# IBM

# @server

## xSeries 306m
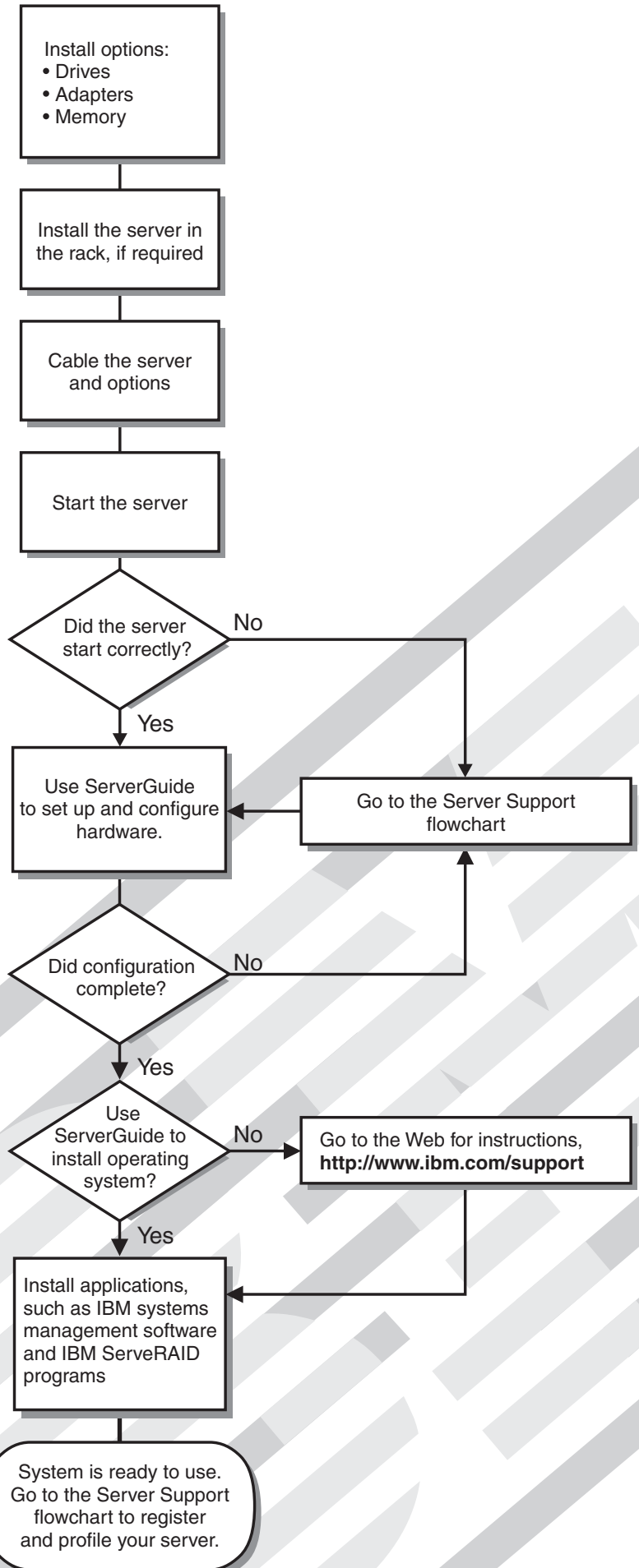### Types 8849 and 8491

# Installation Guide

## Welcome. . .

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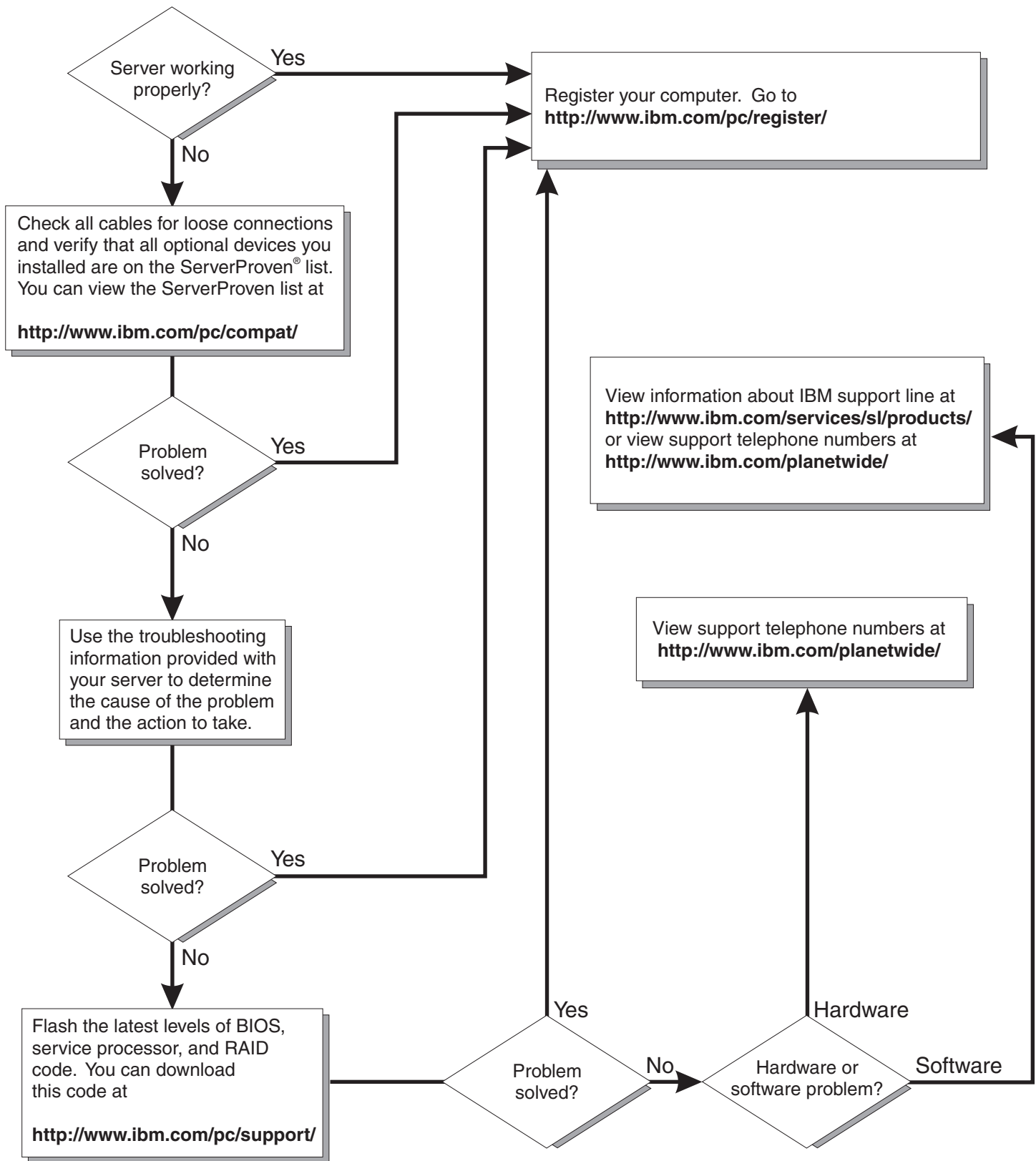superior performance, availability,
and affordability.

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

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

You can also find the most
current information about your
server on the IBM Web site at:
http://www.ibm.com/support.

---

Install options:
• Drives
• Adapters
• Memory

↓

Install the server in
the rack, if required

↓

Cable the server
and options

↓

Start the server

↓

Did the server
start correctly? —— No ——→

Yes ↓

Use ServerGuide
to set up and configure
hardware. ←—— Go to the Server Support
flowchart ←——

↓                                    ↑

Did configuration
complete? —— No ——————————→

Yes ↓

Use
ServerGuide to
install operating
system? —— No ——→ Go to the Web for instructions,
**http://www.ibm.com/support**

Yes ↓                              ↓

Install applications,
such as IBM systems
management software
and IBM ServeRAID
programs ←——————————

↓

System is ready to use.
Go to the Server Support
flowchart to register
and profile your server.

# Server Support

**Server working properly?** — Yes → Register your computer. Go to **http://www.ibm.com/pc/register/**

No ↓

Check all cables for loose connections and verify that all optional devices you installed are on the ServerProven® list. You can view the ServerProven list at

**http://www.ibm.com/pc/compat/**

↓

**Problem solved?** — Yes → Register your computer. Go to **http://www.ibm.com/pc/register/**

No ↓

Use the troubleshooting information provided with your server to determine the cause of the problem and the action to take.

↓

**Problem solved?** — Yes → Register your computer. Go to **http://www.ibm.com/pc/register/**

No ↓

Flash the latest levels of BIOS, service processor, and RAID code. You can download this code at

**http://www.ibm.com/pc/support/**

→ **Problem solved?**

Yes ↑ → Register your computer. Go to **http://www.ibm.com/pc/register/**

No → **Hardware or software problem?**

Hardware ↑ → View support telephone numbers at **http://www.ibm.com/planetwide/**

Software → View information about IBM support line at **http://www.ibm.com/services/sl/products/** or view support telephone numbers at **http://www.ibm.com/planetwide/**

# IBM

# @server

IBM xSeries 306m Type 8849 and 8491

## Installation Guide

# IBM

**Note:**

Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 47 and the *Warranty and Support Information* document on the IBM *xSeries Documentation* CD.

# Contents

# Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

**Important:**

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

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

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

**Statement 1:**

**DANGER**

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

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

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

**Statement 2:**



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

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

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

**Statement 3:**



**CAUTION:**
**When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:**
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**
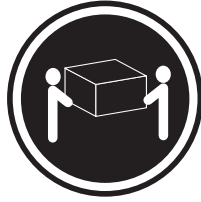


**DANGER**

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

**Statement 4:**

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

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

**Statement 5:**

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

2

1
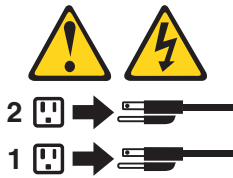
**Statement 8:**



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



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

**Statement 10:**



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



>82 kg (180 lb)

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

# Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up your IBM® @server™ xSeries® 306m Type 8849 or 8491 server and basic instructions for installing some options. More detailed instructions for installing options are in the *User's Guide* on the IBM *xSeries Documentation* CD, which comes with the server. This document contains information about:

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

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

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

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

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

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

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

| Product name | IBM @server xSeries 306m server |
|---|---|
| Machine type Model number Serial number | 8849 or 8491 (circle the machine type that applies) _____ _____ |

The model number and serial number are on the ID label on the bezel, as shown in the following illustration.

ID label
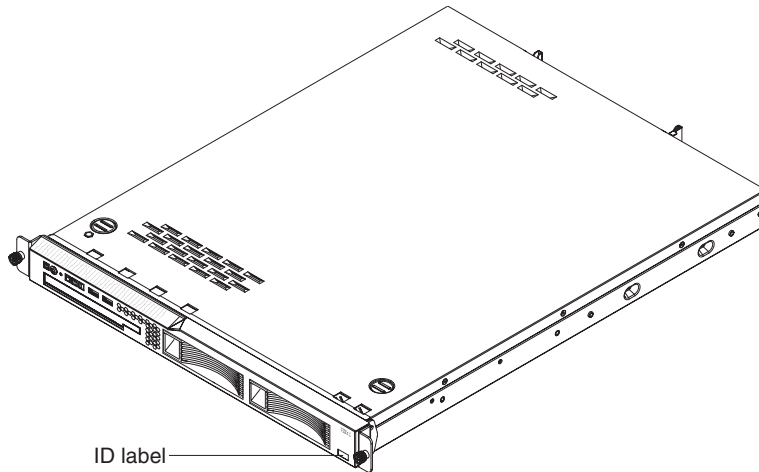
**Note:** This illustration shows a serial-attached SCSI (SAS) hot-swap hard disk drive model. A Serial-ATA (SATA) hot-swap or a SATA simple-swap hard disk drive model is also available. This illustration might differ slightly from your hardware.

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

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

## The IBM xSeries Documentation CD

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

## Hardware and software requirements

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

- Microsoft® Windows NT® 4.0 (with Service Pack 3 or later), 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. Acrobat Reader software is included on the CD, and you can install it when you run the Documentation Browser.

## Using the Documentation Browser

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

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

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

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

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

    ```
    sh runlinux.sh
    ```

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

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

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

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

## Notices and statements in this document

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

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

# Features and specifications

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

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

*Table 1. Features and specifications*

| Microprocessor:<br><br>One Intel® LGA 775 Pentium® IV w/ 1024 KB (minimum) Level-2 cache<br>**Note:** Use the Configuration/Setup Utility program to determine the type and speed of the microprocessor.<br><br>**Memory:**<br>• Minimum: 512 MB<br>• Maximum: 8 GB<br>• Type: PC4200, 533 MHz, ECC, DDR II unbuffered SDRAM DIMMs only<br>• Slots: Four dual inline<br>• Supports 512 MB, 1 GB, and 2 GB DIMMs<br><br>**Drives:**<br><br>CD/DVD: Ultrabay™ Enhanced<br><br>**Expansion bays:**<br><br>Two 3.5-inch slim-high bays for hard disk drives.<br>• Hot-swap models: Supports maximum of two serial-attached SCSI (SAS) drives or two serial ATA (SATA) drives<br>• Simple-swap models: Supports maximum of two SATA drives<br><br>**Expansion slots:**<br>• Two 66/100 MHz/64-bit PCI-X slots<br>• Upgradable to one PCI Express x8 slot and one 66/100 MHz/64-bit PCI-X slot<br><br>**Video controller:**<br>• ATI RN50B video on system board<br>• Compatible with SVGA and VGA<br>• 16 MB DDR video memory | Power supply:<br><br>350 watt (110 or 220 V ac auto-sensing)<br><br>**Size:**<br>• Height: 43 mm (1.75 inches, 1 U)<br>• Depth: 559 mm (22 inches)<br>• Width: 440 mm (17.32 inches)<br>• Maximum weight: 12.7 kg (28 lb) depending on your configuration<br><br>**Integrated functions:**<br>• Two Broadcom NetXtreme™ GB Ethernet controllers on the system board with Wake on LAN® support<br>• Serial port<br>• Four USB ports (two on front and two on rear of server)<br>• Keyboard port<br>• Mouse port<br><br>**Hard disk controllers:**<br>• Serial ATA (SATA) controller with integrated RAID (simple-swap SATA models)<br>• Serial-attached SCSI (SAS) controller with integrated RAID (hot-swap SAS/SATA models)<br><br>**Acoustical noise emissions:**<br>• Sound power, idling: 65 decibel maximum<br>• Sound power, operating: 65 decibel maximum<br><br>**Environment:**<br>• Air temperature:<br>  – Server on: 10° to 35°C (50.0° to 95.0°F); altitude: 0 to 914 m (2998.7 ft)<br>  – Server off: -40° to 60°C (-104° to 140°F); maximum altitude: 2133 m (6998.0 ft)<br>• Humidity:<br>  – Server on: 8% to 80%<br>  – Server off: 8% to 80% | Heat output:<br><br>Approximate heat output in British thermal units (Btu) per hour:<br>• Minimum configuration: 341 Btu (100 watts) per hour<br>• Maximum configuration: 1024 Btu (300 watts) per hour<br><br>**Electrical input:**<br>• Sine-wave input (47-63 Hz) required<br>• Input voltage low range:<br>  – Minimum: 100 V ac<br>  – Maximum: 127 V ac<br>• Input voltage high range:<br>  – Minimum: 200 V ac<br>  – Maximum: 240 V ac<br>• Input kilovolt-amperes (kVA), approximately:<br>  – Minimum: 0.102 kVA<br>  – Maximum: 0.55 kVA<br><br>**Notes:**<br><br>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.<br><br>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. |
|---|---|---|

**Note:** Some operating systems, such as SCO 6.0 and UnixWare 7.14, do not support RAID. See http://www.ibm.com/servers/eserver/serverproven/compat/us/.

# Major components of the server

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

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

The following illustration shows the major components in the server.

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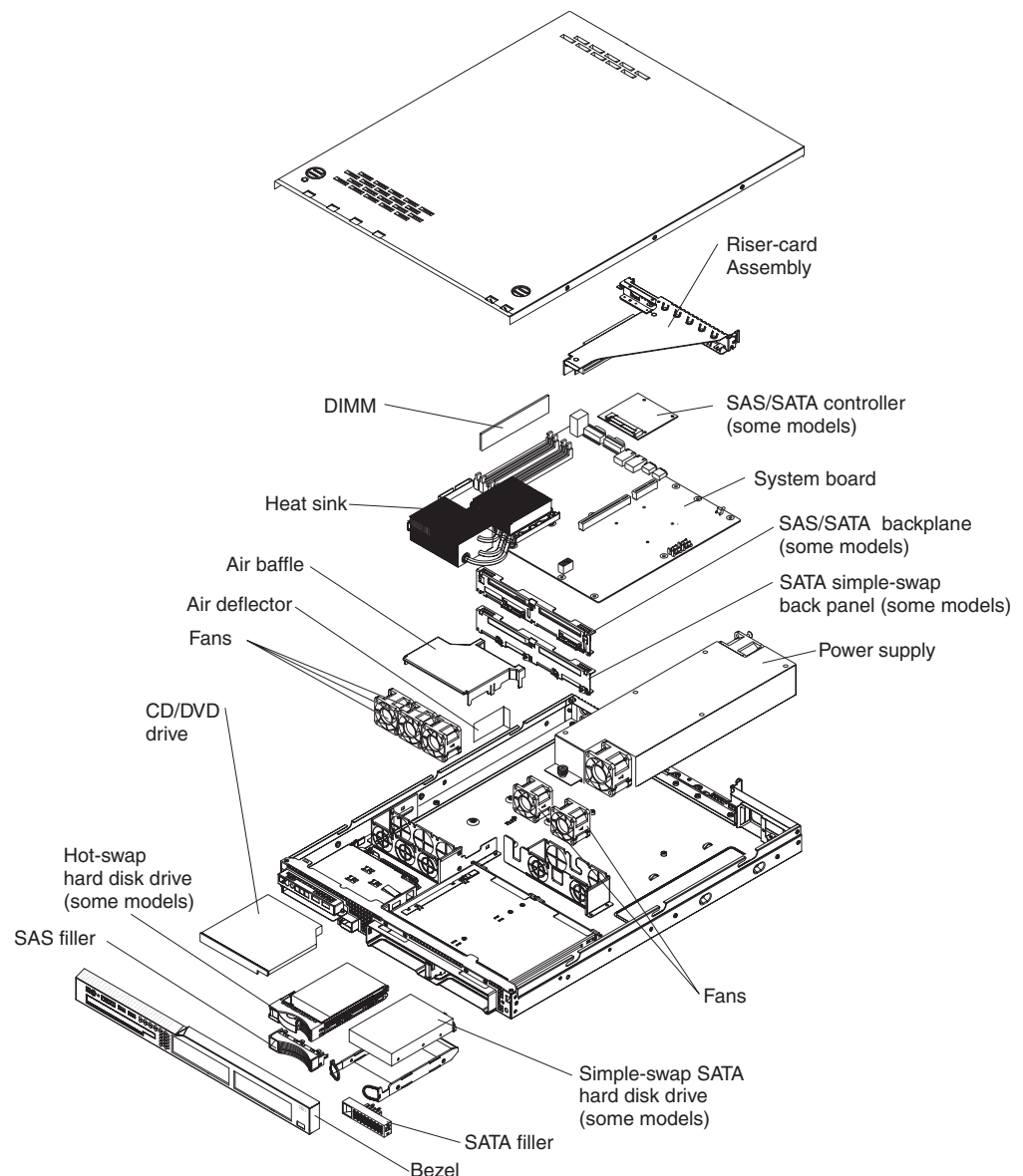


**Attention:** Do not remove the air deflector unless directed to do so in this publication or by IBM Service.

# Chapter 2. Installing options

This chapter provides basic instructions for installing hardware options in the server. These instructions are intended for users who are experienced with setting up IBM server hardware.

## Installation guidelines

Before you install options, read the following information:

- Read the safety information that begins on page v and the guidelines in "Handling static-sensitive devices" on page 8. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace external Universal Serial Bus (USB) devices.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported options for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

## System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.

- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.

## Handling static-sensitive devices

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

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

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

## Removing the cover

To remove the cover, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 7.
2. Turn off the server and all attached devices.
3. Disconnect all external cables and power cords.

Cover-release
button
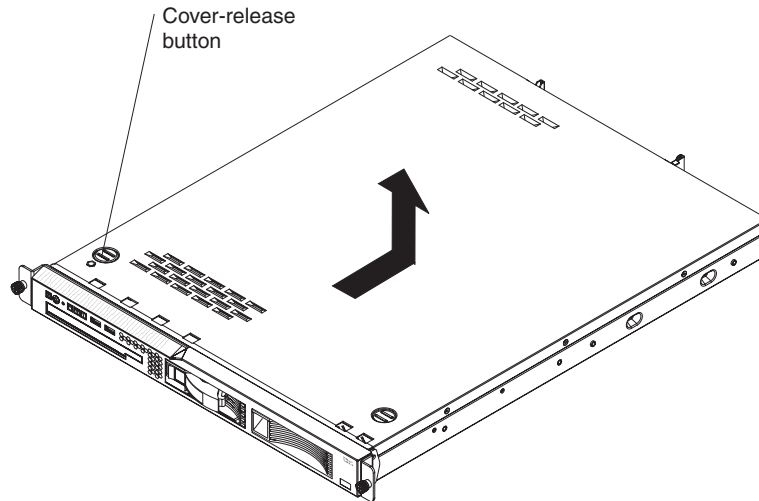


4. Press the cover-release button.
5. Slide the cover back approximately 1.27 cm (0.5 inches); then, lift it off the server.

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

## Installing a memory module

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

- The server supports 512 MB, 1 GB, and 2 GB DIMMs, for a maximum of 8 GB of system memory. See the ServerProven list at http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of memory modules you can use with the server.
- The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The BIOS displays the total amount of installed memory and the amount of configured memory.
- The server comes with one 512 MB DIMM installed in DIMM connector 1. If one DIMM is installed, when you install an additional DIMM, it must be installed in DIMM connector 3, and it must be the same size, speed, type, and technology as the DIMM that is installed in DIMM connector 1. You can mix compatible DIMMs from various manufacturers. The third and fourth DIMMs must be installed as a pair, in DIMM connectors 2 and 4.
- If you install a pair of DIMMs in DIMM connectors 2 and 4, they do not have to be the same size, speed, type, and technology as the DIMMs that are installed in DIMM connectors 1 and 3. However, the size, speed, type, and technology of the DIMMs that you install in DIMM connectors 2 and 4 must match each other.
- Install only 1.8 V, 240-pin, double-data-rate II (DDR II), PC4200, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC4200 SDRAM unbuffered DIMM specification.
- If you install a pair of 2 GB DIMMs and a pair of other-size DIMMs, the 2 GB DIMMs must be installed as the first pair (in DIMM connectors 1 and 3).

- When you restart the server after adding or removing a DIMM, a message is displayed indicating that the memory configuration has changed.
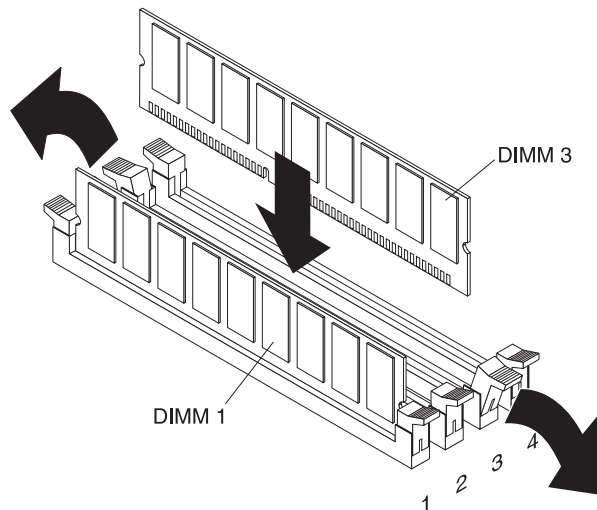


To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables. Remove the cover.

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

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

If you have other options to install, do so now. Otherwise, go to "Completing the installation" on page 15.

## Installing a hard disk drive

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

- Locate the documentation that comes with the hard disk drive and follow those instructions in addition to the instructions in this chapter.
- If you are installing a SAS hard disk drive, see the documentation that comes with the drive before installing it.
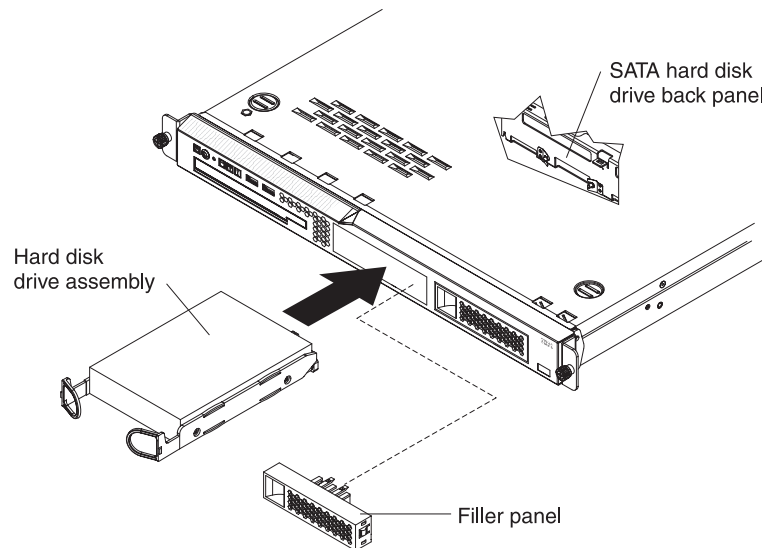
**Attention:** To avoid damage to the hard disk drive connectors, make sure that the cover is in place and fully closed whenever you install or remove a hard disk drive.

## Installing a simple-swap Serial ATA hard disk drive

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

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

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



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

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

**Notes:**

1. If the server has a RAID controller or adapter installed, you might need to reconfigure the disk arrays after installing hard disk drives. See the documentation that comes with the adapter for more information.
2. To remove a simple-swap SATA drive from the bay, make sure that the server is turned off and the power cord is removed: then, pull the loops of the drive tray toward each other and pull the tray out of the bay.

If you have other options to install, do so now. Otherwise, go to "Completing the installation" on page 15.

## Installing a hot-swap hard disk drive

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

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

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



Drive-tray assembly

Drive handle
(in open position)

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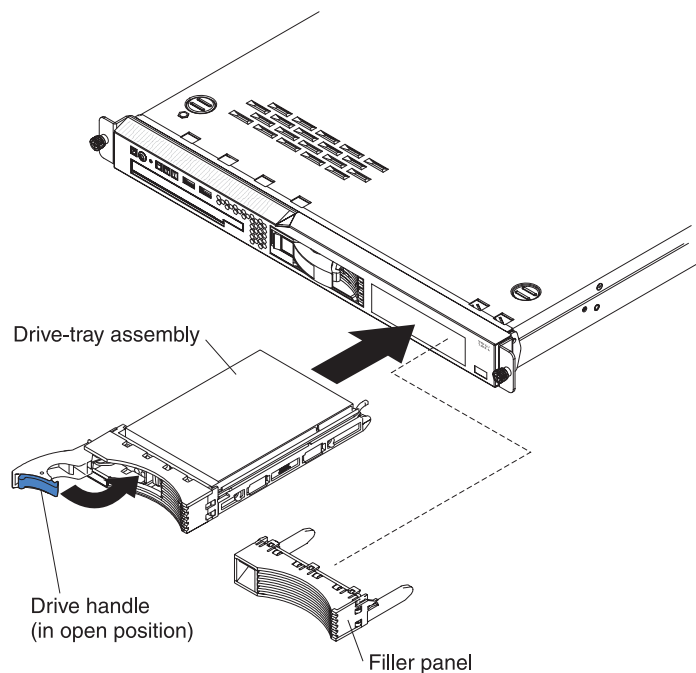
**Attention:** To avoid damage to the hard disk drive connectors, make sure that the cover is in place and fully closed whenever you install or remove a hard disk drive.

1. Read the safety information that begins on page v and "Installation guidelines" on page 7.
2. Make sure that the server cover is in place and fully closed.
3. Remove the filler panel from the bay.

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

4. Open the drive tray handle.
5. Gently push the drive assembly into the bay until the drive stops.
6. Close the drive tray handle.
7. Check the hard disk drive status LED to make sure that the hard disk drive is operating correctly. If the amber hard disk drive status LED for a drive is lit continuously, that drive is faulty and needs to be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.

If you have other options to install, do so now. Otherwise, go to "Completing the installation" on page 15.

# Installing an adapter

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

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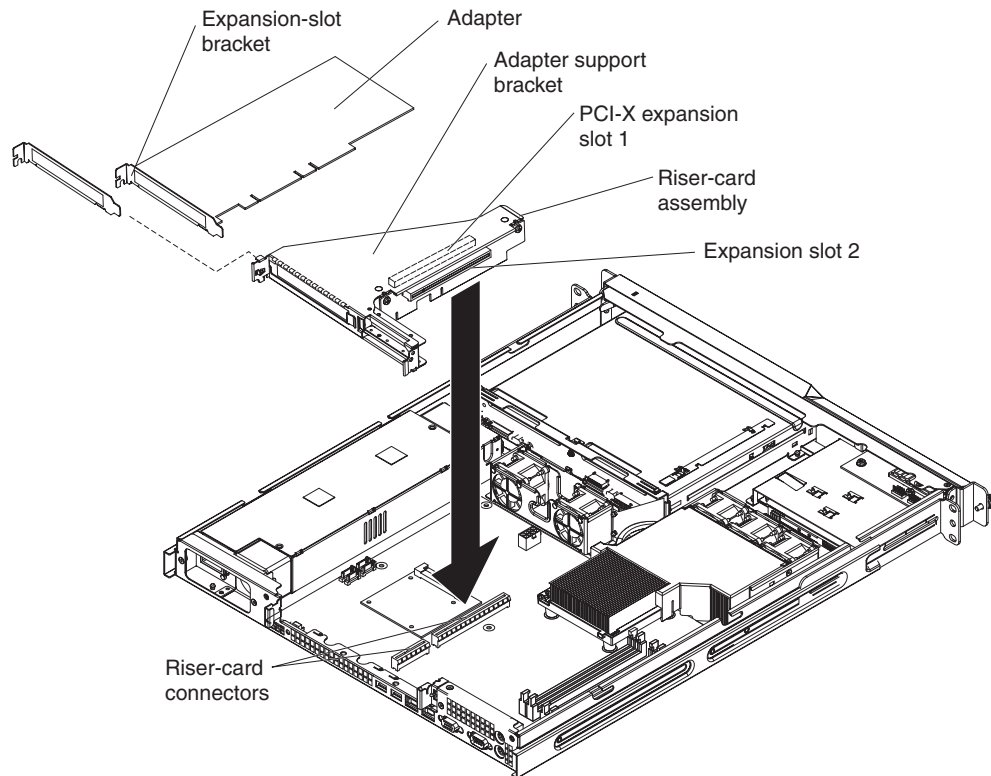
- The adapter slots are on the riser-card assembly. You must first remove the riser-card assembly to access the adapter slots.
- Depending on the riser-card assembly in the server, the server contains either two peripheral component interconnect-extended (PCI-X) adapter slots or one PCI-X slot and one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

  **Note:** If you use a legacy PCI adapter (32 bit/33 MHz) or a slower-speed PCI-X adapter in a hot-swap SAS/SATA system, the hard-disk drive performance will be degraded.
- The server uses a rotational interrupt technique to configure PCI-X adapters so that you can install PCI-X adapters that do not support sharing of PCI-X interrupts.
- The optional Remote Supervisor Adapter II can be installed only in PCI-X slot 1.
- You can install an optional RAID controller to enable you to configure the internal hard disk drives into disk arrays. See your RAID controller option documentation for complete instructions for installing a RAID controller and for additional information about RAID controllers.

  **Note:** Some operating systems, such as SCO 6.0 and UnixWare 7.14, do not support RAID. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ to determine whether a supported operating system supports RAID.
- The optional ServeRAID™ -7t SATA controller can be installed only in PCI-X slot 2. The low-profile bracket that comes with the controller is required for you to install the controller.
- The optional ServeRAID 8i controller can be installed only in PCI-X slot 2. The low-profile bracket that comes with the controller is required for you to install the controller. Remove the large expansion-slot bracket that comes preinstalled on the controller, and install the low-profile bracket.
- The server scans the PCI-X slots to assign system resources. If you have not changed the default startup sequence, the server starts the devices in the following order: the CD drive first; then, depending on the model, the PCI-X slots 1 and 2, or the PCI-X slot and the PCI Express slot, and then the integrated Ethernet controllers.

Expansion-slot bracket

Adapter

Adapter support bracket

PCI-X expansion slot 1

Riser-card assembly

Expansion slot 2

Riser-card connectors

To install an adapter, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 7.

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

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

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

    b. Remove the large bracket.

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

    d. Reinstall the two screws that you removed in step 3a.

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

Riser-card
assembly
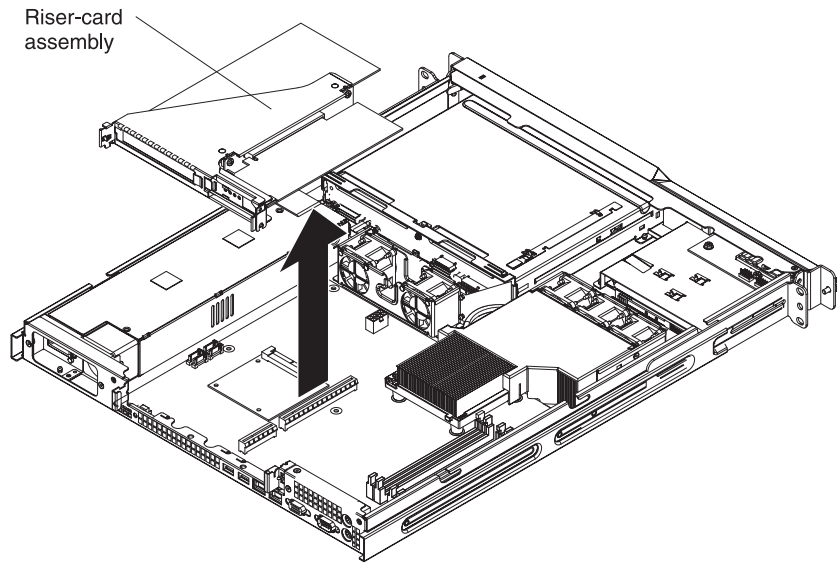
5.  Remove the expansion-slot cover on the slot you intend to use.

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

6.  Follow the instructions that come with the adapter to set any jumpers or switches.

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

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

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

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

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

## Completing the installation

To complete the installation, complete the following steps:

1.  Install the cover. See "Installing the cover" on page 16 for more information.

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

**Attention:**

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

3. Connect the cables and power cords. See "Connecting the cables" on page 16 for more information.
4. Update the server configuration. See "Updating the server configuration" on page 17 for more information.
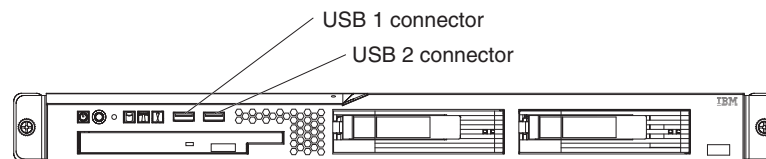
## Installing the cover

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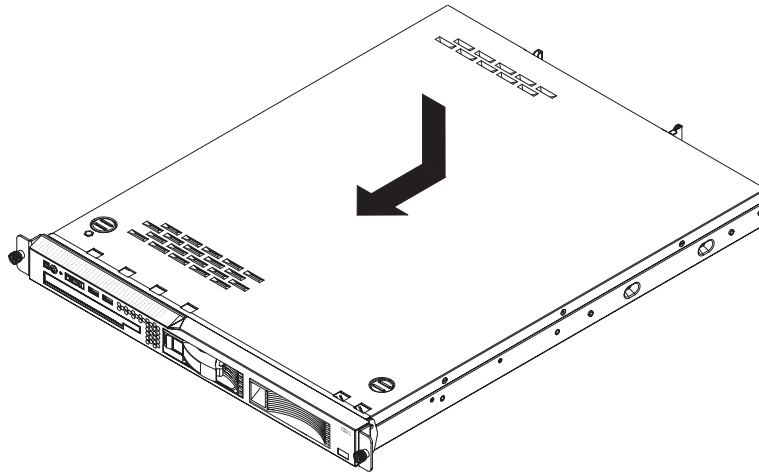


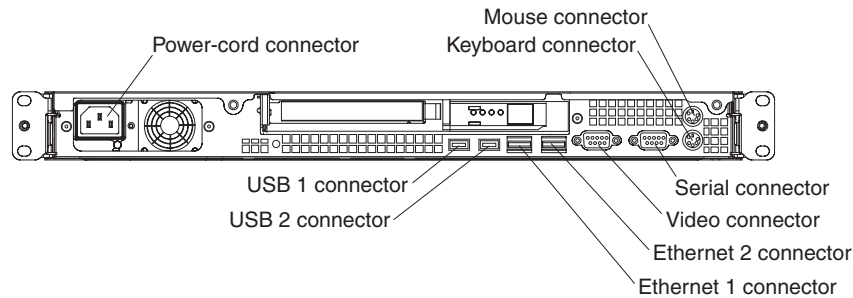## Connecting the cables

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

**Front**



USB 1 connector
USB 2 connector

**Rear**

Power-cord connector

Mouse connector
Keyboard connector

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

You must turn off the server before connecting or disconnecting cables from the server.

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

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

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

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

## Updating the server configuration

When you start the server for the first time after you add or remove an internal option or external SAS device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. For more information, see Chapter 4, "Configuring the server," on page 23.

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

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

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

For information about configuring the integrated Gigabit Ethernet controllers, see the *User's Guide.*

# Chapter 3. Server controls, LEDs, and power

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

## Front view

The following illustration shows the controls, light-emitting diodes (LEDs), and connectors on the front of the server.
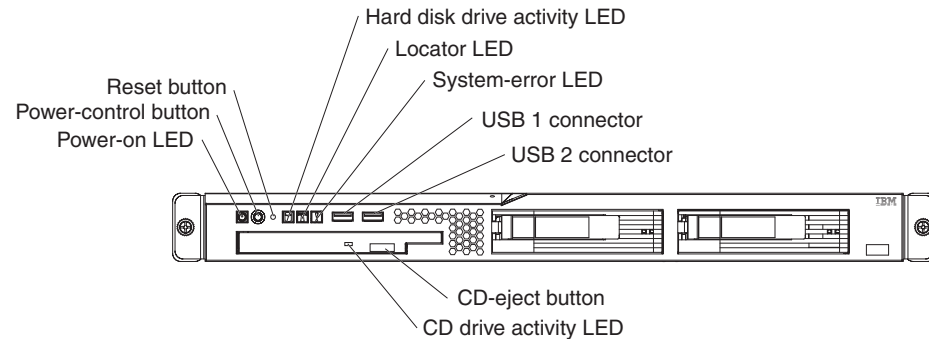


**Power-on LED:** When this LED is lit, it indicates that the server is turned on. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed.

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

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

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

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

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

**System-error LED:** When this LED is lit, it indicates that a system error has occurred.
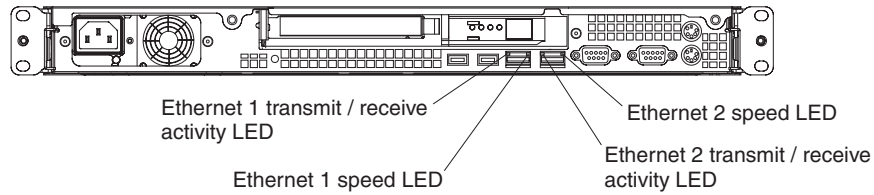
**USB connectors:** Connect a USB device to either of these connectors.

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

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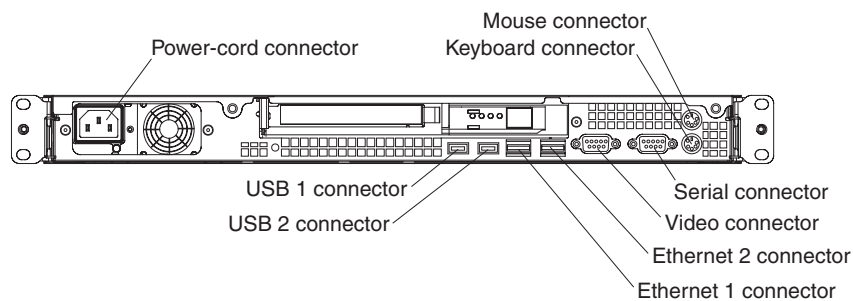
# Rear view

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

Ethernet 1 transmit / receive
activity LED

Ethernet 2 speed LED

Ethernet 1 speed LED

Ethernet 2 transmit / receive
activity LED

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

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

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

Mouse connector
Keyboard connector
Power-cord connector

USB 1 connector
USB 2 connector

Serial connector
Video connector
Ethernet 2 connector
Ethernet 1 connector

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

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

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

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

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

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

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

# Server power features

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

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

# Turning on the server

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

The server can also be turned on in any of the following ways:
- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If the server is connected to an Advanced System Management interconnect network that contains at least one server with an optional Remote Supervisor Adapter or Remote Supervisor Adapter II installed, the server can be turned on from the Remote Supervisor Adapter or Remote Supervisor Adapter II user interface.
- If your operating system supports the system-management software for an optional Remote Supervisor Adapter II, the system-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

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

# Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to requests from the service processor, such as a remote request to turn on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.
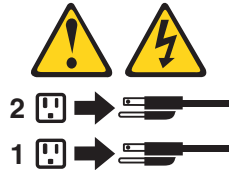
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

**Statement 5:**

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

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

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

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

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

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

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

- The integrated system management processor (mini-BMC) can turn off the server as an automatic response to a critical system failure.

- You can turn off the server through a request from the service processor.

# Chapter 4. Configuring the server

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

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

- Configuration/Setup Utility program
- Adaptec® HostRAID™ configuration programs
- SAS/SATA Configuration Utility program

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

For more information about these programs, see "Configuring the server" in the *User's Guide* on the IBM *xSeries Documentation* CD.

## Using the ServerGuide Setup and Installation CD

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

To start the *ServerGuide Setup and Installation* CD, complete the following steps:

1. Insert the CD, and restart the server. If the CD does not start, see "ServerGuide problems" on page 31.
2. Follow the instructions on the screen to:
   a. Select your language.
   b. Select your keyboard layout and country.
   c. View the overview to learn about ServerGuide features.
   d. View the readme file to review installation tips about your operating system and adapter.
   e. Start the setup and hardware configuration programs.
   f. Start the operating-system installation. You will need your operating-system CD.

## Using the Configuration/Setup Utility program

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

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time

- Set and change passwords
- Set and change the startup characteristics of the server and the order of startup devices (startup-drive sequence)
- Set and change settings for advanced hardware features
- View and clear the error log
- Change interrupt request (IRQ) settings
- Enable USB keyboard and mouse support
- Resolve configuration conflicts

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

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

## Using the Adaptec HostRAID configuration programs

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

Use the Adaptec RAID Configuration Utility programs and SAS/SATA Configuration Utility to add RAID level-0 and level-1 functionality to the integrated Serial ATA (SATA) controller (simple-swap models) or the SAS/SATA controller (hot-swap models). RAID level-0 (striping) causes the drives to be seen as a single volume, and improves performance. RAID level-1 (mirroring) causes the contents of one drive to be copied to the other drive to increase hard drive availability. Be sure to use these programs as described in this document. Use these programs to perform the following tasks:

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

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

- The SAS/SATA controller with integrated RAID (hot-swap models) or the integrated SATA controller (simple-swap models) with integrated RAID support RAID level-0 and level-1. An optional ServeRAID controller (adapter) provides additional RAID levels.
- Hard disk drive capacities affect how you create arrays. Drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- To help ensure signal quality, do not mix drives with different speeds and data rates.
- To update the firmware and BIOS code for an optional ServeRAID controller, you must use the IBM *ServeRAID Support* CD that comes with the ServeRAID option.
- If you install a different type of RAID controller (adapter) in the server, use the method that is described in the instructions that come with the adapter to view or change SAS settings for attached devices.

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

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

**Note:** To add RAID functionality to a hot-swap SATA model, see "Using the SAS/SATA Configuration Utility program (for SAS/SATA HostRAID)" on page 26.

For additional information about using the Adaptec RAID Configuration Utility programs, see the documentation on the IBM *ServeRAID-7e (Adaptec HostRAID) Support* CD. If this CD did not come with the server, you can download it from http://www.ibm.com/support/.

The integrated SATA RAID feature (SATA HostRAID) comes disabled by default. You must enable it and install the device drivers before you can use it. The SATA RAID feature configuration utilities, device drivers, and information are available on the *ServeRAID-7e (Adaptec HostRAID) Support* CD.

## Enabling the Serial ATA HostRAID feature

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

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

## Using the Serial ATA HostRAID feature

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

For additional information about using the Array Configuration Utility program to create, configure, and manage arrays, see the documentation on the *ServeRAID-7e (Adaptec HostRAID) Support* CD.

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

1. Turn on the server.
2. When the prompt `Press <CTRL><A> for Adaptec RAID Configuration Utility` appears, press Ctrl+A.
3. Select **Array Configuration Utility (ACU)**.
4. Select **Create Array**.
5. From the list of ready drives, select the two drives that you want to group into the array.
6. When you are prompted to select the RAID level, select **RAID-1**.
7. (Optional) Type an identifier for the array.
8. When you are prompted for the array build method, select **Quick Int**.

9. Follow the instructions on the screen to complete the configuration, and select **Done** to exit.

10. Restart the server.

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

1. Start the Array Configuration Utility.

2. From the Array Configuration Utility window, select **Manage Arrays**.

3. Select an array and press Enter.

4. Press Esc to exit from the program.

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

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

**Note:** To add RAID functionality to the integrated SATA controller (simple-swap models), see "Using the Adaptec RAID Configuration Utility programs (for Serial ATA HostRAID)" on page 25.

The integrated SAS/SATA RAID feature comes disabled by default. You must enable it and install the device drivers before you can use it. The SAS RAID configuration utilities, device drivers, and information are available on the *ServeRAID-7e (Adaptec HostRAID) Support* CD. If this CD did not come with the server, you can download it from http://www.ibm.com/support/.

## Enabling the SAS HostRAID feature

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

1. Turn on the server.

2. When the message `Press <CTRL><A> for SAS/SATA Configuration Utility` appears, press Ctrl+A.

3. Select **SerialSelect Utility**; then, select **Controller Configuration**.

4. Select **RAID Support**.

5. Select **Enabled**.

6. Press Esc; then, select **Yes** to save the changes.

## Using the SAS/SATA HostRAID feature

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

For additional information about how to use the SAS/SATA HostRAID feature, see the documentation on the *ServeRAID-7e (Adaptec HostRAID) Support* CD.

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

1. Turn on the server.

2. When the message `Press <CTRL><A> for SAS/SATA Configuration Utility` appears, press Ctrl+A.

3. Select **Array Configuration Utility (ACU)**.

4. Select **Create Array**.

5. From the list of ready drives, select the two drives that you want to group into the array.

6. When you are prompted to select the RAID level, select **RAID-1**.

7. (Optional) Type an identifier for the array.

8. When you are prompted for the array build method, select **Quick Int**.

9. Follow the instructions on the screen to complete the configuration; then, select **Done** to exit.

10. Restart the server.

***Viewing the configuration:*** To view information about the SAS/SATA controller, complete the following steps:

1. Start the SAS/SATA Configuration Utility program.

2. From the SAS/SATA Configuration Utility window, select **Manage Arrays**.

3. Select an array and press Enter.

4. To exit from the program, press Esc.

# Chapter 5. Solving problems

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

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, "Getting help and technical assistance," on page 45, the *Problem Determination and Service Guide* on the IBM *xSeries Documentation* CD, and the "Server Support" flowchart in the front of this document.

## Diagnostic tools overview

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

- **POST beep codes**

  The power-on self-test beep codes indicate the detection of a problem. Error messages also appear during startup if POST detects a hardware-configuration problem. See "POST beep codes" and the *Problem Determination and Service Guide* on the IBM *xSeries Documentation* CD for more information.

- **Troubleshooting charts**

  These charts list problem symptoms and steps to correct the problems. See "Troubleshooting tables" on page 32 for more information.

- **Diagnostic programs and error messages**

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

## POST beep codes

POST emits no beep to signal successful completion. If POST detects a problem during startup, beep codes might occur. Use the following beep code descriptions to help diagnose and solve problems that are detected during startup.

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

**One long beep and two short beeps**
> A video error has occurred, and the BIOS cannot initialize the monitor screen to display additional information.

**Other beep codes**
> See the *Problem Determination and Service Guide* on the IBM *xSeries Documentation* CD for information about other beep codes.

# POST error codes

The following table provides an abbreviated list of the error codes that might appear during POST. See the *Problem Determination and Service Guide* on the IBM *xSeries Documentation* CD for more information about the POST error codes.

*Table 2. Abbreviated list of POST error codes*

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

| Error code | Description | Action |
|---|---|---|
| 161 | The real-time clock battery has failed. | 1. Reseat the battery.<br>2. Replace the battery or call for service. |
| 162 | Invalid configuration information or CMOS random-access memory (RAM) checksum failure. | 1. Run the Configuration/Setup Utility program, select **Load Default Settings**, and save the settings.<br>2. Reseat the battery.<br>3. Replace the battery.<br>4. (Trained service technician only) Replace the system board. |
| 163 | The time of day has not been set. | Set the date and time. |
| 289 | A failing DIMM was disabled. | Make sure that DIMMs are supported by the server and that they are installed correctly. |
| 301, 303 | Keyboard and keyboard controller | Make sure that the keyboard cable is connected and that nothing is resting on the keyboard keys. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. |
| 00019*xxx* | Microprocessor *x* is not functioning or failed the built-in self-test. | Make sure that microprocessor *x* is installed correctly. If the problem remains, call for service. |
| 00180*xxx* | A PCI adapter requested a resource that is not available. | Run the Configuration/Setup Utility program and make sure that the resources that are needed by the PCI adapter are available. |
| I9990305 | POST could not find an operating system. | Install an operating system. |

# ServerGuide problems

The following table lists problem symptoms and suggested solutions.

*Table 3. ServerGuide Setup and Installation CD*

| Symptom | Suggested action |
|---------|------------------|
| The *ServerGuide Setup and Installation* CD will not start. | 1. Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive.<br>2. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence.<br>3. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive. |
| The ServeRAID program cannot view all installed drives, or the operating system cannot be installed. | 1. Make sure that there are no duplicate or IRQ assignments.<br>2. Make sure that the hard disk drive is connected correctly.<br>3. Make sure that the hard disk drive cables are securely connected. |
| The operating-system installation program continuously loops. | Make more space available on the hard disk. |
| The ServerGuide program will not start the operating-system CD. | Make sure that the operating-system CD is supported by the ServerGuide program. See the *ServerGuide Setup and Installation* CD label for a list of supported operating-system versions |
| The operating system cannot be installed; the option is not available. | Make sure that the server supports the operating system. If it does, no logical drive is defined (RAID servers). Run the ServerGuide program and make sure that setup is complete. |

# Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms. See the *Problem Determination and Service Guide* on the IBM *xSeries Documentation* CD for more detailed troubleshooting information. If you cannot find the problem in these tables, run the diagnostic programs (see "Running the diagnostic programs" in the *Problem Determination and Service Guide*).

If you have just added new software or a new optional device and the server is not working, complete the following steps before using the troubleshooting tables:

1. Check the system-error LED on the operator information panel (see Chapter 3, "Server controls, LEDs, and power," on page 19).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

# CD or DVD drive problems

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

| Symptom | Action |
|---|---|
| The CD or DVD drive is not recognized. | 1. Make sure that:<br>  • The IDE channel to which the CD or DVD drive is attached (primary) is enabled in the Configuration/Setup Utility program.<br>  • All cables and jumpers are installed correctly.<br>  • The correct device driver is installed for the CD or DVD drive.<br>2. Run the CD, CDRW, or DVD drive diagnostic programs.<br>3. Reseat the following components:<br>  a. CD or DVD drive<br>  b. CD or DVD interface board cable<br>4. Replace the following components one at a time, in the order shown, restarting the server each time:<br>  a. CD or DVD drive<br>  b. CD or DVD drive interface board cable<br>  c. (Trained service technician only) CD or DVD interface board<br>  d. (Trained service technician only) System board |
| A CD or DVD is not working correctly. | 1. Clean the CD or DVD.<br>2. Run the CD or DVD drive diagnostic programs.<br>3. Reseat the CD or DVD drive.<br>4. Replace the CD or DVD drive. |
| The CD or DVD drive tray is not working. | 1. Make sure that the server is turned on.<br>2. Insert the end of a straightened paper clip into the manual tray-release opening.<br>3. Reseat the CD or DVD drive.<br>4. Replace the CD or DVD drive. |

## General problems

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

| Symptom | Action |
|---|---|
| A cover lock is broken, an LED is not working, or a similar problem has occurred. | If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician. |

## Hard disk drive problems

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

| Symptom | Action |
|---|---|
| Not all drives are recognized by the hard disk drive diagnostic test (the Fixed Disk test). | Remove the drive indicated on the diagnostic tests; then, run the hard disk drive diagnostic test again. If the remaining drives are recognized, replace the drive that you removed with a new one. |
| The server stops responding during the hard disk drive diagnostic test. | Remove the hard disk drive that was being tested when the server stopped responding, and run the diagnostic test again. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one. |
| A hard disk drive was not detected while the operating system was being started. | Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again. |
| A hard disk drive passes the diagnostic Fixed Disk Test but the problem remains. | Run the diagnostic SCSI Fixed Disk Test.<br>**Note:** This test is not available on servers that have RAID arrays or servers that have SATA hard disk drives. Use the Fixed Disk Test for SATA hard disk drives or servers that have RAID arrays. |

# Intermittent problems

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

| Symptom | Action |
|---------|--------|
| A problem occurs only occasionally and is difficult to diagnose. | Make sure that:<br>• All cables and cords are connected securely to the rear of the server and attached devices.<br>• When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down.<br><br>If the problem remains, call for service. |

# Keyboard, mouse, or pointing-device problems

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

| Symptom | Action |
|---------|--------|
| All or some keys on the keyboard do not work. | 1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the keyboard cable directly to the correct connector on the rear of the server.<br>2. Make sure that:<br>• The keyboard cable is securely connected to the server and the keyboard and mouse cables are not reversed.<br>• The server and the monitor are turned on.<br>3. Reseat the keyboard cable.<br>4. Replace the following components one at a time, in the order shown, restarting the server each time:<br>  a. Keyboard<br>  b. (Trained service technician only) System board |

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

| Symptom | Action |
|---|---|
| The mouse or pointing device does not work. | 1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the keyboard cable directly to the correct connector on the rear of the server.<br><br>2. Make sure that:<br>　• The mouse or pointing-device cable is securely connected and the keyboard and mouse cables are not reversed.<br>　• The mouse device drivers are installed correctly.<br>　• The mouse is enabled in the Configuration/Setup Utility program.<br><br>3. Reseat the mouse or pointing device cable.<br><br>4. Replace the following components one at a time, in the order shown, restarting the server each time:<br>　a. Mouse or pointing device<br>　b. (Trained service technician only) System board |

## USB keyboard, mouse, or pointing-device problems

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

| Symptom | Action |
|---|---|
| All or some keys on the keyboard do not work. | 1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup.<br><br>2. Make sure that:<br>　• The keyboard cable is securely connected and the keyboard and mouse cables are not reversed.<br>　• The server and the monitor are turned on.<br><br>3. Reseat the keyboard cable.<br><br>4. Replace the following components one at a time, in the order shown, restarting the server each time:<br>　a. Keyboard<br>　b. (Trained service technician only) System board |

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

| Symptom | Action |
|---|---|
| The USB mouse or USB pointing device does not work. | 1. Make sure that:<br><br>   • The mouse or pointing-device USB cable is securely connected to the server, the keyboard and mouse or pointing-device cables are not reversed, and the device drivers are installed correctly.<br><br>   • The server and the monitor are turned on.<br><br>   • Keyboardless operation has been enabled in the Configuration/Setup Utility program.<br><br>2. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server.<br><br>3. Reseat the mouse or pointing device cable.<br><br>4. Replace the following components one at a time, in the order shown, restarting the server each time:<br><br>   a. Mouse or pointing device<br><br>   b. (Trained service technician only) System board |

# Memory problems

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

| Symptom | Action |
|---|---|
| The amount of system memory that is displayed is less than the amount of installed physical memory. | 1. Make sure that:<br>  • No error LEDs are lit on the operator information panel.<br>  • The memory modules are seated correctly.<br>  • You have installed the correct type of memory (see "Installing a memory module" on page 9).<br>  • If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program.<br>  • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.<br>2. Check the POST error log for error message 289:<br>  • If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM.<br>  • If a DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM.<br>3. Run memory diagnostics (see "Running the diagnostic programs" in the *Problem Determination and Service Guide*).<br>4. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair are matching.<br>5. Reseat the DIMMs.<br>6. Replace the following components one at a time, in the order shown, restarting the server each time:<br>  a. DIMMs<br>  b. (Trained service technician only) System board |

# Microprocessor problems

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

| Symptom | Action |
|---|---|
| The server emits a continuous beep during POST, indicating that the microprocessor is not working correctly. | 1. Correct any errors that are indicated by the LEDs (see "Error LEDs" in the *Problem Determination and Service Guide*).<br>2. Make sure that the server supports the microprocessor.<br>3. (Trained service technician only) Make sure that the microprocessor is seated correctly.<br>4. (Trained service technician only) Replace the microprocessor. |

# Monitor problems

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

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

| Symptom | Action |
|---|---|
| Testing the monitor | 1. Make sure that the monitor cables are firmly connected. <br> 2. Try using a different monitor on the server, or try testing the monitor on a different server. <br> 3. Run the diagnostic programs (see the *Problem Determination and Service Guide*). If the monitor passes the diagnostic programs, the problem might be a video device driver. <br> 4. Reseat the Remote Supervisor Adapter II (if one is present). <br> 5. Replace the following components one at a time, in the order shown, restarting the server each time: <br>    a. Remote Supervisor Adapter II (if one is present) <br>    b. (Trained service technician only) System board |
| The screen is blank. | 1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the keyboard cable directly to the correct connector on the rear of the server. <br> 2. Make sure that: <br>   • The server is turned on. If there is no power to the server, see "Power problems" on page 41. <br>   • The monitor cables are connected correctly. <br>   • The monitor is turned on and the brightness and contrast controls are adjusted correctly. <br>   • No beep codes sound when the server is turned on. <br><br> **Important:** In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank monitor screen. If this occurs and the **Boot Fail Count** option in the **Start Options** of the Configuration/Setup Utility program is enabled, you must restart the server three times to reset the configuration settings to the default configuration (the memory connector or bank of connectors enabled). <br> 3. Make sure that the correct server is controlling the monitor, if applicable. <br><br> If the problem remains, call for service. |
| The monitor works when you turn on the server, but the screen goes blank when you start some application programs. | Make sure that: <br> • The application program is not setting a display mode that is higher than the capability of the monitor. <br> • You installed the necessary device drivers for the application. <br><br> If the problem remains, call for service. |

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

| Symptom | Action |
|---|---|
| The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted. | 1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.<br><br>**Attention:** Moving a color monitor while it is turned on might cause screen discoloration.<br><br>Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.<br><br>**Notes:**<br>a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.).<br>b. Non-IBM monitor cables might cause unpredictable problems.<br><br>2. Reseat the following components:<br>a. Monitor cable<br>b. Remote Supervisor Adapter II (if one is present)<br><br>3. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Monitor cable<br>b. Monitor<br>c. Remote Supervisor Adapter II (if one is present)<br>d. (Trained service technician only) System board |
| Wrong characters appear on the screen. | 1. If the wrong language is displayed, update the BIOS code with the correct language.<br>2. Reseat the monitor cable.<br>3. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Monitor<br>b. (Trained service technician only) System board |

# Optional-device problems

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

| Symptom | Action |
|---|---|
| An IBM optional device that was just installed does not work. | 1. Make sure that:<br>  • The device is designed for the server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/).<br>  • You followed the installation instructions that came with the device and the device is installed correctly.<br>  • You have not loosened any other installed devices or cables.<br>  • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or any other device is changed, you must update the configuration.<br>2. Reseat the device that you just installed.<br>3. Replace the device that you just installed. |
| An IBM optional device that used to work does not work now. | 1. Make sure that all of the hardware and cable connections for the device are secure.<br>2. If the device comes with test instructions, use those instructions to test the device.<br>3. Reseat the failing device.<br>4. Replace the failing device. |

# Power problems

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

| Symptom | Action |
|---|---|
| The power-control button does not work, and the reset button does work (the server does not start).<br>**Note:** The power-control button will not function until 20 seconds after the server has been connected to ac power. | 1. Make sure that the power-control button is working correctly:<br>  a. Disconnect the server power cords.<br>  b. Reconnect the power cords.<br>  c. (Trained service technician only) Reseat the operator information panel cables, and then repeat steps 1a and 1b. If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.<br>2. Make sure that:<br>  • The power cords are correctly connected to the server and to a working electrical outlet.<br>  • The type of memory that is installed is correct.<br>3. (Trained service technician only) Reseat the power connector on the system board.<br>4. If you just installed an optional device, remove it, and restart the server. If the server now turns on, you might have installed more devices than the power supply supports.<br>5. Replace the following components one at a time, in the order shown, restarting the server each time:<br>  a. (Trained service technician only) Power supply<br>  b. (Trained service technician only) System board<br>6. See "Solving undetermined problems" in the *Problem Determination and Service Guide*. |
| The server does not turn off. | 1. Determine whether you are using an Advanced Configuration and Power Management (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps:<br>  a. Press Ctrl+Alt+Delete.<br>  b. Turn off the server by pressing the power-control button for 5 seconds.<br>  c. Restart the server.<br>  d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server.<br>2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board. |
| The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit. | Call for service. |

# Serial port problems

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

| Symptom | Action |
|---|---|
| The number of serial ports that are identified by the operating system is less than the number of installed serial ports. | 1. Make sure that:<br>  • Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports is disabled.<br>  • The serial-port adapter (if one is present) is seated correctly.<br>2. Reseat the serial port adapter.<br>3. Replace the serial port adapter. |
| A serial device does not work. | 1. Make sure that:<br>  • The device is compatible with the server.<br>  • The serial port is enabled and is assigned a unique address.<br>  • The device is connected to the correct connector (see "Rear view" on page 20).<br>2. Reseat the following components:<br>  a. Failing serial device<br>  b. Serial cable<br>  c. Remote Supervisor Adapter II (if one is present)<br>3. Replace the following components one at a time, in the order shown, restarting the server each time:<br>  a. Failing serial device<br>  b. Serial cable<br>  c. Remote Supervisor Adapter II (if one is present)<br>  d. (Trained service technician only) System board |

# Software problems

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

| Symptom | Action |
|---|---|
| You suspect a software problem. | 1. To determine whether the problem is caused by the software, make sure that:<br>  • The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, the server might have a memory-address conflict.<br>  • The software is designed to operate on the server.<br>  • Other software works on the server.<br>  • The software works on another server.<br><br>2. If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.<br><br>3. Contact your place of purchase of the software. |

# Universal Serial Bus (USB) port problems

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

| Symptom | Action |
|---|---|
| A USB device does not work. | 1. Run USB diagnostics.<br><br>2. Make sure that:<br>  • The correct USB device driver is installed.<br>  • The operating system supports USB devices.<br>  • A standard PS/2 keyboard or mouse is not connected to the server. If it is, a USB keyboard or mouse will not work during POST.<br><br>3. Make sure that the USB configuration options are set correctly in the Configuration/Setup Utility program menu (see the _User's Guide_ for more information).<br><br>4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server. |

# Video problems

See "Monitor problems" on page 38.

# 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 appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your @server® or IntelliStation® system or optional device, and whom to call for service, if it is necessary.

## Before you call

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

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

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

- Go to the IBM support Web site at http://www.ibm.com/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 @server and IntelliStation systems also describes the diagnostic tests that you can perform. Most @server and IntelliStation 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.

## Using the documentation

Information about your IBM @server or IntelliStation 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/support/ and follow the instructions. Also, some documents are available through the IBM Publications Ordering System at http://www.elink.ibmlink.ibm.com/public/applications/publications/ cgibin/pbi.cgi.

# 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 @server and IntelliStation systems, optional devices, services, and support. The address for IBM xSeries and BladeCenter™ information is http://www.ibm.com/eserver/xseries/. The address for IBM IntelliStation information is http://www.ibm.com/intellistation/.

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

# Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with 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).

# Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See http://www.ibm.com/planetwide/ for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

# Appendix B. Notices

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# Important notes

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

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

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

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

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

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# Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at http://www.ibm.com/ibm/environment/products/prp.shtml.
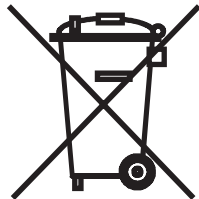


**Notice:** This mark applies only to countries within the European Union (EU) and Norway.

This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as

applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

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

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

## Battery return program

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

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

In the Netherlands, the following applies.



For Taiwan: Please recycle batteries.



廢電池請回收

# Electronic emission notices

## Federal Communications Commission (FCC) statement

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

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

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

## Industry Canada Class A emission compliance statement

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

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

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

## Australia and New Zealand Class A statement

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

## United Kingdom telecommunications safety requirement

**Notice to Customers**

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

## European Union EMC Directive conformance statement

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

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN

55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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

## Taiwanese Class A warning statement

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

## Chinese Class A warning statement

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。

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

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
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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。

## Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

| IBM power cord part number | Used in these countries and regions |
| --- | --- |
| 02K0546 | China |
| 13F9940 | Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea |
| 13F9979 | Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire |
| 13F9997 | Denmark |
| 14F0015 | Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda |
| 14F0033 | Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe |
| 14F0051 | Liechtenstein, Switzerland |
| 14F0069 | Chile, Italy, Libyan Arab Jamahiriya |

| IBM power cord part number | Used in these countries and regions |
|---|---|
| 14F0087 | Israel |
| 1838574 | Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela |
| 24P6858 | Korea (Democratic People's Republic of), Korea (Republic of) |
| 34G0232 | Japan |
| 36L8880 | Argentina, Paraguay, Uruguay |
| 49P2078 | India |
| 49P2110 | Brazil |
| 6952300 | Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela |

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Printed in USA