

System x3100 M3 Type 4253



# Installation and User's Guide



System x3100 M3 Type 4253



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**Note:**

Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 65, the *IBM Safety Information* and *IBM Environmental Notices and User's Guide* on the *IBM System x Documentation CD*, and the *Warranty Information* document.

The most recent version of this document is available at <http://www.ibm.com/systems/support/>.

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

**Important:**

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

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

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

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

**To Disconnect:**

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

**Statement 2:**



**CAUTION:**

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

*Do not:*

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

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

**Statement 3:**



**CAUTION:**

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

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



**DANGER**

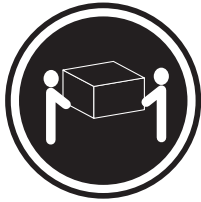
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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



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

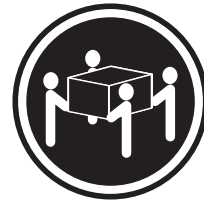
**Statement 4:**



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

**CAUTION:**

**Use safe practices when lifting.**

**Statement 5:**



**CAUTION:**

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



Statement 8:



**CAUTION:**

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



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

Statement 11:



**CAUTION:**

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



Statement 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.

**Statement 17:**



**CAUTION:**

The following label indicates moving parts nearby.



**Statement 26:**



**CAUTION:**

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



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

**Statement 27:**



**CAUTION:**

**Hazardous moving parts are nearby.**







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## Chapter 1. The System x3100 M3 server

This *Installation and User's Guide* contains information and instructions for setting up your IBM System x3100 M3 Type 4253 server, instructions for installing some optional devices, and instructions for cabling, and configuring the server. For removing and installing optional devices, diagnostics and troubleshooting information, see the *Problem Determination and Service Guide* on the IBM System x Documentation CD, which comes with the server.

The IBM® System x3100 M3 Type 4253 server is a 5u-high-high, high-performance, self-contained 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 printed *Warranty Information* document that comes with your server.

The server contains IBM Enterprise X-Architecture® technologies, which help increase performance, reliability, and availability. For more information, see “What your server offers” on page 8 and “Reliability, availability, and serviceability” on page 8.

You can obtain up-to-date information about the server and other IBM server products at <http://www.ibm.com/systems/x/>. At <http://www.ibm.com/support/mysupport/>, you can create a personalized support page by identifying IBM products that are of interest to you. From this personalized page, you can subscribe to weekly e-mail notifications about new technical documents, search for information and downloads, and access various administrative services.

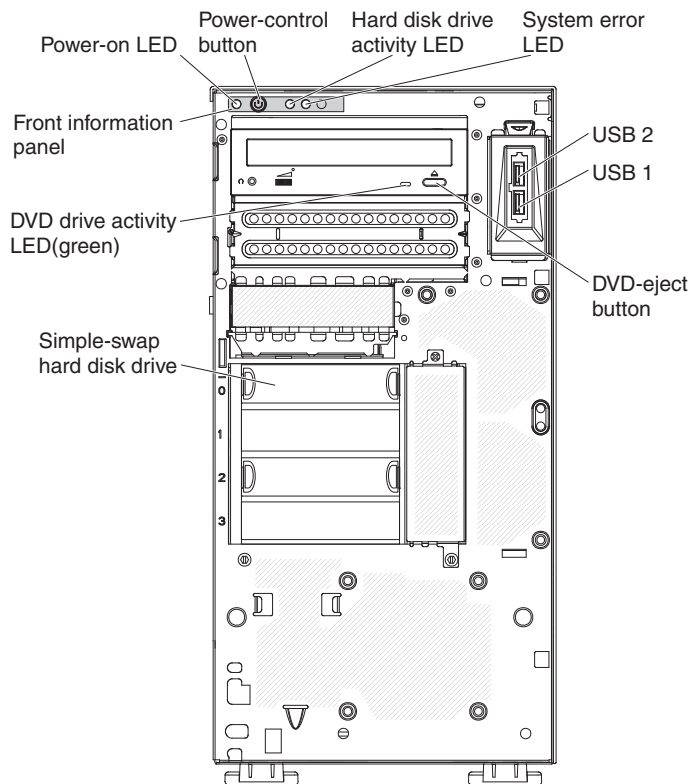
If you participate in the IBM client reference program, you can share information about your use of technology, best practices, and innovative solutions; build a professional network; and gain visibility for your business. For more information about the IBM client reference program, see <http://www.ibm.com/ibm/clientreference/>.

The server supports up to four 3.5-inch simple-swap SATA hard disk drives.

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

**Note:** The illustrations in this document might differ slightly from your model.



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

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

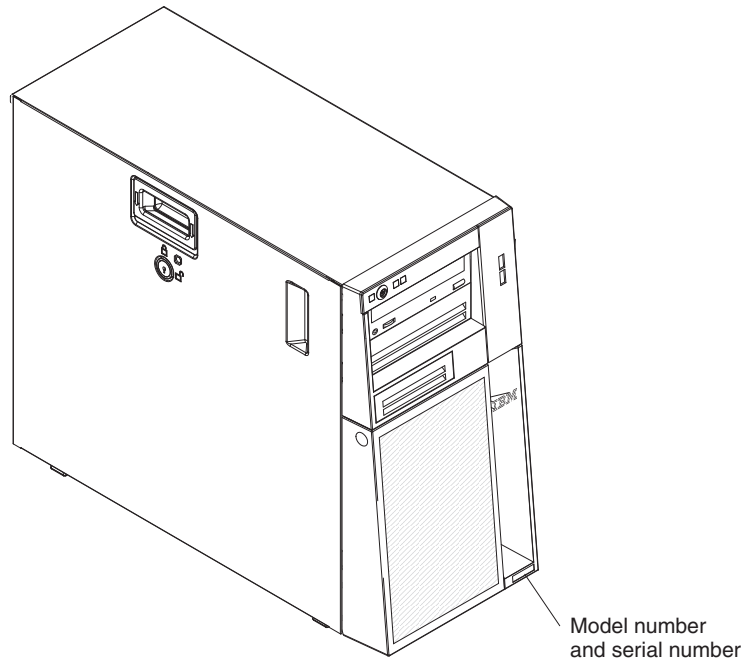
1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers** for firmware updates, or click **Publications lookup** for documentation updates.

Record information about the server in the following table.

<b>Product name</b>	IBM System x3100 M3 server
<b>Machine type</b>	4253
<b>Model number</b>	_____
<b>Serial number</b>	_____

The model number and serial number are on the lower-right side of the bezel, as shown in the following illustration.

**Note:** The illustrations in this document might differ slightly from your hardware.



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

**Important:** The server keys cannot be duplicated by a locksmith. If you lose them, order replacement keys from the key manufacturer. The key serial number and the telephone number of the manufacturer are on a tag that is attached to the keys.

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## The IBM System x Documentation CD

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

### Hardware and software requirements

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

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

### Using the Documentation Browser

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

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

- If Autostart is enabled, insert the CD into the CD or DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
  - If you are using a Windows operating system, insert the CD into the CD or DVD drive and click **Start -> Run**. In the **Open** field, type
 

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

where *e* is the drive letter of the CD or DVD drive, and click **OK**.
  - If you are using Red Hat Linux, insert the CD into the CD or DVD drive; then, run the following command from the /mnt/cdrom directory:
 

```
sh runlinux.sh
```

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

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

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

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

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## Related documentation

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

- *Warranty Information*  
This printed document contains the warranty terms and a pointer to the IBM Statement of Limited Warranty on the IBM Web site.
- *Environmental Notices and User Guide*  
This document is in PDF format on the IBM *System x Documentation* CD. It contains translated environmental notices.
- *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 xSeries and BladeCenter™ 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 BladeCenter Tools Center is at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.

The server might have features that are not described in the documentation that 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 the **Product family** menu, select **System x3100 M3** 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 your 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 lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

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## Features and specifications

The following information is a summary of the features and specifications for Machine Type 4253. Depending on the server model, some features might not be available, or some specifications might not apply. See the *Problem Determination and Service Guide* on the *System x Documentation CD* for additional information about the server.

Table 1. Features and specifications

<p><b>Microprocessor:</b></p> <ul style="list-style-type: none"> <li>• One Intel LGA1156 quad-core (Xeon X3400 series) or dual-core (Celeron G1101, Pentium G6950, or Core i3-540) processor</li> <li>• Designed for LGA 1156 socket</li> <li>• 32 KB instruction cache, 32 KB data cache, and up to 8 MB L3 cache that is shared among the cores</li> <li>• Intel 64 architecture</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Use the Setup utility to determine the type and speed of the microprocessors.</li> <li>• For a list of supported microprocessors, see <a href="http://www.ibm.com/servers/eserver/serverproven/compat/us/">http://www.ibm.com/servers/eserver/serverproven/compat/us/</a>.</li> </ul> <p><b>Memory:</b></p> <ul style="list-style-type: none"> <li>• Minimum: 1 GB</li> <li>• Maximum: 16 GB</li> <li>• Types: PC3 (single-rank or dual-rank), ECC, double-data-rate 3 (DDR3), 1066 or 1333 MHz unbuffered SDRAM DIMM</li> <li>• Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved</li> <li>• Supports 1 GB, 2 GB, and 4 GB unbuffered DIMMs</li> </ul>	<p><b>Fan:</b></p> <ul style="list-style-type: none"> <li>• One system fan</li> <li>• One microprocessor fan</li> </ul> <p><b>Power supply:</b> One fixed 350-watt (100-127V, 200-240Vac)</p> <p><b>Size:</b></p> <ul style="list-style-type: none"> <li>• Height: 438 mm (17.25 in.)</li> <li>• Depth: 540 mm (21.25 in.)</li> <li>• Width: 216 mm (8.5 in.)</li> <li>• Weight: 15 kg (33 lb) to 18 kg (40 lb) depending upon configuration</li> </ul>	<p><b>RAID (depending on model):</b></p> <ul style="list-style-type: none"> <li>• Software RAID capabilities that support RAID levels 0 and 1</li> </ul> <p><b>Note:</b> The integrated RAID utility is not supported on Linux operating systems.</p> <ul style="list-style-type: none"> <li>• ServeRAID-BR10il v2 SAS/SATA adapter that provides RAID levels 0 and 1</li> </ul> <p><b>Environment:</b></p> <ul style="list-style-type: none"> <li>• Air temperature: <ul style="list-style-type: none"> <li>– Server on: 10°C to 35°C (50°F to 95°F)</li> <li>Altitude: 0 to 914.4 m (3000 ft)</li> <li>– Server on: 10°C to 32°C (50°F to 89.6°F)</li> <li>Altitude: 914.4 m (3000 ft) to 2133.6 m (7000 ft)</li> <li>– Server off: 10°C to 43°C (50°F to 109.4°F)</li> <li>Maximum altitude: 2133.6 m (7000.0 ft)</li> <li>– Shipping: -40°C to 60°C (-40°F to 140°F)</li> </ul> </li> <li>• Humidity (operating and storage): 8% to 80%</li> <li>• Particulate contamination: <p><b>Attention:</b> Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see “Particulate contamination” on page 67.</p> </li> </ul>
<p><b>Drives (depending on the model):</b></p> <ul style="list-style-type: none"> <li>• Hard disk drives: up to four simple-swap SATA</li> <li>• One of the following SATA attached optical drives: <ul style="list-style-type: none"> <li>– DVD-ROM</li> <li>– Multi-burner (optional)</li> </ul> </li> </ul> <p><b>Drive bays:</b></p> <ul style="list-style-type: none"> <li>• Two 5.25-inch half-high bays (one optical drive installed).</li> <li>• Four 3.5-inch hard disk drive bays</li> </ul>	<p><b>Integrated functions:</b></p> <ul style="list-style-type: none"> <li>• Intel 82574L Gb Ethernet controller</li> <li>• Integrated SATA controller</li> <li>• Integrated video controller</li> <li>• Seven Universal Serial Bus (USB) 2.0 ports (two front, four rear of the chassis, and one internal for an optional tape drive)</li> <li>• One serial port</li> <li>• One Ethernet port</li> <li>• Six SATA ports (four for simple-swap hard disk drives and two for the DVD drive and the optional tape drive)</li> </ul>	<p><b>Heat output:</b></p> <p>Approximate heat output:</p> <ul style="list-style-type: none"> <li>• Minimum configuration: 324 Btu per hour (95 watts)</li> <li>• Maximum configuration: 1484 Btu per hour (435 watts)</li> </ul> <p><b>Electrical input:</b></p> <ul style="list-style-type: none"> <li>• Sine-wave input (50 or 60 Hz) required</li> <li>• Input voltage and frequency ranges automatically selected</li> <li>• Input voltage low range: <ul style="list-style-type: none"> <li>– Minimum: 100 V ac</li> <li>– Maximum: 127 V ac</li> </ul> </li> <li>• Input voltage high range: <ul style="list-style-type: none"> <li>– Minimum: 200 V ac</li> <li>– Maximum: 240 V ac</li> </ul> </li> <li>• Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> <li>– Minimum: 0.20 kVA (all models)</li> <li>– Maximum: 0.55 kVA</li> </ul> </li> </ul>

Table 1. Features and specifications (continued)

<p><b>Expansion slots:</b></p> <ul style="list-style-type: none"> <li>• One PCI 32-bit/33 MHz slot</li> <li>• One PCI Express x16 slot</li> <li>• One PCI Express x8 slot</li> <li>• One PCI Express x4 slot</li> </ul>	<p><b>Acoustical noise emissions:</b></p> <p>Sound power: 4.8 bel</p>	<p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.</li> <li>2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.</li> </ol>
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## What your server offers

The server uses the following features and technologies:

- **Baseboard management controller**

The baseboard management controller (BMC) provides basic service-processor environmental monitoring functions. If an environmental condition exceeds a threshold or if a system component fails, the baseboard management controller lights LEDs to help you diagnose the problem. Critical errors are also included in the error log. When the optional Virtual Media Key is installed, BMC provides advanced virtual presence capability for remote server management capabilities.

- **Quad-core or dual-core processing**

The server supports one Intel quad-core or dual-core microprocessor.

- **System diagnostics CD**

The server comes with a diagnostics CD, which you can use to diagnose problems.

- **IBM X-Architecture technology**

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

- **Large system-memory capacity**

The memory bus supports up to 16 GB of memory. The memory controller supports error correcting code (ECC) for up to four industry-standard PC3-10600-999, 1066 or 1333 MHz, DDR3 (third-generation double-data-rate), unbuffered, synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

- **Integrated network support**

The server comes with an integrated Intel Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. For more information, see “Configuring the Gigabit Ethernet controller” on page 58.

- **RAID support**

Depending on the model, your server implements redundant array of independent disks (RAID) through software or hardware.

The optional ServeRAID-BR10i v2 adapter provides hardware RAID and supports provides RAID levels 0 and 1.

The server supports software RAID capability that provides RAID levels 0 and 1.

---

## 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.

Your server has the following RAS features:

- 1-year parts and 1-year labor limited warranty
- Advanced Configuration and Power Interface (ACPI)
- Advanced Desktop Management Interface (DMI) features
- 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
- Automatic server restart after a power failure, based on the BIOS setting
- Availability of microcode level
- Boot-block recovery
- Built-in monitoring for fan, power, temperature, and voltage
- Built-in, menu-driven configuration and setup programs
- CD-based diagnostic programs
- Cooling fan with speed-sensing capability
- Customer support center that is available 24 hours a day, 7 days a week<sup>2</sup>
- Error codes and messages
- Error correcting code (ECC) memory
- Error logging of POST failures
- Integrated Ethernet controller
- Intelligent Platform Management Interface (IPMI) 2.0 support
- Memory change messages posted to the error log
- Menu-driven setup, system configuration, and redundant array of independent disks (RAID) configuration programs
- Power-on self-test (POST)
- Read-only memory (ROM) checksums
- SDRAM with serial presence detect (SPD)
- Wake on LAN capability

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## Server controls, LEDs, and power

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

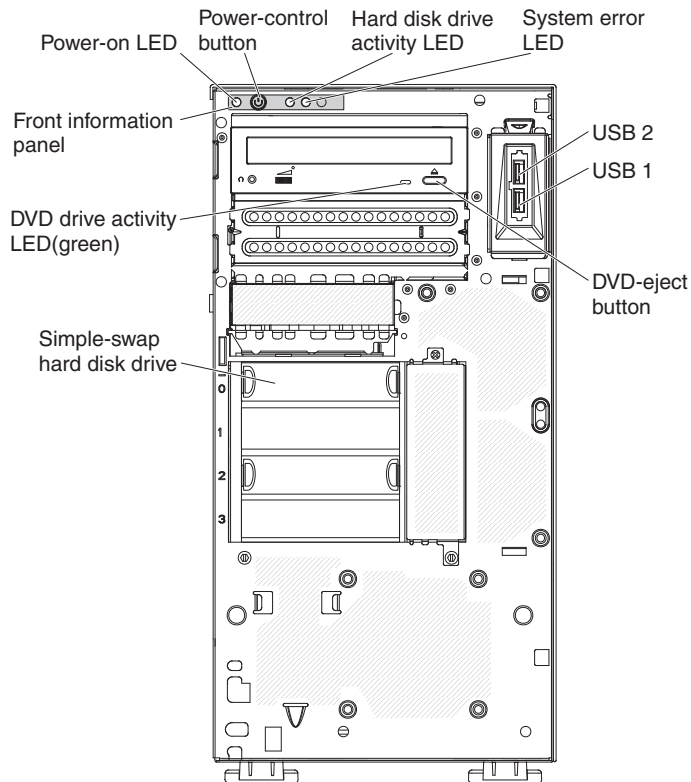
**Note:** The illustrations in this document might differ slightly from your model.

### Front view

The following illustrations show the controls, LEDs, and connectors on the front of the server.

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<sup>2</sup>. Service availability will vary by country. Response time varies; may exclude holidays.



### Power-control button and power-on LED

Press this button to turn the server on and off manually or to wake the server from a reduced-power state. When this LED is lit, it indicates that the server is turned on. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed. When this LED is blinking, it indicates that the system is in the ACPI S4 or S5 system status.

**Attention:** If you are connecting the server to an ac power source for the first time, do not press the power-control button until the power LED flashes.

### Hard disk drive activity LED

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

### System-error LED

When this amber LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error. Detailed troubleshooting information is in the *Problem Determination and Service Guide* on the IBM System x Documentation CD.

### USB connectors

Connect USB devices to these connectors.

### DVD-eject button

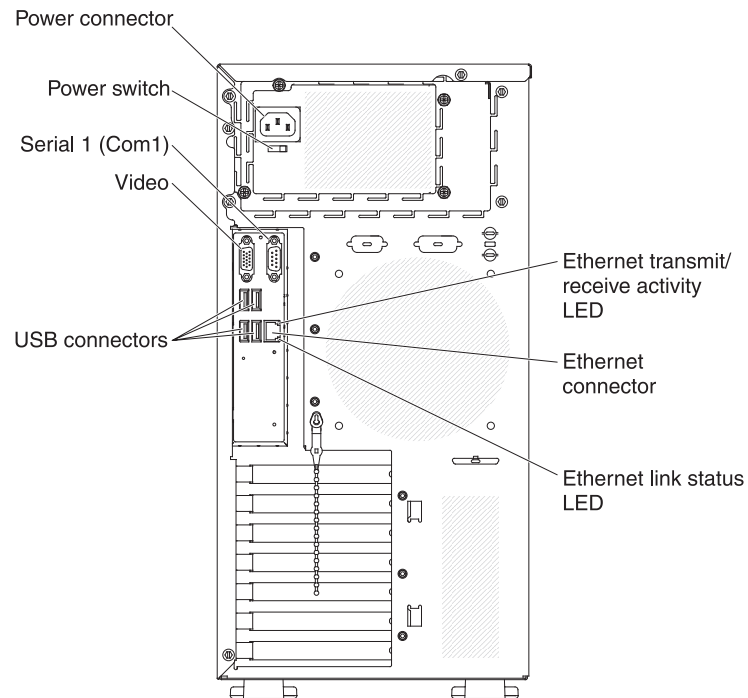
Press this button to release a CD or DVD from the DVD drive.

### DVD drive activity LED

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

## Rear view

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



### Power connector and power switch

Connect the power cord to this connector and press the power switch to the on position to turn on the power supply.

### Video connector

Connect a monitor to this connector.

**Note:** The maximum video resolution is 1280 x 1024.

### Serial connector

Connect a 9-pin serial device to this connector.

### USB connectors

Connect USB devices to these connectors.

### Ethernet connector

Use the 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 off, it indicates that there is no activity occurring. When this LED is blinking, 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. When this LED is off, it indicates that there is no active connection on the Ethernet port.

## Server power features

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

### Turning on the server

**Note:** If you connect the server to an ac power source for the first time, do not press the power-control button until the power LED flashes.

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 BIOS Restore AC Power Loss is enabled.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

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

## Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to requests to 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.

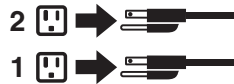
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

### 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.
- The server can be turned off by the Wake on LAN feature.
- The server can turn itself off as an automatic response to a critical system failure.



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## Chapter 2. Installing optional devices

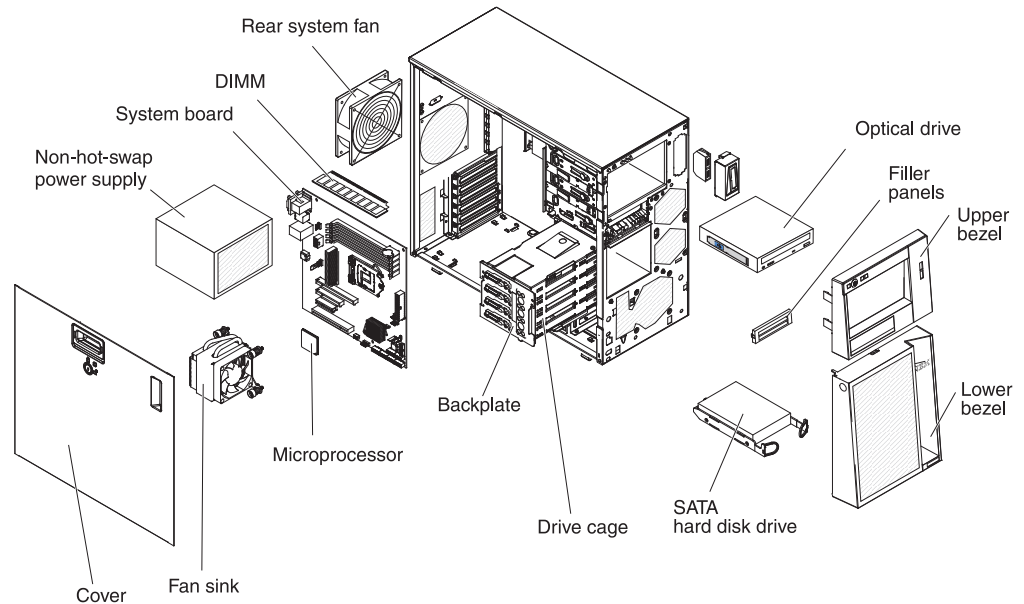
**Important:** Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed. If the server is not working correctly, see the *Problem Determination and Service Guide* for diagnostic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

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

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### Server components

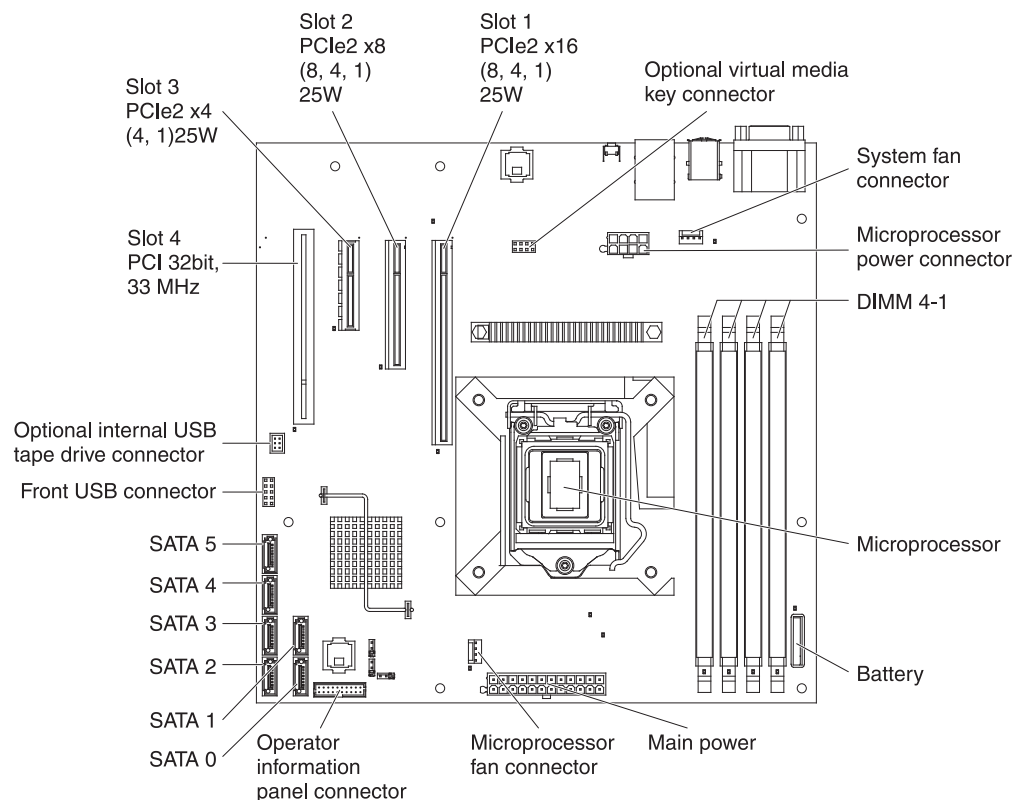
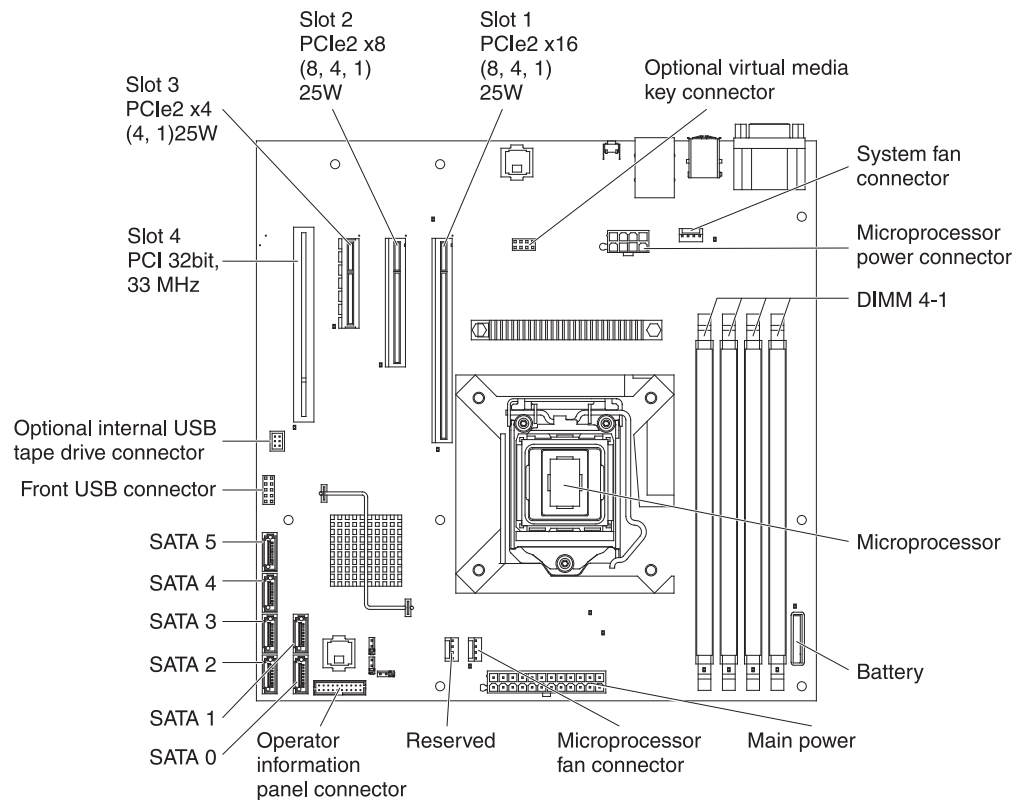
The following illustration shows the major components in the server (depending on the server model). The illustrations in this document might differ slightly from your hardware.



## System-board internal connectors

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

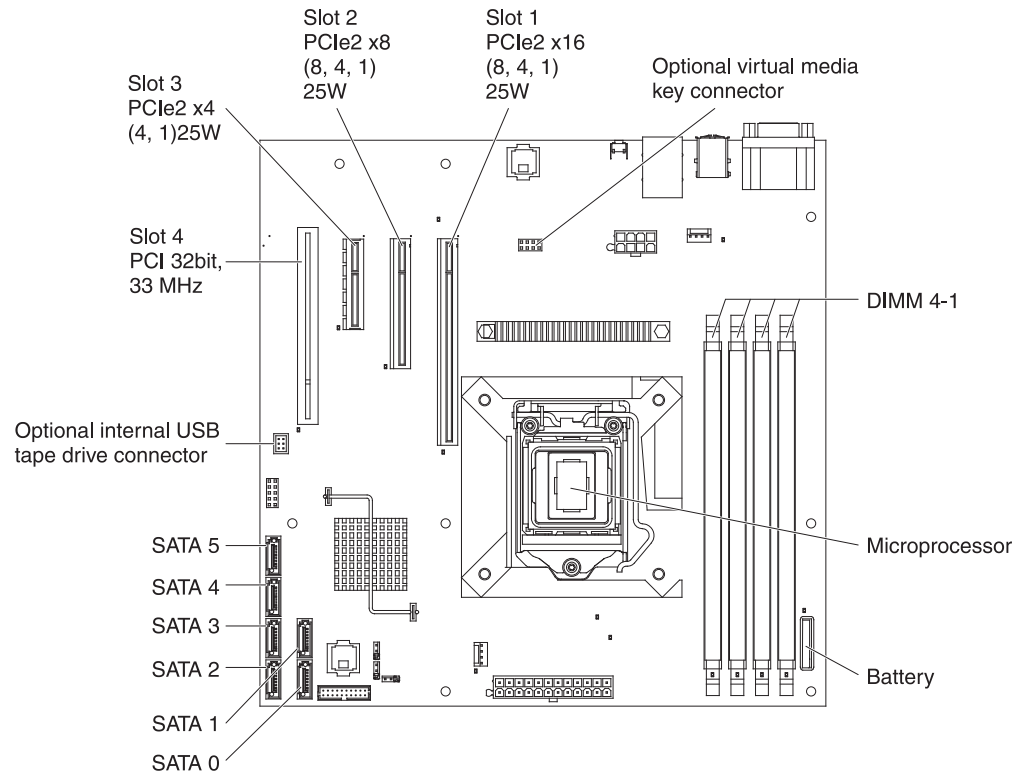
**Note:** The illustration might differ slightly from your hardware.





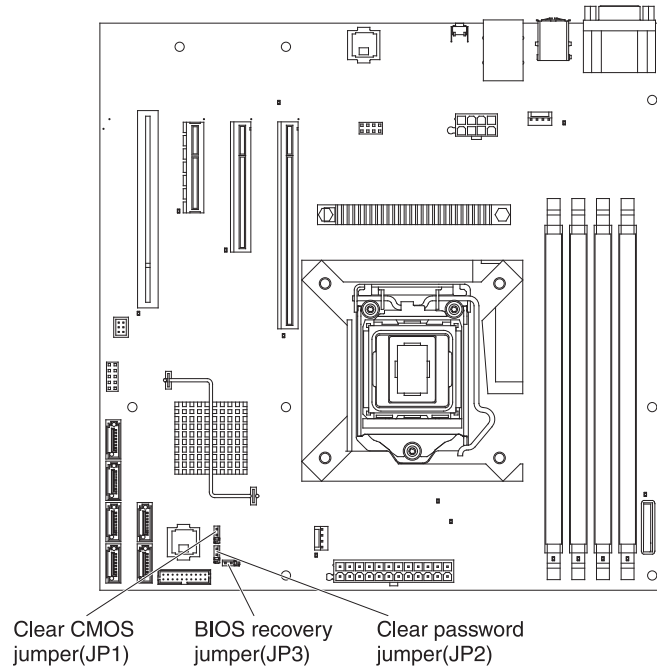
# System-board optional-device connectors

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



## System-board switches and jumpers

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



The following table describes the jumpers on the system board.

Table 2. System board jumpers

Jumper number	Jumper name	Jumper setting
JP1	Clear CMOS jumper	<ul style="list-style-type: none"> <li>Pins 1 and 2: Normal (default) - This keeps the CMOS data.</li> <li>Pins 2 and 3: This clears the CMOS data such as power-on password and administrator password, and loads the default BIOS settings.</li> </ul>
JP2	Clear password jumper	<ul style="list-style-type: none"> <li>Pins 1 and 2: Normal (default).</li> <li>Pins 2 and 3: This clears the power-on password and administrator password.</li> </ul>
JP3	BIOS recovery jumper	<ul style="list-style-type: none"> <li>Pin 1 and 2: Boot normally (default).</li> <li>Pin 2 and 3: BIOS recovery from a bootable USB key which contains the new BIOS image file.</li> </ul>

Table 2. System board jumpers (continued)

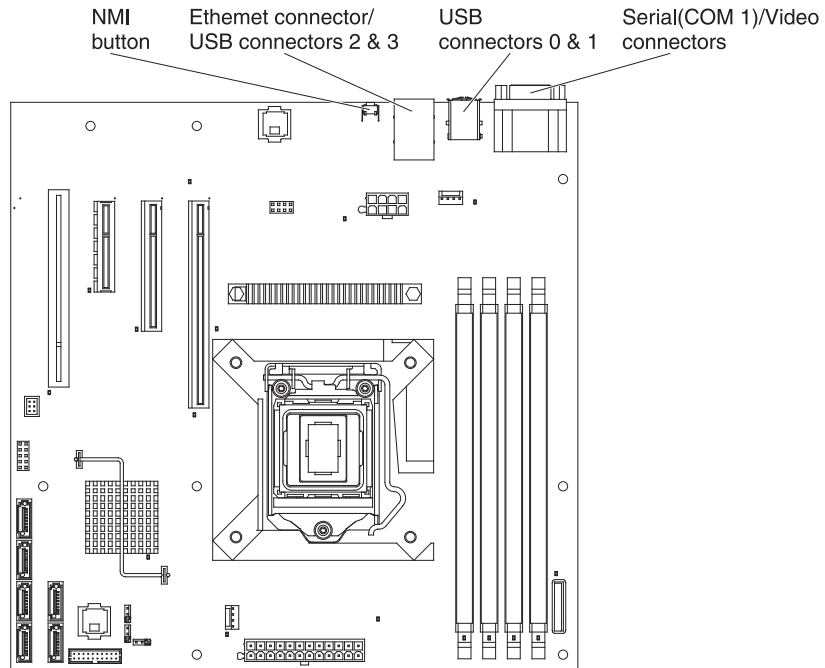
Jumper number	Jumper name	Jumper setting
Notes:		
<ul style="list-style-type: none"><li>• If no jumper is present, the server responds as if the pins are set to 1 and 2.</li><li>• Changing the position of the BIOS recovery jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on sets the BIOS recovery process. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem.</li></ul>		

**Important:**

1. Before you change any switch settings or move any jumpers, turn off the server, then, disconnect all power cords and external cables. Review the information in “Installation guidelines” on page 22, “Handling static-sensitive devices” on page 23, and “Turning off the server” on page 13.
2. Any system-board switch blocks or jumpers that are not shown in the illustrations in this document are reserved.

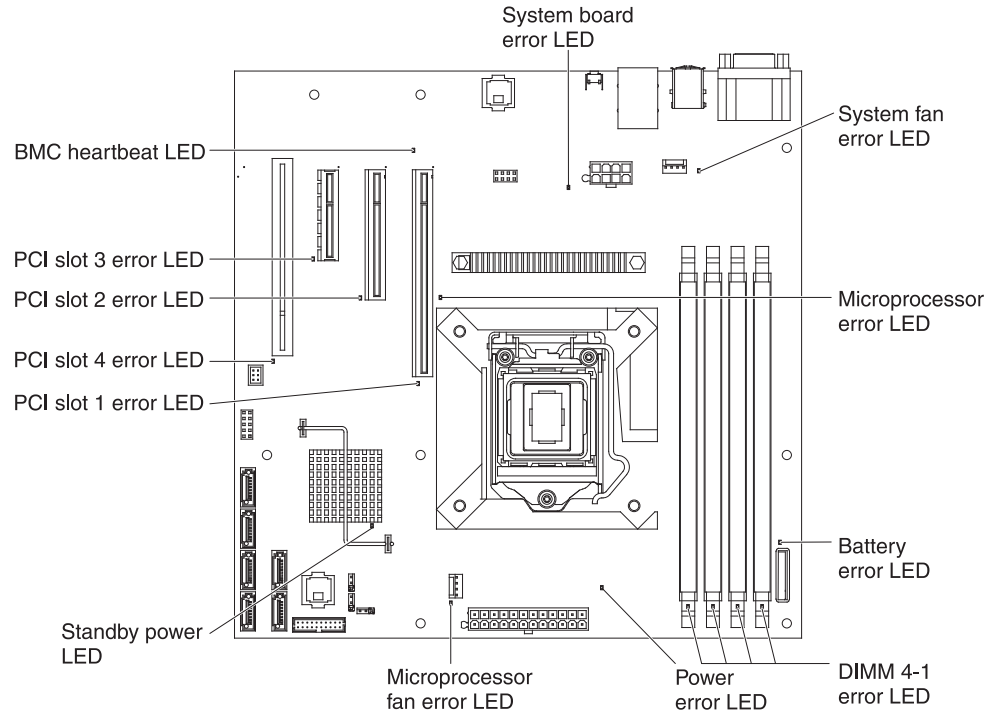
## System-board external connectors

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



## System-board LEDs

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



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## Installation guidelines

Before you install options, read the following information:

- Read the safety information that begins on page v, the guidelines in “Working inside the server with the power on” on page 23, 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:
  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 x3100 M3** 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 BladeCenter Tools Center at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.

- Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed. If the server is not working correctly, see the *Problem Determination and Service Guide* for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- You do not have to turn off the server to install or replace hot-swap fans and hot-swap drives.
- 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 options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

## System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.

## 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 could result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.

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

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

## Handling static-sensitive devices

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

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

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



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## Removing the side cover

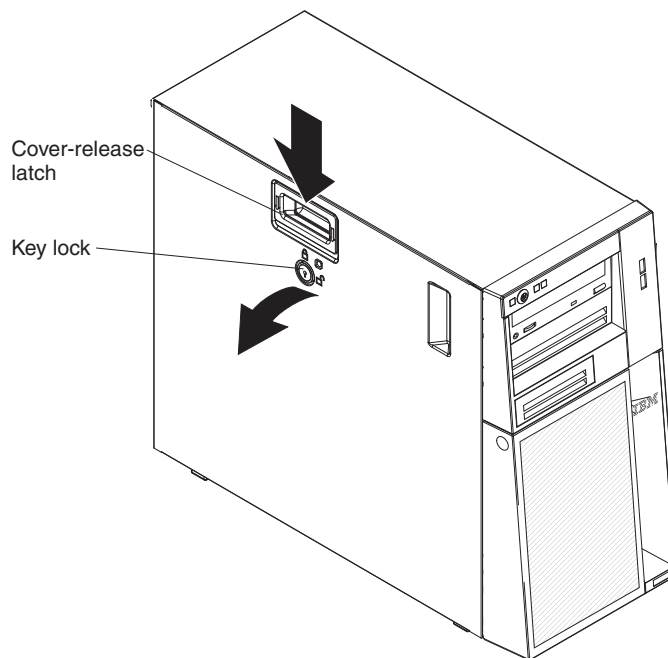
**Important:** Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed. If the server is not working correctly, see the *Problem Determination and Service Guide* for diagnostic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

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

**Attention:** Operating the server for more than 30 minutes with the side cover removed might damage server components. For proper cooling and airflow, replace the side cover before turning on the server.

1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Turn off the server and all attached devices (see “Turning off the server” on page 13); then, disconnect all power cords and external cables.
3. Unlock the side cover; then, press the cover-release latch down (as shown in the illustration); then, remove the cover and set it aside.

**Note:** The server keys are located on the rear of the server.



To replace the side cover, see “Reinstalling the side cover” on page 49.

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

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## Removing the two-piece bezel

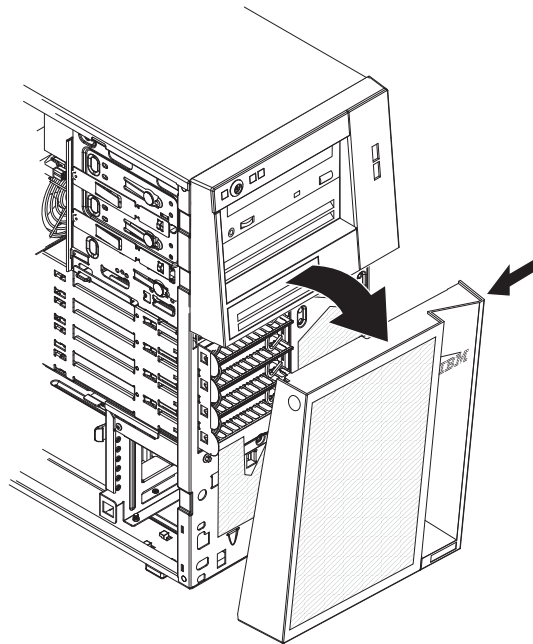
When you work with some devices, such as drives in bays 1 through 7 (see page 32), you must first remove the two-piece bezel to access the devices.

**Note:**

- 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 must unlock the side cover. You do not have to remove the side cover.

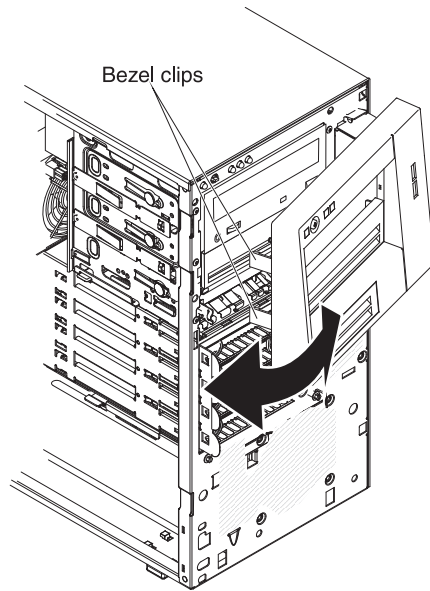
To remove the two-piece bezel, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Unlock and remove the side cover (see “Removing the side cover” on page 25).
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 47

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## 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 (see “System-board optional-device connectors” on page 17 for the location of the DIMM connectors):

- The server supports industry-standard, 1066 or 1333 MHz, PC3-10600-999 (single-rank or dual-rank) double-data-rate 3 (DDR3), unbuffered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC). For a list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>; then, select your country and navigate to the list of options for the server.
- The maximum amount of memory that the server supports is dependent on the type of memory that you install in the server. See “Unbuffered DIMMs (UDIMMs)” on page 29 for more information.
- The amount of usable memory is 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 Setup utility. For additional information, see “Using the Setup utility” on page 53.
- The maximum memory speed is determined by the combination of the microprocessor, DIMM speed, and the number of DIMMs installed in each channel.
- You can use compatible DIMMs from various manufacturers in the same pair.
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.
- The specifications of a DDR3 DIMM are on a label on the DIMM, in the following format.

*ggg eRxff-PC3-wwwwwm-aa-bb-cc*

where:

*ggg* is the total capacity of the DIMM (for example, 1GB, 2GB, or 4GB)

*e* is the number of ranks

1 = single-rank

2 = dual-rank

4 = quad-rank

*ff* is the device organization (bit width)

4 = x4 organization (4 DQ lines per SDRAM)

8 = x8 organization

16 = x16 organization

*wwwww* is the DIMM bandwidth, in MBps

8500 = 8.53 GBps (PC3-1066 SDRAMs, 8-byte primary data bus)

10600 = 10.66 GBps (PC3-1333 SDRAMs, 8-byte primary data bus)

*m* is the DIMM type

E = Unbuffered DIMM (UDIMM) with ECC (x72-bit module data bus)

R = Registered DIMM (RDIMM)

U = Unbuffered DIMM with no ECC (x64-bit primary data bus)

*aa* is the CAS latency, in clocks at maximum operating frequency

*bb* is the JEDEC SPD Revision Encoding and Additions level

cc is the reference design file for the design of the DIMM

**Note:** To determine the type of a DIMM, see the label on the DIMM. The information on the label is in the format xxxxx nRxxx PC3-xxxxx-xx-xx-xxx. The numeral in the sixth numerical position indicates whether the DIMM is single-rank (n=1) or dual-rank (n=2).

The following sections provide additional information specific to unbuffered DIMMs that you must consider.

## Unbuffered DIMMs (UDIMMs)

The following notes provide information that you must consider when you install UDIMMs:

- The memory channels run at the fastest common frequency of the installed DIMMs.
- Using ECC and non-ECC UDIMMs in the server will cause the server to run in non-ECC mode.
- The UDIMM options that are available for the server are 1 GB, 2 GB, and 4 GB memory DIMMs.
- You can install a maximum of 16 GB of memory in the server.
- The server supports up to two single-rank or dual-rank UDIMMs per channel.
- The following table lists the supported UDIMM population.

*Table 3. Supported UDIMM population per channel*

DIMMs slots per channel	DIMMs installed in each channel	DIMM type	DIMM speed	Ranks per DIMM (any combination)
2	1	Unbuffered DDR3 ECC	1066, 1333	single-rank, dual-rank
2	2	Unbuffered DDR3 ECC	1066, 1333	single-rank, dual-rank

- The following table lists the maximum DIMM population using ranked UDIMM.

*Table 4. Maximum memory population using ranked UDIMMs (depending on your model)*

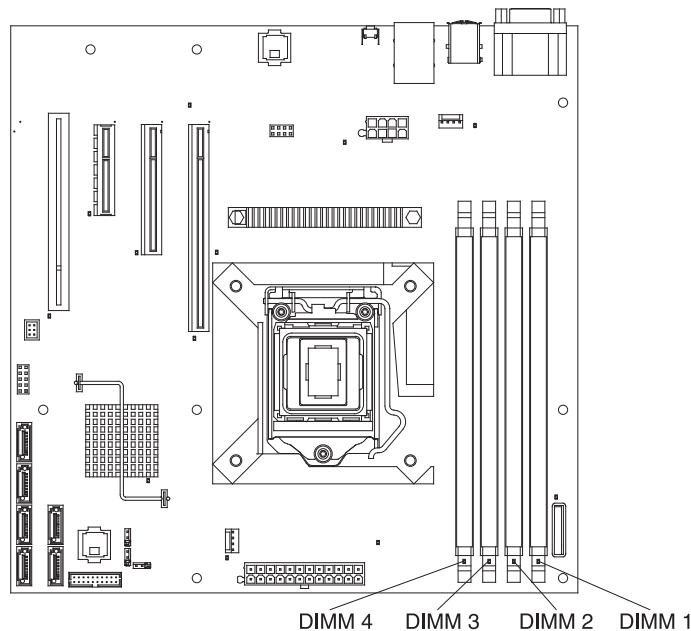
Number of UDIMMs	DIMM type	DIMM size	Total memory
4	single-rank UDIMMs	1 GB	4 GB
4	single-rank UDIMMs	2 GB	8 GB
4	dual-rank UDIMMs	2 GB	8 GB
4	dual-rank UDIMMs	4 GB	16 GB

- The following table lists the UDIMM memory population rule to optimize the system performance.

Table 5. UDIMMs population rule

DIMMs connector 1	DIMMs connector 2	DIMMs connector 3	DIMMs connector 4
populated	empty	empty	empty
populated	empty	populated	empty
populated	populated	populated	populated

The following illustration shows the location of the DIMM connectors on the system board.

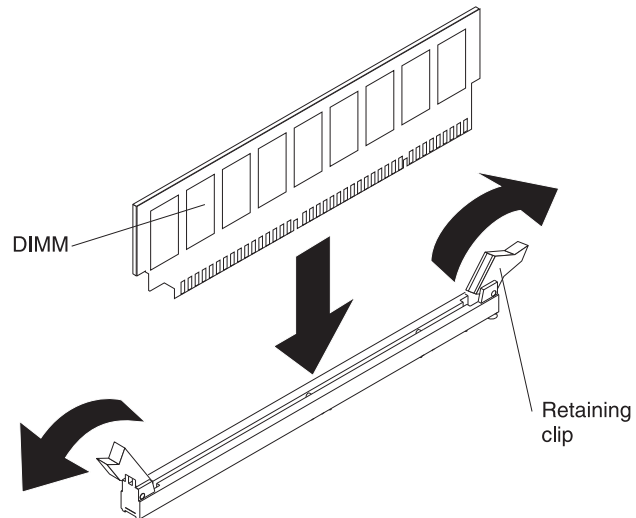


**Attention:** Static electricity that is released to internal server components when the server is powered-on might cause the server to stop, which could result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when working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

To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.
3. Unlock and remove the side cover (see “Removing the side cover” on page 25).
4. Lay the server on its side.
5. Open the retaining clip on each end of the DIMM connector. If you are installing a DIMM into DIMM connector 1, avoid touching the system battery.

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



6. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.
7. Turn the DIMM so that the DIMM keys align correctly with the 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 (see “System-board optional-device connectors” on page 17 for the location of the DIMM connectors).
9. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

**Note:** If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

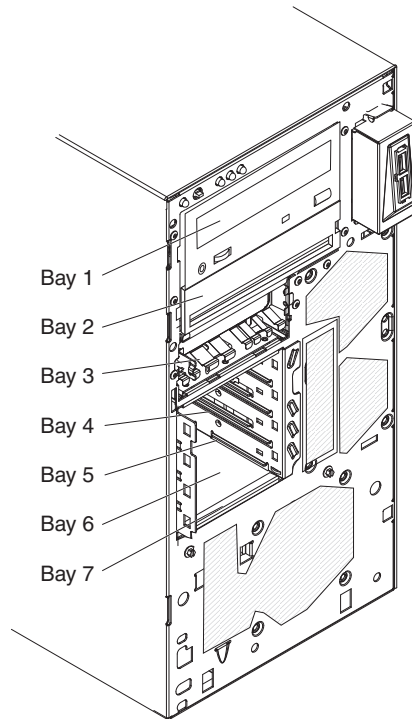
If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 47.

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## Installing drives

Depending on the server model, a DVD-ROM or multiburner drive might be installed in the server. The server supports up to four 3.5-inch simple-swap SATA hard disk drives.

The following illustration shows the locations of the drive bays.



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

- Make sure that you have all the cables and other equipment that is 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 see whether you have to set any switches or jumpers on the drive. If you are installing a SATA device, be sure to set the 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 5 connector on the system board and the drive in bay 2 connects to the SATA 4 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/>.

## Power and signal cables for internal drives

The server uses cables to connect SATA attached and simple-swap SATA devices to the power supply and to the system board. (See “System-board internal connectors” on page 16 for the location of system-board connectors.) Review the following information before connecting 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 and SAS 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.
  - **Simple-swap SATA:** Depending on the number of hard drives already installed in your server, the server comes with one or more SATA cables that are already connected to the system board and the backplate at the rear of the simple-swap drive cage.

For more information about the requirements for SATA cables and connecting 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 a DVD drive

To install a DVD drive, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 25).
4. Remove the two-piece bezel (see “Removing the two-piece bezel” on page 26).
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.

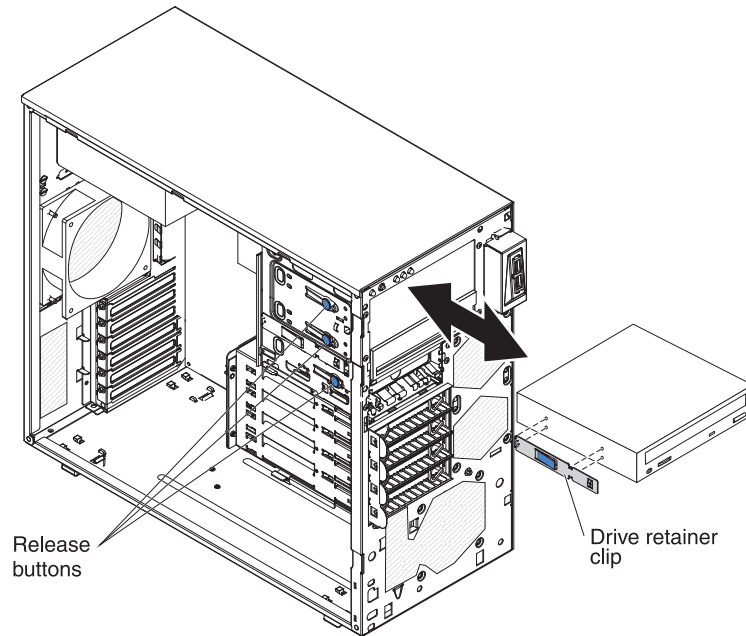


Class 1 Laser Product  
Laser Klasse 1  
Laser Klass 1  
Luokan 1 Laserlaite  
Appareil À Laser de Classe 1

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 bay 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.
  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 (see “System-board internal connectors” on page 16).
- Note:** 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).
11. 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 47.

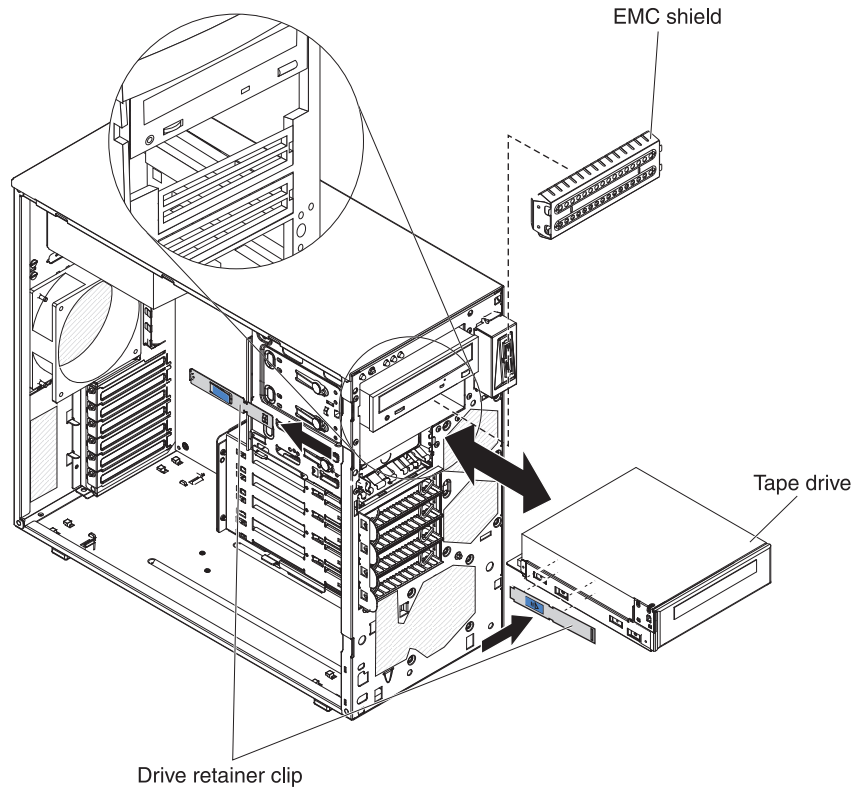
## Installing an optional tape drive

**Note:** Make sure that you have all the cables and other equipment that is specified in the documentation that comes with the new drive.

To install an optional tape drive, complete the following steps.

1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 25).
4. Remove the two-piece bezel (see “Removing the two-piece bezel” on page 26).
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 bay 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 SATA connector on the system board (see “System-board internal connectors” on page 16).

**Note:** 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).

11. 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 47.

## Installing a simple-swap SATA hard disk drive

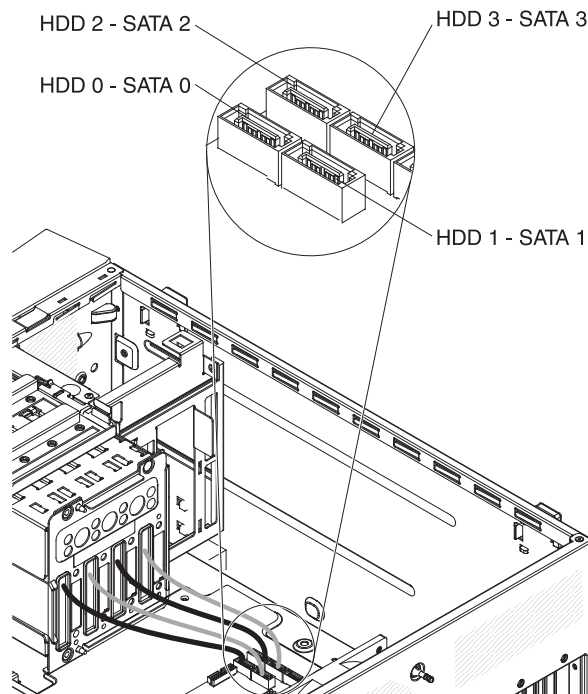
The server supports up to four 3.5-inch simple-swap SATA hard disk drives, which are accessible from the front of the server. You must disconnect all power from the server before you remove or install simple-swap drives. Before you install a simple-swap SATA hard disk drive, read the following information:

- Install the drives starting from the top bay to the bottom bay (bay 4, 5, 6, and then 7). The following tables list the IDs of the hard disk drives:

Table 6. IDs of simple-swap drives

Drive bay	ID
4	0
5	1
6	2
7	3

- The simple-swap SATA hard disk drives connect to the SATA 0 through SATA 3 connectors on the system board as follows:



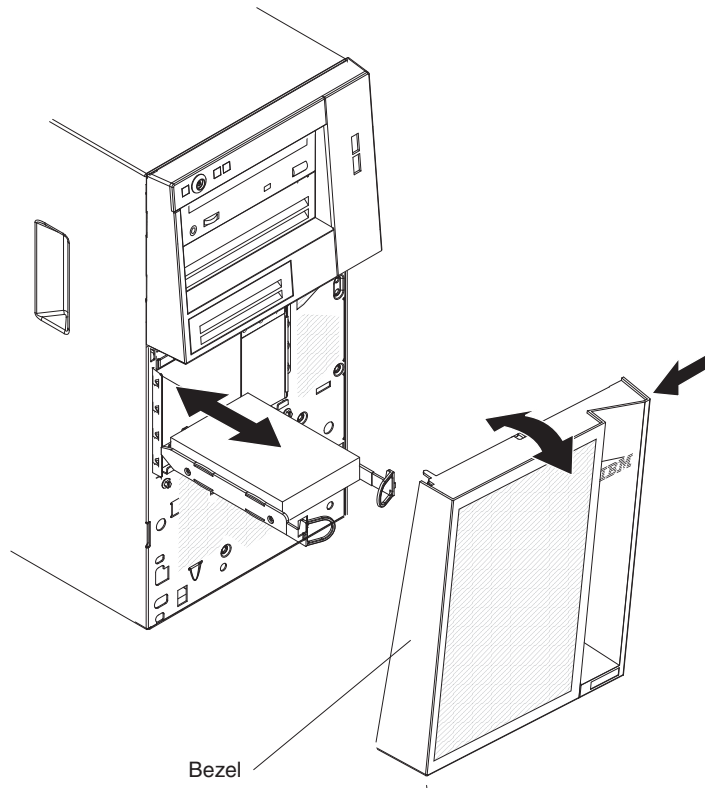
- Hard disk drive 0 connects to the SATA 0 connector on the system board.
- Hard disk drive 1 connects to the SATA 1 connector on the system board.
- Hard disk drive 2 connects to the SATA 2 connector on the system board.
- Hard disk drive 3 connects to the SATA 3 connector on the system board.

**Note:** If you installed a ServeRAID adapter in the server, connect the other end of the SATA signal cable to the connector on the ServeRAID adapter.

**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 22.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords.
3. Unlock the side cover and remove the lower bezel (see “Removing the two-piece bezel” on page 26).
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. Align the drive assembly with the guide rails in the bay (the connector end of the drive goes in first).



6. Pull the blue 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 47.

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## 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. Adapter that the server supports might vary, depending on your server model.

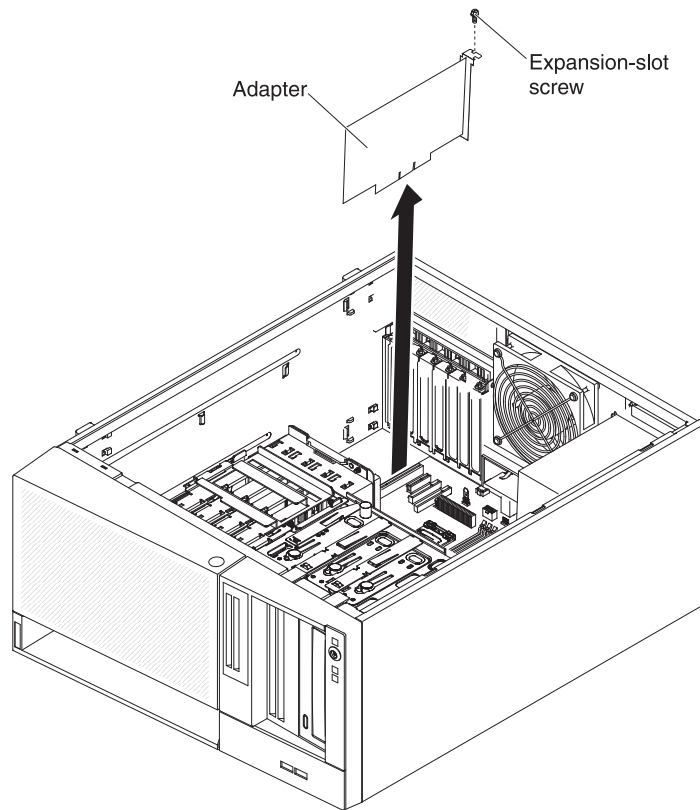
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you must change the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.
- Read the documentation that comes with your operating system.
- The server comes with the following adapter connectors or slots:
  - Slot 1, PCIe2 x16 (8, 4, 1) 25W
  - Slot 2, PCIe2 x8 (8, 4, 1) 25W
  - Slot 3, PCIe2 x4 (4, 1) 25W
  - Slot 4, PCI 32bit, 33MHz
- The server scans slot 1, slot 2, slot 3, and slot 4 to assign system resources. Then, the server starts the PCI devices in the following order, if you have not changed the default startup sequence: slot 1, slot 2, slot 3, and slot 4.
- The 32-bit slot 4 support 5.0 V keyed PCI adapters; they do not support 3.3 V keyed adapters. Universal adapters are supported in slot 4 if they are universally keyed.
- The optional ServeRAID-BR10il controller v2 enables integrated RAID levels 0 and 1.
- The server does not support full-length adapters.
- For a list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

To install an adapter, complete the following steps.

**Note:** 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.

1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords.
3. Unlock and remove the side cover. See “Removing the side cover” on page 25.
4. Lay the server on its side.
5. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you install the adapter.
6. Follow the instructions that come with the adapter to set jumpers or switches, if any.
7. 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.



8. 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.



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. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fan.

If you have other devices to install or remove, do so now; otherwise, go to “Completing the installation” on page 47.

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## Installing an optional ServeRAID-BR10il SAS/SATA controller v2

The optional IBM ServeRAID-BR10il SAS/SATA controller v2 must be installed in its dedicated connector, PCI slot 3, on the system board. The ServeRAID-BR10il v2 adapter enables hardware RAID levels 0 and 1. For configuration information, see the ServeRAID documentation at <http://www.ibm.com/systems/support/>.

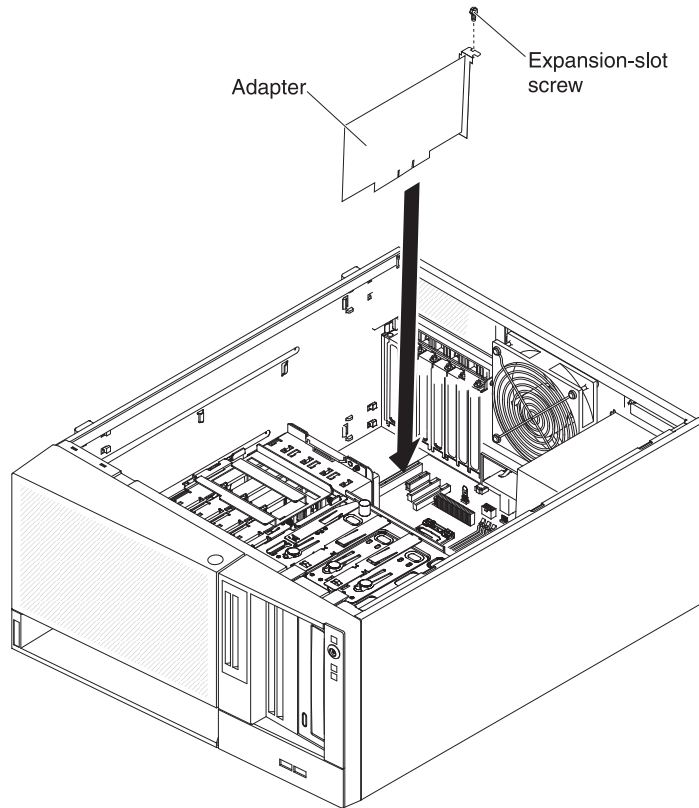
**Note:** If you are upgrading to hardware RAID for the first time, you need to install the hardware RAID upgrade cable kit that contains a new backplate and attached cables. To order the cable kit, contact your IBM marketing representative or authorized reseller.

To install the ServeRAID adapter, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 25).
4. Lay the server on its side.
5. Disconnect the signal and power cables and the existing SAS/SATA controller (if one is installed); then, remove the SAS/SATA controller from the server.
6. Touch the static-protective package that contains the ServeRAID-BR10il v2 adapter to any unpainted metal surface on the server. Then, remove the ServeRAID-BR10il v2 adapter from the package.
7. Align the ServeRAID-BR10il v2 adapter 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-BR10il v2 adapter.

8. Press the ServeRAID-BR10il v2 adapter firmly into the connector on the system board.
9. Install the expansion-slot screw to secure the ServeRAID-BR10il v2 adapter to the chassis.



10. Take the other end of the signal cable that is attached to the backplate for drive bays 0 through 3 (as labeled on the front of the drive cage) and connect it to the connector on the ServeRAID-BR10il v2 adapter.

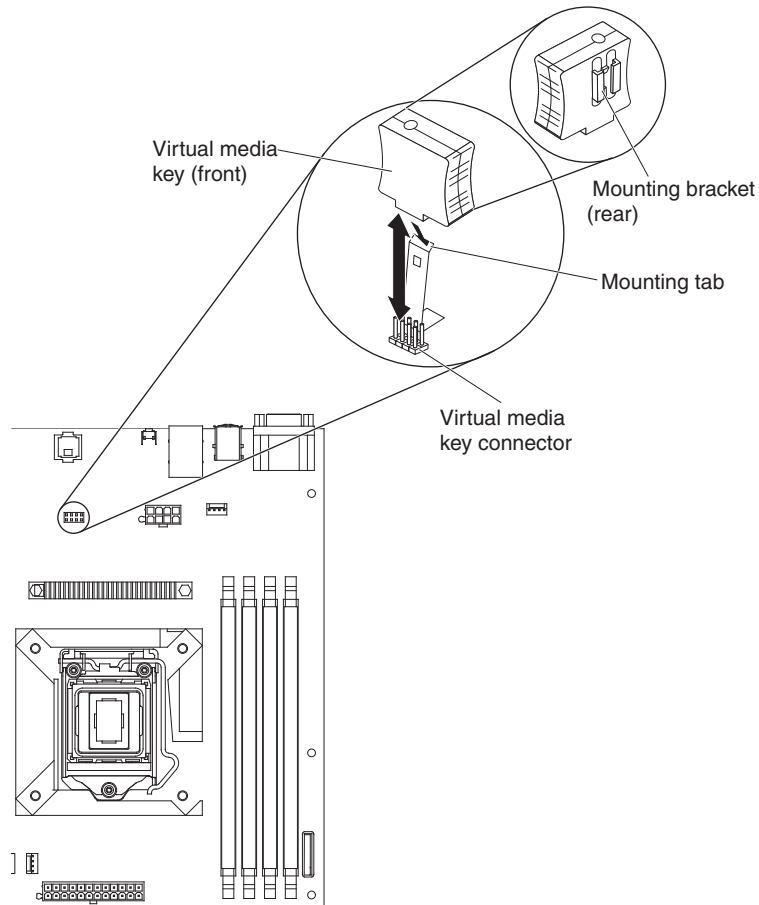
If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 47.

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## Installing the virtual media key

To install the virtual media key, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Unlock and remove the side cover (see “Removing the side cover” on page 25).
3. Lay the server on its side.
4. Align the virtual media key with the mounting tab and slide it down the tab onto the connector on the system board. Press the virtual media key down into the connector until it is firmly seated on the system board.



If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 47.

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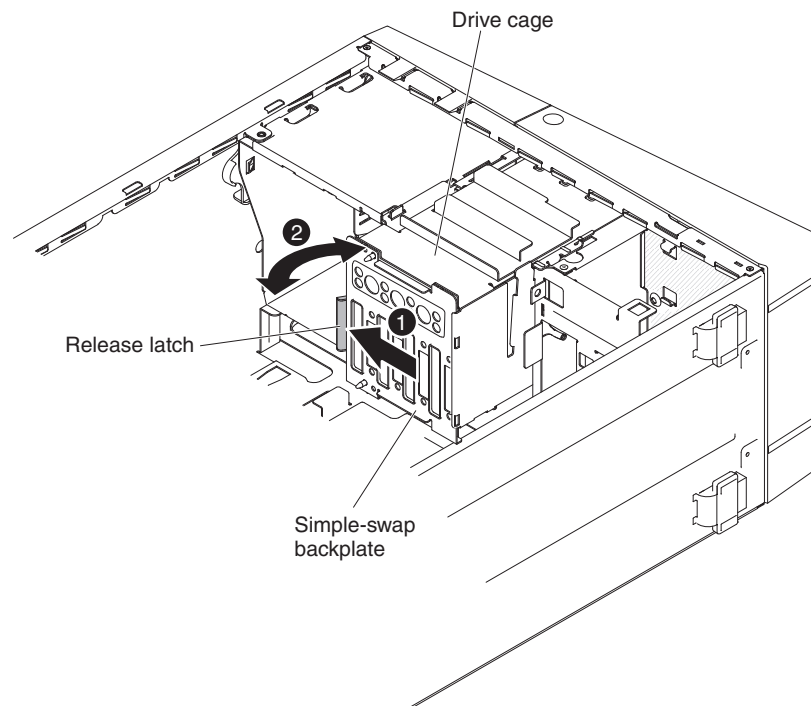
## Installing the simple-swap backplate

**Important:** Before you replace the simple-swap backplate in the server, take the following precautions to save data, firmware, and configuration data:

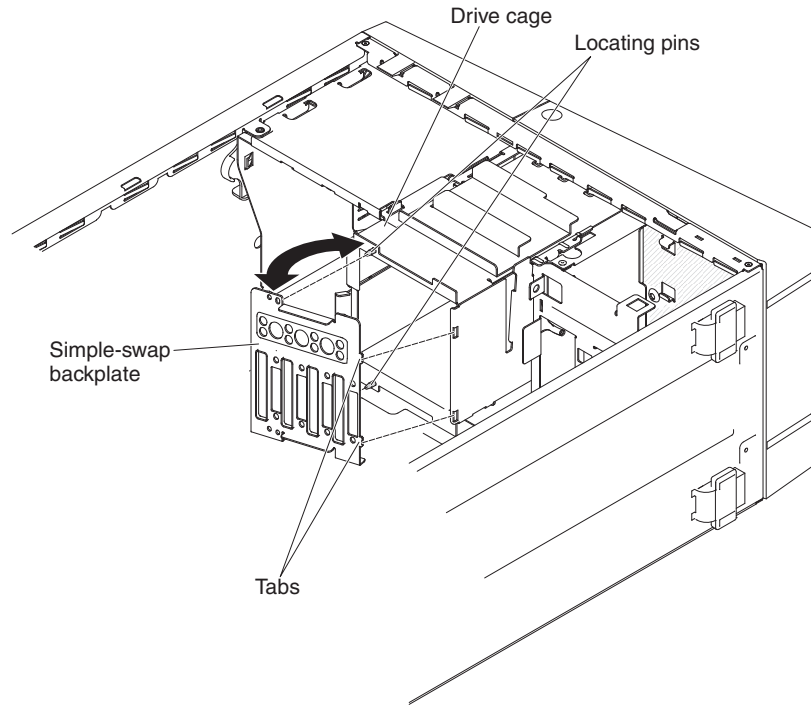
- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplates, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

To install the simple-swap hard disk drive backplate, complete the following steps.

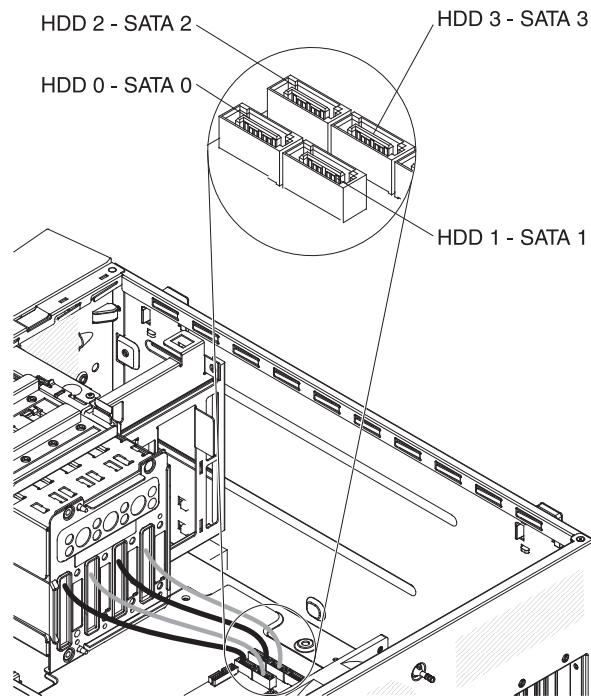
1. Read the safety information that begins on page v and “Installation guidelines” on page 22.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords.
3. Unlock the side cover and remove the lower bezel (see “Removing the two-piece bezel” on page 26).
4. Touch the static-protective package that contains the new backplate to any unpainted metal surface on the server; then, remove the backplate from the package and place it on a static-protective surface.
5. Lay the server on its side.
6. Pull the round blue loops of the drive assembly toward each other; then, pull the hard disk drive forward slightly to disconnect the drive from the backplate. It is not necessary to remove these drives.
7. Remove the existing backplate (if one is installed):
  - a. Disconnect the signal cable from the ServeRAID adapter (if one is installed) or disconnect the SATA signal cables from the system board, and note the routing of the cables.
  - b. Disengage the signal cables from the retention-clips.
  - c. While pressing the release latch, rotate the backplate away from the drive cage until it is clear of the locating pins.
  - d. Lift the backplate out of the server and set it aside.



8. Insert the two tabs on the backplate into the matching holes on the drive cage.



9. Rotate the backplate toward the drive cage and over the locating pins; then, press the backplate onto the drive cage until the release latch securely engages the backplate.
10. Connect the cables. Do one of the following:
  - Connect the signal cable to the connector on the ServerRAID adapter
  - Connect the other end of the SATA signal cables and power cable to the connectors on the system board (see )



11. Route the signal cables 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. Secure the cables with the retention-clips.
13. Install the simple-swap hard disk drives.

If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 47.

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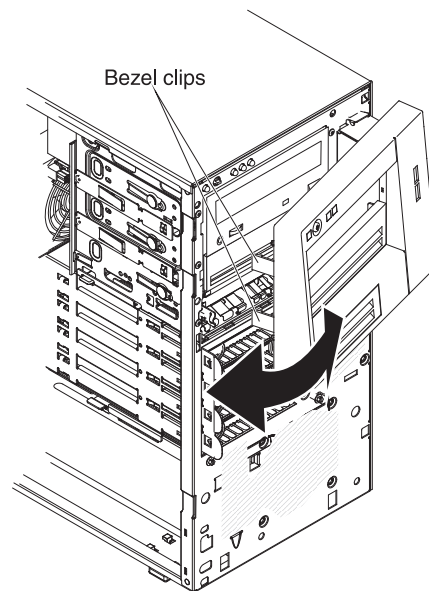
## Completing the installation

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 Setup utility. Follow the instructions in this section.

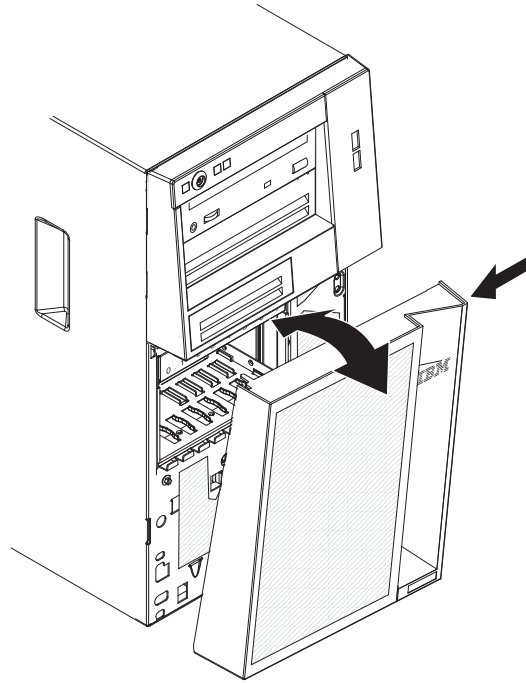
### Reinstalling the two-piece bezel

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.

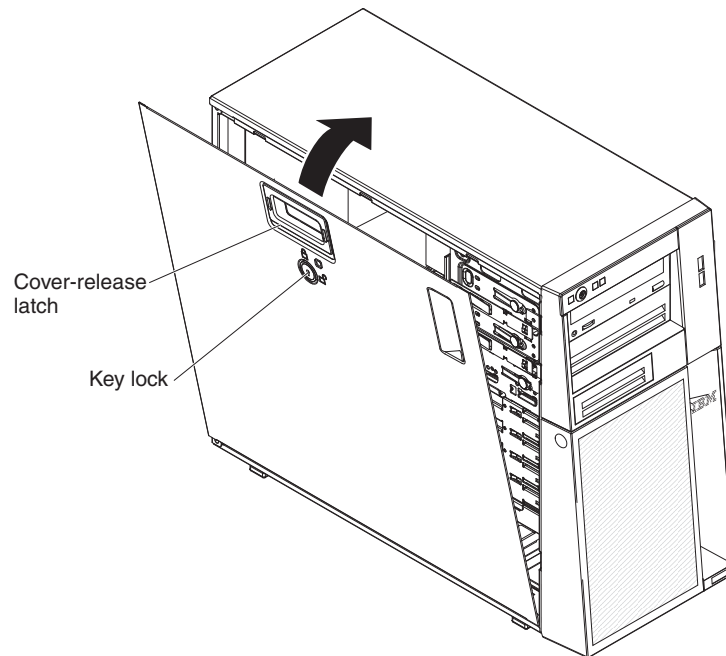


- b. Rotate the top of the lower bezel up to the chassis; then, press the blue release tab on the right side of the lower bezel and completely close the lower bezel until it locks securely into place.



## Reinstalling the side cover

If you removed the side cover, reinstall it.



To reinstall the side cover, complete the following steps:

1. 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.

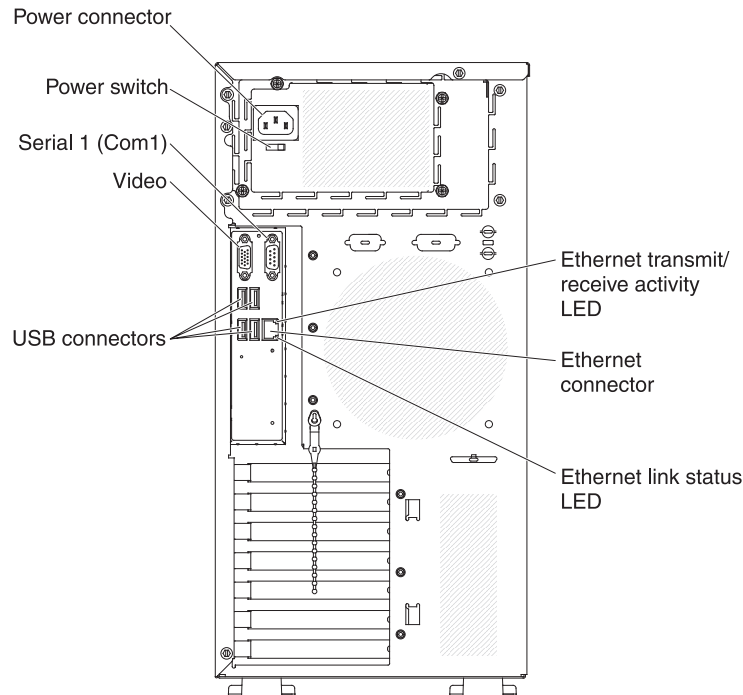
2. Position the lip on the bottom edge of the side cover on the ledge on the bottom of the chassis; then, rotate the cover up to the chassis, and then press down on the cover release latch and push the cover completely closed until it latches securely into place.
3. Press down on the cover-release latch and close the cover to secure it 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 connections, match the color of the cable end with the color of the connector. For example, match a blue cable end with a blue panel connector, a red cable end with a red connector, and so on.

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 option or an external device, you might receive a message that the configuration has changed. The Setup utility starts automatically so that you can save the new configuration settings. For additional information, see “Using the Setup utility” on page 53.

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

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

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## Connecting external devices

If you install a supported optional adapter, 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 22, 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.

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## Installing the server in a rack

To convert the server from a tower model to a rack model, you must use a Tower-to-Rack Kit. 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.



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## Chapter 3. Configuring the server

The following configuration programs and utilities come with the server:

- **Setup utility**

The Setup utility program is part of the basic input/output system firmware. Use it to change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see “Using the Setup utility.”

- **Boot Manager program**

The Boot Manager program is part of the server firmware. Use it to override the startup sequence that is set in the Setup utility and temporarily assign a device to be first in the startup sequence. For more information about using this program, see “Using the Boot Manager program” on page 57.

- **Ethernet controller configuration**

For information about configuring the Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 58.

- **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 “Using LSI Configuration Utility program” on page 58

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

Table 7. Server configuration and applications for configuring and managing RAID arrays

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-BR10il v2 adapter installed	LSI Utility (Setup utility, press Ctrl+C)	MegaRAID Storage Manager (for monitoring storage only)

- **BIOS Configuration Utility (BCU) program**

Use this program as an alternative to the Setup utility for modifying BIOS settings. Use the BCU program online or out of band to modify BIOS settings from the command line without the need to restart the server to access the Setup utility. For more information about using this program, see “BIOS Configuration Utility program” on page 62.

---

### Using the Setup utility

Use the setup utility program to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features
- View and clear error logs
- Resolve configuration conflicts

## Starting the Setup utility

To start the Setup utility, complete the following steps:

1. Turn on the server.

**Note:** If you are connecting the server to an ac power source for the first time, do not press the power-control button until the power LED flashes.

2. When the prompt Press <F1> to enter Setup is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
3. Select settings to view or change.

## Setup utility menu choices

The following choices are on the Setup utility main menu. Depending on the version of the firmware, some menu choices might differ slightly from these descriptions.

- **Main**

Select this choice to view the revision level and release date of the firmware, total memory information, system language, system date and time, and access level. You can change the system date and time in this menu.

- **Advanced**

Select this choice to view or change server component settings.

- **Legacy OpROM Support**

- **Launch PXE OpROM**

- Select this choice to enable or disable legacy boot option for legacy network devices with option ROM.

- **Launch Storage OpROM**

- Select this choice to enable or disable legacy boot option for legacy storage devices with option ROM.

- **PCI Subsystem Settings**

- Select this choice to view or change PCI adapter settings. You can also configure the integrated video controller options.

- **ACPI Settings**

- Select this choice to enable or disable BIOS ACPI auto configuration and system hibernation option.

**Note:** System hibernation may not take effect in some operating systems.

- **CPU Configuration**

- Select this choice to view or change the processor settings.

- **SATA Configuration**

- Select this choice to view or change the SATA controller settings.

- **USB Configuration**

- Select this choice to view or change the USB controller settings.

- **Super IO Configuration**

- Select this choice to view or change serial port0 settings.

- **System Information**

- Select this choice to view information about the server. You cannot change settings directly in the system information.

- **Serial Port Console Redirection**

Select this choice to enable or disable console port redirection and configure console connection options.

- **UEFI PXE Boot Support**

Select this choice to enable or disable the UEFI PXE support.

- **Chipset**

Select this choice to view and set north bridge and south bridge options.

- **Boot**

Select this choice to view or boot to devices, including the startup sequence. The server starts from the first boot record that it finds.

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

- **Security**

Select this choice to set or clear passwords. See “Passwords” on page 56 for more information.

- **Administrator Password**

Select this choice to set an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If an administrator password is set, the full Setup utility menu is available only if you type the administrator password at the password prompt. For more information, see “Administrator password” on page 56.

- **User Password**

Select this choice to set a power-on password. See “Power-on password” on page 56 for more information.

- **Save & Exit**

Select this choice to save the changes that you have made in the settings and exit from the Setup utility.

- **Event Logs**

Select this choice to view SMBIOS and system event logs.

- **View SMBIOS Event Logs**

Select this choice to enter the SMBIOS event log viewer to view SMBIOS event logs.

- **View System Event Log**

Select this choice to enter the system event log viewer to view system event logs.

**Note:** You can view all hardware error messages in the system event log viewer.

- **Server Mgmt**

Select this choice to configure FRB2 timer, SMBIOS and system event log settings, and BMC network settings.

- **SMBIOS Event Log Settings**

Select this choice to enable or disable SMBIOS event logging; change SMBIOS event log erasing settings. You must restart your server to make your changes take effect.

- **System Event Log Settings**

Select this choice to change system event log deletion settings. You must restart your server to make your changes take effect.

- **BMC Network Configuration**

Select this choice to view the system management network interface port, the BMC MAC address, and the current BMC IP address; define the static IP address, subnet mask, and gateway address for BMC; specify whether to use the static IP address or have DHCP assign the IP address; and save the network changes.

## Passwords

From the **Security** menu choice, you can set, change, and delete a power-on password and an administrator password.

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

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

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

### Power-on password

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

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

- If an administrator password is set, type the administrator password at the password prompt. Start the Setup utility and reset the power-on password.
- Remove the battery from the server and then reinstall it. See the *Problem Determination and Service Guide* on the IBM System x Documentation CD for instructions for removing the battery.
- Change the position of the password clear jumper on the system board to reset the power-on password. See "Resetting passwords" on page 57 for additional information.

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

### Administrator password

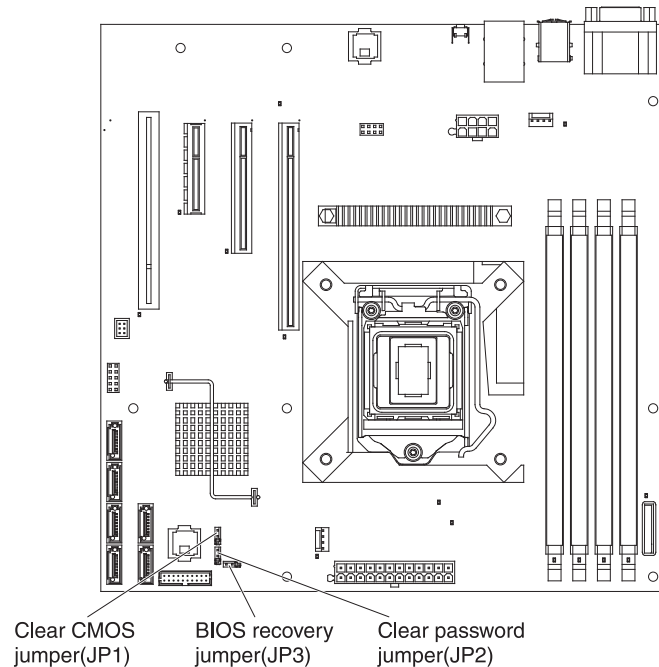
If an administrator password is set, you must type the administrator password for access to the full Setup utility menu. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the password.

If you forget the administrator password, you can reset it after you change the position of the password clear jumper.



## Resetting passwords

If you forget the power-on password or administrator password, you can move the password clear jumper on the system board to pins 2 and 3, to clear the power-on or administrator password check. The jumper location is shown in the following illustration.



---

## Using the Boot Manager program

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

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

1. Turn off the server.
2. Restart the server.
3. When the prompt `<F12> Select Boot Device` is displayed, press F12. If a bootable USB mass storage device is installed, a submenu item (**USB Key/Disk**) is displayed.
4. Use the Up Arrow and Down Arrow keys to select an item from the **Boot Selection Menu** and press **Enter**.

The next time the server starts, it returns to the startup sequence that is set in the Setup utility.

---

## Installing your operating system

If you have already configured the server hardware, you can complete the following steps to download the latest operating-system installation instructions from the IBM Web site.

### Notes:

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

2. The server does not support the DataCenter edition of Microsoft Windows Server 2008 R2.
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 x3100 M3**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

---

## Configuring the Gigabit Ethernet controller

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

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. From the **Product family** menu, click **System x3100 M3**.

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

---

## Using 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 the following tasks:
  - 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. In some server models, the ServeRAID-BR10il SAS/SATA controller v2 provides RAID levels 0 and 1 support.

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 optional 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 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 optional 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.

**Note:** If you are connecting the server to an ac power source for the first time, do not press the power-control button until the power LED flashes.

2. When the prompt, press CTRL + C to access the LSI Configuration Utility program. If you have set an administrator password, you are prompted to type the password.
3. To perform storage-management tasks, follow the procedures in the documentation that comes with the SAS/SATA controller.

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 using the LSI Configuration Utility program, 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.

---

## Using the RAID Configuration Utility program

The system firmware provides software RAID capabilities that supports RAID levels 0 and 1. The following describes the information you must consider when you configure software RAID:

- To configure software RAID level 0, the total hard disk space on the server must be less than 2 TB.
- To configure software RAID level 1, the total hard disk space on the server must be less than 4 TB.

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

1. Turn on the server.  
  
**Note:** If you are connecting the server to an ac power source for the first time, do not press the power-control button until the power LED flashes.
2. When the prompt Press <F1> to enter Setup is displayed, press F1. If you have set an administrator password, you are prompted to type the password.
3. Select **Advanced** → **SATA Configuration** .
4. For **SATA Mode**, select **RAID Mode**.
5. Save the changes and exit the Setup utility.
6. Press CTRL + I to access the RAID Configuration Utility program.
7. Select **Create RAID Volume** and configure the required settings.
8. Save the changes and exit to the main Setup utility menu.
9. Use the **Boot** menu to boot from the CD-ROM/DVD-ROM.
10. Follow the installation instructions to install the operating system.
11. After the operating system installation is complete, install the Intel RAID utility. You can get the instructions and setup file from [http://downloadcenter.intel.com/Detail\\_Desc.aspx?agr=Y&ProdId=2101&DwnldID=18859&lang=eng](http://downloadcenter.intel.com/Detail_Desc.aspx?agr=Y&ProdId=2101&DwnldID=18859&lang=eng).

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## Using the Baseboard Management Controller

The baseboard management controller (BMC) provides basic service-processor environmental monitoring functions. If an environmental condition exceeds a threshold or if a system component fails, the baseboard management controller lights LEDs to help you diagnose the problem. Critical errors are also included in the error log. When the optional Virtual Media Key is installed, BMC provides advanced virtual presence capability for remote server management capabilities

### Using the remote presence capability

The remote presence features are integrated functions of the baseboard management controller (BMC). When the optional IBM Virtual Media Key is installed in the server, it activates the remote presence functions: virtual media and keyboard, video, and mouse (KVM). The virtual media key is required to enable the integrated remote presence features. However, you can still access the Web interface without the key.

After the virtual media key is installed in the server, it is authenticated to determine whether it is valid. If the key is not valid, the configuration menu for the remote presence feature will not display in the BMC Web interface.

The virtual media key has an LED. When this LED is lit and green, it indicates that the key is installed and functioning correctly. When the LED is not lit, it indicates that the key might not be installed correctly.

### Enabling the remote presence feature

To enable the remote presence feature, complete the following steps:

1. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
2. Install the virtual media key into the dedicated slot on the system board (see “Installing the virtual media key” on page 43).
3. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

**Note:** If you are connecting the server to an ac power source for the first time, do not press the power-control button until the power LED flashes.

### Obtaining the IP address for the BMC

To access the Web interface, you need the IP address for the BMC. You can obtain the BMC IP address through the Setup utility. To locate the IP address, complete the following steps:

1. Turn on the server.

**Note:** If you are connecting the server to an ac power source for the first time, do not press the power-control button until the power LED flashes.

2. When the prompt Press <F1> to enter Setup 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 Setup utility menu.
3. From the Setup utility main menu, select **Server Mgmt → BMC Network Configuration**.
4. Find the IP address and write it down.

**Note:** The BMC defaults to DHCP. If a DHCP host is not available, you can select **Static** in **Configuration Source** and specify the IP settings (such as IP address and subnet mask). You may need to obtain this information from your network administrator.

5. Exit from the Setup utility.

## Logging on to the Web interface

To log on to the Web interface to use the remote presence functions, complete the following steps:

1. Open a Web browser on a computer that connects to the server and in the **address** or **URL** field, type the IP address or host name of the BMC to which you want to connect.
2. On the Login page, type the user name and password. If you are using the BMC for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log.

**Note:** The BMC is set initially with a user name of USERID and password of PASSWORD (passw0rd with a zero, not the letter O). You have read/write access. You must change the default password the first time you log on.

---

## BIOS Configuration Utility program

The BIOS Configuration Utility (BCU) program is an alternative to the Setup utility for modifying BIOS settings. Use the BCU program online or out of band to modify BIOS settings from the command line without the need to restart the system to access the Setup utility.

Use the command-line interface to issue setup commands. You can save any of the settings as a file and run the file as a script. The BCU program supports scripting environments through a batch-processing mode.

For more information and to download the BCU program, go to <http://www.ibm.com/systems/support/>.

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## Appendix A. Getting help and technical assistance

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

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### Before you call

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

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

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

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### Using the documentation

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

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

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

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

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## Software service and support

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

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

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## Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to <http://www.ibm.com/partnerworld/> and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see <http://www.ibm.com/planetwide/>. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

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## IBM Taiwan product service

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台灣國際商業機器股份有限公司  
台北市松仁路7號3樓  
電話：0800-016-888

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



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## Appendix B. Notices

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## Important notes

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

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

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

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

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

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

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

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## Particulate contamination

**Attention:** Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the server to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the server, IBM may condition provision of repair or replacement of servers or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 8. Limits for particulates and gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none"><li>The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2<sup>1</sup>.</li><li>Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.</li><li>The deliquescent relative humidity of the particulate contamination must be more than 60%<sup>2</sup>.</li><li>The room must be free of conductive contamination such as zinc whiskers.</li></ul>
Gaseous	<ul style="list-style-type: none"><li>Copper: Class G1 as per ANSI/ISA 71.04-1985<sup>3</sup></li><li>Silver: Corrosion rate of less than 300 Å in 30 days</li></ul>

<sup>1</sup> ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

<sup>2</sup> The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

<sup>3</sup> ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

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## Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a Web-based format or accessible PDF document for a publication, direct your mail to the following address:

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## Electronic emission notices

### Federal Communications Commission (FCC) statement

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

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

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

### Industry Canada Class A emission compliance statement

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

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

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

### Australia and New Zealand Class A statement

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

### United Kingdom telecommunications safety requirement

#### Notice to Customers

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

## European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

**Attention:** This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Responsible manufacturer:

International Business Machines Corp.  
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Armonk, New York 10504  
914-499-1900

European Community contact:

IBM Technical Regulations, Department M456  
IBM-Allee 1, 71137 Ehningen, Germany  
Telephone: 0049 (0) 7032 15-2937  
E-mail: tjahn@de.ibm.com

## Germany Class A statement

**Deutschsprachiger EU Hinweis:**

### **Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit**

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

### **Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten**

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

## **Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A**

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.  
New Orchard Road  
Armonk, New York 10504  
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland  
Technical Regulations, Department M456  
IBM-Allee 1, 71137 Ehningen, Germany  
Telephone: 0049 (0) 7032 15-2937  
E-mail: tjahn@de.ibm.com

### **Generelle Informationen:**

**Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.**

## **Japan VCCI Class A statement**

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

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

## **Japan Electronics and Information Technology Industries Association (JEITA) statement**

高調波ガイドライン適合品

Japanese Electronics and Information Technology Industries Association (JEITA)  
Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

## **Korea Communications Commission (KCC) statement**

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Please note that this equipment has obtained EMC registration for commercial use. In the event that it has been mistakenly sold or purchased, please exchange it for equipment certified for home use.

### **Russia Electromagnetic Interference (EMI) Class A statement**

**ВНИМАНИЕ!** Настоящее изделие относится к классу А.  
В жилых помещениях оно может создавать радиопомехи, для  
снижения которых необходимы дополнительные меры

### **People's Republic of China Class A electronic emission statement**

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

### **Taiwan Class A compliance statement**

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





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