kVA) approximately:
  - Minimum: 0.20 kVA (all models)
  - Maximum: 0.55 kVA

Notes:
1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use.
2. 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 stated values because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

What your server offers

The server uses the following features and technologies:

- **High-performance graphics controller**

  The server comes with an integrated graphics controller. This high-performance controller supports high resolutions and includes many performance-enhancing features for the operating-system environment.

- ***IBM Dynamic System Analysis (DSA) Preboot Diagnostic* CD**

  The *IBM Dynamic System Analysis Preboot Diagnostic* CD contains the diagnostic programs for testing the major components of the server. If the CD did not come with the server, complete the following steps to download it.

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

  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **Dynamic System Analysis (DSA)**.

  For additional information about the DSA diagnostic programs, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

- **IBM Director**

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

- **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 an operating system. The ServerGuide™ program detects installed optional hardware devices and provides the correct configuration programs and device drivers.

  For more information about the *ServerGuide Setup and Installation* CD, see “Using the ServerGuide Setup and Installation CD” on page 63.

- **Integrated network support**

  The server comes with an integrated Broadcom NetXtreme Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. For more information, see “Configuring the Broadcom NetXtreme Gigabit Ethernet controller” on page 68.

- **Large data-storage capacity and hot-swap capabilities**

  Some hot-swap models support up to four slim-high, 3.5-inch or 2.5-inch hot-swap SAS hard disk drives. Some models support up to eight slim-high 2.5-inch hot-swap SAS hard disk drives. With the hot-swap feature, you can add, remove, or replace hard disk drives without turning off the server.

- **Large system-memory capacity**

  The server supports up to 8 GB of system memory. The memory controller supports error correcting code (ECC) for up to four industry-standard, 1.8 V, 240-pin, double-data-rate 2 (DDR2), PC2-5300 or PC2-6400 unbuffered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs).

- **Mini-baseboard management controller (mini-BMC)**

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

Note: In messages and documentation, term *service processor* refers to the mini-baseboard management controller or the optional Remote Supervisor Adapter II SlimLine.

- **Redundant connection**

  The addition of an optional network interface card (NIC) provides a failover capability to a redundant Ethernet connection. If a problem occurs with the primary Ethernet connection, all Ethernet traffic that is associated with the primary connection is automatically switched to the redundant NIC. If the applicable device drivers are installed, this switching occurs without data loss and without user intervention.

- **ServeRAID™ support**

  The server supports ServeRAID adapters to create redundant array of independent disks (RAID) configurations. The server also has integrated RAID level-0 and level-1 support in selected models. In addition, some hot-swap models support RAID level-5 when a ServeRAID-MR10i SAS/SATA controller is installed.

- **Systems-management capabilities**

  The server supports an optional Remote Supervisor Adapter II SlimLine, which provides service-processor functions in addition to those that the mini-BMC provides. When this adapter is used with the systems-management software that comes with the server, you can manage the functions of the server locally and remotely. The Remote Supervisor Adapter II SlimLine also provides system monitoring, event recording, and dial-out alert capability.

  See the documentation that comes with your systems-management software for more information. To order an optional Remote Supervisor Adapter II SlimLine, contact your IBM marketing representative or authorized reseller.

  Note: In messages and documentation, the term *service processor* refers to the integrated mini-baseboard management controller or the optional Remote Supervisor Adapter II SlimLine.

Reliability, availability, and serviceability

Three important server 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:

- 1-year parts and 1-year labor limited warranty (Machine Type 4367) and 3-year parts and 3-year labor limited warranty (Machine Type 4368)
- Advanced Configuration and Power Interface (ACPI)
- Advanced Desktop Management Interface (DMI) features
- Automatic BIOS recovery to a backup image
- Automatic error retry or recovery
- Automatic memory downsizing on error detection
- Automatic restart on nonmaskable interrupt (NMI)

- Automatic Server Restart (ASR) logic supporting a system restart when the operating system becomes unresponsive when enabled in the mini-BMC
- Automatic server restart after a power failure, based on the BIOS setting
- Availability of microcode level
- Boot-block recovery
- Built in, menu-driven setup, system configuration, and redundant array of independent disks (RAID) configuration
- Built-in monitoring for fan, power, temperature, and voltage
- CD-based diagnostic programs
- Cooling fans with speed-sensing capability
- Customer support center that is available 24 hours a day, 7 days a week[2]
- Diagnostic support of ServeRAID adapters
- Error codes and messages
- Error correcting code (ECC) double-data-rate 2 (DDR2) synchronous dynamic random-access memory (SDRAM) with serial presence detect (SPD)
- Error logging of POST failures
- Hot-swap Serial Attached SCSI (SAS) hard disk drives (some models)
- Hot-swap Serial Advanced Technology Attachment (SATA) hard disk drives (some models)
- Integrated Ethernet controller
- Intelligent Platform Management Interface (IPMI)
- Support for an optional IBM Remote Supervisor Adapter II SlimLine
- Key-lock support for physical security
- Memory change messages posted to the error log
- Mini-baseboard management controller (mini-BMC) (service processor)
- Power management
- Power-on self-test (POST)
- Read-only memory (ROM) checksums
- Redundant Ethernet capabilities (requires an optional Ethernet adapter) with failover support
- Simple-swap Serial Advanced Technology Attachment (SATA) hard disk drives (some models)
- Standby voltage for system-management features and monitoring
- System auto-configuring from the configuration menu
- System-error LED on the front bezel and diagnostic LEDs on the system board
- Upgradeable mini-BMC firmware
- Upgradeable microcode for POST, basic input/output system (BIOS) code, and read-only memory (ROM) resident code, locally or over a LAN
- Vital product data (VPD); includes serial-number information and replacement part numbers, stored in nonvolatile memory, for easier remote maintenance
- Wake on LAN® capability

2. Service availability will vary by country. Response time varies; may exclude holidays.

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 x86-processor-based servers, desktop computers, workstations, and notebook computers on a variety of platforms

IBM Director provides a comprehensive entry-level workgroup hardware manager. It includes the following key features:

- Advanced self-management capabilities for maximum system availability.
- Multiple operating-system platform support, including Microsoft® Windows® 2000 Server, Windows Server 2003, Windows XP Professional, AIX, i5/OS, Red Hat Linux®, SUSE , VMware, 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/systems/management/director/resources/. It is updated every 6 to 8 weeks.
- Support for IBM and non-IBM servers, desktop computers, workstations, and notebook 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 documentation on the IBM Director CD that comes with the server, the *IBM Director* Information Center at http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/diricinfo_all/diricinfoparent.html, and the IBM xSeries Systems Management Web page at http://www.ibm.com/systems/management/, which presents an overview of IBM Systems Management and IBM Director.

Update *Xpress* program

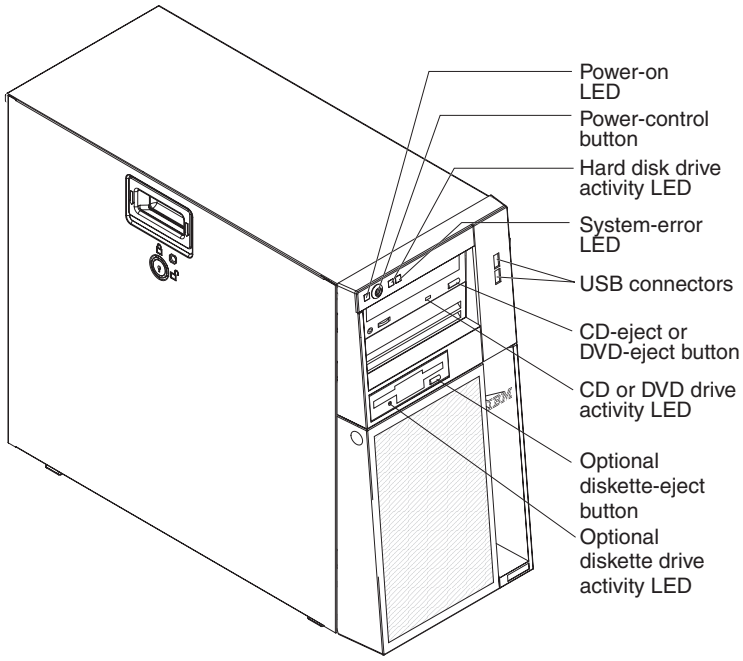
The Update*Xpress* program is available for most System x and xSeries servers and optional devices. It detects supported and installed device drivers and firmware in the server and installs available updates. You can download the Update*Xpress* program from the Web at no additional cost, or you can purchase it on a CD. To download the program or purchase the CD, go to http://www.ibm.com/systems/management/xpress.html. Additional information about UpdateXpress is available from the System x and xSeries Tools Center at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

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, LEDs, and connectors on the front of the server.



Power-on LED

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

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

Power-control button

Press this button to turn the server on and off manually.

Hard disk drive activity LED

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

USB connectors

Connect USB devices to these connectors.

CD-eject or DVD-eject button

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

CD or DVD drive activity LED

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

(Optional) diskette-eject button

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

(Optional) diskette drive activity LED

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

Hot-swap hard disk drive activity LED (some models)

On some server models, each hot-swap drive has a hard disk drive activity LED. When this green LED is flashing, it indicates that the associated hard disk drive is in use.

When the drive is removed, this LED also is visible on the hard disk drive backplane, next to the drive connector. The backplane is the printed circuit board behind drive bays 4 through 7 (or bays 4 through 11 on some 2.5-inch hard disk drive SAS models).

Hot-swap hard disk drive status LED (some models)

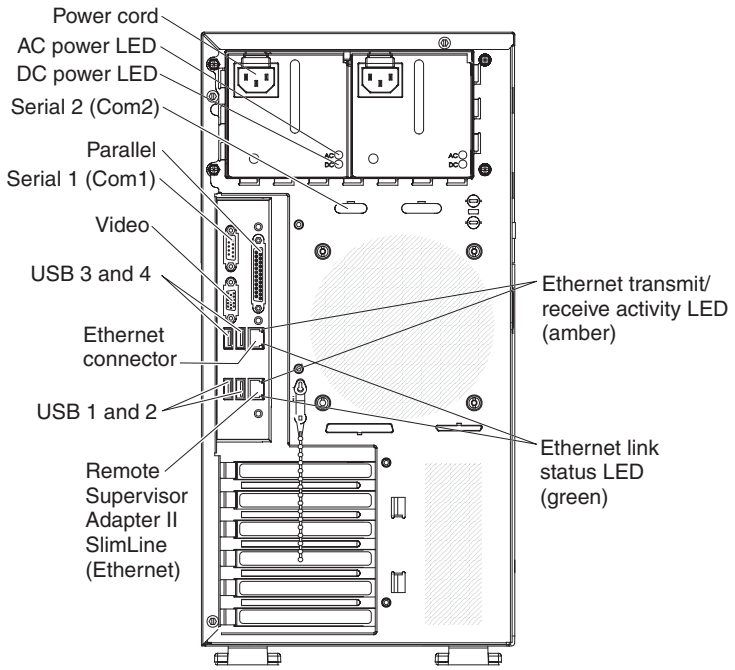
On some server models, each hot-swap hard disk drive has an amber status LED. If this amber status LED for a drive is lit, it indicates that the associated hard disk drive has failed.

If an optional IBM ServeRAID controller is installed in the server and the LED flashes slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

When the drive is removed, this LED also is visible on the hard disk drive backplane, below the hot-swap hard disk drive activity LED.

Rear view

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



Power-cord connector

Connect the power cord to this connector.

AC power LED

On some server models, each hot-swap power supply has an ac power LED and a dc power LED. During typical operation, both the ac and dc power LEDs are lit.

DC power LED

On some server models, each hot-swap power supply has a dc power LED and an ac power LED. During typical operation, both the ac and dc power LEDs are lit.

Serial 2 connector

Connect a 9-pin serial device to this connector.

Parallel connector

Connect a parallel device to this connector.

Serial 1 connector

Connect a 9-pin serial device to this connector.

Video connector

Connect a monitor to this connector.

USB connectors

Connect USB devices to these connectors.

Ethernet connector

Use this connector to connect the server to a network.

Ethernet transmit/receive activity LED

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

Ethernet link status LED

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

Remote Supervisor Adapter II SlimLine/Ethernet connector

Use this connector to connect the Remote Supervisor Adapter II SlimLine to a network.

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 the service processor is shut down; however, the server can respond to requests from the service processor, such as a remote request to turn on the server. The power-on LED flashes to indicate that the server is connected to ac power but not turned on.

Turning on the server

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

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the systems-management software for an optional Remote Supervisor Adapter II SlimLine, the systems-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.
- If an optional Remote Supervisor Adapter II SlimLine is installed in the server, the server can be turned on from the Remote Supervisor Adapter II SlimLine user interface.

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 optional devices.

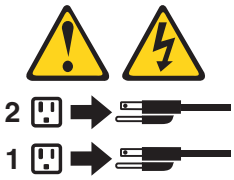
Turning off the server

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:

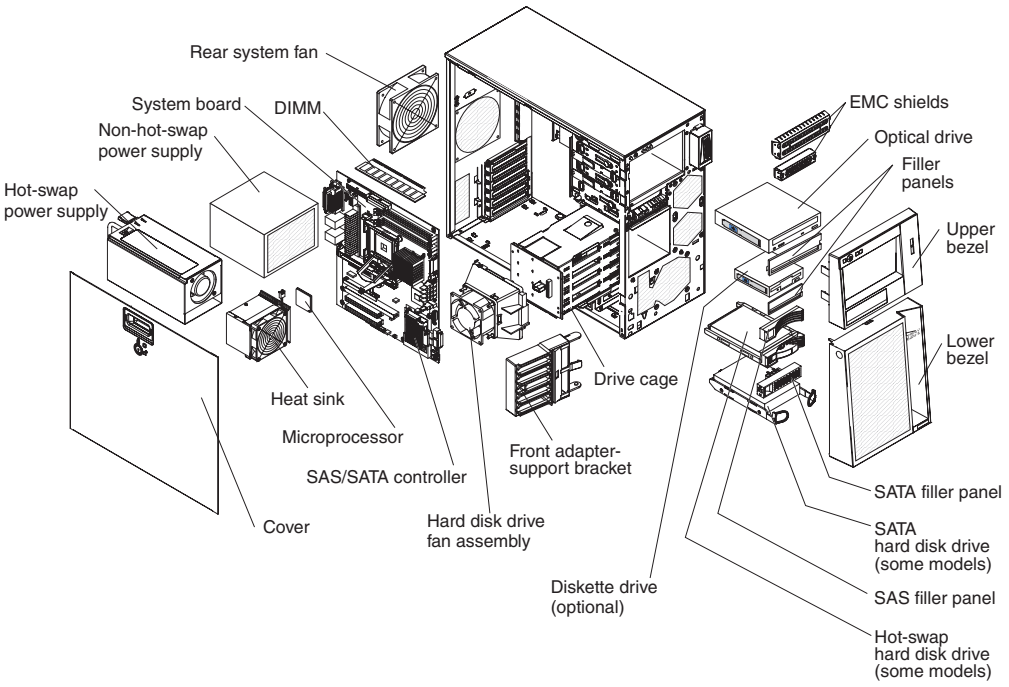
- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn 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 an optional Remote Supervisor Adapter II SlimLine is installed in the server, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- The server can turn itself off as an automatic response to a critical system failure.

Chapter 2. Installing optional devices

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

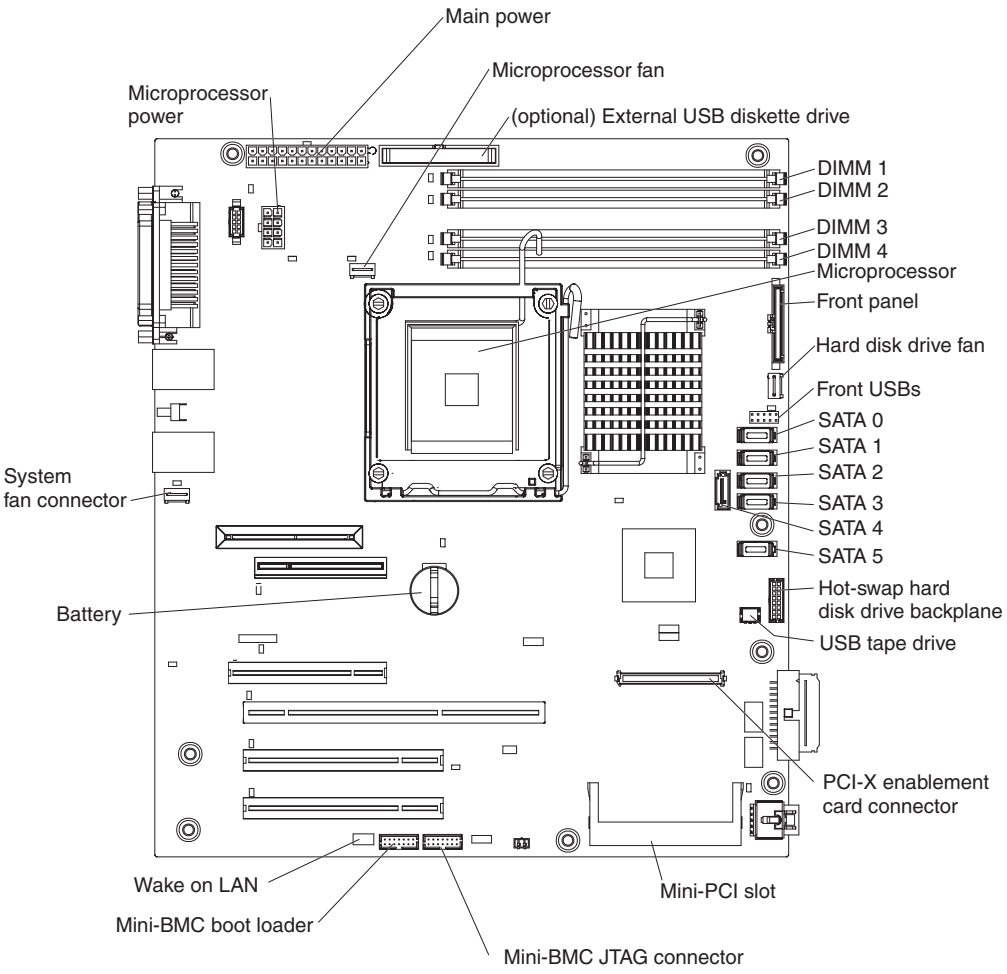
Server components

The following illustration shows the major components in the server (depending on the server model). The illustrations in this document might differ slightly from your hardware.



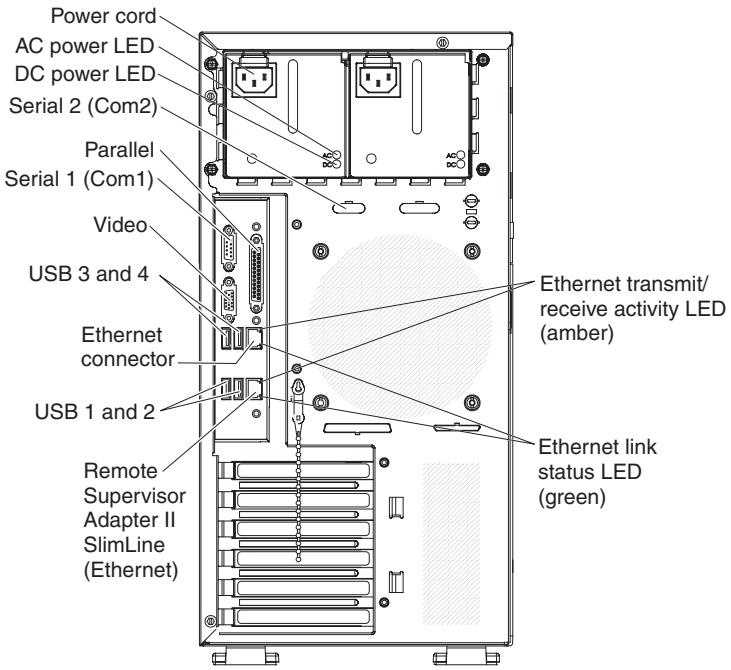
System-board internal connectors

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



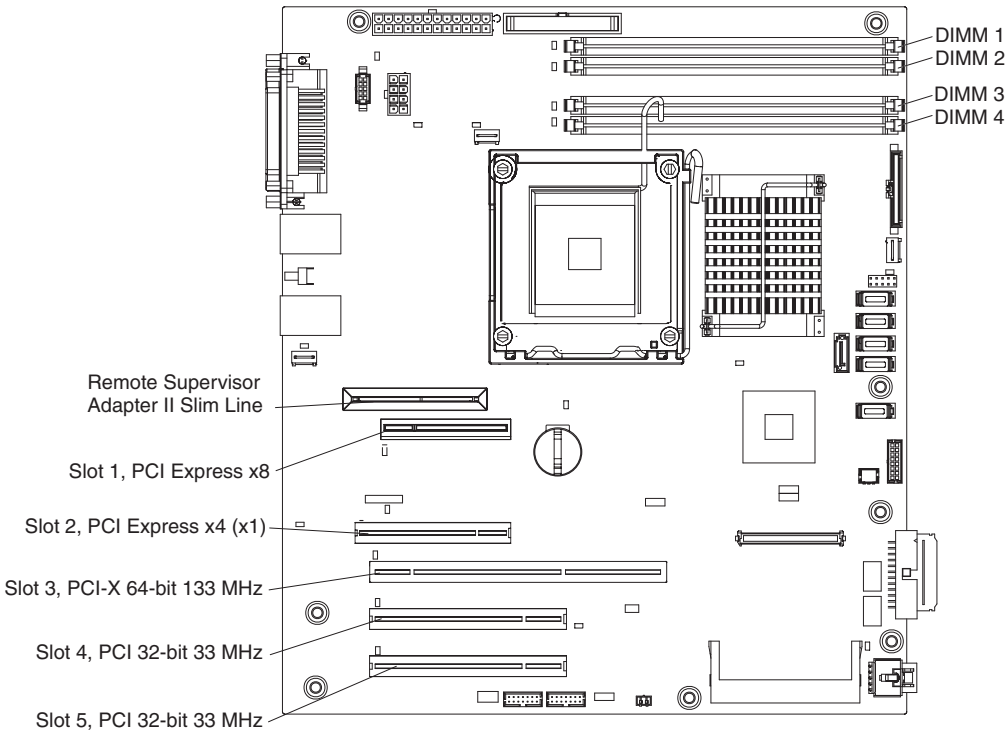
System-board external connectors

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



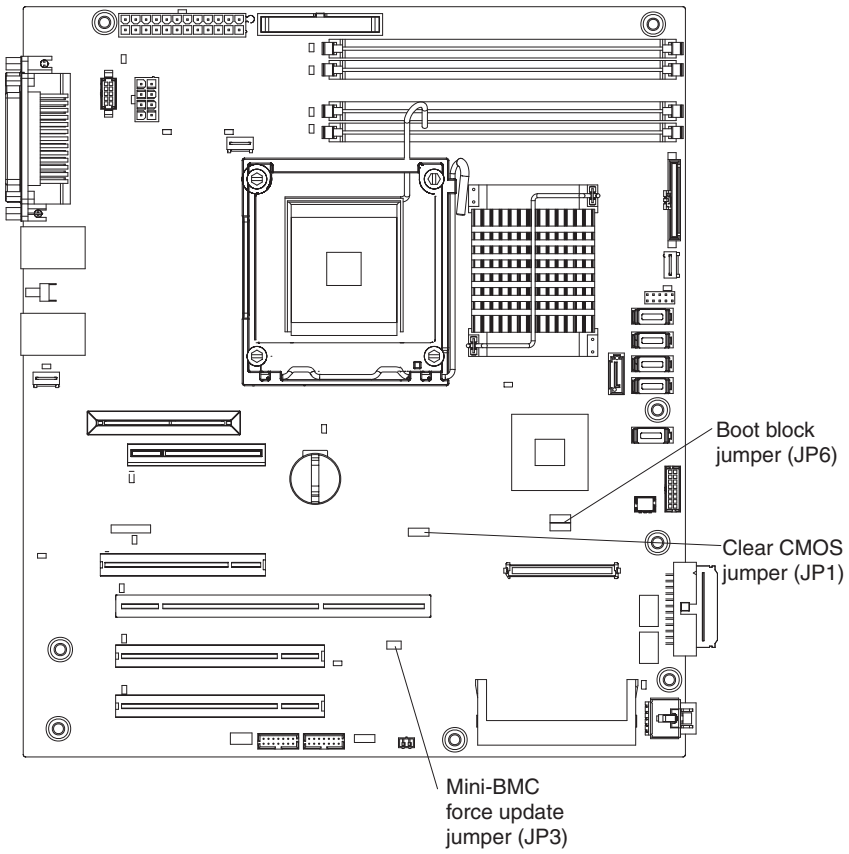
System-board optional-device connectors

The following illustration shows the system-board and connectors for user-installable optional devices.



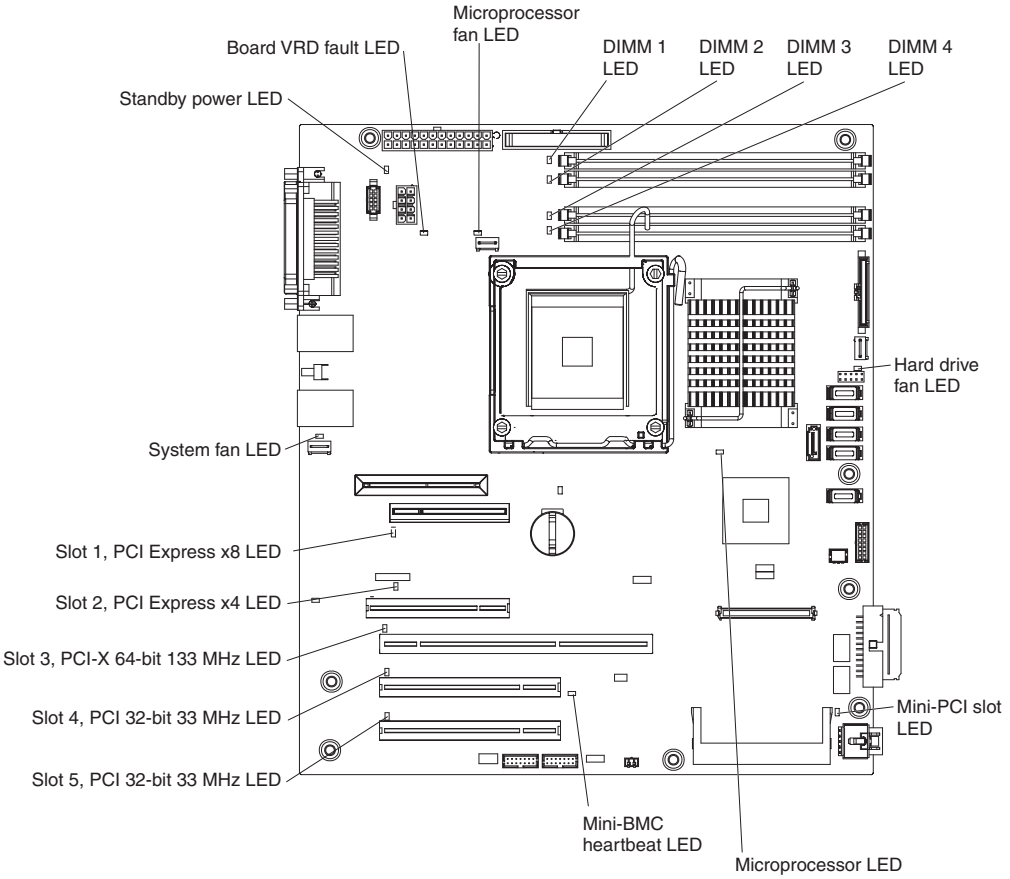
System-board jumpers

The following illustration shows the jumpers on the system board. There are no changeable switches on the system board.



System-board LEDs

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



For more information about the system-board LEDs, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

Installation guidelines

Important: Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see "Solving Problems" in the *Installation Guide* for diagnostic information.

Before you install optional devices, read the following information:

- Read the safety information that begins on page v, the guidelines in “Working inside the server with the power on” on page 22, and “Handling static-sensitive devices” on page 23. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3200 M2** to display the matrix of downloadable files for the server.

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

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

System reliability guidelines

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

- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.
- You have replaced a hot-swap drive within 2 minutes of removal.

Working inside the server with the power on

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

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

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

Handling static-sensitive devices

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

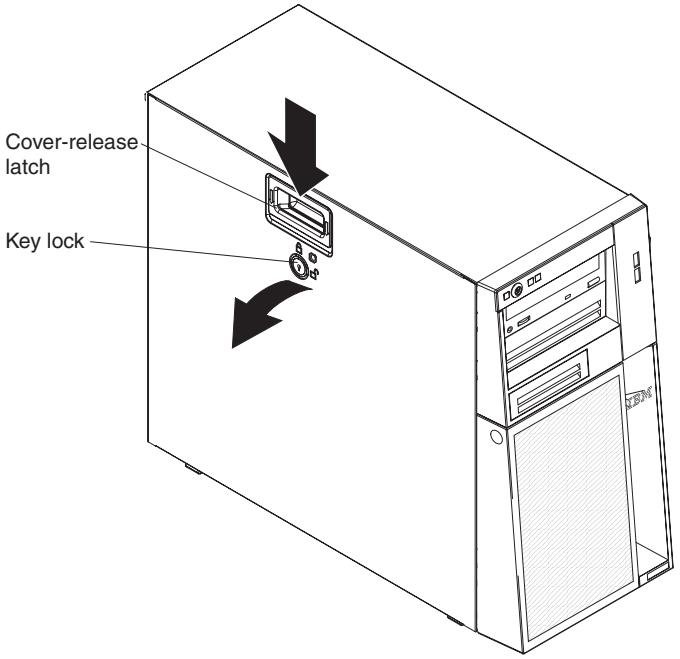
To reduce the possibility of electrostatic discharge, observe the following precautions:

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

Removing the side cover

To remove the server side cover, complete the following steps:

1. Review the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and all attached devices (see “Server power features” on page 12); then, disconnect all power cords and external cables.
3. Lay the server on its side.
4. Unlock the side cover; then, press the cover-release latch down, as indicated by the two arrows on the latch.



5. Lift the side cover off the server and set it aside.

To replace the side cover, see “Reinstalling the side cover” on page 54.

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

Removing the two-piece bezel

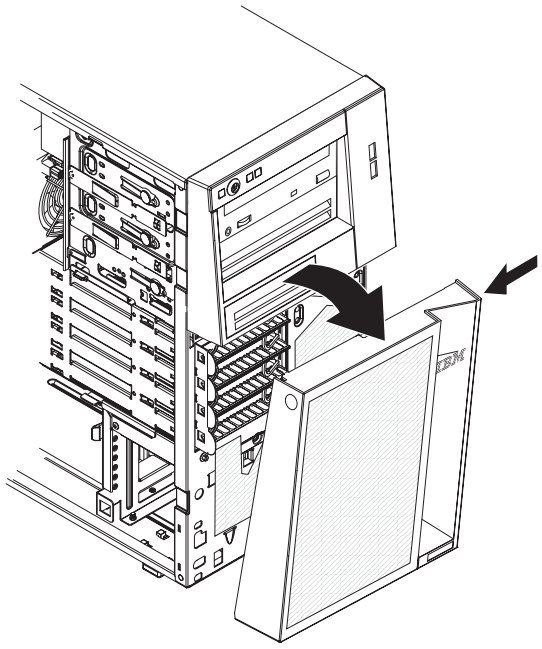
When you work with some devices, such as drives in bays 1 through 7 (or bays 1 through 11 if you have the 2.5-inch eight-drive model, see page 31), you must first remove the two-piece bezel to access the devices.

Notes:

- Before you remove the upper bezel, you must unlock and remove the side cover and remove the lower bezel.
- If you are removing only the lower bezel, you do not have to remove the side cover. However, the side cover must be unlocked.

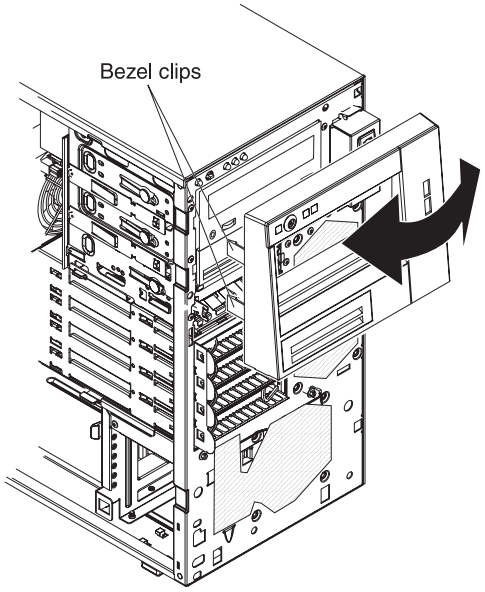
To remove the two-piece bezel, complete the following steps:

1. Unlock the side cover.
2. Remove the side cover (see “Removing the side cover” on page 24).
3. Press the round blue release button on the right side of the lower bezel and tilt the lower bezel forward to disengage it from the chassis.



4. Lift the lower bezel to disengage the two bottom tabs from the chassis. Set the lower bezel aside.

5. Carefully pull the two bezel clips on the left side of the upper bezel away from the chassis; then, rotate the upper bezel to the right side of the server to disengage the two right-side tabs from the chassis. Set the upper bezel aside.



For instructions for replacing the two-piece bezel, see “Reinstalling the two-piece bezel” on page 52.

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 you install DIMMs:

- The server supports only industry-standard, 1.8 V, 240-pin double-data-rate 2 (DDR2), 667 or 800 MHz, PC2-5300 or PC2-6400, unbuffered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC). These DIMMs must be compatible with the latest DDR2 667 or 800 MHz SDRAM unbuffered DIMM specification. For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- The optional DIMMs that are available for the server are 512 MB, 1 GB, and 2 GB. The server supports a minimum of 512 MB and a maximum of 8 GB of system memory.
- Some servers come with one 512 MB DIMM, two 512 MB DIMMs, or two 1 GB DIMMs installed.

  Depending on the DIMM sizes that are installed in your server, the server can support one, two, or four DIMMs. The 512 MB DIMM option kit contains one DIMM; however, the 1 GB DIMM and 2 GB option kits each contain two DIMMs.
- The system board contains four DIMM connectors and supports two-way memory interleaving. For two-way memory interleaving, DIMMs must be installed in matched pairs.

  If one DIMM is installed in the DIMM 1 connector, when you install an additional DIMM, it must be installed in the DIMM 3 connector, and it must be the same size, speed, type, and technology as the DIMM in the DIMM 1 connector. You can use compatible DIMMs from various manufacturers.

  If you install a second pair of DIMMs in the DIMM 2 and DIMM 4 connectors, they do not have to be the same size, speed, type, and technology as the DIMMs in the DIMM 1 and DIMM 3 connectors. However, the size, speed, type, and technology of the DIMMs that you install in the DIMM 2 and DIMM 4 connectors must match each other.
- The maximum operating speed of the server is determined by the slowest DIMM in the server.
- The server can operate in single-channel mode or dual-channel mode.
- DIMM population is based on single-rank, double-rank, or combined single-rank and double-rank DIMMs. DIMMs must be installed in order, starting with the DIMM connector that is farthest from the memory controller hub. Double-rank DIMMs must be installed in the DIMM connector that is farthest from the memory controller hub when you install a combination of single-rank and double-rank DIMMs. The following tables show examples of populating the server with different combinations of single-rank and double-rank DIMMs and different operating modes.

Table 2. Single-channel mode with single-rank and double-rank DIMMs

Channel 0		**Channel 1**	
DIMM 1	DIMM 2	DIMM 3	DIMM 4
Single-rank			
Double-rank			
Single-rank	Single-rank		

Table 3. Dual-channel mode with single-rank and double-rank DIMMs

First pair		Second pair		Remarks
DIMM 1	DIMM 2	DIMM 3	DIMM 4	
Single-rank	Single-rank	Single-rank	Single-rank	
Single-rank	Single-rank	Double-rank	Double-rank	This configuration is the second-best choice.
Double-rank	Double-rank	Single-rank	Single-rank	This configuration is the best choice.
Double-rank	Double-rank	Double-rank	Double-rank	

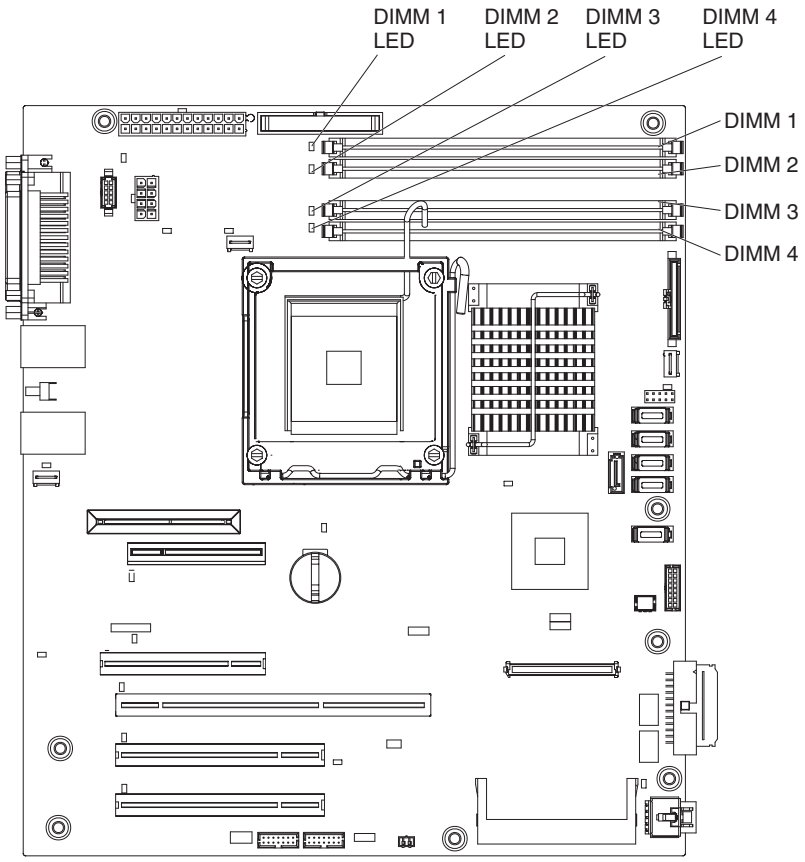
The following table shows the sequence in which DIMMs must be installed in the server.

Table 4. DIMM installation sequence

Number of DIMMs	Installation sequence (connectors)
1	1
2 (interleaved configuration)	1, 3
3	The use of three DIMMs is not supported,
4 (interleaved configuration)	1, 3, 2, 4

- The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Configuration/Setup Utility program and select **System Summary** from the menu. For additional information, see Chapter 3, “Configuring the server,” on page 57.
- When you restart the server after you add or remove a DIMM, the server displays a message that the memory configuration has changed.

The following illustration shows the dual inline memory module (DIMM) connectors and corresponding LEDs on the system board.



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

To install a DIMM, complete the following steps:

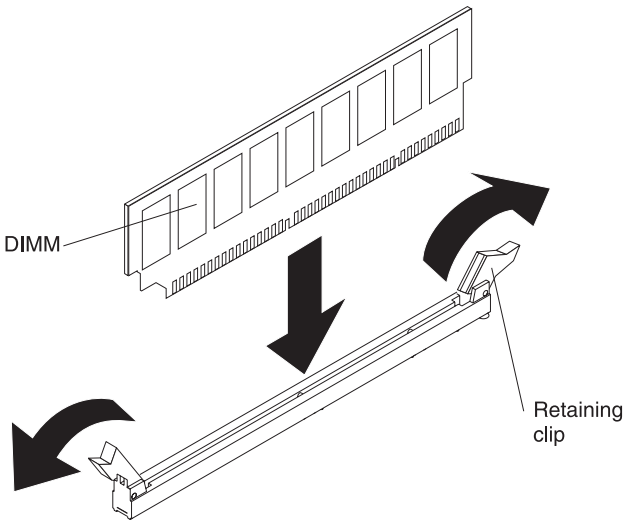
1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 24).
4. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Install the DIMMs in the sequence shown in the following table.

Table 5. DIMM installation sequence

Number of DIMMs	Installation sequence (connectors)
1	1
2 (interleaved configuration)	1, 3
3	Not supported
4 (interleaved configuration)	1, 3, 2, 4

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

5. Open the retaining clips and, if necessary, remove any existing DIMM.



6. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the new DIMM from the package.
7. Turn the DIMM so that the DIMM keys align correctly with the connector.
8. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, and then reinsert it.

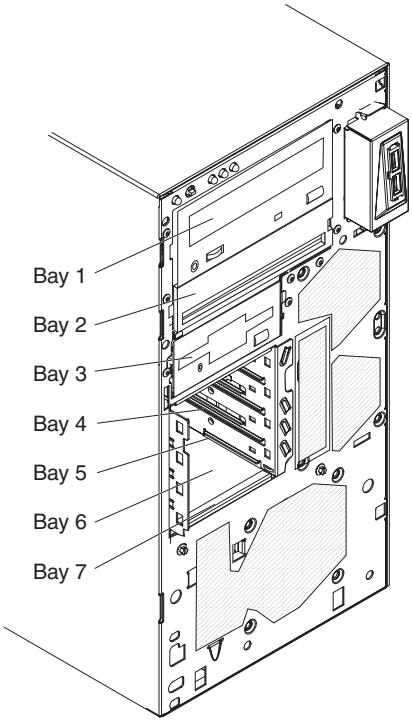
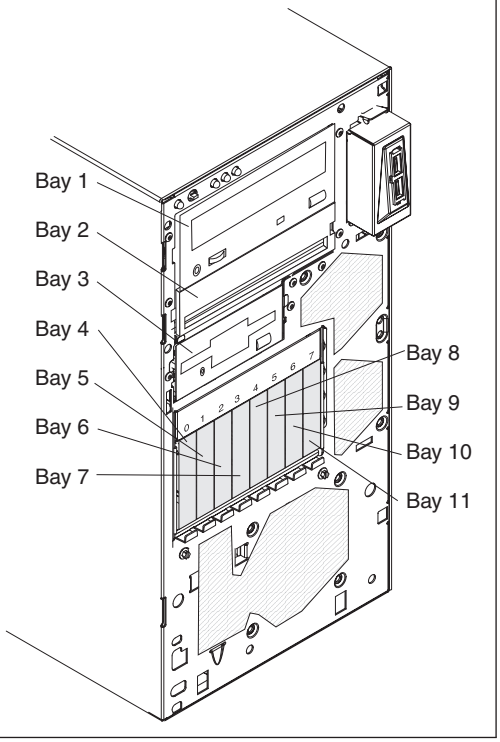
If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 52.

Installing a drive

Depending on the server model, a DVD-ROM or multiburner drive might be installed in the server. The server supports 2.5-inch or 3.5-inch hot-swap SAS, 3.5-inch hot-swap SATA, or 3.5-inch simple-swap SATA hard disk drives (depending on the model).

The following illustrations show the locations of the drive bays. Some models have seven drive bays, and some models have eleven drive bays.

Table 6. Drive bays on the server models

Seven drive-bay model	Eleven drive-bay model
	

The following notes describe the types of drives that the server supports and other information that you must consider when you install a drive:

- Make sure that you have all the cables and other equipment that are specified in the documentation that comes with the drive.
- Select the bay in which you want to install the drive.
- Check the instructions that come with the drive to determine whether you have to set any switches or jumpers on the drive. If you are installing a SAS or SATA device, be sure to set the SAS or SATA ID for that device.
- Optional internal or external USB diskette drives, tape drives, DVD-ROM, and multiburner drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, and 3 only.
- The SATA removable-media drives that you install in bay 1 connects to the SATA 4 connector on the system board and the drive in bay 2 connects to the SATA 5 connector on the system board.
- To install a 3.5- inch drive in a 5.25-inch bay, you must use the 5.25-inch conversion kit.

- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI and PCI Express slots covered or occupied. When you install a drive, PCI, or PCI Express adapter, save the EMC shield and filler panel from the bay or PCI or PCI Express adapter slot cover in the event that you later remove the device.
- For a complete list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

Installing a CD or DVD 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 20.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 24).
4. Remove the two-piece bezel (see “Removing the two-piece bezel” on page 25).
5. Use a screwdriver to pry the filler panel and EMC shield away from the server.

Note: If you are installing a drive that contains a laser, observe the following safety precaution.
Statement 3:

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

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

DANGER

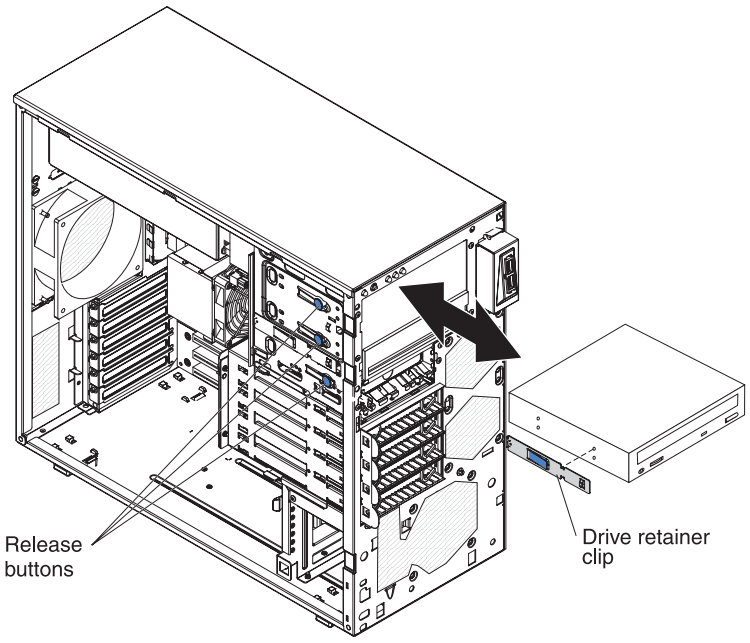
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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

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

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

   Note: You might find it easier to install the new drive from the front and then attach the cables.
8. Remove the drive retainer clip from the side of the drive cage of bays 1 or 2. Slide the drive retainer clip to the right to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive.



9. If you are installing a 5.2-inch drive in bay 2, slide the drive into the bay. If you are installing a 3.5-inch drive in bay 2, you must attach the 5.2-inch. conversion kit to the 3.5-inch drive.

   Note: An optional diskette drive can be installed in bay 3.
10. Connect one end of the applicable signal cable into the rear of the drive and make sure that the other end of this cable is connected into the applicable SATA connector on the system board.
11. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and dual inline memory modules (DIMMs).
12. If you have another drive to install or remove, do so now.
13. Connect the power cable to the rear of the drive. The connectors are keyed and can be inserted only one way.

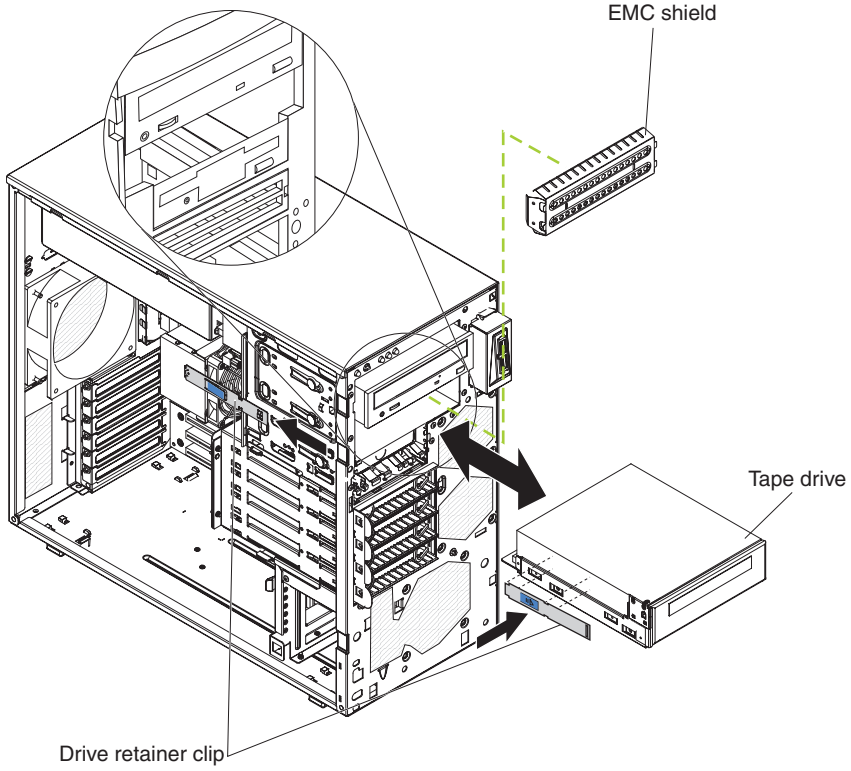
If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 52.

Installing a tape drive

To install a tape drive, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 24).
4. Remove the two-piece bezel (see “Removing the two-piece bezel” on page 25).
5. Use a screwdriver to pry the filler panel and EMC shield away from the server.
6. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
7. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

8. Remove the drive retainer clip from the side of the drive cage of bays 1 or 2. Slide the drive retainer clip to the right to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive.



9. Slide the drive into the bay.

   Note: A tape drive can be installed in bay 1 or 2.

10. Connect one end of the applicable signal cable into the rear of the drive and make sure that the other end of this cable is connected into the applicable connector on the system board.
11. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and dual inline memory modules (DIMMs).
12. If you have another drive to install or remove, do so now.
13. Connect the power cable to the rear of the drive. The connectors are keyed and can be inserted only one way.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 52.

Installing a hot-swap SAS or hot-swap SATA hard disk drive

Some hot-swap SAS models support 2.5-inch or 3.5-inch hot-swap SAS hard disk drives. The hot-swap SATA models support 3.5-inch hot-swap SATA hard disk drives. Before you install a hot-swap hard disk drive, read the following information:

- Depending on your model, the server supports the following maximum number of hot-swap drives:
  - Four 3.5-inch hot-swap SAS
  - Four 3.5-inch hot-swap SATA
  - Four 2.5-inch hot-swap SAS
  - Eight 2.5-inch hot-swap SAS
- You must install either all SAS hard disk drives or all SATA hard disk drives in the server. Do not install both SAS and SATA drives in the server.
- Install drives in the following sequence:
  - For server models that support four hard disk drives, install the drives starting from the top bay to the bottom bay (bay 4, 5, 6, and then 7).
  - For server models that support eight hard disk drives, install the drives starting from left to right (bay 4, 5, 6, 7, 8, 9, 10, and then 11).
- Inspect the drive tray for signs of damage.
- Make sure that the drive is correctly installed in the tray.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays.

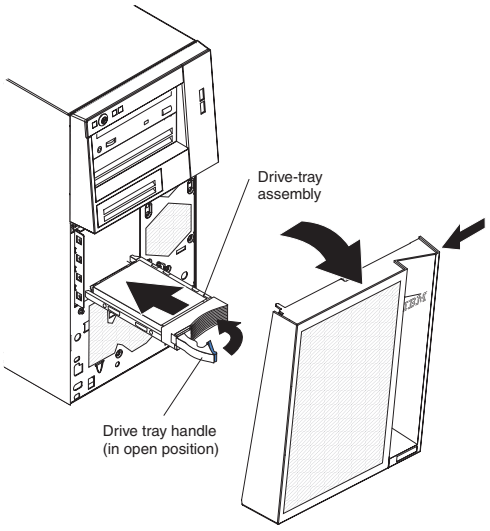
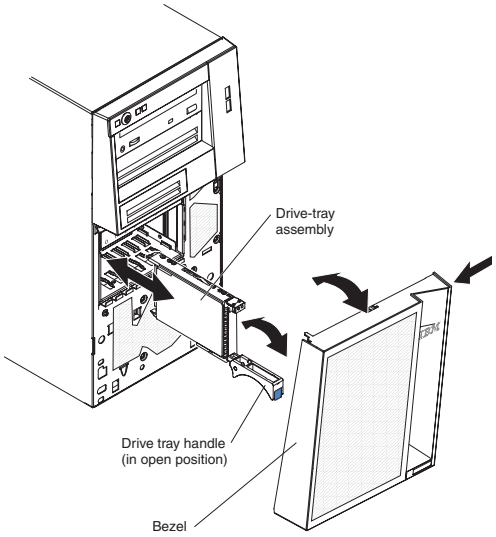
The server hot-swap bays are connected to a SAS/SATA backplane. This backplane, also known as the hot-swap-drive backplane, is the printed circuit board behind these bays.

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

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

1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Unlock the side cover (the bezel will not disengage from the server if the cover is locked).
3. Remove the lower bezel (see “Removing the two-piece bezel” on page 25).
4. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
5. Install the hard disk drive in the hot-swap bay:
   a. Make sure that the drive tray handle is open.
   b. Align the drive assembly with the guide rails in the bay as shown in the following illustrations based on your model.

Table 7. Illustrations of the server models with four and eight drive bays

Server model with four hot-swap drive bays	Server model with eight hot-swap drive bays
	

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

d. Rotate the drive tray handle to the closed (locked) position.

e. Check the hard disk drive status indicator to make sure that the hard disk drive is operating correctly. (You might have to restart the server before the drive is recognized.) If the amber hard disk drive status LED for a drive is lit continuously, it indicates that the drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, it indicates that the drive is being accessed.

   Note: If the server is configured for RAID operation using an optional ServeRAID adapter, you might have to reconfigure your disk arrays after you install hard disk drives. See the ServeRAID documentation on the *IBM ServeRAID Support* CD for additional information about RAID operation and complete instructions for using ServeRAID Manager.

6. If you are installing additional hot-swap hard disk drives, do so now.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 52.

IDs for hot-swap hard disk drives

On some models, the hot-swap-drive backplane controls the IDs of the internal hot-swap drive bays. The following table lists the IDs of the hard disk drives and backplane that are connected to one channel in the hot-swap models. In the typical configuration, the standard hard disk drives and backplane are connected to channel A. This table applies only to server models that support four hard disk drives.

Table 8. IDs of the hot-swap drives (models with four drive bays)

Drive bay	ID
4	0
5	1
6	2
7	3

If your server is the eight-bay, 2.5 inch hot-swap SAS model, the IDs of the hard disk drives are shown in the following table.

Table 9. IDs of the hot-swap drives (models with eight drive bays)

Drive bay	ID
4	0
5	1
6	2
7	3
8	4
9	5
10	6
11	7

Installing a simple-swap SATA hard disk drive

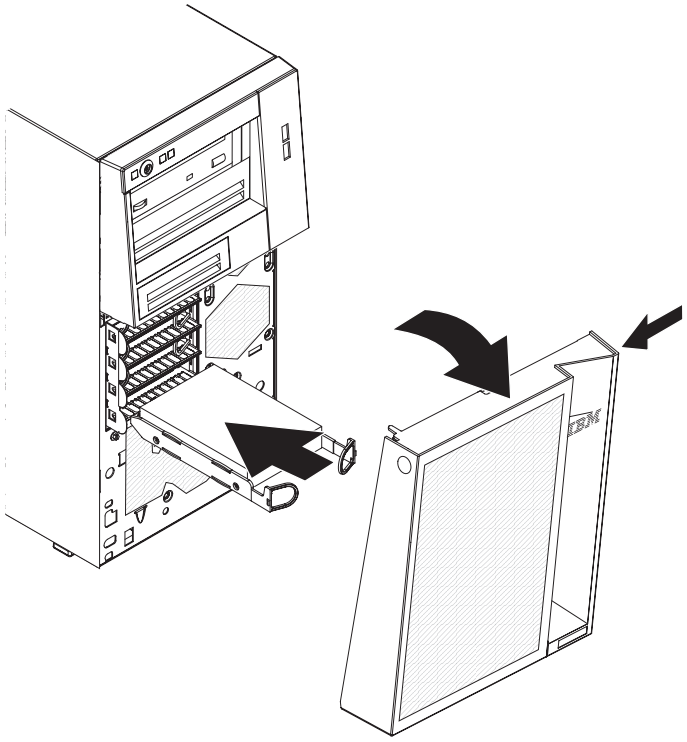
Some server models support 3.5-inch simple-swap SATA hard disk drives, which are accessible from the front of the server. You must disconnect all power from the server before remove or install simple-swap drives. Before you install a simple-swap SATA hard disk drive, read the following information:

- You can install four simple-swap SATA hard disk drives in the simple-swap models.
- Install the drives starting from the top bay to the bottom bay (bay 4, 5, 6, and then 7).
- The four simple-swap SATA hard disk drive connects to the SATA 0 through SATA 3 connectors on the system board as follows:
  - The drive in bay 4 connects to the SATA 0 connector on the system board.
  - The drive in bay 5 connects to the SATA 1 connector on the system board.
  - The drive in bay 6 connects to the SATA 2 connector on the system board.
  - The drive in bay 7 connects to the SATA 3 connector on the system board.
  -

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

To install a simple-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords.
3. Unlock the side cover (the bezel will not disengage from the server if the cover is locked).
4. Remove the lower bezel (see “Removing the two-piece bezel” on page 25).
5. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
6. Align the drive assembly with the guide rails in the bay (the connector end of the drive goes in first).



7. Pull the loops of the drive assembly toward each other; then, carefully slide the drive assembly into the drive bay until it stops, and release the loops.

   Note: Do not release the loops on the drive assembly until it is completely seated.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 52.

The simple-swap-drive backplate controls the IDs of the internal simple-swap drive bays. The following table lists the IDs of the hard disk drives and backplate in simple-swap models.

Table 10. IDs of simple-swap drives

Drive bay	ID
4	0
5	1
6	2
7	3

Power and signal cables for internal drives

The server uses cables to connect SATA-attached, simple-swap SATA, hot-swap SAS, and hot-swap SATA devices to the power supply and to the system board. (See “System-board internal connectors” on page 16 for the locations of system-board connectors.) Review the following information before you connect power and signal cables to internal drives:

- The drives that are preinstalled in the server come with power and signal cables attached. If you replace any drives, remember which cable is attached to which drive.
- When you install a drive, make sure that one of the signal cable drive connectors is connected to the drive and that the connector at the other end of the signal cable is connected to the system board or a compatible adapter or controller that you have installed.
- When you route a cable, make sure that it does not block the airflow to the rear of the drives or over the microprocessor or DIMMs.

The following cables are provided:

- **Power cables:** Four-wire power cables connect the drives to the power supply. At the ends of these cables are plastic connectors that can be attached to different drives; these connectors vary in size. Use either a four-wire power cable or SATA power cable with SATA drives, but do not use both at the same time (use one or the other).
- **Signal cables:** Signal cables are typically flat cables, also called ribbon cables, that connect SATA attached, SATA, SAS, and diskette drives to the system board. Two or three types of signal cables come with the server:
  - **SATA attached (for optical drives):** The flat SATA-attached signal cable has two connectors. One of these connectors is attached to the optical drive, and one is attached to one of the connectors on the system board.
  - **(Optional) USB diskette drive:** The narrower signal cable has two connectors. One is attached to the diskette drive, and the other is attached to the connector (J11) on the system board.
  - **Simple-swap SATA:** Simple-swap SATA models come with four SATA cables that are already connected to the system board and the backplate at the rear of the simple-swap drive cage.
  - **Hot-swap SAS/SATA:** Hot-swap SAS/SATA models come with one or two (depending on the model) data cables that connect the SAS/SATA controller to the hot-swap backplane. The data cable provides inherent connectivity for the SAS or SATA drives that the server supports. Therefore, additional cabling is not required for these drives.

    For more information about the requirements for SAS/SATA cable and connecting SAS/SATA devices, see the documentation that comes with these devices.

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

Installing an adapter

The following notes describe the types of adapters that the server supports and other information that you must consider when you install 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 the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.
- Read the documentation that comes with your operating system.
- The server comes with the following adapter connectors or slots:
  - Slot 1, PCI Express x8
  - Slot 2, PCI Express x4 (x1)

    Important: The x1 designation in parentheses for slot 2 identifies an x4 slot that is designed to support x1 and x4 adapters that can downshift to operate at the x1 bandwidth. For example, if you install an x4 adapter in slot 2 that can downshift to x1 bandwidth, it will run at the x1 bandwidth. The x4 connector (slot 2) can be used for x1 and x4 adapters. Check the information that comes with your adapter for compatibility information.
  - Slot 3, PCI-X 64-bit/133 MHz

    Note: PCI-X slot 3 is enabled when the optional mini-PCI-X enablement card is installed in the mini-PCI slot on the system board. When no mini-PCI-X enablement card is installed, PCI-X slot 3 has no function.
  - Slot 4, PCI 32-bit/33 MHz
  - Slot 5, PCI 32-bit/33 MHz
- Some server models come with a mini-SAS/SATA RAID controller installed. The mini-SAS/SATA RAID controller enables integrated RAID levels-0 and level-1. Some models also come with a ServeRAID-MR10i SAS/SATA controller that enables integrated RAID level 5 capability.
- The ServeRAID-MR10i SAS/SATA controller must be installed in slot 1, PCI Express x8.
- You can install the mini-PCI-X enablement card or the mini-SAS/SATA RAID controller in the mini-PCI slot on the system board.
- When an optional mini-PCI-X enablement card is installed in the mini-PCI slot, it passes PCI-X signals from the mini-PCI-X enablement card to PCI-X slot 3.
- When an optional mini-PCI-X enablement card is installed in the server, the server cannot support RAID levels-0 and level-1.
- You can install full-length adapters that are included in the ServerProven® list in slots 1 through 5 (depending on your model).
- The 64-bit slot 3 supports 3.3 V PCI-X adapters.
- The 32-bit slots 4 and 5 support 5.0 V keyed PCI adapters; they do not support 3.3 V keyed adapters. Universal adapters are supported in slots 4 and 5 if they are universally keyed.
- An optional IBM Remote Supervisor Adapter II SlimLine can be installed only in its dedicated connector on the system board. See “System-board internal connectors” on page 16 for the location of the connector. For additional information, see the documentation that comes with this adapter.

- When you start the server for the first time after you install a Remote Supervisor Adapter II SlimLine, the startup process will take several minutes longer than a typical startup.
- The server scans PCI Express x8 slot 1, PCI Express x4 slot 2, PCI-X slot 3, and PCI slots 4 and 5 to assign system resources. Then, the server starts the PCI devices in the following order, if you have not changed the default startup sequence: PCI Express x8 slot 1, PCI Express x4 slot 2, PCI-X slot 3, PCI slot 4, and PCI slot 5.
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

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

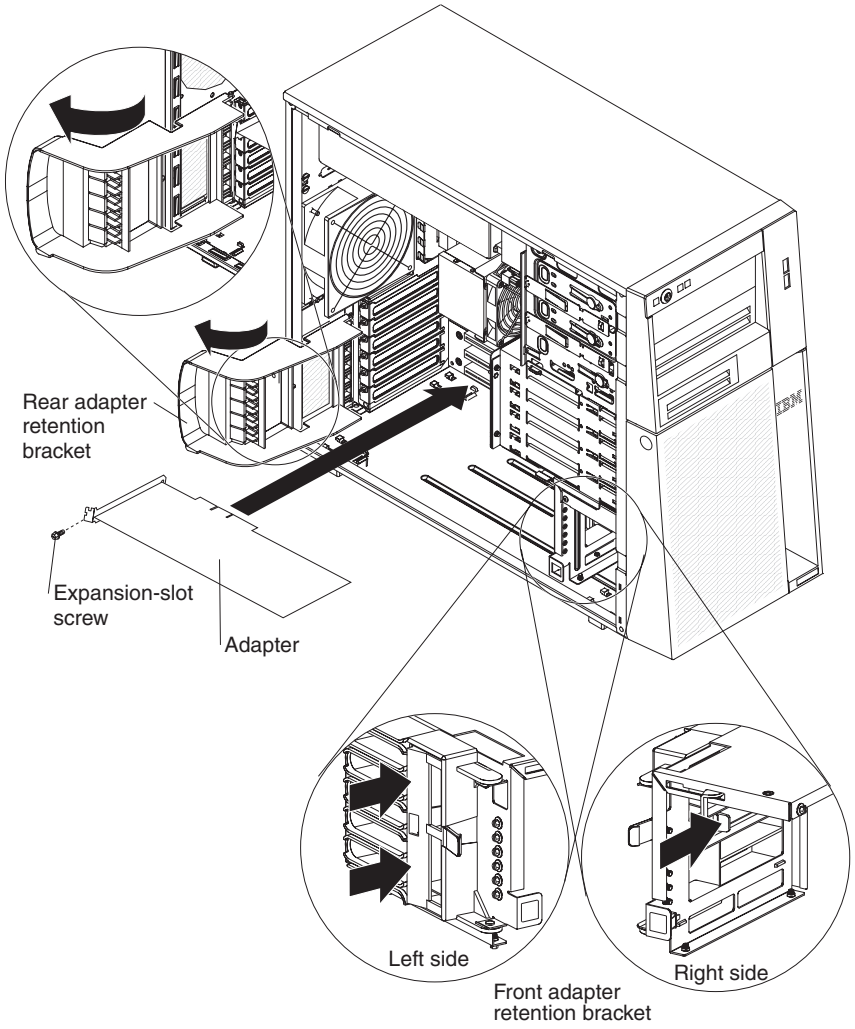
See “System-board optional-device connectors” on page 18 for the locations of the expansion slots and the Remote Supervisor Adapter II SlimLine connector.

To install an adapter, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the side cover. See “Removing the side cover” on page 24.
3. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you install the adapter.
4. Follow the instructions that come with the adapter to set jumpers or switches, if any.
5. Rotate the rear adapter-retention bracket to the open position and remove it from the server.

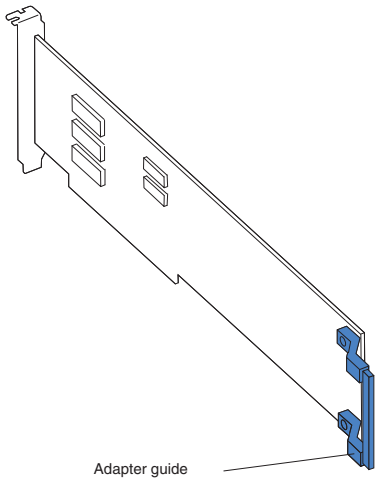
6. Remove the screw that secures the expansion-slot cover to the chassis. Store the expansion-slot cover and screw in a safe place for future use.

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



7. 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.

8. If you are installing a full-length adapter, remove the blue adapter guide (if any) from the end of the adapter.



9. Carefully grasp the adapter by the top edge or upper corners, and align it with the expansion slot guides; then, press the adapter *firmly* into the expansion slot. Move the adapter directly from the static-protective package to the expansion slot.

   Attention: Make sure that the adapter is correctly seated in the expansion slot before you turn on the server. Incomplete installation of an adapter might damage the system board or the adapter.

10. Install an expansion-slot screw at the rear of the adapter.
11. If you are installing a full-length adapter, press on the release lever on the right side of the front adapter-retention bracket to release the retaining tab on the left side of the bracket.
12. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans.
13. Reinstall the rear adapter-retention bracket; then, rotate the bracket to the closed position.

    Note: If any adapters in the server are large or have heavy cables attached to them, you can remove the rear adapter-retention bracket and secure all of the adapters with expansion-slot screws.

If you have other devices to install or remove, do so now; otherwise, go to "Completing the installation" on page 52.

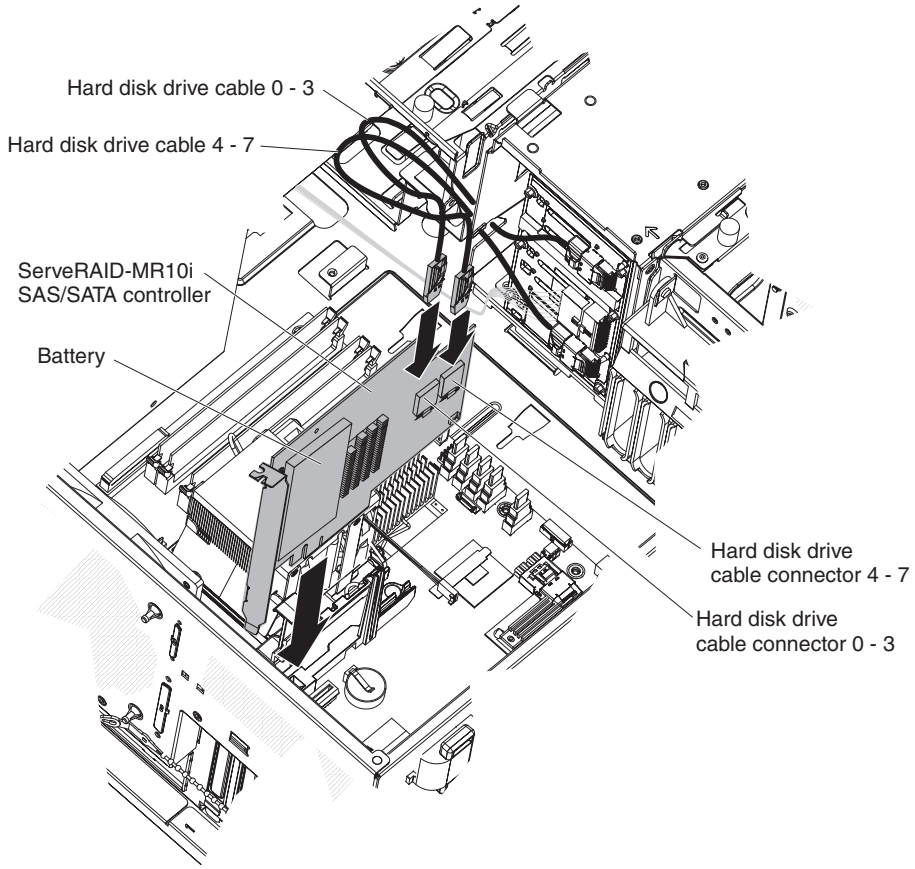
Installing the IBM ServeRAID-MR10i SAS/SATA controller

Some server models come with the IBM ServeRAID-MR10i SAS/SATA controller. The ServeRAID-MR10i SAS/SATA controller enables integrated RAID level-5 capability on hot-swap SAS models that support 2.5-inch and 3.5-inch SAS hard disk drives. To install the ServeRAID-MR10i SAS/SATA controller, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 20.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see "Removing the side cover" on page 24).

4. Remove the hard disk drive fan assembly:
   a. Disconnect the hard disk drive fan assembly cable from the system board and make a note of where the cable was connected for later installation.
   b. Remove all hard disk drives.
   c. Press and hold the drive cage release tab on the side of the drive cage; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
   d. Pull out on the hard disk drive fan assembly release tabs (at the blue dots); then, rotate the hard disk drive fan assembly away from the drive cage slightly.
5. Disconnect the signal and power cables and the existing SAS/SATA controller (if one is installed); then, remove the controller from the server.
6. Touch the static-protective package that contains the ServeRAID-MR10i SAS/SATA controller to any unpainted metal surface on the server. Then, remove the ServeRAID-MR10i SAS/SATA controller from the package.
7. Align the ServeRAID-MR10i SAS/SATA controller so that the keys align correctly with the connector on the system board.

   Attention: Incomplete insertion might cause damage to the system board or the ServeRAID-MR10i controller.



   Note: The drive cage should be in the open position. This illustration shows it in the closed position.
8. Press the ServeRAID-MR10i SAS/SATA controller firmly into the connector on the system board.

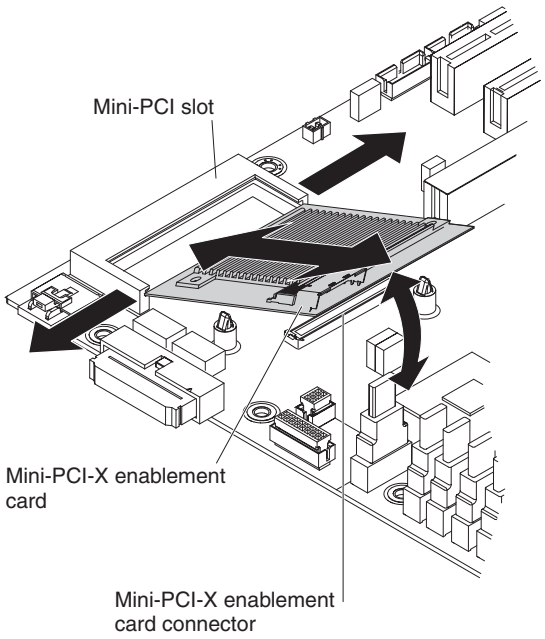
9. Take the other end of the signal cable that is attached to the drive backplane section for drive bays 0 through 3 (as labeled on the front of the drive cage) and connect it to the connector that is closest to the battery on the ServeRAID-MR10i SAS/SATA controller. If drives are installed in drive bays 4 through 7 (as labeled on the front of the drive cage), take the other end of the signal cable that is attached to drive backplane section for drive bays 4 through 7 and connect it to the connector that is farthest from the battery on the ServeRAID-MR10i SAS/SATA controller.
10. Replace the hard disk drive fan assembly:
    a. Insert the hard disk drive fan assembly retaining tab over the right edge of the hard disk drive backplane; then, rotate the hard disk drive fan assembly toward the backplane. Do not fully close the hard disk drive fan assembly.
    b. Route the signal cables and power cable through the slot on the edge of the hard disk drive fan assembly. Make sure that the cables will not be pinched between the hard disk drive fan assembly and the hard disk drive backplane when the assembly is installed.
    c. Rotate the hard disk drive fan assembly toward the backplane until the release tabs are fully engaged and snap into place.
11. Reconnect the hard disk drive fan assembly cable to the system board.
12. Rotate the drive cage back into the server until it stops; then, press and hold the retaining tab on top of the drive cage while you rotate the drive cage into the chassis until it is in the closed position.
13. Reinstall the hard disk drives.

    Note: Before you continue, check all internal power cables to make sure that they are connected to the system board and other optional devices.
14. Install the side cover (see “Reinstalling the side cover” on page 54).
15. Lock the side cover.
16. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Installing an optional mini-PCI-X enablement card

To install an optional mini-PCI-X enablement card, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 24).
4. Touch the static-protective package that contains the mini-PCI-X enablement card to any unpainted surface on the outside of the server; then, remove mini-PCI-X enablement card from the package.
5. Position the mini-PCI-X enablement card over the mini-PCI slot connector and the plastic standoff. Press the mini-PCI-X enablement card firmly into the mini-PCI slot connector and into the mini-PCI-X enablement card connector, and then onto the plastic standoff.



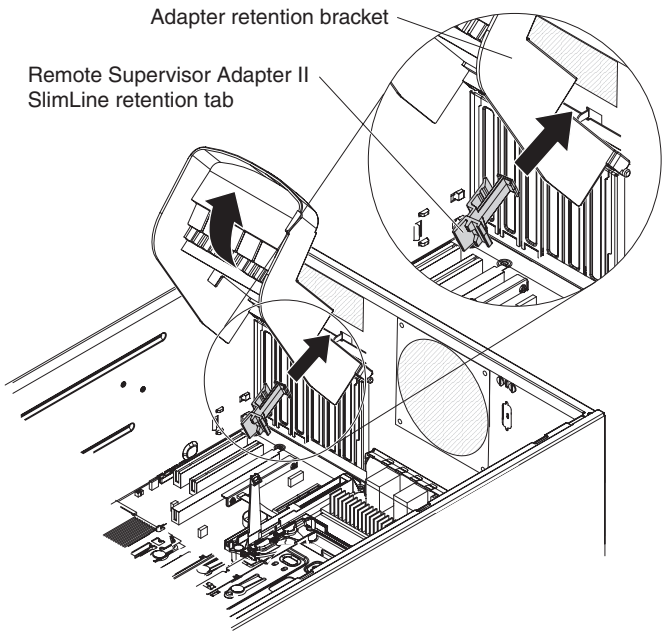
6. Install and lock the side cover (see “Reinstalling the side cover” on page 54).
7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Installing an IBM Remote Supervisor Adapter II SlimLine

An optional IBM Remote Supervisor Adapter II SlimLine must be installed only in its dedicated connector on the system board. See “System-board optional-device connectors” on page 18 for the location of this connector on the system board. After you install the Remote Supervisor Adapter II SlimLine, the systems-management Ethernet port on the rear of the server is active.

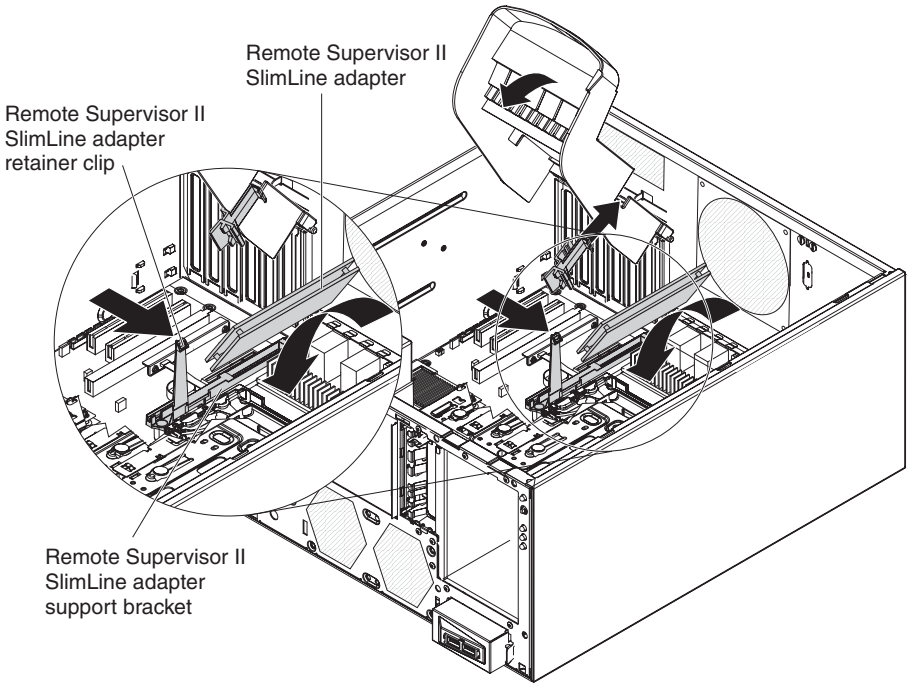
To install a Remote Supervisor Adapter II SlimLine, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Lay the server on its side.
4. Unlock the side cover.
5. Remove the side cover (see “Removing the side cover” on page 24).
6. Open the rear adapter-retention bracket and install the Remote Supervisor Adapter II SlimLine retention tab on the bracket by clipping it onto the rear adapter-retention bracket.



7. Carefully grasp the Remote Supervisor Adapter II SlimLine by its top edge or upper corners, and align it with the Remote Supervisor Adapter II SlimLine guide and the connector on the system board.

   Attention: Incomplete insertion might cause damage to the system board or the adapter.



8. Press the Remote Supervisor Adapter II SlimLine firmly into the connector and under the retention clip on the Remote Supervisor Adapter II SlimLine support bracket.
9. Close the rear adapter-retention bracket.

10. Install the side cover (see “Reinstalling the side cover” on page 54).
11. Lock the side cover.
12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Installing a hot-swap power supply

The following notes describe the type of power supply that the server supports and other information that you must consider when you install a power supply:

- The type and number of power supplies vary by server model. The server comes with at least one power supply.
- Some servers come with a hot-swap power supply that supports redundant mode. The redundant mode requires two operational hot-swap power supplies in the server.

This procedure applies only to server models that have hot-swap power supplies. If the server contains a non-hot-swap power supply that requires replacement, the power supply must be replaced by a service technician.

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

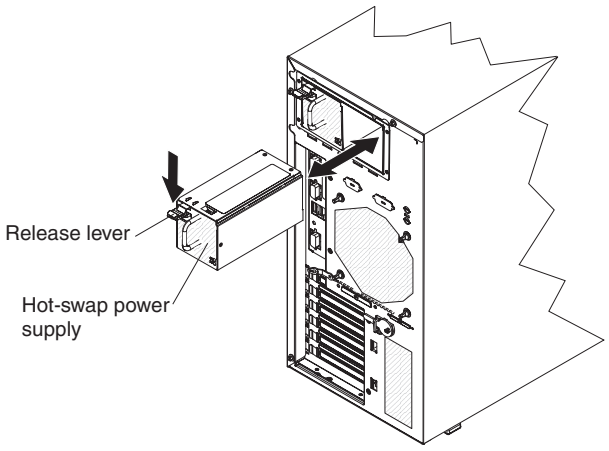
Statement 8:

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

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

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

1. Review the safety information that begins on page v and “Installation guidelines” on page 20.
2. Disconnect the power cord from the power supply that is to be removed.
3. Press down on the orange release lever and pull the power supply out of the bay, using the handle.



4. If you are instructed to return the hot-swap power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
5. Touch the static-protective package that contains the hot-swap power supply to any unpainted metal surface on the server; then, remove the power supply from the package and place it on a static-protective surface.
6. Place the power supply into the bay guides.
7. Press down on the orange release lever and push the power supply toward the front of the chassis until it locks into place.
8. Connect one end of the power cord into the connector on the back of the power supply and connect the other end of the power cord into a properly grounded electrical outlet.
9. Make sure that both the ac and dc power LEDs on the rear of the power supply are lit, indicating that the power supply is operating correctly.

Go to “Completing the installation” on page 52 for information on completing the installation.

Installing a security rope clip

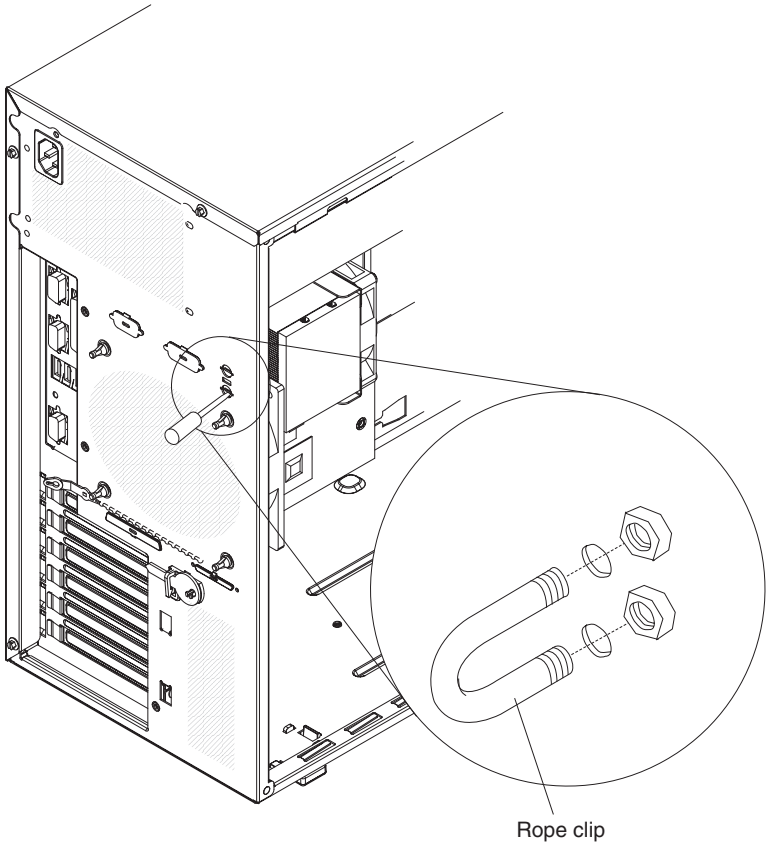
To help prevent hardware theft, you can add a security rope clip and cable to the server. After you add the security cable, make sure that it does not interfere with other cables that are connected to the server.

Before you begin, obtain the following items:

- A flat-blade screwdriver
- An adjustable wrench
- A 19 mm (0.75 in.) rope clip or wire rope (similar to National Manufacturing number 3230, stock number 176-735)
- Threaded nuts that fit the rope clip
- A security cable
- A lock, such as a combination lock or padlock

To install a rope clip, complete the following steps:

1. Turn off the server and all attached devices. Disconnect all external cables and power cords.
2. Use a screwdriver to remove the two metal knockouts.
3. Insert the rope clip through the rear panel; then, attach and tighten the nuts.



4. Thread the cable through the rope clip and around an object that is not part of or permanently secured to the building structure or foundation, and from which the cable cannot be removed. Fasten the cable ends together with a lock. After you add the security cable, make sure that it does not interfere with other cables that are connected to the server.

If you have other devices to install or remove, do so now; otherwise, go to "Completing the installation."

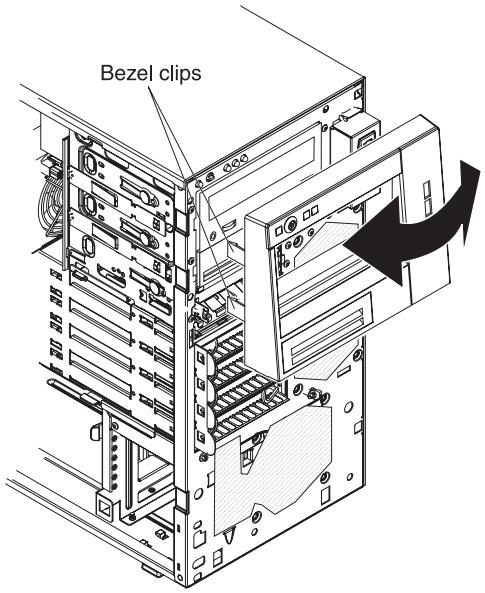
Completing the installation

To complete the installation, you must reinstall the two-piece bezel, reinstall the side cover, connect all the cables and, for some devices, run the Configuration/Setup Utility program. Follow the instructions in this section.

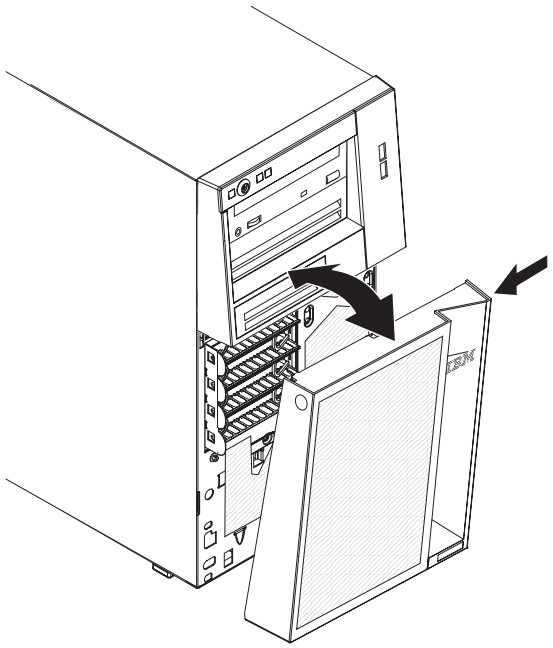
Reinstalling the two-piece bezel

To reinstall the two-piece bezel, complete the following steps:

1. Install the upper bezel on the front of the server chassis:
   a. Insert the two right-side tabs on the upper bezel into the matching holes on the right side of the chassis.
   b. Rotate the upper bezel to the left side of the chassis and press the bezel clips into the matching indentations on the left side of the chassis until the bezel clips snap into place.



2. Install the lower bezel:
   a. Insert the two bottom tabs on the lower bezel into the matching holes in the front of the chassis.



   b. Rotate the top of the lower bezel up to the chassis; then, press the blue release tab on the right side of the lower bezel and completely close the lower bezel until it locks securely into place.

Reinstalling the side cover

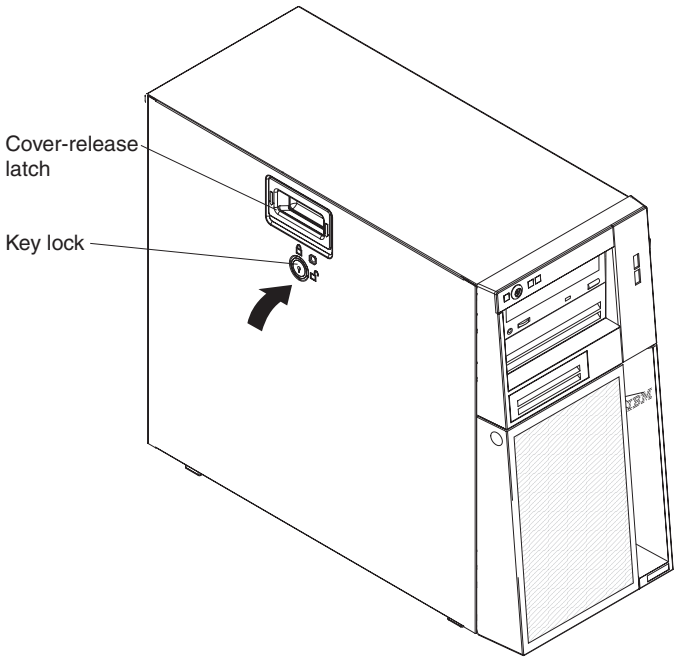
If you removed the bezel, reinstall it before you reinstall the side cover. See “Reinstalling the two-piece bezel” on page 52.

Note: The rear adapter-retention bracket rests against the server side cover. You might find it easier to lay the server on its side to replace the side cover.

To reinstall the side cover, complete the following steps:

1. Before you install the side cover, make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server. Also, make sure that all internal cables are correctly routed.

   Note: The cover-release latch must be in the unlocked (opened) position before you install the side cover.
2. Position the lip on the bottom edge of the side cover on the ledge on the bottom of the chassis; then, rotate the cover up to the chassis, and then press down on the cover release latch and push the cover completely closed until it latches securely into place.



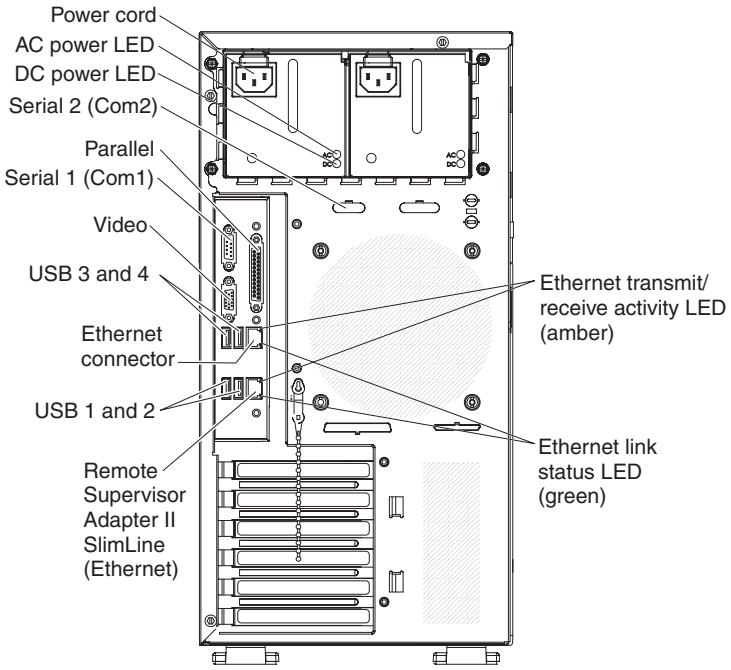
3. Close the cover-release latch to secure the side cover in place.
4. Lock the side cover.

Connecting the cables

Attention: To prevent damage to equipment, connect the power cords last.

If the server cables and connector panel have color-coded connectors, match the color of each cable end with the color of the connector. For example, match a blue cable end to a blue connector on the panel, a red cable end with a red connector, and so on.

The following illustration shows the input/output (I/O) connectors on the rear of the server.



Updating the server configuration

When you start the server for the first time after you add or remove an internal or external 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. See “Using the Configuration/Setup Utility program” on page 58 for additional information.

Some optional devices have device drivers that you must install. For information about installing device drivers, see the documentation that comes with each device.

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

Connecting external devices

If you install an optional adapter that the server supports, you can attach external devices to the server.

To attach an external device, complete the following steps:

1. Read the safety information that begins on page v, “Installation guidelines” on page 20, and the documentation that comes with the device.
2. Turn off the server and all attached devices.
3. Follow the instructions that come with the device to prepare it for installation and to connect it to the server.

Note: If you are attaching an external device, see the documentation that comes with the device for information about cabling.

Installing the server in a rack

An optional Tower-to-Rack Kit is needed to convert the server from a tower model to a rack model. You can then install the server in a rack cabinet. To order a Tower-to-Rack Kit for the server, contact your IBM marketing representative or authorized reseller.

Note: The Tower-to-Rack Kit does not support the server models that have eight 2.5-inch SAS hot-swap drive bays. You cannot install these models in a rack cabinet.

Chapter 3. Configuring the server

The following configuration programs are available to configure the server:

- **Configuration/Setup Utility program**

  The Configuration/Setup Utility program is part of the basic input/output system (BIOS) code. You can use this program to configure serial port assignments, change interrupt request (IRQ) settings, change the device startup sequence, set the date and time, and set passwords. For information about using this program, see “Using the Configuration/Setup Utility program” on page 58.

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

  The ServerGuide program provides software-setup tools and installation tools that are designed for the server. Use this CD during the installation of the server to configure basic hardware features, such as a ServeRAID adapter, and to simplify the installation of the operating system. For information about using this CD, see “Using the ServerGuide Setup and Installation CD” on page 63.

- **Mini-baseboard management controller utility programs**

  Use these programs to configure the mini-baseboard management controller, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using these programs, see “Using the mini-baseboard management controller utility programs” on page 65.

- **Boot Menu program**

  The Boot Menu program is part of the BIOS code. Use it to override the startup sequence that is set in the Configuration/Setup Utility program and temporarily assign a device to be first in the startup sequence. For information about using this program, see “Using the Boot Menu program” on page 68.

- **Broadcom NetXtreme Gigabit Ethernet Boot Agent**

  The Broadcom NetXtreme Gigabit Ethernet Boot Agent is part of the BIOS. You can use it to configure the network as a startable device, and you can customize where the network startup optional devices occur in the startup sequence. Enable and disable the Broadcom NetXtreme Gigabit Ethernet Boot Agent from the Configuration/Setup Utility program. For information, see “Enabling the Broadcom NetXtreme Gigabit Ethernet Boot Agent” on page 68.

- **Broadcom NetXtreme Gigabit Ethernet controller configuration**

  To configure the integrated Gigabit Ethernet controller, see “Configuring the Broadcom NetXtreme Gigabit Ethernet controller” on page 68.

- **LSI Configuration Utility program**

  Use the LSI Configuration Utility program to configure the integrated SAS/SATA controller with RAID capabilities and the devices that are attached to it. For information about using this program, see “LSI Configuration Utility program” on page 69.

  The following table lists the different server configurations and the applications that are available for configuring and managing RAID arrays.

Table 11.

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
Integrated SATA and no SAS controller card installed	None	None

Table 11. (continued)

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
SAS/SATA controller card (LSI 1064E) installed	LSI Utility (BIOS Utility Ctrl+C), ServerGuide	MyStorage (for monitoring storage only)
ServeRAID-MR10i adapter installed	ServeRAID Manager Hardware Boot CD, BIOS Utility (Ctrl+A), ServerGuide	ServeRAID Manager, ARCCONF (CLI)

- **Remote Supervisor Adapter II SlimLine configuration**

  For information about setting up and cabling a Remote Supervisor Adapter II SlimLine for use in an Advanced System Management (ASM) network, see "Setting up a Remote Supervisor Adapter II SlimLine" on page 71.

Using the Configuration/Setup Utility program

This section provides instructions for starting the Configuration/Setup Utility program and descriptions of the menu choices that are available.

Starting the Configuration/Setup Utility program

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

1. Turn on the server. If the server is already on when you start this procedure, you must shut down the operating system, turn off the server, wait a few seconds until all in-use LEDs are turned off, and restart the server.
2. When the message `Press F1 for Configuration/Setup, Press F12 for Boot Menu` is displayed, press F1. (This prompt is displayed on the screen for only a few seconds. You must press F1 quickly.) 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. Follow the instructions on the screen.

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.

Note: When you use the server for the first time, you might want to use the Configuration/Setup Utility menu choice **Load Default Settings** to reset the Configuration/Setup Utility menu choices to the factory default settings, in case they were changed before you received the server. Otherwise, some choices might not be displayed in the menu.

- **System Summary**

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

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

  – **Processor Summary**

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

- **System Information**

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

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

- **Devices and I/O Ports**

  Select this choice to view or change device assignments and input/output (I/O) ports. Select this choice to enable or disable the integrated SAS/SATA controller and Ethernet controller, and standard connectors (such as serial and parallel). **Enable** is the default setting for all controllers. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device). If you disable the SAS/SATA controller and no SAS/SATA adapter is installed, the server will have no SAS/SATA capability. If you disable the integrated Ethernet controller and no Ethernet adapter is installed, the server will have no Ethernet capability.

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

  - **Serial Port 1**

    Select this choice to set up serial port 1.

  - **Serial Port 2**

    Select this choice to set up serial port 2.

  - **Parallel Port Setup**

    Select this choice to set up the parallel port and to adjust the parallel port resources and features.

  - **Remote Console Redirection**

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

  - **Internal Floppy Support**

    Select this choice to disable or enable the diskette drive.

  - **SATA Programming Interface**

    Select this choice to disable, enable, or configure the Serial ATA.

    To comply with the 4690 OS requirement, this option provides a **Legacy Only (4690)** mode that you can select from the menu. When you select the **Legacy Only (4690)** mode, this enables the SATA 0 through SATA 3 ports for the 4690 OS.

  - **Planar Ethernet**

    Select this choice to disable or enable the Ethernet on the system board.

  - **USB Support**

    Select this choice to enable or disable the USB support.

  - **Video**

    Select this choice to view the video information.

  - **System MAC Addresses**

    Select this choice to view the MAC addresses for network devices that are installed in the server.

- **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 Configuration/Setup Utility menu only.

- **System Security**

  Select this choice to set password. See “Using passwords” on page 62 for more information about passwords.

  – **Administrator Password**

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

    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.

  – **Power-on Password**

    Select this choice to set, change, or delete a power-on password.

- **Start Options**

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

  You can enable or disable the hard disk drive self-monitoring, analysis, and reporting technology (SMART) function.

  You can set keyboard operating characteristics, such as the keyboard speed, and you can specify whether the server starts with the keyboard number lock on or off.

  You can enable a virus-detecting test that checks for changes in the boot record when the server starts.

  – **Startup Sequence Options**

    Select this choice to view the **Startup Sequence Options** menu. 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.

- **Advanced Setup**

  Select this choice to change values for advanced hardware features, such as CPU options and PCI configuration.

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

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

  – **CPU Options**

    Select this choice to view or change the options that control the behavior of the microprocessor.

  – **PCI Bus Control**

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

  – **RSA II Settings**

    This choice is displayed only when a Remote Supervisor Adapter II SlimLine is installed in the server.

    Select this choice to view the DHCP IP address and settings and the Remote Supervisor Adapter II SlimLine MAC address; to view or change the DHCP control, static IP address, operating-system USB selections; and to save the values and reboot the Remote Supervisor Adapter II SlimLine.

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

    Select this choice to change the Intelligent Platform Management Interface (IPMI) settings for the mini-BMC controller.

- **IPMI Specification Version**

  This nonselectable item displays the IPMI specification version.
- **BMC Firmware Version**

  This nonselectable item displays the mini-BMC firmware version.
- **BMC Build Date**

  This nonselectable item displays the date that the mini-BMC code was built.
- **BMC Build Level**

  This nonselectable item displays the version of the mini-BMC code.
- **Existing Event Log number**

  This nonselectable item displays the number of entries in the system-event log.
- **BMC POST Watchdog**

  This option enables or disables the POST watchdog. **Disabled** is the default setting.
- **BMC POST Watchdog Timeout**

  This option enables or disables the mini-BMC POST watchdog timer.
- **System - BMC Serial Port Sharing**

  Select this choice to specify whether the serial port that the mini-BMC uses is shared with the other system components or is dedicated to the mini-BMC. When this option is enabled, the mini-BMC controls the serial port by way of remote commands. If this option is disabled, the serial port is assigned to the mini-BMC, unless the **BMC Serial Port Access Mode** option is disabled.
- **BMC Serial Port Access Mode**

  Select this choice to set the mini-BMC access mode for the system serial port. **Shared** is the default setting. You can choose from the following access modes:

  Shared
  The serial port is available for use by POST and the operating system; however, the mini-BMC can still monitor the serial data for a take-control sequence.

  Pre-Boot
  The mini-BMC has control of the serial port prior before the operating system is booted; however, after the operating system is booted, the mini-BMC will not have access to the serial port until you turn off the server or reset the settings.

  Dedicated
  The mini-BMC has complete control of the serial port. POST and the operating system will not be allowed to use the serial port.

  Disabled
  The mini-BMC has access to the serial port.
- **Reboot System on NMI**

  This option sets the mini-BMC timer to automatically reboot the server after an NMI occurs. **Enabled** is the default setting.
- **User Account Settings**

  Select this choice to view the user account settings for the mini-BMC.
- **BMC Network Configuration**

  Select this choice to configure specific network settings for the mini-BMC.

- **BMC System Event Log**

  Select this choice to view the mini-BMC system-event log, which contains all system-error messages that have been generated. Use the arrow keys to move among pages in the log. Run the diagnostic programs to get more information about the error codes. See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for instructions for solving the problems. Select **Clear BMC System Event Log** to clear the mini-BMC system-event logs.

- **Event/Error Logs**

  Select this choice to view or clear error logs.

  – **System Event/Error Log**

    Select this choice to view the system-event and error messages that the system generated during POST and run time, by the SMI handler and by the service processor. The most recent event or error is displayed first. Use the Down Arrow key to view the older entries, and use the Up Arrow key to view the newer entries. Select **Clear system logs** and press Enter to erase the system event/error log.

- **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.

Using passwords

You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the power-on (user) password or the administrator password.

If you set both a power-on password and an administrator password, you can type either password at the password prompt that is displayed as you start the server. However, if you want to change the settings in the Configuration/Setup Utility program, you must type the administrator password to access the full Configuration/Setup Utility menu. If you type the power-on password, you have access to only the limited Configuration/Setup Utility menu.

Keep a record of the passwords in a secure place. If you forget the power-on password or administrator password, you can regain access to the server through one of the following methods:

- If you have forgotten the power-on password and an administrator password is set, type the administrator password at the power-on password prompt. Start the Configuration/Setup Utility program and change the power-on password.
- Remove the battery and then install the battery.

Using the ServerGuide Setup and Installation CD

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

If the *ServerGuide Setup and Installation* CD did not come with the server, you can download a free image of the CD or purchase the CD from the ServerGuide fulfillment Web site at http://www.ibm.com/systems/management/serverguide/sub.html. To download the free image, click **IBM Service and Support Site**.

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

The ServerGuide program has the following features:

- An easy-to-use interface
- Diskette-free setup, and configuration programs that are based on detected hardware
- ServeRAID Manager program, which configures your ServeRAID adapter with RAID capabilities
- LSI Configuration Utility program that you use to set up and configure RAID arrays.

  Note: The LSI Configuration Utility program on the *ServerGuide Setup and Installation* CD provides limited RAID capability. Use the LSI Configuration Utility program that is integrated in the BIOS to get the full range of RAID configuration capabilities. Start the server and watch the monitor; at the prompt `<<< Press <CTRL><C> to start LSI Configuration Utility >>>` press Ctrl+C.
- Device drivers that are provided for the server model and detected hardware
- File-system type that is selectable during setup

ServerGuide features

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

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

The ServerGuide program performs the following tasks:

- Sets system date and time
- Detects an installed ServeRAID adapter and runs the SAS/SATA RAID configuration program
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed optional hardware devices and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems

- Includes an online readme file with links to tips for your hardware and operating system installation

Setup and configuration overview

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

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

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

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

Typical operating system installation

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

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

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

Installing your operating system without using ServerGuide

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

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

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

3. From the menu on the left side of the page, click **System x support search**.
4. From the **Task** menu, select **Install**.
5. From the **Product family** menu, select **System x3200 M2**.
6. From the **Operating system** menu, select your operating system, and then click Search to display the available installation documents.

Using the mini-baseboard management controller utility programs

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

Using the mini-baseboard management controller setup utility program

Use the mini-baseboard management controller setup utility program to view or change mini-baseboard management controller information, user management, LAN configuration, and LAN alert settings. To download the program, 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 tohttp://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3200 M2** to display the matrix of downloadable files for the server.
5. From the BMC software, copy the files bmc.exe and Init.ini to a setup utility diskette.

To start the mini-baseboard management controller setup utility program, complete the following steps:

1. Turn on the server.
2. Insert the setup utility diskette into the diskette drive.
3. From a command line, type `bmc` and press Enter.

For the program to interface with the mini-baseboard management controller, the parameters in the Intf.ini file must be set correctly. To modify the Intf.ini file, select **0** from the main menu and use the arrow keys to select settings for the following parameters:

- **System interface:** This is the interface through which system software sends and receives messages to and from the mini-baseboard management controller. Select **KCS** (keyboard controller style).
- **Port Address:** This is the base address of the system interface.
- **Register Spacing:** Select **ByteBoundary**, **ThirtyTwoBitBoundary**, or **SixteenBitBoundary**.
- **Channel Number:** Use the arrow keys to select the channel number (0 through 15).
- **DHCP Mode:** This is the LAN configuration address source.

Using the mini-baseboard management controller configuration utility program

Use the mini-baseboard management controller configuration utility program to view or change the mini-baseboard management controller configuration settings and to save the configuration to a file for use on multiple servers.

To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3200 M2** to display the matrix of downloadable files for the server.
5. From the BMC software, copy the file bmc_cfg.exe to a configuration utility diskette.

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

1. Turn on the server.
2. Insert the configuration utility diskette into the diskette drive.
3. From a command line, type `bmc_cfg` and press Enter.

For the program to interface with the mini-baseboard management controller, the parameters in the Intf.ini file must be set correctly. To modify the Intf.ini file, use the mini-baseboard management controller setup utility program or a text editor.

Using the mini-baseboard management controller firmware updates utility program

Use the mini-baseboard management controller firmware update utility program to download a mini-baseboard management controller firmware update. This program updates the mini-baseboard management controller firmware only and does not affect any device drivers.

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

To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3200 M2** to display the matrix of downloadable files for the server.
5. From the BMC software, copy the file Flash.exe to a firmware update diskette.

To update the firmware, use one of the following procedures:

- If the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained it, follow the instructions that come with the package.
- If you are using a diskette, complete the following steps:
  1. Turn on the server.
  2. Insert the firmware update diskette into the diskette drive.
  3. From a command line, type `flash -?` and press Enter.

For the program to interface with the mini-baseboard management controller, the parameters in the Intf.ini file must be set correctly. To modify the Intf.ini file, use the mini-baseboard management controller setup utility program or a text editor.

Using the mini-baseboard management controller SDR/FRU update utility program

Use the mini-baseboard management controller SDR/FRU update utility program to download an SDR/FRU update.

To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3200 M2** to display the matrix of downloadable files for the server.
5. From the BMC software, copy the file fsloader.exe to an SDR/FRU update diskette.

To start the mini-baseboard management controller SDR/FRU update utility program, complete the following steps:

1. Turn on the server.
2. Insert the SDR/FRU update diskette into the diskette drive.
3. From a command line, type `fsloader -?` and press Enter.

Using the mini-baseboard management controller management utility program

Use the mini-baseboard management controller management utility program to remotely manage and configure a server network. The following features are available from the program:

- **IPMI (Intelligent Platform Management Interface) Shell**

  Use this feature to remotely perform power-management and system identification control functions over a LAN or serial port interface from a command-line interface. Use this feature also to remotely view the event log.
- **Serial over LAN Proxy**

  Use this feature to remotely perform control and management functions over a Serial over LAN network. Use this feature also to remotely view and change the BIOS settings.

  To download the utility program and create the mini-baseboard management controller management utility CD, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3200 M2** to display the matrix of downloadable files for the server.
5. From the BMC software, use the information on the CD to install and use the program.

Using the Boot Menu program

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

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

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

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

Enabling the Broadcom NetXtreme Gigabit Ethernet Boot Agent

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

To enable the Broadcom NetXtreme Gigabit Ethernet boot agent, complete the following steps:

1. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports**. Select **Planar Ethernet** and set it to **Enabled**, if it is not already enabled. Press Esc to exit.
2. From the **Start Options** menu choice, press Enter and make sure that **Planar Ethernet PXE/DHCP** is set to **Enabled**. Select **Startup Sequence Options** and press Enter; then, set the network-planar device as the first startup device.
3. Press Esc twice to exit.
4. Select **Save Settings** in the Configuration/Setup Utility main menu and press Enter to save your changes.

Configuring the Broadcom NetXtreme Gigabit Ethernet controller

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

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. For device drivers and information about configuring the Ethernet controller, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the server. To find updated information about configuring the controller, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**
3. Under Popular links, click Publications lookup.
4. From the **Product family** menu, select **System x3200 M2** and click **Continue**.

LSI Configuration Utility program

Use the LSI Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use this program as described in this document.

- Use the LSI Configuration Utility program to:
  - Perform a low-level format on a hard disk drive
  - Create an array of hard disk drives with or without a hot-spare drive
  - Set protocol parameters on hard disk drives

The integrated SAS/SATA controller with RAID capabilities supports RAID arrays. You can use the LSI Configuration Utility program to configure RAID 1 (IM), RAID 1E (IME), and RAID 0 (IS) for a single pair of attached devices. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change settings for attached devices.

In addition, you can download an LSI command-line configuration program from http://www.ibm.com/systems/support/.

When you are using the LSI Configuration Utility program to configure and manage arrays, consider the following information:

- The integrated SAS/SATA controller with RAID capabilities supports the following features:
  - Integrated Mirroring (IM) with hot-spare support (also known as RAID 1)

    Use this option to create an integrated array of two disks plus up to two optional hot spares. All data on the primary disk can be migrated.
  - Integrated Mirroring Enhanced (IME) with hot-spare support (also known as RAID 1E)

    Use this option to create an integrated mirror enhanced array of three to eight disks, including up to two optional hot spares. All data on the array disks will be deleted.
  - Integrated Striping (IS) (also known as RAID 0)

    Use this option to create an integrated striping array of two to eight disks. All data on the array disks will be deleted.
- Hard disk drive capacities affect how you create arrays. The 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.

- If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID 1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing settings for attached devices.

Starting the LSI Configuration Utility program

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

1. Turn on the server.
2. When the prompt `<<< Press <CTRL><C> to start LSI Configuration Utility >>>` is displayed, press Ctrl+C. If you have set an administrator password, you are prompted to type the password.
3. To select a controller (channel) from the list of adapters, use the arrow keys and press Enter.
4. To change the settings of the selected items, follow the instructions on the screen. If you select **Raid Properties**, **SAS Topology**, or **Advanced Adapter Properties** additional screens are displayed.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Formatting a hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before you perform this procedure.

Note: Before you format a hard disk, make sure that the disk is not part of a mirrored pair.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format and press Enter.
2. Select **SAS Topology** and press Enter.
3. Select **Direct Attach Devices** and press Enter.
4. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key. Press Alt+D.
5. To start the low-level formatting operation, select **Format** and press Enter.

Creating a RAID array of hard disk drives

To create a RAID array of hard disk drives, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drives that you want to mirror.
2. Select **RAID Properties**.
3. Select the type of array that you want to create.
4. Use the arrow keys to highlight the first drive in the pair; then, press the Minus (-) or Plus (+) key to change the mirror value to **Primary**.
5. Continue to select the next drive using the Minus (-) or Plus (+) key until you have selected all the drives for your array.

6. Press C to create the disk array.
7. Select **Apply changes and exit menu** to create the array.

Setting up a Remote Supervisor Adapter II SlimLine

This section describes how to set up, cable, and configure a Remote Supervisor Adapter II SlimLine for use on an Advanced System Management (ASM) network so that you can manage the server remotely.

In addition to the information in this section, see the documentation that comes with the Remote Supervisor Adapter II SlimLine for information about how to configure and use an ASM network to manage the server remotely through the Web-based interface or the text-based interface.

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

Requirements

Make sure that you have completed the following procedures before you set up the Remote Supervisor Adapter II SlimLine:

- Install the operating system, using the ServerGuide program and the documentation that comes with the operating system.
- If you plan to use the remote disk function, install the following software:
  - On the server, install Microsoft Windows 2000 with Service Pack 3 or later.
  - On the client system, install Microsoft Windows 2000 or later and the Java 1.4 or later Plug-in.
- Make sure that the server has an Internet connection, so that you can download software and firmware from the IBM support Web site during the installation process.
- If you plan to configure Simple Network Management Protocol (SNMP) trap alerts on the Remote Supervisor Adapter II SlimLine, install and compile the management information base (MIB) on the SNMP manager. The Remote Supervisor Adapter II SlimLine firmware, the integrated service processor firmware, and the MIB are available on the *ServerGuide Setup and Installation* CD and are fully functional. You can download the latest versions from http://www.ibm.com/systems/support/.
- If you plan to use the Web-based interface to access the Remote Supervisor Adapter II SlimLine remotely, install the Java 1.4 or later Plug-in and one of the following Web browsers on the client system:
  - Microsoft Internet Explorer version 5.5 with the latest Service Pack
  - Netscape Navigator version 7.0 or later
  - Mozilla version 1.3 or later

  The Web browser must be Java-enabled and must support JavaScript™.

Cabling the Remote Supervisor Adapter II SlimLine

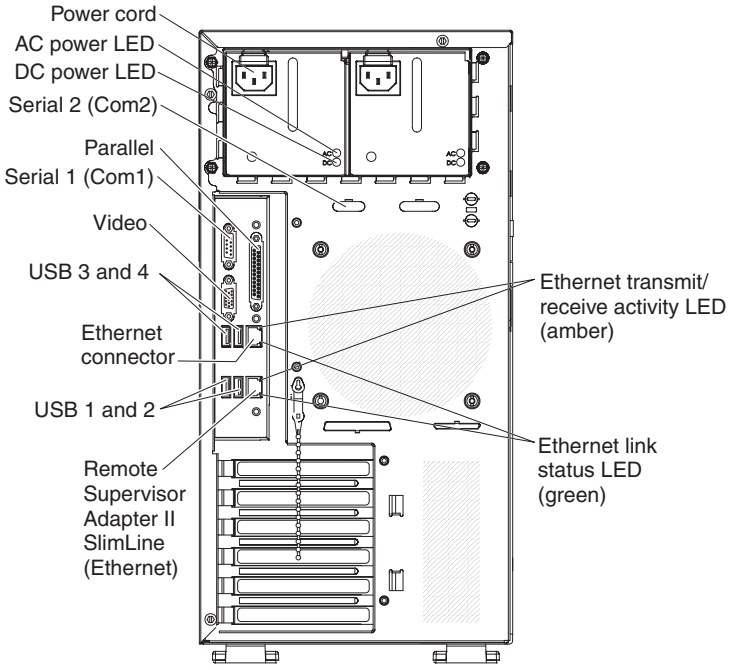
You can manage the server remotely through the Remote Supervisor Adapter II SlimLine by using one of the user interfaces and one of the connection methods that are described in the following table.

Table 12. Cabling tasks to enable remote access to the Remote Supervisor Adapter II SlimLine

User interface to Remote Supervisor Adapter II SlimLine	Connection to Remote Supervisor Adapter II SlimLine
ASM Web-based interface using HTTP	LAN using the Ethernet connector
Text-based interface using Telnet	

To connect the Ethernet cables, complete the following steps:

1. Connect one end of a Category 3 or Category 5 Ethernet cable to the dedicated Ethernet connector for the Remote Supervisor Adapter II SlimLine. Connect the other end of the cable to the network. The following illustration shows the locations of the Ethernet connectors.
2. To make sure that the network connection is working, check the Ethernet LEDs. The following illustration shows the locations of the LEDs.



Installing the Remote Supervisor Adapter II SlimLine firmware

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

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

To download and install the software and firmware, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3200 M2** to display the matrix of downloadable files for the server.
5. Select the software or firmware package that you want to install. On the next page, click the link for each file that you want to download. Follow the instructions that are displayed.
6. Repeat step 5 until you have downloaded all the files that you need.
7. Follow the instructions in the Remote Supervisor Adapter II SlimLine readme file that you downloaded to install the software and firmware.
8. Restart the server after the software and firmware are installed.

Completing the setup

See the documentation that comes with IBM Remote Supervisor Adapter II SlimLine for instructions for completing the configuration, including the following procedures:

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

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

Appendix. Notices

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

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

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

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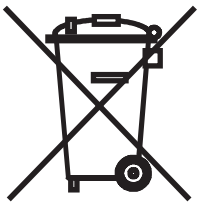

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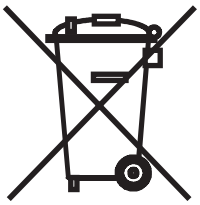
In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the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

For Taiwan: Please recycle batteries.

For the European Union:



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