

xSeries 206m
Types 8485 and 8490

Installation Guide

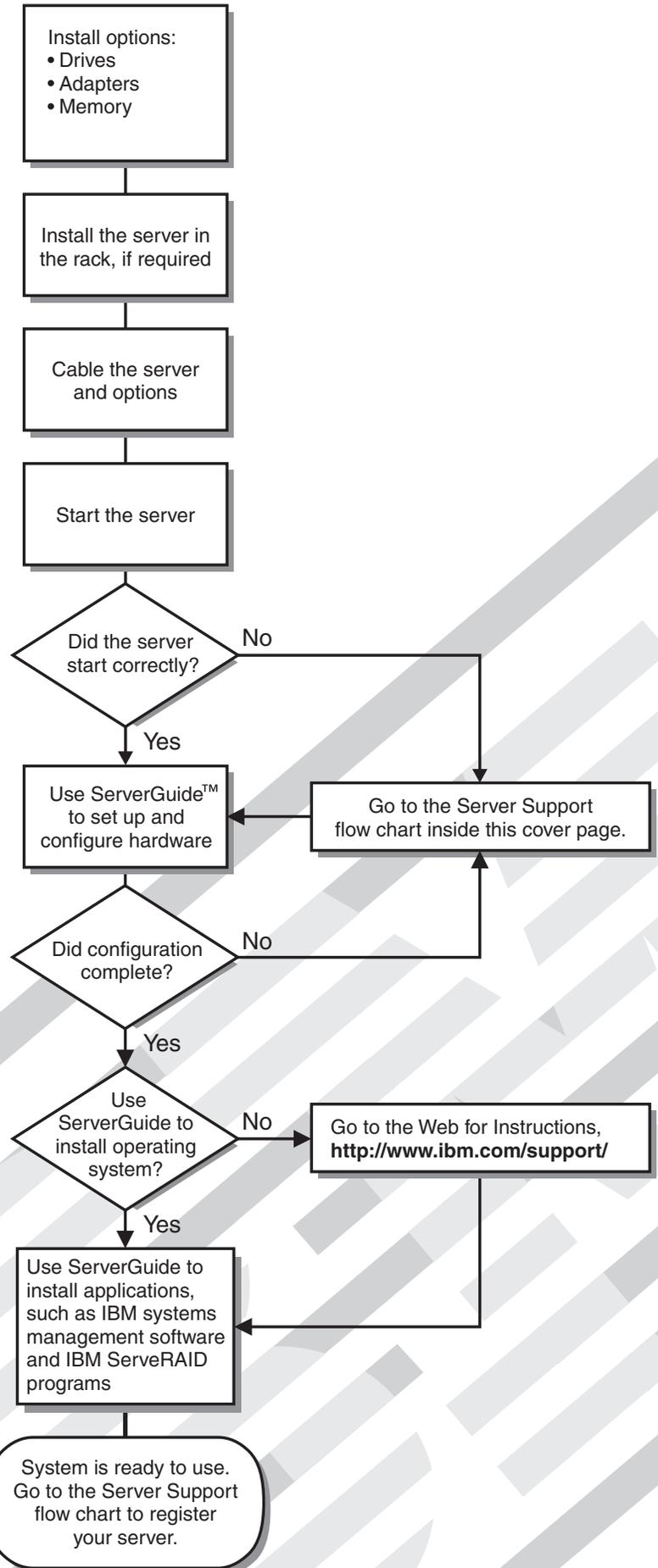
Welcome...

Thank you for buying an IBM xSeries server.

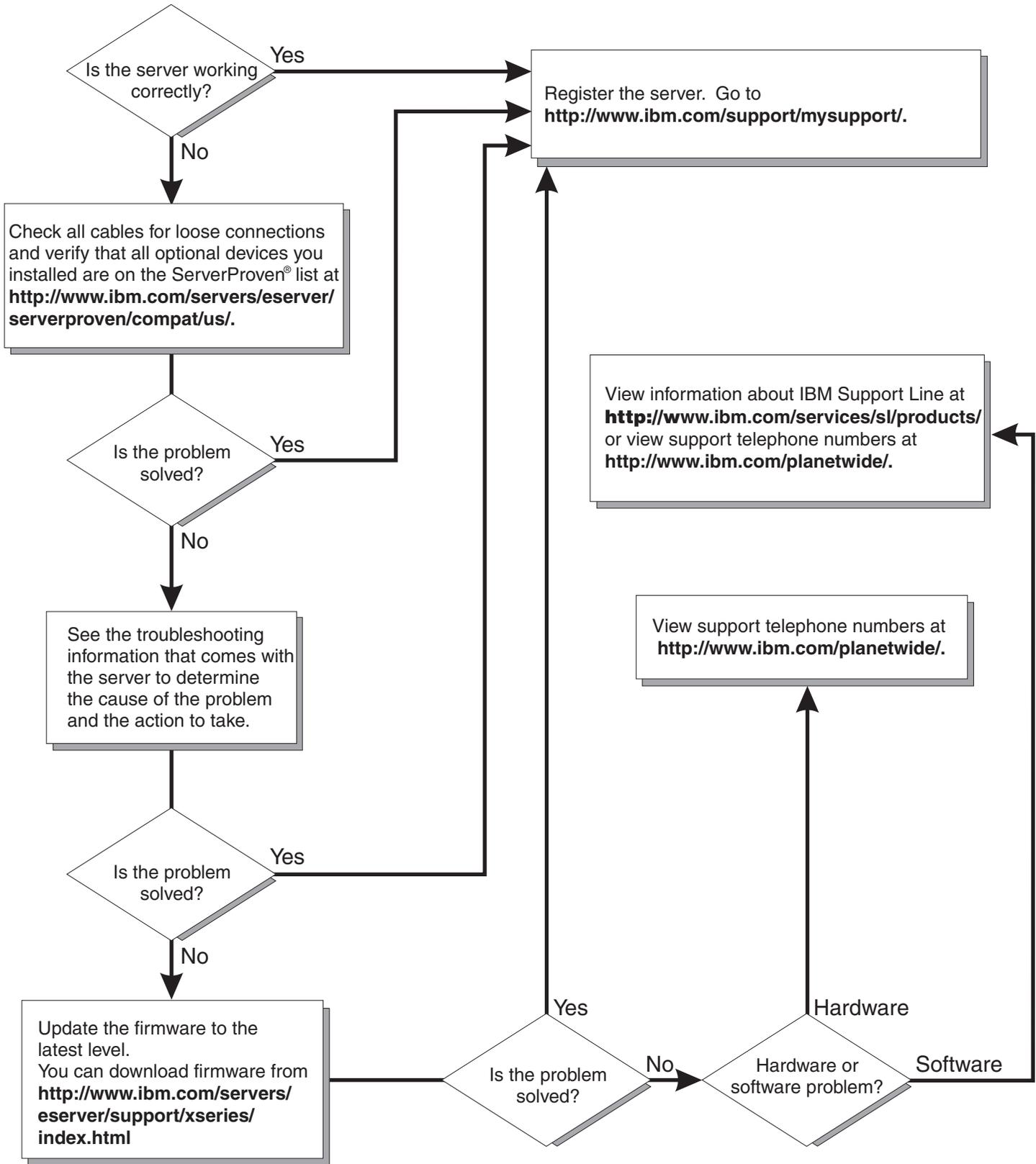
This server *Installation Guide* contains information for setting up and configuring your server.

For detailed information about your server, view the *User's Guide* 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/>



Server Support





xSeries 206m Types 8485 and 8490
Installation Guide

Note:

Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 79, and the *Warranty and Support Information* document on the IBM *xSeries Documentation CD*.

Third Edition (October 2006)

© Copyright International Business Machines Corporation 2006. All rights reserved.

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Safety	v
Chapter 1. Introduction	1
The IBM xSeries Documentation CD	3
Hardware and software requirements	3
Using the Documentation Browser	3
Notices and statements in this document	4
Features and specifications	5
Major components of the xSeries 206m Types 8485 and 8490	6
Chapter 2. Installing options	7
Installation guidelines	7
System reliability guidelines	8
Working inside the server with the power on	8
Handling static-sensitive devices	9
Removing the side cover	10
Removing the two-piece bezel	11
Installing a memory module	13
Installing a drive	16
Installing a drive in bay 2 or 3	17
Installing a hot-swap hard disk drive in bay 4, 5, 6, or 7	19
IDs for hot-swap hard disk drives	21
Installing a simple-swap SATA hard disk drive in bay 4, 5, 6, or 7	21
Installing a non-hot-swap SATA hard disk drive in bay 4, 5, 6, or 7	23
Power and signal cables for internal drives	24
Installing an adapter	25
Completing the installation	28
Reinstalling the two-piece bezel	28
Reinstalling the side cover	30
Connecting the cables	31
Updating the server configuration	32
Chapter 3. Server controls, LEDs, and power	33
Front view	33
Rear view	35
Server power features	36
Turning on the server	36
Turning off the server	36
Chapter 4. Configuring the server	39
Using the ServerGuide Setup and Installation CD	39
Using the Configuration/Setup Utility program	40
Using the SAS/SATA Configuration Utility program (hot-swap SAS/SATA models only)	40
Using the Adaptec HostRAID configuration programs	41
Using the Adaptec RAID Configuration Utility programs (for Serial ATA RAID)	41
Using the SAS/SATA Utility program (for SAS/SATA HostRAID)	44
Using ServeRAID Manager	45
Configuring the controller	45
Viewing the configuration	46
Using the Boot Menu program	47
Configuring the Ethernet controller	47

Chapter 5. Solving problems	49
Diagnostic tools overview	49
POST beep codes	49
POST error codes	50
ServerGuide problems	63
Troubleshooting tables	63
CD or DVD drive problems	64
Diskette drive problems	65
General problems	65
Hard disk drive problems	65
Intermittent problems	66
Keyboard, mouse, or pointing-device problems	67
Memory problems	68
Microprocessor problems	69
Monitor problems	69
Optional-device problems	72
Power problems	73
Serial port problems	74
Software problems	75
Universal Serial Bus device problems	75
System-board LEDs	76
Appendix A. Getting help and technical assistance	77
Before you call	77
Using the documentation	77
Getting help and information from the World Wide Web	78
Software service and support	78
Hardware service and support	78
Appendix B. Notices	79
Edition notice	79
Trademarks	80
Important notes	80
Product recycling and disposal	81
Battery return program	82
Electronic emission notices (Class A)	83
Federal Communications Commission (FCC) statement	83
Industry Canada Class A emission compliance statement	83
Australia and New Zealand Class A statement	83
United Kingdom telecommunications safety requirement	83
European Union EMC Directive conformance statement	83
Taiwanese Class A warning statement	84
Chinese Class A warning statement	84
Japanese Voluntary Control Council for Interference (VCCI) statement	84
Electronic emission notices (Class B)	85
Federal Communications Commission (FCC) statement	85
Industry Canada Class B emission compliance statement	85
Avis de conformité à la réglementation d'Industrie Canada	85
European Union EMC Directive conformance statement	86
Japanese Voluntary Control Council for Interference (VCCI) statement	86
Power cords	86
Index	89

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

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

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

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

Statement 1:



DANGER

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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

Statement 2:



CAUTION:

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

Do not:

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

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

Statement 3:



CAUTION:

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

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



DANGER

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

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



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

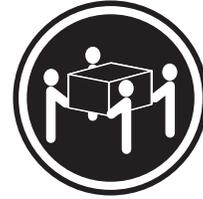
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Statement 5:



CAUTION:

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



Statement 8:



CAUTION:

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



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

Statement 12:



CAUTION:

The following label indicates a hot surface nearby.



Statement 13:



DANGER

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

Statement 15:



CAUTION:

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

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

ADVERTENCIA: El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. ***Lávese las manos después de usar el producto.***

Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up the IBM® xSeries® 206m Machine Types 8485 and 8490 servers 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 the server documentation. These updates are available from the IBM Web site. To check for updated documentation and technical updates, complete the following steps.

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

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 8485 or 8490 (depending on the machine type for your server model), 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.

Important:: If your server comes preloaded with an operating system and software, you do not need to use the IBM *ServerGuide Setup and Installation CD* to install the operating system. This will overwrite the existing preload.

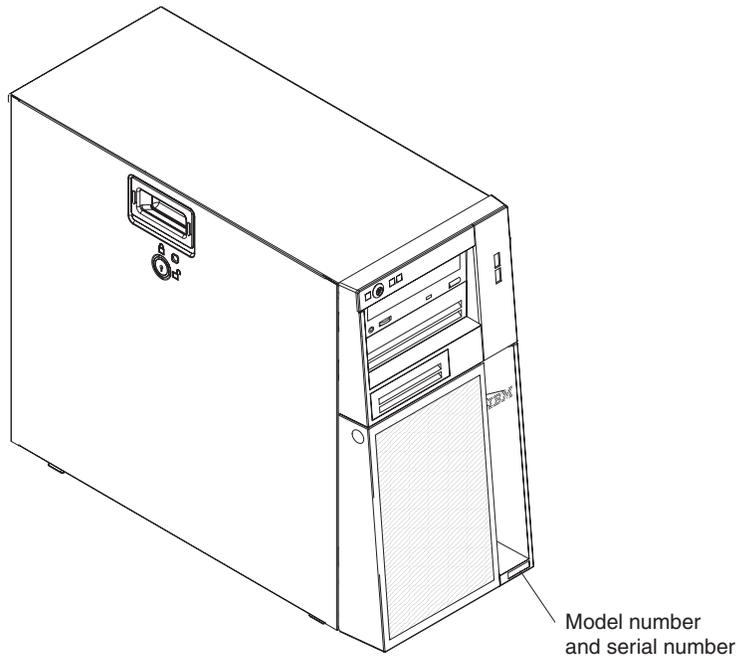
The server comes with a limited warranty. You can obtain up-to-date information about the server and other IBM server products at <http://www.ibm.com/eserver/xseries/>.

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 206m server
Machine type	8485 or 8490
Model number	_____
Serial number	_____
Key serial number	_____
Key manufacturer	_____
Key phone number	_____

The model number and serial number are on the lower-right side of the bezel, as shown in the following illustrations. These illustrations might differ slightly from your hardware.

Several models are available; for additional information, see the *User's Guide* on the IBM *xSeries Documentation* CD. The following illustration shows a hot-swap model.



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

If you plan to install the server in a rack, you must purchase a Tower-to-Rack Kit conversion kit. For a list of supported options for the server, see the ServerProven® list 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 the server in Portable Document Format (PDF) and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

The IBM *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 Ctrl+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 the server. Depending on the server model, some features might not be available, or some specifications might not apply.

Table 1. Features and specifications

<p>Microprocessor:</p> <ul style="list-style-type: none"> • Intel® Pentium® 4 Processor • 1 MB or 2 MB Level-2 or Level-3 cache • 800 MHz front-side bus (FSB) <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 512 MB • Maximum: 8 GB • Types: PC2-4200 double-data-rate 2 (DDR2) • Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved <p>Drives (depending on the model):</p> <ul style="list-style-type: none"> • Diskette (optional): 1.44 MB (two modes) • Hard disk drive: SAS or SATA • One of the following IDE drives: <ul style="list-style-type: none"> – CD-ROM – CD-RW (optional) – DVD-ROM (optional) – DVD-ROM/CD-RW (optional) <p>Expansion bays (depending on the model):</p> <ul style="list-style-type: none"> • Two 5.25-in. bays (one CD drive installed) • One 3.5-in. removable-media drive bay • Four 3.5-in. hard disk drive bays with one of the following bays: <ul style="list-style-type: none"> – Open hot-swap bays – Simple-swap bays with one hard disk drive installed – Non-hot-swap bays with one hard disk drive installed <p>PCI expansion slots (depending on the model):</p> <ul style="list-style-type: none"> • Four PCI expansion slots <ul style="list-style-type: none"> – One PCI Express x8 slot – One PCI Express x1 slot – Two PCI 32-bit/33 MHz slots • Six PCI expansion slots (models with the PCI-X expansion card) <ul style="list-style-type: none"> – One PCI Express x8 slot – One PCI Express x1 slot – Two PCI 32-bit/33 MHz slots – Two PCI-X 64-bit/100 MHz slots • One connector on PCI-X expansion card for the mini-PCI-X Serial Attached SCSI (SAS) adapter 	<p>Fans:</p> <p>Two or three speed-controlled fans</p> <p>Power supply:</p> <p>One of the following power supplies:</p> <ul style="list-style-type: none"> • Two redundant 430 watt (90-240 V ac) • One nonredundant 400 watt (90-240 V ac) <p>Size:</p> <ul style="list-style-type: none"> • Height: 438 mm (17.25 in.) • Depth: 540 mm (21.25 in.) • Width: 216 mm (8.5 in.) • Weight: 16.3 kg (36 lb) to 20.8 kg (45.8 lb) depending upon configuration <p>Integrated functions:</p> <ul style="list-style-type: none"> • Mini baseboard management controller (mini-BMC) • Broadcom 5721 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet port • Two serial ports • One parallel port • Four-port Serial ATA controller • One internal SAS port (mini-PCI slot) • Integrated RAID capability (HostRAID) • Four Universal Serial Bus (USB) v2.0 ports (two on front and two on rear) • Keyboard port • Mouse port • ATA-100 single-channel IDE controller (bus mastering) • ATI ES1000 video controller <ul style="list-style-type: none"> – Compatible with SVGA and VGA – 16 MB SDRAM video memory <p>Diagnostic LEDs:</p> <ul style="list-style-type: none"> • Fans • Memory <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Sound power, idling: 5.0 bel • Sound power, operating: 5.5 bel 	<p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Server on: 10° to 35°C (50° to 95°F) Altitude: 0 to 914 m (2998.0 ft) – Server off: -40° to 60°C (-40° to 140°F) Altitude: 0 to 2133 m (7000.0 ft) • Humidity (operating and storage): 8% to 80% <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 630 Btu per hour (185 watts) • Maximum configuration: 1784 Btu per hour (523 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50 or 60 Hz) required • Input voltage and frequency ranges automatically selected • Input voltage low range: <ul style="list-style-type: none"> – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: <ul style="list-style-type: none"> – Minimum: 200 V ac – Maximum: 240 V ac • Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> – Minimum: 0.20 kVA (all models) – Maximum: 0.55 kVA <p>Notes:</p> <ol style="list-style-type: none"> 1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use. 2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.
--	---	---

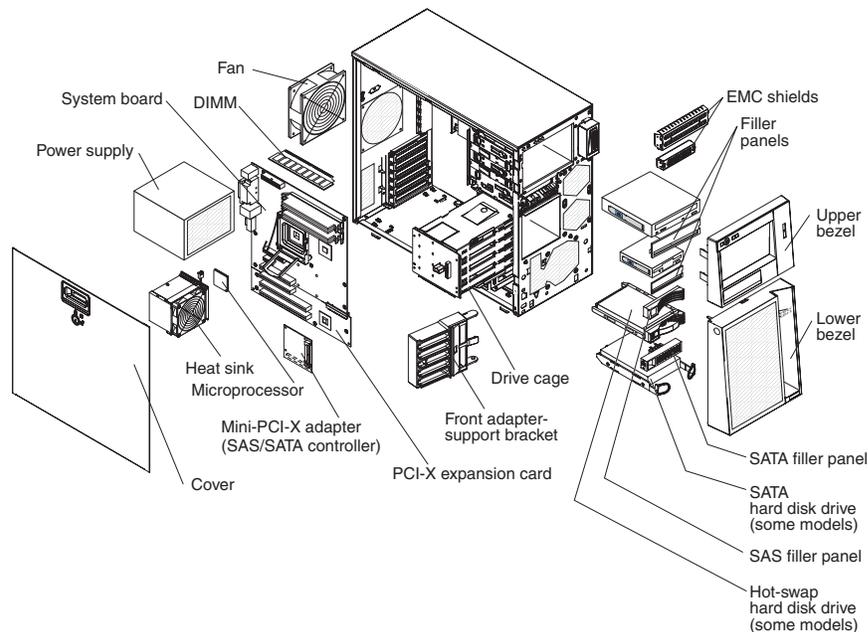
Major components of the xSeries 206m Types 8485 and 8490

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.



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. If you need more detailed instructions, see the *User's Guide* on the IBM *xSeries Documentation CD*.

Installation guidelines

Before you install options, read the following information:

- Read the safety information that begins on page v, the guidelines in “Working inside the server with the power on” on page 8, and “Handling static-sensitive devices” on page 9. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
 - Make sure that you can stand safely without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing and installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you have to access the inside of the server, you might find it easier to lay the server on its side. Before laying the server on its side, rotate the two front stabilizing feet a quarter turn inward toward the server, so that they do not break. Before returning the server to an upright position, rotate the front stabilizing feet a quarter turn outward from the server.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 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.

When installing the server in a rack, make sure that space is available around the server to enable the server cooling system to work properly. See the documentation that comes with the rack for additional information.

- 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.

Working inside the server with the power on

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

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

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

Handling static-sensitive devices

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

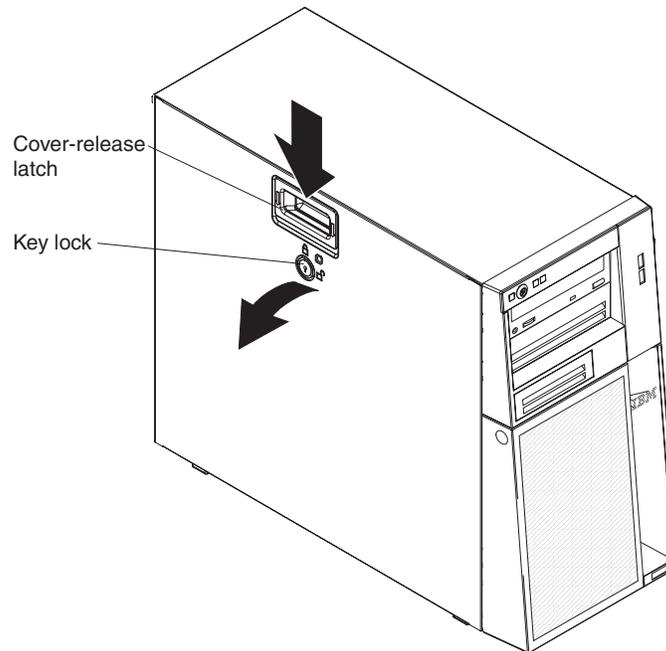
To reduce the possibility of electrostatic discharge, observe the following precautions:

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

Removing the side cover

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

1. Review the safety information that begins on page v and the “Installation guidelines” on page 7.
2. Turn off the server and all attached devices (see “Turning off the server” on page 36); then, disconnect all power cords and external cables.
3. Lay the server on its side.
4. Unlock the side cover; then, press the cover-release latch down, as indicated by the two arrows on the latch.



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

To replace the side cover, see “Reinstalling the side cover” on page 30.

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.

Removing the two-piece bezel

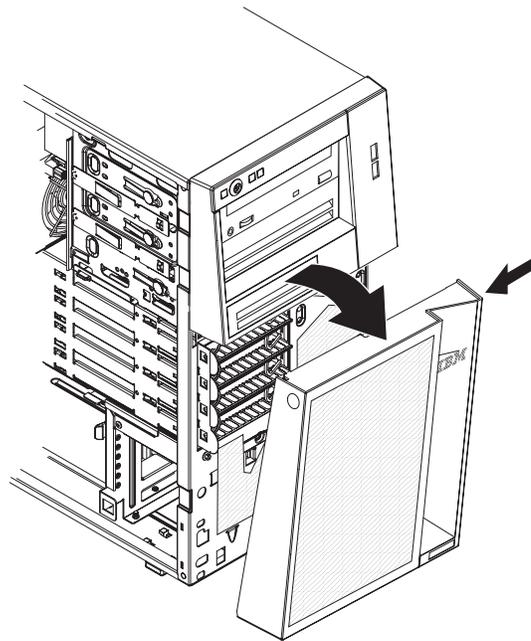
When working with some devices, such as drives in bays 1 through 7, you must first remove the two-piece bezel to access the devices.

Notes:

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

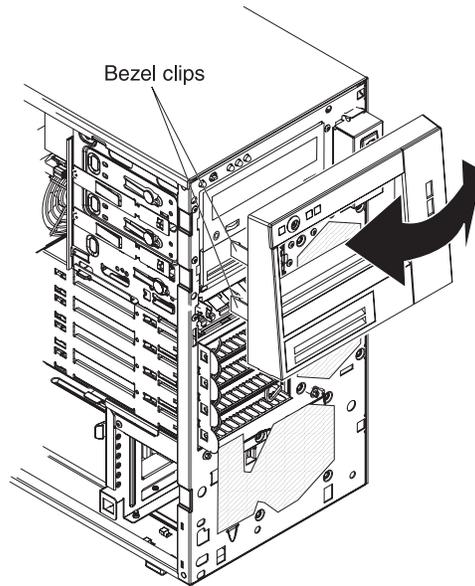
To remove the two-piece bezel, complete the following steps:

1. Unlock the side cover.
2. Remove the side cover (see “Removing the side cover” on page 10).
3. Press the round blue release button on the right side of the lower bezel and tilt the lower bezel forward to disengage it from the chassis.



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

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



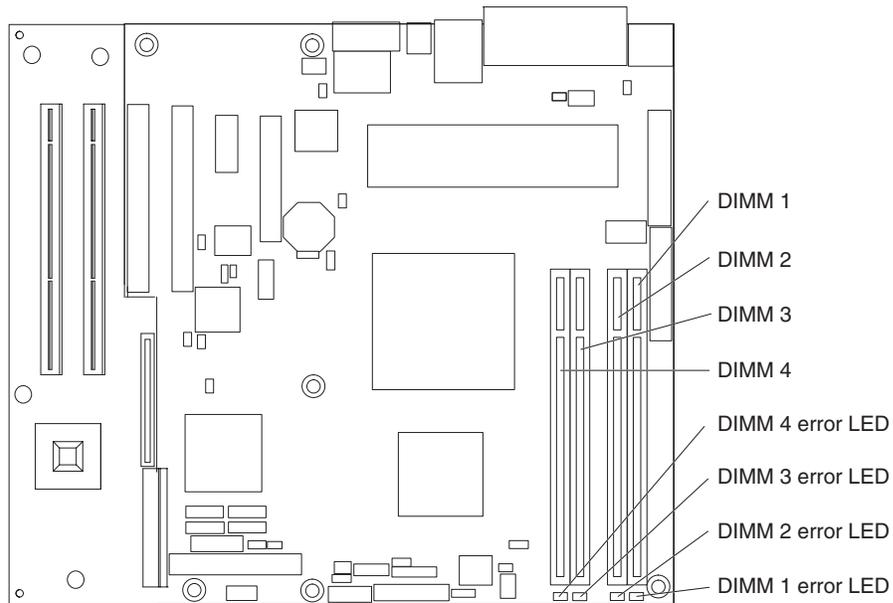
For instructions for reinstalling the two-piece bezel, see “Reinstalling the two-piece bezel” on page 28.

Installing a memory module

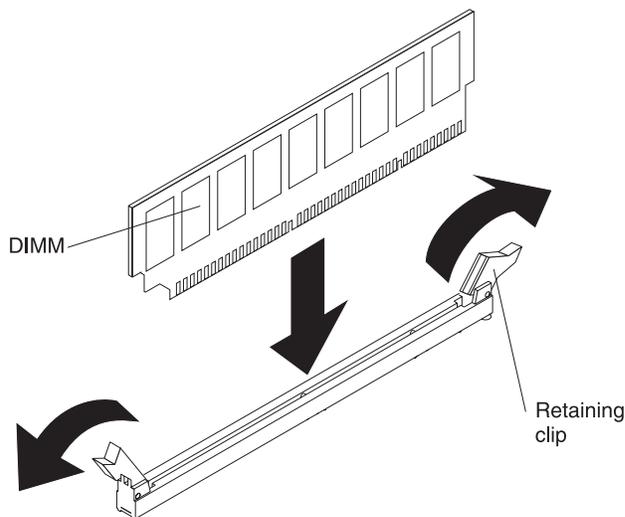
The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when installing DIMMs:

- The server supports industry-standard, 533/667 MHz, PC2-4200, double-data-rate 2 (DDR2) dual inline memory modules (DIMMs).
- The system board contains four DIMM connectors and supports two-way memory interleaving.
- The DIMM options available for the server are 512 MB, 1 GB, and 2 GB. The server supports a minimum of 512 MB and a maximum of 8 GB of system memory.
- The server comes with one 512 MB DIMM or two 512 MB DIMMs installed. Depending on the DIMM sizes that you select, the server also supports two or four DIMMs. The 512 MB DIMM option kit contains one DIMM; however, the 1 GB DIMM and 2 GB option kits each contain two DIMMs.
- The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Configuration/Setup Utility program and select **System Summary** from the menu. For additional information, see the *User's Guide* on the IBM *xSeries Documentation CD*.
- For two-way memory interleaving, DIMMs must be installed in matched pairs. If one DIMM is installed in the DIMM 1 connector, when you install an additional DIMM, it must be installed in the DIMM 3 connector, and it must be the same size, speed, type, and technology as the DIMM in the DIMM 1 connector. You can mix compatible DIMMs from various manufacturers. If you install a second pair of DIMMs in the DIMM 2 and DIMM 4 connectors, they do not have to be the same size, speed, type, and technology as the DIMMs in the DIMM 1 and DIMM 3 connectors. However, the size, speed, type, and technology of the DIMMs that you install in the DIMM 2 and DIMM 4 connectors must match each other.
- Install only 1.8 V, 184-pin, double-data-rate 2 (DDR2), 533/667 MHz, PC2-4200, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest DDR2 533/667 MHz SDRAM unbuffered DIMM specification. For a list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>; then, select your country and navigate to the list of options for the server.
- When you restart the server after adding or removing a DIMM, the server displays a message that the memory configuration has changed.

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



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



To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 10).

4. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Install the DIMMs in the sequence shown in the following table.

Number of DIMMs	Connector sequence
One DIMM	1
Two DIMMs (interleaved configuration)	1, 3
Three DIMMs	Not supported
Four DIMMs (interleaved configuration)	1, 3, 2, 4

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

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

If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 28.

Installing a drive

Depending on the server model, one or more of the following drives might be installed in the server:

- Diskette drive (optional)
- Hard disk drive
- CD-ROM, CD-RW, or DVD/CD-RW combo drive

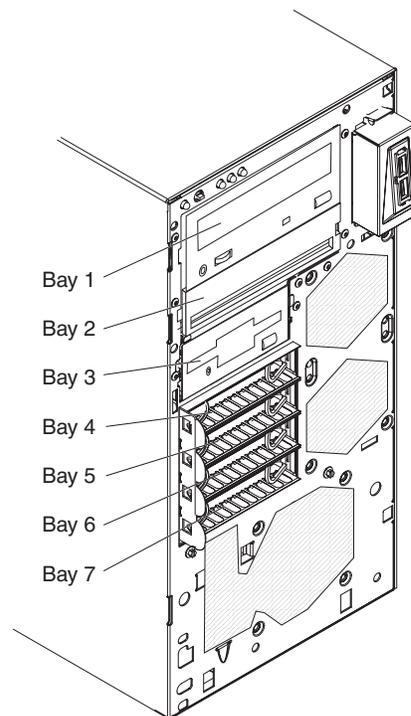
Some hot-swap Serial Attached SCSI (SAS) models might come with an integrated drive electronics (IDE) CD-ROM drive in bay 1 and four hot-swap hard disk drive bays.

Some simple-swap Serial Advanced Technology Attachment (SATA) models might come with an IDE CD-ROM drive in bay 1 and a simple-swap SATA hard disk drive in bay 4.

Some non-hot-swap SATA models might come with an IDE CD-ROM drive in bay 1 and a non-hot-swap SATA hard disk drive in bay 4.

Some hot-swap SATA models might come with an IDE CD-ROM drive in bay 1 and a hot-swap SATA hard disk drive in bay 4.

The following illustration shows the drive bays.

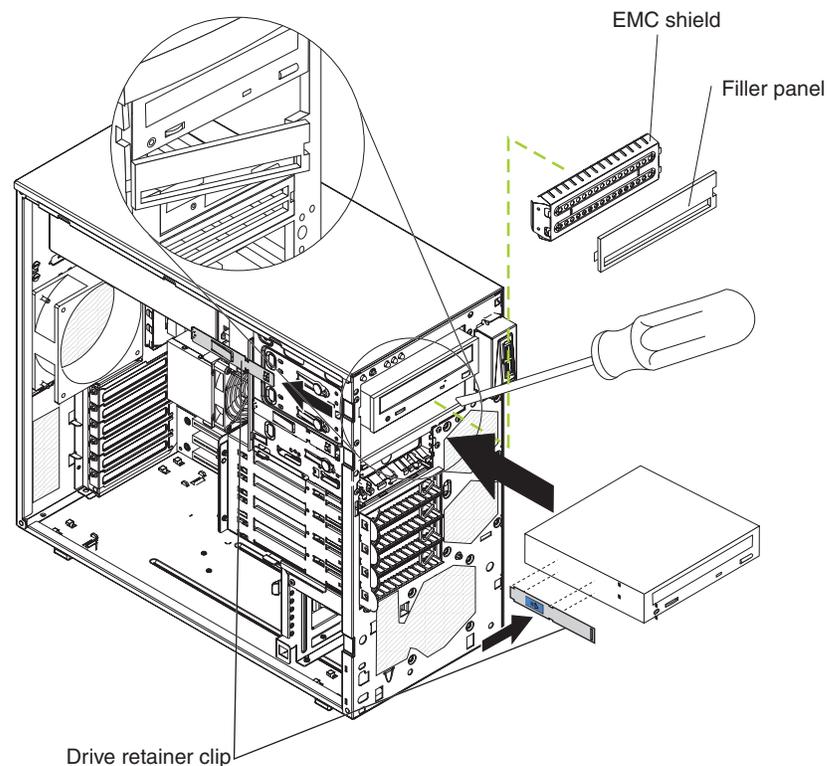


The following notes describe the types of drives that the server supports and other information that you must consider when installing a hard disk drive:

- Make sure that you have all the cables and other equipment specified in the documentation that comes with the drive.
- Select the bay in which you want to install the drive.

- Check the instructions that come with the drive to see whether you have to set any switches or jumpers on the drive. If you are installing a SAS device, be sure to set the SAS ID for that device.
- Diskette drives, tape drives, CD drives, CD-RW drives, and DVD/CD-RW combo drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, and 3 only.
- To install a 3.5-in. drive in a 5.25-in. bay, you must use the 5.25-in. conversion kit.
- Only a 3.5-in. device can be installed in bay 3.
- The server supports only one diskette drive.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI, PCI Express, and PCI-X slots covered or occupied. When you install a drive or PCI, PCI Express, or PCI-X adapter, save the EMC shield and filler panel from the bay or the PCI, PCI Express, or PCI-X adapter slot cover in the event that you later remove the option.
- For a complete list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

Installing a drive in bay 2 or 3



To install a drive in bay 2 or 3, 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 cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 10).
4. Remove the two-piece bezel (see “Removing the two-piece bezel” on page 11).

5. Use a screwdriver to pry the filler panel and EMC shield away from the server.

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

Statement 3:



CAUTION:

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

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



DANGER

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

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



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

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

Note: You might find it easier to install the new drive from the front and then attach the cables.

8. Remove the drive retainer clip from the side of the drive cage of bays 1 and 2 (see the illustration at the beginning of this section). Slide the drive retainer clip

to the left to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive (the blue side of the drive retainer clip should be facing outward).

9. If you are installing a 5.25-in. drive in bay 2, push the drive into the bay. If you are installing a 3.5-in. drive in bay 2, you must attach the 5.25-in. conversion kit to the 3.5-in. drive.

Note: An optional diskette drive can be installed in bay 3.

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

If you have other options to install or remove, do so now; otherwise go to “Completing the installation” on page 28.

Installing a hot-swap hard disk drive in bay 4, 5, 6, or 7

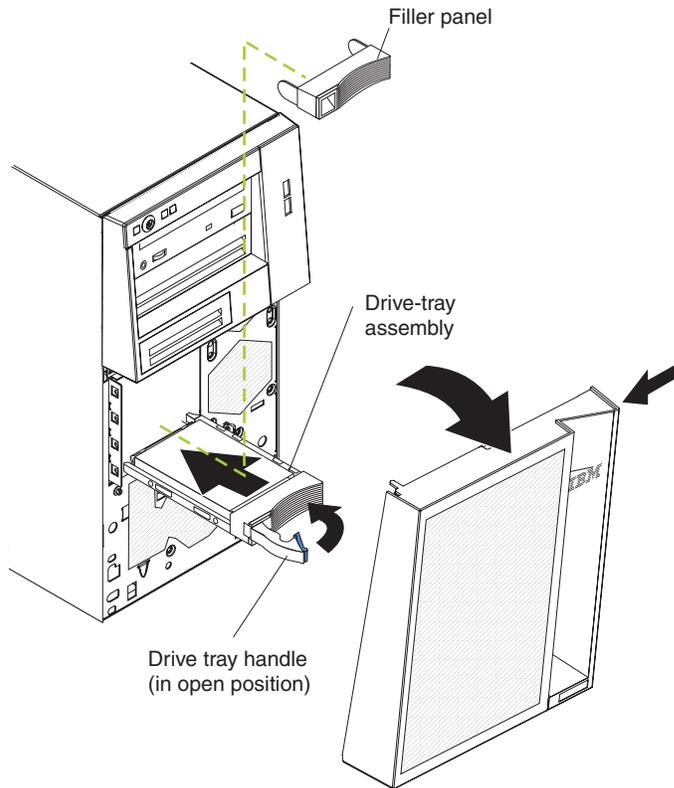
This procedure applies only to server models that have hot-swap hard disk drives. Some server models come with SAS or SATA hot-swap hard disk drives. Before you install a hot-swap hard disk drive, read the following information:

- The hot-swap drives must be either all SAS hard disk drives or all SATA hard disk drives; the two types cannot be combined.
- Inspect the drive tray for signs of damage.
- Make sure that the drive is correctly installed in the tray.
- To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each drive bay.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays.

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

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

Note: If you install the maximum number of hot-swap hard disk drives (four), remove the EMC shield that is attached inside the lower bezel.



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

1. Read the safety information that begins on page v and “Installation guidelines” on page 7.
2. Unlock the side cover.
3. Remove the side cover and lower bezel (see “Removing the side cover” on page 10 and “Removing the two-piece bezel” on page 11).
4. Remove the filler panel from the bay in which you want to install the drive by inserting your finger into the depression area at the left side of the filler panel and pulling it away from the server.
5. Install the hard disk drive in the hot-swap bay:
 - a. Make sure that the drive tray handle is open.
 - b. Align the drive assembly with the guide rails in the bay.
 - c. Gently push the drive assembly into the bay until the drive stops.
 - d. Push the tray handle to the closed (locked) position.
 - e. Check the hard disk drive status indicator to make sure that the hard disk drive is operating correctly. (You might have to restart the server before the drive is recognized.) If the amber hard disk drive status LED for a drive is lit continuously, it indicates that the drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, this indicates that the drive is being accessed.

Note: If the server is configured for RAID operation using an optional ServeRAID™ adapter, you might have to reconfigure your disk arrays after installing hard disk drives. See the ServeRAID documentation

on the *IBM ServeRAID Support* CD for additional information about RAID operation and complete instructions for using ServeRAID Manager.

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

If you have other options to install or remove, do so now; otherwise go to “Completing the installation” on page 28.

IDs for hot-swap hard disk drives

The hot-swap-drive backplane controls the IDs for the internal hot-swap drive bays. The following table lists the IDs for the hard disk drives and backplane that are connected to one channel in hot-swap models. In the typical configuration, the standard hard disk drives and backplane are connected to channel A.

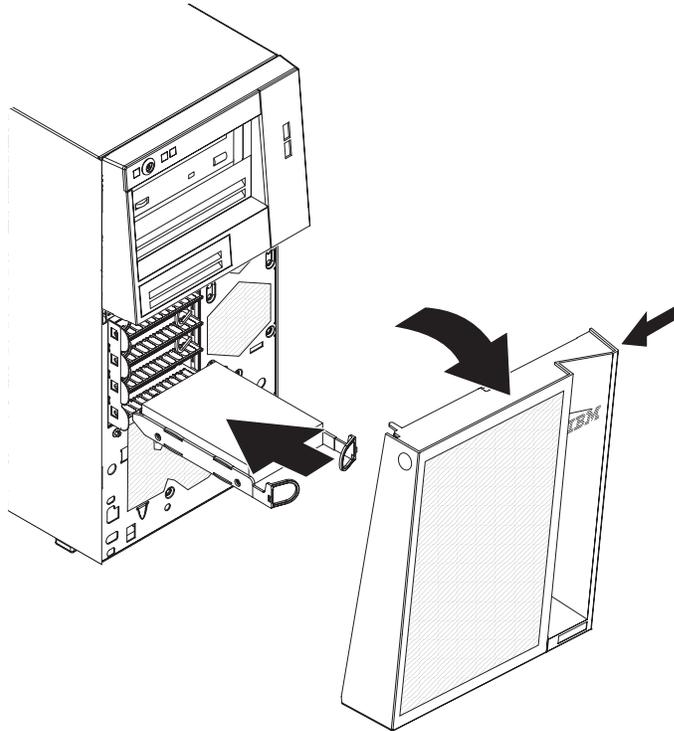
Device	ID
Drive bay 4	0
Drive bay 5	1
Drive bay 6	2
Drive bay 7	3

Installing a simple-swap SATA hard disk drive in bay 4, 5, 6, or 7

Some server models come with simple-swap SATA hard disk drives, which are accessible from the front of the server. Before you install a simple-swap SATA hard disk drive, read the following information:

- You can install four simple-swap SATA hard disk drives in the server.
- Install the drives in ascending order by bay number.

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 hard disk drive, 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 all external cables and power cords.
3. Unlock the side cover (the bezel will not disengage from the server if the cover is locked).
4. Remove the side cover and lower bezel (see “Removing the side cover” on page 10 and “Removing the two-piece bezel” on page 11).
5. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
6. Align the drive assembly with the guide rails in the bay (the connector end of the drive goes in first).
7. Pull the loops of the drive assembly toward each other; then, carefully slide the drive assembly into the drive bay until it stops and release the loops.

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

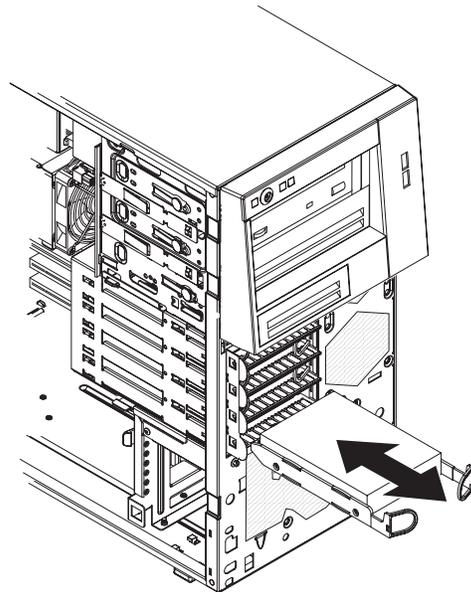
If you have other options to install or remove, do so now. Otherwise, go to “Completing the installation” on page 28.

Installing a non-hot-swap SATA hard disk drive in bay 4, 5, 6, or 7

Some server models come with non-hot-swap SATA hard disk drives. Before you install a non-hot-swap SATA hard disk drive, read the following information:

- Read the documentation that comes with the drive for cabling instructions.
- Route the cable before you install non-hot-swap drives. Do not block the airflow from the fans.
- You can install four non-hot-swap SATA hard disk drives in the server.
- Install the drives in ascending order by bay number.

Attention: Disconnect all power from the server before removing or installing a non-hot-swap hard disk drive.



To install a non-hot-swap SATA hard disk drive, 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 all external cables and power cords.
3. Unlock the side cover (the bezel will not disengage from the server if the cover is locked).
4. Remove the side cover and lower bezel (see “Removing the side cover” on page 10 and “Removing the two-piece bezel” on page 11).
5. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
6. Align the drive assembly with the guide rails in the bay (the connector end of the drive goes in first).

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

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

8. Attach the signal cable to the drive:
 - a. Attach one end of the signal cable to the corresponding connector on the rear of the drive.
 - b. Attach the other end of the signal cable to the corresponding connector on the system board.
9. Connect the power cable to the rear of the drive. The connectors are keyed and can be inserted only one way.

If you have other options to install or remove, do so now. Otherwise, go to “Completing the installation” on page 28.

Power and signal cables for internal drives

The server uses cables to connect parallel IDE, simple-swap SATA, and SAS devices to the power supply and to the system board. (For the location of the system-board connectors, see the *User's Guide* on the IBM *xSeries Documentation CD*.) Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in the server come with power and signal cables attached. If you replace any drives, remember which cable is attached to which drive.
- When you install a drive, make sure that one of the signal cable drive connectors is connected to the drive and that the connector at the other end of the signal cable is connected to the system board.
- If you have only one IDE device on a cable, it must be set as a master device.
- If two IDE devices are used on a single cable, one must be designated as the master device and the other as the subordinate device; otherwise, the server might not recognize some of the IDE devices. The master and subordinate designation is determined by switch or jumper settings on each IDE device.

The following cables are provided:

- **Power cables:** Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that can be attached to different drives; these connectors vary in size. Use either a four-wire power cable or SATA power cable with SATA drives, but do not use both at the same time (use one or the other).
- **Signal cables:** Signal cables are typically flat cables, also called ribbon cables, that connect parallel IDE, SATA, SAS, and diskette drives to the system board. Two or three types of signal cables come with the server:
 - **IDE:** The wider IDE signal cable has three connectors. One of these connectors is attached to the drive, one is a spare, and the third is attached to the primary or secondary IDE connector on the system board. The spare connector can be used to connect an additional IDE drive to the server.

The CD-ROM drive is attached to an ATA 100 signal cable. ATA 100 signal cables are color-coded. The blue connector is attached to the system board. The black connector is attached to the master IDE device. The gray middle connector is attached to the subordinate IDE device.

- **(Optional) Diskette drive:** The narrower signal cable has two connectors. One is attached to the diskette drive, and the other is connected to the connector (FDD1) on the system board.
- **SATA:** The narrower, black signal cable has two connectors. One is connected to the non-hot-swap SATA drive, and the other is attached to the connector on the system board.
 Simple-swap SATA models come with four SATA cables that are already connected to the system board and the back panel at the rear of the simple-swap drives.
 Hot-swap SATA models come with a single data cable that connects the SAS/SATA controller to the hot-swap backplane. This cable provides inherent connectivity for the four SATA drives that the server supports. Therefore, additional cabling is not required for these drives.
- **SAS:** Hot-swap SAS models come with a single data cable that connects the SAS/SATA controller to the hot-swap backplane. This cable provides inherent connectivity for the four SAS drives that the server supports. Therefore, additional cabling is not required for these drives.
 For more information about the requirements for SAS cable and connecting SAS devices, see the documentation that comes with these devices.
 For a list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

Installing an adapter

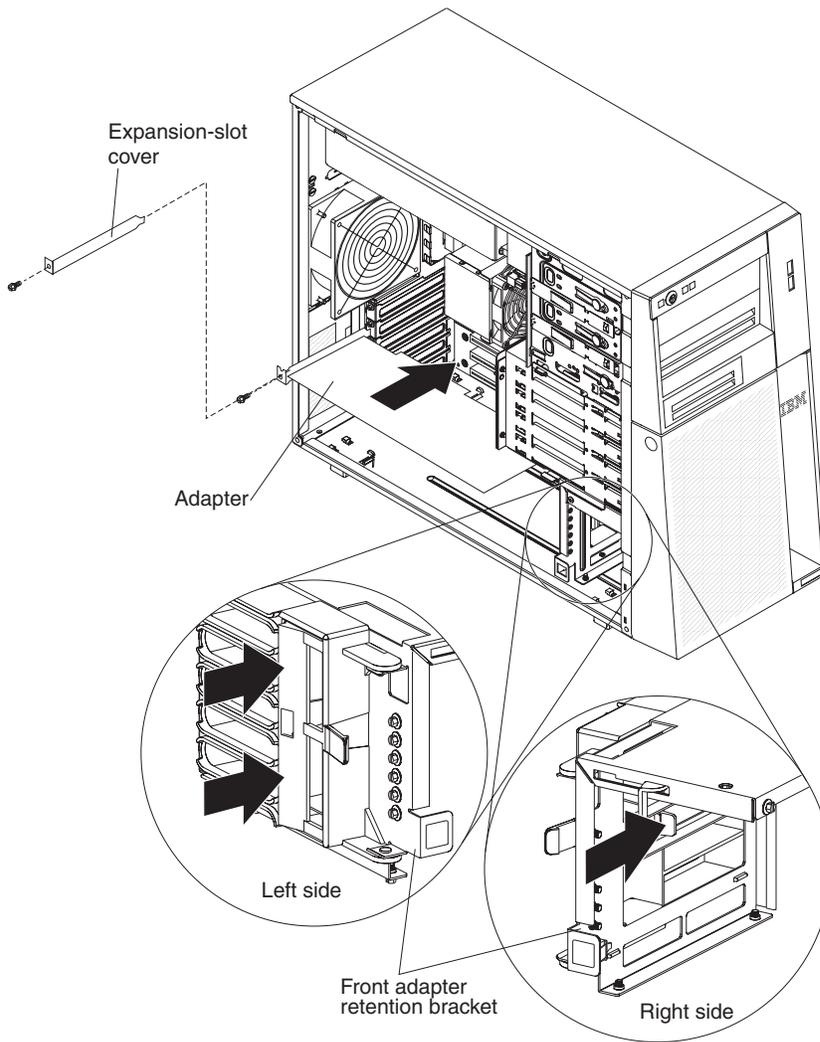
The following notes describe the types of adapters that the server supports and other information that you must consider when installing an adapter.

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you need to change the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.
- Read the documentation that comes with your .
- The server comes with two PCI slots and two PCI Express slots on the main system board. If your model comes with the optional PCI-X expansion card, it provides two PCI-X slots.
- You can install full-length adapters that are included in the ServerProven list in slots 1 through 6 (depending on your model).
- The 32-bit slots 3 and 4 support 5.0 V keyed PCI adapters; they do not support 3.3 V keyed adapters. Universal adapters are supported in slots 3 and 4 if they are universally keyed and the server is not a hot-swap model. If you are installing 64-bit adapters in a hot-swap model, you must install them only in slots 5 and 6.
- An optional IBM Remote Supervisor Adapter II can be installed only in the following slots: PCI slots 3 and 4. Use the ribbon cable that comes with this adapter to connect it to the Remote Supervisor Adapter II cable connector on the system board. For additional information, see the documentation that comes with this adapter.
- When you start the server for the first time after installing a Remote Supervisor Adapter II, the startup process will take several minutes longer than a typical startup.
- If you install an optional IBM Remote Supervisor Adapter II, you must disconnect the video cable from the system board and connect it to the optional Remote Supervisor Adapter II.
- The optional ServeRAID-8i adapter can be installed only in PCI-X slot 6.

- The server scans PCI Express x1 slot 2, PCI Express x8 slot 1, and PCI slots 3 and 4 to assign system resources. If the optional PCI-X expansion card is attached to the system board, the server also scans PCI-X slots 5 and 6 to assign additional system resources. Then, the server starts the PCI devices in the following order, if you have not changed the default startup sequence: PCI Express x8 slot 1, PCI-X slot 5 (optional), PCI-X slot 6 (optional), PCI Express x1 slot 2, PCI slot 3, and PCI slot 4.
- For a list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

For the locations of the expansion slots on the system board and the optional PCI-X expansion card, see the *User's Guide* on the IBM xSeries Documentation CD.

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

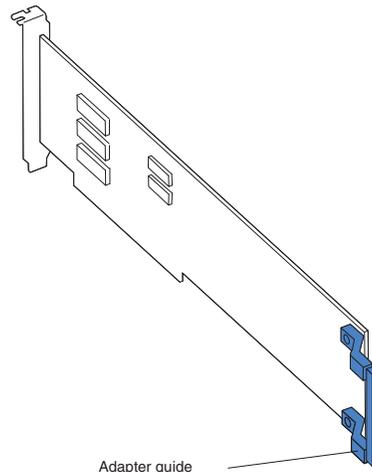


To install an adapter, complete the following steps:

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 all external cables and power cords; then, remove the side cover. See “Removing the side cover” on page 10.
3. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you install the adapter.
4. Follow the instructions that come with the adapter to set jumpers or switches, if any.
5. Rotate the rear adapter-retention bracket to the open (unlocked) position and remove it from the server.
6. Remove the screw that secures the expansion-slot cover to the chassis. Store the expansion-slot cover and screw in a safe place for future use.

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

7. Touch the static-protective package that contains the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.
8. If you are installing a full-length adapter, remove the blue adapter guide (if any) from the end of the adapter.



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

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

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

13. Reinstall the rear adapter-retention bracket; then, rotate the bracket to the closed (locked) position.

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

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

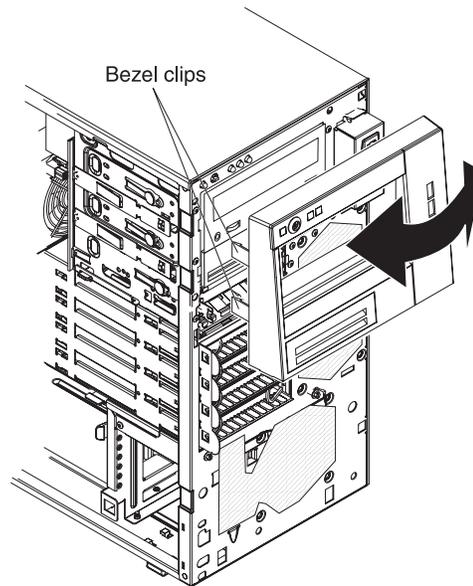
Completing the installation

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

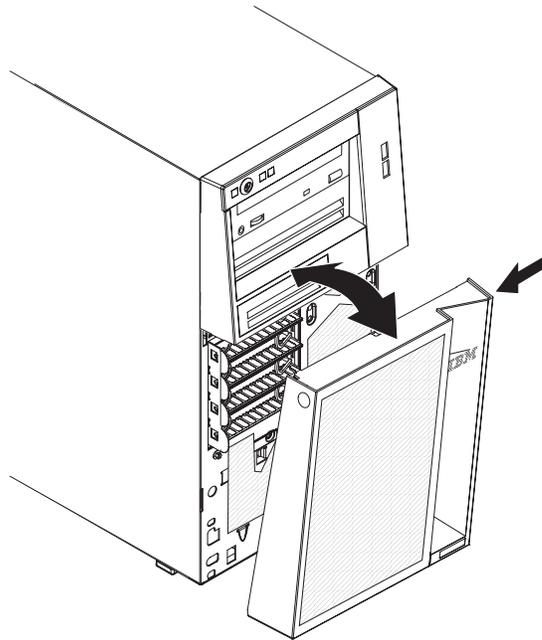
Reinstalling the two-piece bezel

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

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



2. Install the lower bezel on the front of the server chassis.

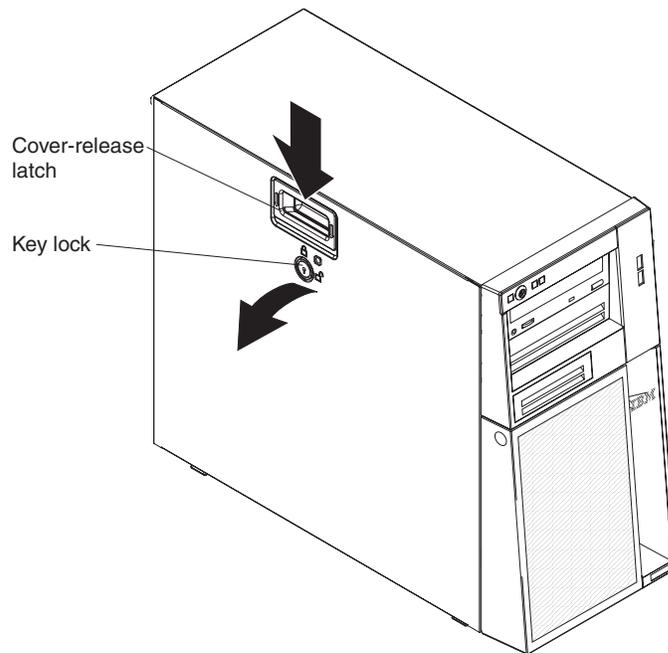


- a. Insert the two bottom tabs on the lower bezel into the matching holes in the front of the chassis.
- b. Tilt the top of the lower bezel into position on the chassis until the lower bezel locks securely into place.

Reinstalling the side cover

If you removed the bezel, reinstall it before you reinstall the side cover. See “Reinstalling the two-piece bezel” on page 28.

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



To reinstall the side cover, complete the following steps:

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

Note: The cover-release latch must be in the unlocked (opened) position before you install the side cover.

2. Insert the tabs inside the cover into the slots on the server chassis.

Note: Make sure that each tab on the side cover is in its corresponding slot before closing the cover-release latch.

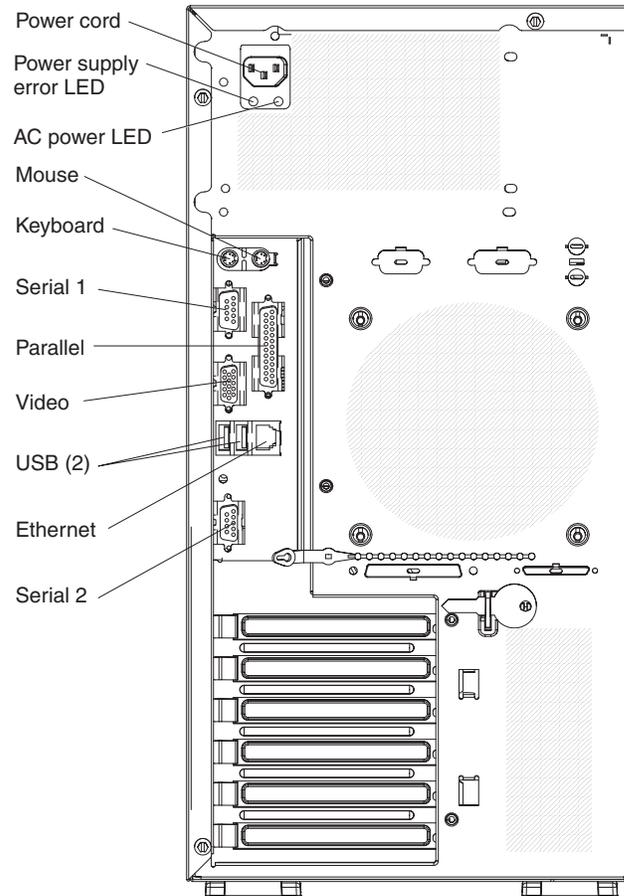
3. Close the cover-release latch to secure the side cover in place.
4. Lock the side cover.

Connecting the cables

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

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

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



Updating the server configuration

When you start the server for the first time after you add or remove an internal option or an external device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. See Chapter 4, “Configuring the server,” on page 39 for additional information.

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

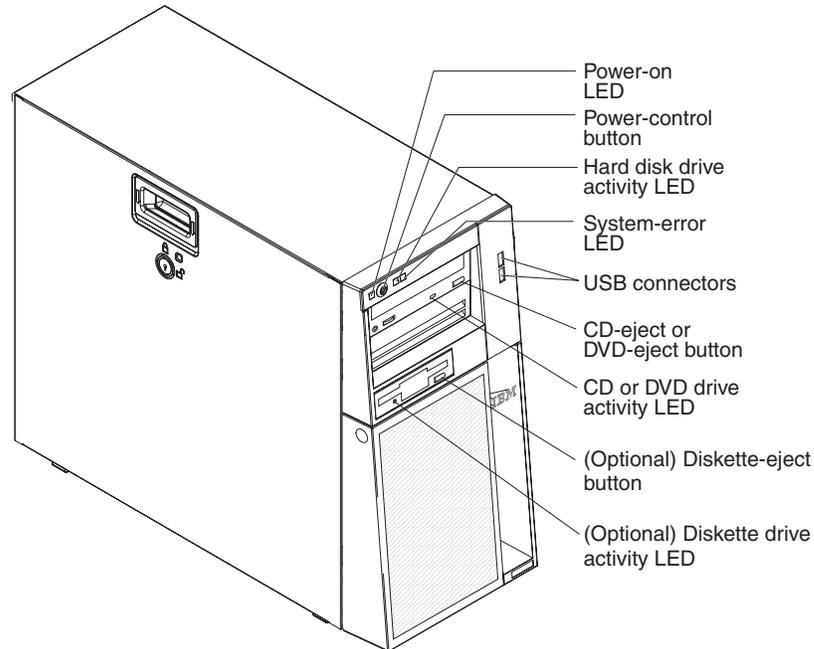
If the server has a ServeRAID adapter and you have installed or removed a hard disk drive, see the ServeRAID documentation that comes with the server for information about reconfiguring the disk arrays.

Chapter 3. Server controls, LEDs, and power

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

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server.



Power-on LED

When this LED is lit, 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 cords from the electrical outlets.

Power-control button

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

Hard disk drive activity LED

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

System-error LED

When this amber LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error. See Chapter 5, "Solving problems," on page 49 for additional information. Detailed troubleshooting information is in the *Problem Determination and Service Guide* on the IBM xSeries Documentation CD.

USB connectors

Connect USB devices to these connectors.

CD-eject or DVD-eject button

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

CD or DVD drive activity LED

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

(Optional) Diskette-eject button

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

(Optional) Diskette drive activity LED

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

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

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

When the drive is removed, this LED also is visible on the SAS backplane, next to the drive connector. The backplane is the printed circuit board behind drive bays 4 through 7.

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

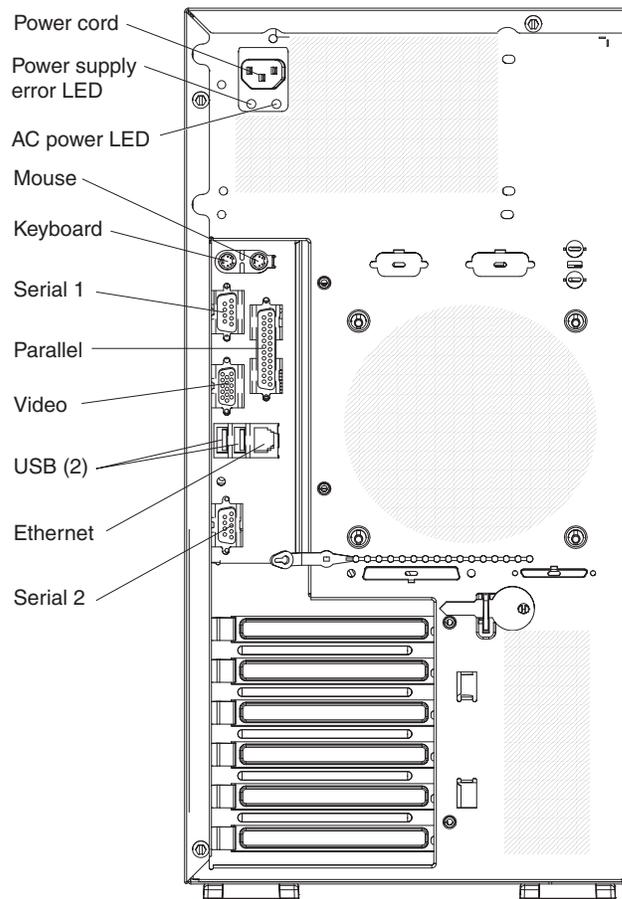
On some server models, each hot-swap hard disk drive has an amber status LED. If this amber status LED for a drive is lit, it indicates that the associated hard disk drive has failed.

If an optional ServeRAID adapter is installed in the server and the LED flashes slowly (one flash per second), the drive is being rebuilt. If the LED flashes rapidly (three flashes per second), the adapter is identifying the drive.

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

Rear view

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



Power-cord connector

Connect the power cord to this connector.

Mouse connector

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

Keyboard connector

Connect a keyboard PS/2 to this connector.

Serial 1 connector

Connect a 9-pin serial device to this connector.

Parallel connector

Connect a parallel device to this connector.

Video connector

Connect a monitor to this connector.

USB connectors

Connect USB devices to these connectors.

Ethernet connector

Use this connector to connect the server to a network.

Serial 2 connector

Connect a 9-pin serial device to this connector.

Ethernet transmit/receive activity LED

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

Ethernet link status LED

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

If an optional Remote Supervisor Adapter II (systems-management adapter) is installed, the server has additional connectors and LEDs. For more information about these connectors and LEDs, see the documentation that comes with this adapter. If you install the optional Remote Supervisor Adapter II, you must disconnect the video cable from the system board and connect it to the optional Remote Supervisor Adapter II.

Server power features

When the server is connected to an ac power source but is not turned on, the does not run, and all core logic is shut down; however, the server can respond to remote requests to turn on the server.

Turning on the server

Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active, and you can turn on the server and start the by pressing the power-control button.

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

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

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the . The amount of memory that is reserved for system resources depends on the , 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 remote requests to turn on the server. To remove all power from the server, you must disconnect it from the power source.

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

Statement 5:



CAUTION:

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



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

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned off from the Remote Supervisor Adapter II user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- The server can turn itself off as an automatic response to a critical system failure.

Chapter 4. Configuring the server

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are specifically designed for the 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
- SAS/SATA Configuration Utility program (hot-swap SAS/SATA models only)
Use the SAS/SATA Configuration Utility program to configure devices that are attached to the SAS/SATA controller (hot-swap SAS/SATA models only). For information about using this program, see “Using the SAS/SATA Configuration Utility program (hot-swap SAS/SATA models only)” on page 40.
- Adaptec® HostRAID™ configuration programs
 - Adaptec RAID Configuration Utility programs (for Serial ATA RAID)
 - SAS/SATA Configuration Utility program
- ServeRAID Manager
- Boot Menu program
- Broadcom Gigabit Ethernet Utility program

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>.

Important:: If your server comes preloaded with an operating system and software, you do not need to use the IBM *ServerGuide Setup and Installation* CD to install the operating system. This will overwrite the existing preload.

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 63.
2. Follow the instructions that appear 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 the operating system and adapter.
 - e. Start the setup and hardware configuration programs.

- f. Start the operating system installation. You will need your copy of the 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:

- Change interrupt request (IRQ) settings
- Change the startup drive sequence
- Configure serial-port assignments
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set passwords and security settings

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

1. Turn on the server.
2. When the prompt Press F1 for Configuration/Setup appears, press F1. If 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.

See the *User's Guide* on the IBM xSeries Documentation CD for more detailed information about the Configuration/Setup Utility program.

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

Notes:

1. RAID options and HostRAID are not supported on the SCO 6.0 and UnixWare 7.14 operating systems.
2. A configuration conflict (error code 1801) might occur if SATA RAID and SAS/SATA RAID are both enabled. If you are enabling SAS/SATA RAID, make sure that the **SATA RAID Enable** option in the Configuration/Setup Utility program is disabled (for more information, see "Enabling the Serial ATA HostRAID feature" on page 42).

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

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

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

Note: If the prompt <<< Press <CTRL><A> for Adaptec RAID Configuration Utility! >>> does not appear, start the Configuration/Setup Utility (see the *User's Guide* on the IBM xSeries Documentation CD), select **Devices and I/O Ports --> Advanced Chipset Control --> Serial ATA**, and make sure that the Serial ATA options are set to the following values:

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

3. To select a choice from the menu, use the arrow keys.
4. Use the arrow keys to select the channel for which you want to change settings.
5. To change the settings of the selected items, follow the instructions on the screen. Be sure to press Enter to save your changes.

Using the Adaptec HostRAID configuration programs

Important: RAID options and HostRAID are not supported on the SCO 6.0 and UnixWare 7.14 operating systems.

Use the Adaptec RAID Configuration Utility programs and SAS/SATA Configuration Utility (also referred to as IBM ServeRAID-7e) to add RAID level-0 and level-1 functionality to the integrated Serial ATA controller (simple-swap SATA models) and the SAS/SATA controller (hot-swap models). 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) and the integrated Serial ATA controller (simple-swap SATA models) with integrated SATA RAID support RAID level-0 and level-1 with the option of having a hot-spare drive. An optional ServeRAID controller provides additional RAID levels.
- You cannot use the *ServerGuide Setup and Installation* CD to configure the integrated Serial ATA controller with integrated RAID and the SAS/SATA controller with integrated RAID.
- 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 in the server, use the method that is described in the instructions that come with the controller to view or change settings for attached devices.

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

Use the Array Configuration Utility, in the Adaptec RAID Configuration Utility programs, to add RAID level-0 and level-1 functionality to the integrated Serial ATA (SATA) controller. This utility is a part of the BIOS code. 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 Serial ATA 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 IBM *ServeRAID-7e (Adaptec HostRAID) Support CD*.

Enabling the Serial ATA HostRAID feature

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

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

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

Using the Serial ATA HostRAID feature

The instructions in this section are for using the Array Configuration Utility program to access and perform an initial RAID level-1 configuration. If you install a different type of RAID adapter, use the method that is 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 IBM *ServeRAID-7e (Adaptec HostRAID) Support CD*.

Configuring the controller: To use the Array Configuration Utility program to configure a RAID level-1 array, 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**.
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 SATA 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 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 code.

Note: To add RAID functionality to the integrated SATA controller (simple-swap models), see “Using the Adaptec RAID Configuration Utility programs (for Serial ATA RAID)” on page 41.

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 RAID configuration utilities, device drivers, and information are available 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/>.

Enabling the SAS/SATA HostRAID feature

Important: A configuration conflict (error code 1801) might occur if SATA RAID and SAS/SATA RAID are both enabled. If you are enabling the SAS HostRAID feature, make sure that the **SATA RAID Enable** option in the Configuration/Setup Utility program is disabled (for more information, see “Enabling the Serial ATA HostRAID feature” on page 42).

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

1. Turn on the server.
2. When the prompt Press <CTRL><A> for SAS/SATA Configuration Utility appears, press Ctrl+A. If you have set an administrator password, you are prompted to type the password.
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 different type of RAID adapter in the server, use the method that is described in the instructions that come with the adapter to view or change settings for attached devices.

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

Configuring the controller: To use the SAS/SATA HostRAID feature to configure a RAID level-1 array, 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**.
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 type, select **RAID-1**.

7. (Optional) Type an identifier for the array.
8. When you are prompted for the array build method, select **Quick Int**.
9. Follow the instructions on the screen to complete the configuration; then, select **Done** to exit.
10. Restart the server.

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

1. Start the SAS/SATA Configuration Utility program.
2. From the SAS/SATA Configuration Utility window, select **Manage Arrays**.
3. Select an array and press Enter.
4. To exit from the program, press Esc.

Using ServeRAID Manager

Important: RAID options and HostRAID are not supported on the SCO 6.0 and UnixWare 7.14 operating systems.

Use ServeRAID Manager, which is on the IBM *ServeRAID Support CD*, to perform the following tasks:

- Configure a redundant array of independent disks (RAID) array
- Erase all data from a hot-swap SAS hard disk drive and return the disk to the factory-default settings
- View the RAID configuration and associated devices
- Monitor the operation of the RAID controllers

To perform some tasks, you can run ServeRAID Manager as an installed program. However, to configure the SAS/SATA controller and perform an initial RAID configuration on the server, you must run ServeRAID Manager in Startable CD mode, as described in the instructions in this section. If you install a different type of RAID adapter in the server, use the method that is described in the instructions that come with the adapter to view or change settings for attached devices.

For additional information about RAID technology and instructions for using ServeRAID Manager, see the ServeRAID documentation on the IBM *ServeRAID Support CD*. Additional information about ServeRAID Manager is also available from the **Help** menu. For information about a specific object in the ServeRAID Manager tree, select the object and click **Actions** → **Hints and tips**.

Configuring the controller

By running ServeRAID Manager in Startable CD mode, you can configure the controller before you install the operating system. The information in this section assumes that you are running ServeRAID Manager in Startable CD mode.

To run ServeRAID Manager in Startable CD mode, turn on the server; then, insert the IBM *ServeRAID Support CD* into the CD drive. If ServeRAID Manager detects an unconfigured controller and ready drives, the Configuration wizard starts.

In the Configuration wizard, you can select express configuration or custom configuration. Express configuration automatically configures the controller by grouping the first two physical drives in the ServeRAID Manager tree into an array

and creating a RAID level-1 logical drive. If you select custom configuration, you can select the two physical drives that you want to group into an array and create a hot-spare drive.

Using express configuration

To use express configuration, complete the following steps:

1. In the ServeRAID Manager tree, click the controller.
2. From the toolbar, click **Create**.
3. Click **Express configuration**.
4. Click **Next**.
5. In the “Configuration summary” window, review the information. To change the configuration, click **Modify arrays** or **Modify logical drives**.

Note: Some operating systems have size limitations for logical drives. Before you save the configuration, make sure that the size of the logical drive is appropriate for your operating system.

6. Click **Apply**; when you are asked whether you want to apply the new configuration, click **Yes**. The configuration is saved in the controller and in the physical drives.
7. Exit from ServeRAID Manager and remove the CD from the CD drive.
8. Restart the server.

Using custom configuration

To use custom configuration, complete the following steps:

1. In the ServeRAID Manager tree, click the controller.
2. From the toolbar, click **Create**.
3. Click **Custom configuration**.
4. Click **Next**.
5. Click the applicable tab in the right pane. In the “Create arrays” window, from the list of ready drives, select the two drives that you want to move into the array.
6. Click the icon to add the drives to the array.
7. If you want to configure a hot-spare drive, complete the following steps:
 - a. Click the **Spares** tab.
 - b. Select the physical drive that you want to designate as the hot-spare drive, and click the icon to add the drive.
8. Click **Next**.
9. In the “Configuration summary” window, review the information. To change the configuration, click **Back**.
10. Click **Apply**; when you are asked whether you want to apply the new configuration, click **Yes**. The configuration is saved in the controller and in the physical drives.
11. Exit from ServeRAID Manager, and remove the CD from the CD drive.
12. Restart the server.

Viewing the configuration

You can use ServeRAID Manager to view information about RAID controllers and the RAID subsystem (such as arrays, logical drives, hot-spare drives, and physical

drives). When you click an object in the ServeRAID Manager tree, information about that object appears in the right pane. To display a list of available actions for an object, click the object and click **Actions**.

Using the Boot Menu program

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

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

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

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

Configuring the Ethernet controller

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

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. To find updated information about configuring the controller, complete the following steps.

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

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 8485 or 8490 (depending on the machine type for your server model), and click **Search**.
3. In the **Additional search terms** field, type ethernet, and click **Go**.

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 77, 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.

- No beep indicates successful completion of POST, with no errors.
- More than one beep indicates that POST detected a problem. Error messages also appear during startup if POST detects a hardware-configuration problem.

For more information, see “POST beep codes” and the *Problem Determination and Service Guide* on the IBM xSeries Documentation CD.

- **ServerGuide problems**

This chart lists problem symptoms and steps to correct problems that occur when you are using the *ServerGuide Setup and Installation CD*. For more information, see “ServerGuide problems” on page 63.

- **Troubleshooting tables**

These tables list problem symptoms and steps to correct the problems. For more information, see “Troubleshooting tables” on page 63.

- **Diagnostic programs and error messages**

The diagnostic programs are the primary method of testing the major components of the server. These programs are on the IBM *Enhanced Diagnostics* CD that comes with the server. See the *Problem Determination and Service Guide* on the IBM xSeries Documentation CD for more information.

- **System-board error LEDs**

An LED on the system board might be lit to help isolate an error that is indicated by the system-error LED on the front of the server. For more information, see “System-board LEDs” on page 76.

POST beep codes

When POST is completed successfully, no beep occurs. 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.

Repeating long beeps

A memory error has occurred. Make sure that all DIMMs are correctly installed.

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. To check for updated technical information, go to <http://www.ibm.com/support/>, and type 8485 or 8490 (depending on the machine type for your server model) under **Search technical support**.

Table 2. Abbreviated list of POST error codes

<ul style="list-style-type: none">• 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 <i>Problem Determination and Service Guide</i> 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
062	Three consecutive boot failures using the default configuration.	<ol style="list-style-type: none">1. Flash the system firmware to the latest level (see the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD).2. (Trained service technician only) Replace the system board.
101	Tick timer internal interrupt failure.	(Trained service technician only) Replace the system board.
102	Internal timer channel 2 test failure.	(Trained service technician only) Replace the system board.
151	Real-time clock error.	<ol style="list-style-type: none">1. Reseat the battery.2. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Batteryb. (Trained service technician only) System board

Table 2. Abbreviated list of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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	Real-time clock battery failure.	<ol style="list-style-type: none"> 1. Reseat the battery. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board
162	Invalid configuration information or CMOS random-access memory (RAM) checksum failure.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the following components: <ol style="list-style-type: none"> a. Battery b. Failing device (if the device is a FRU, the device must be reseated by a trained service technician only) 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. Failing device (if the device is a FRU, the device must be replaced by a trained service technician only) c. (Trained service technician only) System board
163	Time of day not set.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, make sure that the date and time are correct, and save the settings. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board

Table 2. Abbreviated list of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
175	Service processor flash code damaged or not loaded. Note: In this case, the service processor is the optional Remote Supervisor Adapter II.	<ol style="list-style-type: none"> 1. Update the Remote Supervisor Adapter II firmware (see the <i>Problem Determination and Service Guide</i> on the IBM <i>xSeries Documentation CD</i>). 2. Replace the Remote Supervisor Adapter II.
184	Power-on password damaged.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board
187	VPD serial number not set.	<ol style="list-style-type: none"> 1. Set the serial number by updating the BIOS code level (see the <i>Problem Determination and Service Guide</i> on the IBM <i>xSeries Documentation CD</i>). 2. (Trained service technician only) Replace the system board.
189	Three attempts were made to access the server with an incorrect password.	Restart the server and enter the administrator password; then, run the Configuration/Setup Utility program and change the power-on password.

Table 2. Abbreviated list of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
289	A DIMM has been disabled by the user or by the system.	<ol style="list-style-type: none"> 1. If the DIMM was disabled by the user, run the Configuration/Setup Utility program and enable the DIMM. 2. Make sure that the DIMM is installed correctly (see “Installing a memory module” on page 13). 3. Replace the DIMM. 4. (Trained service technician only) Replace the system board.
301	Keyboard or keyboard controller error.	<ol style="list-style-type: none"> 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. 2. Reseat the keyboard cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board
303	Keyboard controller failure.	<ol style="list-style-type: none"> 1. Reseat the keyboard. 2. Replace the keyboard. 3. (Trained service technician only) Replace the system board.

Table 2. Abbreviated list of POST error codes (continued)

Error code	Description	Action
1600	<p>The service processor is not functioning.</p> <p>Note: Depending on which device is installed, the service processor is the optional Remote Supervisor Adapter II or the mini-BMC.</p>	<ol style="list-style-type: none"> 1. If the optional Remote Supervisor Adapter II is installed: <ol style="list-style-type: none"> a. Update the Remote Supervisor Adapter II firmware (see the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). b. Replace the Remote Supervisor Adapter II. 2. Update the mini-BMC firmware (see the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). 3. (Trained service technician only) Replace the system board.

Table 2. Abbreviated list of POST error codes (continued)

Error code	Description	Action
178x	Fixed disk error. Note: x is the drive that has the error.	<ol style="list-style-type: none"> 1. Run the hard disk drive diagnostic tests on drive x (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). 2. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Mini-PCI-X adapter cable c. Mini-PCI-X adapter d. PCI-X expansion card • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Hard disk drive x cable • Non-hot-swap models: hard disk drive x cable 3. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Mini-PCI-X adapter cable c. SAS backplane d. Mini-PCI-X adapter e. PCI-X expansion card • Simple-swap and non-hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Hard disk drive x cable 4. (Trained service technician only) Replace the system board.

Table 2. Abbreviated list of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
1800	Unavailable PCI hardware interrupt.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and adjust the adapter settings. 2. Remove each adapter one at a time, restarting the server each time, until the problem is isolated.
1801	A PCI adapter has requested memory resources that are not available.	<ol style="list-style-type: none"> 1. Make sure that no devices have been disabled in the Configuration/Setup Utility program. 2. Change the order of the adapters in the PCI, PCI-X, and PCI Express slots. Make sure that the startup (boot) device is positioned early in the scanning order. (For information about the scanning order, see the <i>User's Guide</i> on the IBM <i>xSeries Documentation CD</i>). 3. Make sure that the settings for the adapter and all other adapters in the Configuration/Setup Utility program are correct. If the memory resource settings are not correct, change them. 4. If all memory resources are being used, remove an adapter to make memory available to the adapter. Disabling the BIOS on the adapter should correct the error. See the documentation that comes with the adapter.

Table 2. Abbreviated list of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
1805	PCI option read-only memory (ROM) checksum error.	<ol style="list-style-type: none"> 1. Remove the failing PCI adapter. 2. Reseat the following components: <ol style="list-style-type: none"> a. Each adapter b. PCI-X expansion card (if failing adapter is on the card). 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Failing PCI adapter b. PCI-X expansion card (if failing adapter is on the card). c. (Trained service technician only) System board

Table 2. Abbreviated list of POST error codes (continued)

Error code	Description	Action
1810	PCI error.	<ol style="list-style-type: none"> 1. Make sure that no devices have been disabled in the Configuration/Setup Utility program. 2. Remove the adapters from the PCI, PCI-X, or PCI Express slots. 3. Reseat the following components: <ol style="list-style-type: none"> a. Failing adapter Note: If an error LED is lit on an adapter, reseat that adapter first; if no LEDs are lit, reseat each adapter one at a time, restarting the server each time, to isolate the failing adapter. b. PCI-X expansion card (if failing adapter is on the card) 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Failing adapter b. PCI-X expansion card (if failing adapter is on the card) c. (Trained service technician only) System board

Table 2. Abbreviated list of POST error codes (continued)

Error code	Description	Action
1962	A drive does not contain a valid boot sector.	<ol style="list-style-type: none"> 1. Make sure that a bootable operating system is installed. 2. Run the hard disk drive diagnostic tests (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i> on the IBM <i>xSeries Documentation CD</i>). 3. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Mini-PCI-X adapter cable c. Mini-PCI-X adapter d. PCI-X expansion card • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable • Non-hot-swap models: hard disk drive cable 4. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Mini-PCI-X adapter cable c. SAS backplane d. Mini-PCI-X adapter e. PCI-X expansion card • Simple-swap and non-hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable 5. (Trained service technician only) Replace the system board.

Table 2. Abbreviated list of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
8603	Pointing-device error.	<ol style="list-style-type: none"> 1. Reseat the pointing device. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Pointing device b. (Trained service technician only) System board
00012000	Processor machine check error.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
00019701	Microprocessor 1 failed the built-in self-test (BIST).	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
01298001	No update data for microprocessor 1.	<ol style="list-style-type: none"> 1. Update the BIOS code again (see the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.

Table 2. Abbreviated list of POST error codes (continued)

Error code	Description	Action
01298101	Bad update data for processor 1.	<ol style="list-style-type: none"> 1. Update the BIOS code again (see the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.
I9990301	Hard disk drive boot sector error.	<ol style="list-style-type: none"> 1. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Mini-PCI-X adapter cable c. Mini-PCI-X adapter d. PCI-X expansion card • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable • Non-hot-swap models: hard disk drive cable 2. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Mini-PCI-X adapter cable c. SAS backplane d. Mini-PCI-X adapter e. PCI-X expansion card • Simple-swap and non-hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable 3. (Trained service technician only) Replace the system board.

Table 2. Abbreviated list of POST error codes (continued)

Error code	Description	Action
I9990305	An operating system was not found.	<ul style="list-style-type: none"> 1. Make sure that a bootable operating system is installed. To determine whether an operating system is one of the devices in the startup sequence, run the Configuration/Setup Utility program (see the <i>User's Guide</i> on the IBM <i>xSeries Documentation CD</i>). 2. Run the hard disk drive diagnostic tests (see "Running the diagnostic programs" in the <i>Problem Determination and Service Guide</i> on the IBM <i>xSeries Documentation CD</i>). 3. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: <ul style="list-style-type: none"> a. Hard disk drive b. Mini-PCI-X adapter cable c. Mini-PCI-X adapter d. PCI-X expansion card • Simple-swap models: <ul style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable • Non-hot-swap models: hard disk drive cable 4. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ul style="list-style-type: none"> a. Hard disk drive b. Mini-PCI-X adapter cable c. SAS backplane d. Mini-PCI-X adapter e. PCI-X expansion card • Simple-swap and non-hot-swap models: <ul style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable 5. (Trained service technician only) Replace the system board.

Table 2. Abbreviated list of POST error codes (continued)

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
I9990650	AC power has been restored.	<ol style="list-style-type: none"> 1. Reseat the power cords. 2. Check for interruption of the external power. 3. Replace the power cords.

ServerGuide problems

The following table lists problem symptoms and suggested solutions.

Table 3. ServerGuide Setup and Installation CD

Symptom	Action
The <i>ServerGuide Setup and Installation</i> CD will not start.	<ul style="list-style-type: none"> • Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive. • If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence. • 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.
ServeRAID program cannot view all installed drives or the operating system cannot be installed.	<ul style="list-style-type: none"> • Make sure that there are no duplicate IRQ assignments. • Make sure that the hard disk drive is connected correctly.
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 <i>ServerGuide Setup and Installation</i> 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 operating-system CD is supported on the server. If the operating system is supported, no logical drive is defined (RAID servers). Run the ServerGuide program and make sure that setup is complete.

Troubleshooting tables

Use the following 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-board LEDs or the LEDs on the front panel (see “System-board LEDs” on page 76).
2. Remove the software or device that you 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

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The IDE channel to which the CD or DVD drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. • All cables and jumpers are installed correctly. • The correct device driver is installed for the CD or DVD drive. 2. Run the CD or DVD drive diagnostic programs. 3. Reseat the CD or DVD drive cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. CD or DVD drive cable b. CD or DVD drive c. (Trained service technician only) System board
A CD or DVD is not working correctly.	<ol style="list-style-type: none"> 1. Clean the CD or DVD. 2. Run the CD or DVD drive diagnostic programs. 3. Reseat the CD or DVD drive cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. CD or DVD drive cable b. CD or DVD drive
The CD or DVD drive tray is not working.	<ol style="list-style-type: none"> 1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the CD or DVD drive cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. CD or DVD drive cable b. CD or DVD drive

Diskette drive problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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 diskette drive activity LED stays lit, or the server bypasses the diskette drive.	<ul style="list-style-type: none"> • If there is a diskette in the drive, make sure that: <ul style="list-style-type: none"> – The diskette drive cables are correctly and securely connected. – The diskette drive is enabled in the Configuration/Setup Utility program. – The diskette is good and not damaged. (Try another diskette if you have one.) – The diskette is inserted correctly in the drive. – The diskette contains the necessary files to start the server. – Your software program is working properly. • To prevent diskette drive read/write errors, make sure that the distance between monitors and diskette drives is at least 76 mm (3 in.). <p>If the problem remains, replace the internal diskette drive (see the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD).</p>

General problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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 or the SCSI 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.

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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 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 (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). 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

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached devices. • 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. 2. Check the system/event error log (see “Error logs” in the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD).

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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The keyboard cable is securely connected. • For PS/2 keyboards, the keyboard and mouse cables are not reversed. • The server and the monitor are turned on. 2. 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. 3. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board
The mouse or pointing device does not work.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The mouse or pointing-device cable is securely connected to the server. • For PS/2 devices, the keyboard and mouse or pointing-device cables are not reversed. • The mouse or pointing-device drivers are installed correctly. • The server and the monitor are turned on. • The keyboardless operation and mouse options are enabled in the Configuration/Setup Utility program. 2. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Mouse or pointing device 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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • No error LEDs are lit on the front-panel assembly or on the system board. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program. • All DIMMs are enabled. The server might have automatically disabled a DIMM when it detected a problem, or a DIMM might have been manually disabled. 2. Check the POST error log for error message 289: <ul style="list-style-type: none"> • If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM. 3. Run memory diagnostics (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). 4. Make sure that there is no memory mismatch when the server is over the minimum memory configuration (one 512 MB DIMM) and that you have installed the correct number of DIMMs (see the <i>User’s Guide</i> on the IBM xSeries Documentation CD for information about installing optional memory modules). 5. Reseat the DIMMs. 6. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board

Microprocessor problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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 startup (boot) microprocessor is not working correctly.	<ol style="list-style-type: none"> 1. Make sure that the microprocessor is supported on this server. 2. (Trained service technician only) Reseat the microprocessor. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board

Monitor problems

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

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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	<ol style="list-style-type: none"> 1. Make sure that the monitor cables are firmly connected. 2. Try using a different monitor on the server, or try using the monitor that is being tested on a different server. 3. Run the diagnostic programs. If the monitor passes the diagnostic programs, the problem might be a video device driver. 4. Reseat the Remote Supervisor Adapter II (if one is present). 5. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Remote Supervisor Adapter II (if one is present) 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 screen is blank.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The server is turned on. If there is no power to the server, see “Power problems” on page 73. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. • No beep codes sound when the server is turned on. <p>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).</p> 2. Make sure that the correct server is controlling the monitor, if applicable. 3. Make sure that damaged BIOS code is not affecting the video; see “Recovering from a BIOS update failure” in the <i>Problem Determination and Service Guide</i> on the IBM <i>xSeries Documentation CD</i>. 4. See “Solving undetermined problems” in the <i>Problem Determination and Service Guide</i>.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application. 2. Run video diagnostics (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i> on the IBM <i>xSeries Documentation CD</i>). <ul style="list-style-type: none"> • If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” in the <i>Problem Determination and Service Guide</i>. • (Trained service technician only) If the server fails the video diagnostics, replace the 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 monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<ol style="list-style-type: none"> 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. Attention: Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. Notes: <ol style="list-style-type: none"> 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.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the following components: <ol style="list-style-type: none"> a. Monitor cable b. Remote Supervisor Adapter II (if one is present) 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor b. Remote Supervisor Adapter II (if one is present) c. (Trained service technician only) System board
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the BIOS code with the correct language (see “Updating the firmware” in the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor 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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The device is designed for the server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/). • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or any other device is changed, you must update the configuration. 2. Reseat the device that you just installed. 3. Replace the device that you just installed.
An IBM optional device that used to work does not work now.	<ol style="list-style-type: none"> 1. Make sure that all of the hardware and cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. Reseat the failing device. 4. Replace the failing device.

Power problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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
<p>The power-control button does not work (the server does not start).</p> <p>Note: The power-control button will not function until 20 seconds after the server has been connected to ac power.</p>	<ol style="list-style-type: none"> 1. Make sure that the front-panel assembly power-control button is working correctly: <ol style="list-style-type: none"> a. Disconnect the server power cords. b. Reconnect the power cords. c. Press the power-control button. d. If the server does not start, bypass the front-panel assembly power-control button by using the force power-on jumper (see the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD). If the server starts, reseat the front-panel assembly cable and repeat steps 1a through 1c. If the problem remains, replace the front-panel assembly. 2. Make sure that: <ul style="list-style-type: none"> • The power cords are correctly connected to the server and to a working electrical outlet. • The server contains the correct type of DIMMs. • The DIMMs are correctly seated. • The LEDs on the power supply do not indicate a problem. • The microprocessor is correctly installed. 3. Reseat the following components: <ol style="list-style-type: none"> a. DIMMs b. Power supply cables to all internal components c. Power supplies (hot-swap models) 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. Power supplies (hot-swap models) c. (Trained service technician only) Power supply (non-hot swap models) 5. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports. 6. See “Solving undetermined problems” in the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD.
<p>The server does not turn off.</p>	<ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> a. Press Ctrl+Alt+Delete. b. Turn off the server by holding the power-control button for 5 seconds. c. Restart the server. 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. 2. (Trained service technician only) If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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 unexpectedly shuts down, and the LEDs on the front-panel assembly are not lit.	See “Solving undetermined problems” in the <i>Problem Determination and Service Guide</i> on the IBM xSeries Documentation CD.

Serial port problems

For more information about the serial port, see the *User’s Guide* on the IBM xSeries Documentation CD.

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports is disabled. • The serial-port adapter (if one is present) is seated correctly. 2. Reseat the serial-port adapter. 3. Replace the serial-port adapter.
A serial device does not work.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct connector. (For connector locations, see the <i>User’s Guide</i> on the IBM xSeries Documentation CD.) 2. Reseat the following components: <ol style="list-style-type: none"> a. Failing serial device b. Serial cable c. Remote Supervisor Adapter II (if one is present) 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Failing serial device b. Serial cable c. Remote Supervisor Adapter II (if one is present) d. (Trained service technician only) System board

Software problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. To determine whether the problem is caused by the software, make sure that: <ul style="list-style-type: none"> • 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. • The software is designed to operate on the server. • Other software works on the server. • The software works on another server. 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. 3. Contact your place of purchase of the software.

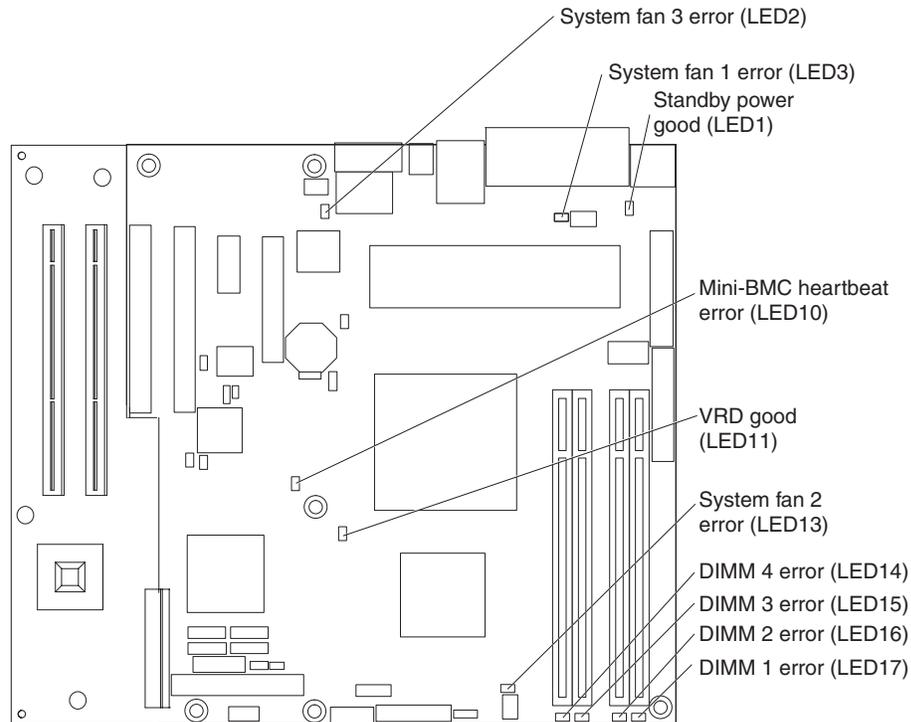
Universal Serial Bus device problems

<ul style="list-style-type: none"> • 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 <i>Problem Determination and Service Guide</i> 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.	<ol style="list-style-type: none"> 1. Run USB diagnostics (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i> on the IBM <i>xSeries Documentation CD</i>). 2. Make sure that: <ul style="list-style-type: none"> • The correct USB device driver is installed. • The operating system supports USB devices. • 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. 3. Make sure that the USB configuration options are set correctly in the Configuration/Setup Utility program menu. (For more information, see the <i>User’s Guide</i> on the IBM <i>xSeries Documentation CD</i>.) 4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

System-board LEDs

The following illustration shows the LEDs on the system board. You might need to refer to this illustration when solving problems with the server.

Note: The server does not contain a light path diagnostics panel.



Use the system-board LEDs to diagnose system errors. Each error LED is lit to indicate a problem with a specific component. After a problem is corrected, its LED will not be lit the next time that the server is restarted; if the problem remains, the LED will be lit again. For additional information, see the *Problem Determination and Service Guide* on the IBM xSeries Documentation CD.

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 *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.
- Go to the IBM support Web site at <http://www.ibm.com/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.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

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

*IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.*

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Edition notice

© Copyright International Business Machines Corporation 2005. All rights reserved.

U.S. Government Users Restricted Rights — Use, duplication, or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

Active Memory	Predictive Failure Analysis
Active PCI	PS/2
Active PCI-X	ServeRAID
Alert on LAN	ServerGuide
BladeCenter	ServerProven
C2T Interconnect	TechConnect
Chipkill	ThinkPad
EtherJet	Tivoli
e-business logo	Tivoli Enterprise
@server	Update Connector
FlashCopy	Wake on LAN
IBM	XA-32
IBM (logo)	XA-64
IntelliStation	X-Architecture
NetBAY	Xcel4
Netfinity	XpandOnDemand
NetView	xSeries
OS/2 WARP	

Intel, MMX, and Pentium are trademarks of Intel Corporation in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Adaptec and HostRAID are trademarks of Adaptec, Inc., in the United States, other countries, or both.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Red Hat, the Red Hat "Shadow Man" logo, and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc., in the United States and other countries.

Other company, product, or service names may be trademarks or service marks of others.

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.

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

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

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

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。

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

L'étiquette 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.



Electronic emission notices (Class A)

IBM @server xSeries 206m Types 8485 and 8490

Important: The notices in this section apply to xSeries 206m servers that contain hot-swap power supplies.

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

聲 明
此為 A 級產品。在生活環境中，該產品可能會造成無線電干擾。在這種情況下，可能需要用戶對其干擾採取切实可行的措施。

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

Electronic emission notices (Class B)

IBM @server xSeries 206m Types 8485 and 8490

Important: The notices in this section apply to xSeries 206m servers that contain non-hot-swap power supplies.

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. 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.

Responsible party:

International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Telephone: 1-919-543-2193



Tested To Comply
With FCC Standards

FOR HOME OR OFFICE USE

Industry Canada Class B emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

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 B Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

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）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

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
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

IBM power cord part number	Used in these countries and regions
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

Index

A

- acoustical noise emissions 5
- Adaptec RAID Configuration Utility 42
- adapter
 - installing 26
 - requirements 25
 - scanning order 26
 - specifications 5
 - support bracket 6
- Array Configuration Utility 42
- arrays, using ServeRAID Manager 45
- attention notices 4

B

- backplane 19, 21
- battery
 - return program 82
 - safety viii
- bay identification 16
- bays 2 and 3, removable-media drives 17
- bays 4-7
 - hot-swap drives 19, 20
 - non-hot-swap drives 23
 - simple-swap drives 21
- bays, filler panel 18
- beep codes 49, 70
- bezel
 - installing 28
 - removing 11
- Boot Menu program 47

C

- cables
 - internal drives 24
 - power 24
 - rear connectors 31
 - signal 24
- caution statements 4
- CD drive
 - activity LED 34
 - eject button 34
 - installing 16
 - problems 64
 - specifications 5
- Class A electronic emission notice 83
- Class B electronic emission notice 85
- components, major 6
- configuration
 - Configuration/Setup Utility 40
 - custom 46
 - enabling SATA options on Configuration/Setup Utility menu 40
 - Ethernet controller 47
 - express 46
 - fine-tuning 46

- configuration (*continued*)
 - integrated Serial Advanced Technology Attachment (SATA) controller 42
 - resetting 70
 - SAS/SATA controller 40, 44
 - Serial Attached SCSI (SAS) devices 40
 - ServeRAID controller 45
 - summary window 46
 - updating 32
- connector
 - cable 31
 - Ethernet 35
 - external 34, 35
 - keyboard 35
 - mouse 35
 - parallel 35
 - power cord 35
 - serial 1 35
 - serial 2 35
 - Universal Serial Bus (USB) 34, 35
 - video 35
- controller
 - Ethernet, configuring 47
 - SAS/SATA
 - configuring 44
 - enabling 44
 - using 44
 - Serial ATA, configuring 42
 - ServeRAID 45
- controls and indicators 33
- cooling 5, 8
- cover
 - installing 30
 - removing 10
- custom configuration 46

D

- danger statements 4
- data rate, Ethernet 47
- diagnostic tools 49
- diskette drive
 - activity LED 34
 - installing 16, 17
 - problems 65
 - specifications 5
- diskette-eject button 34
- documentation CD 3
- drive
 - bay filler panel 18
 - bay identification 16
 - cables 24
 - hot-swap
 - installation 19
 - support 16
 - installing 16
 - non-hot-swap 23
 - removable-media 17

- drive (*continued*)
 - simple-swap 21
- dual inline memory module (DIMM)
 - connectors 14
 - installing 14
 - retaining clips 15
- DVD drive
 - activity LED 34
 - eject button 34
 - problems 64

E

- eject button
 - CD 34
 - diskette 34
 - DVD 34
- electrical input 5
- electromagnetic compatibility (EMC) shield 6, 17, 18
- electronic emission notices
 - Class A 83
 - Class B 85
- enabling
 - SAS/SATA HostRAID feature 44
 - SATA options on Configuration/Setup Utility menu 40
 - Serial ATA RAID feature 42
- environment 5
- error LED 76
- error messages, POST 50
- error symptoms
 - CD-ROM drive, DVD-ROM drive 64
 - general 65
 - hard disk drive 65
 - intermittent 66
 - keyboard 67
 - keyboard, USB 75
 - memory 68
 - microprocessor 69
 - mouse 67
 - mouse, USB 75
 - optional devices 72
 - pointing device 67
 - pointing device, USB 75
 - power 73
 - serial port 74
 - software 75
 - USB port 67, 75
- Ethernet
 - activity LED 36
 - connector 35
 - controller, configuring 47
 - high performance modes 47
 - integrated on system board 47
 - link status LED 36
 - modes 47
- expansion slots 5, 26
- express configuration 46
- external connectors 35

F

- FCC Class A notice 83
- FCC Class B notice 85
- features
 - SATA RAID, enabling 42
 - server 5
- filler panel
 - hard disk drive bay 6, 20
 - removable-media drive bay 6, 17
 - removing 18
 - SAS 6
 - SATA 6

H

- handling static-sensitive devices 9
- hard disk drive
 - activity LED 33, 34
 - hot-swap 19
 - installing 16
 - non-hot-swap 23
 - order of installation 21, 23
 - problems 65
 - simple-swap 21
 - status LED 34
- heat output 5
- HostRAID feature
 - enabling, for SAS/SATA controller 44
 - using 42
- hot-swap drive
 - backplane
 - activity LED 34
 - SAS IDs 21
 - status LED 34
 - installation 19
 - specifications 5

I

- IBM Configuration/Setup Utility program 40
- IDs for SAS hot-swap drives 21
- important notices 4
- indicators 33
- installation guidelines 7
- installation order
 - hard disk drives 21, 23
 - memory modules 13, 15
- installing
 - adapters 26
 - cover 30
 - diskette drive 17
 - hot-swap drives 19, 20
 - internal drives 16
 - lower bezel 29
 - memory modules 13
 - non-hot-swap drives 23
 - options 7
 - removable-media drives 16
 - simple-swap drives 21
 - upper bezel 28

- integrated Serial ATA controller, configuring 42
- intermittent problems 66
- internal
 - drive bays 16
 - drives, installing 16

K

- keyboard connector 35
- keyboard problems 67, 75
- keys 2

L

- LEDs
 - CD drive activity 34
 - diskette drive activity 34
 - DVD drive activity 34
 - error 76
 - Ethernet link status 36
 - Ethernet transmit/receive activity 36
 - hard disk drive activity 33
 - hot-swap hard disk drive activity 34
 - hot-swap hard disk drive status 34
 - power-on 33
 - system-error 33
- lower bezel
 - installing 29
 - removing 11

M

- major components 6
- memory
 - configuration 70
 - installing 13
 - problems 68
 - specifications 5
- memory module
 - installing 14
 - order of installation 13, 15
 - specifications 5
 - supported 13
- microprocessor
 - problems 69
 - specifications 5
- modes, Ethernet 47
- mouse connector 35
- mouse problems 67, 75

N

- non-hot-swap drives 23
- notes 4
- notes, important 80
- notices
 - electronic emission 83, 85
 - FCC, Class A 83
 - FCC, Class B 85
- notices and statements 4

O

- online publications 1
- optional device
 - installation guidelines 7
 - problems 72
 - static-sensitive 9
- options
 - adapters 25, 26
 - connectors 35
 - drives 16
 - installing 7
 - memory modules 13
- order of installation
 - hard disk drives 21, 23
 - memory modules 13, 15

P

- parallel connector 35
- pointing-device problems 67, 75
- ports
 - Ethernet 35
 - parallel 35
 - serial 1 35
 - serial 2 35
 - Universal Serial Bus (USB) 34, 35, 75
 - video 35
- power control-button 33
- power cords 86
- power problems 73, 74
- power supply
 - hot-swap, Class A electronic emission notice 83
 - non-hot-swap, Class B electronic emission notice 85
 - specifications 5
- power-cord connector 35
- power-cord safety xii
- power-on LED 33
- power-on self-test (POST)
 - beep codes 49, 70
 - error messages 50
- problems
 - CD-ROM, DVD-ROM drive 64
 - diskette drive 65
 - hard disk drive 65
 - intermittent 66
 - keyboard 67, 75
 - memory 68
 - microprocessor 69
 - mouse 67, 75
 - optional devices 72
 - pointing device 67, 75
 - power 73, 74
 - serial port 74
 - software 75
 - solving 49
 - USB port 75

R

- redundant array of independent disks (RAID)
 - Adaptec HostRAID 41
 - adapter 21, 25
 - enabling SATA options on Configuration/Setup Utility menu 40
 - non-support 40, 45
 - SAS/SATA HostRAID 44
 - Serial ATA HostRAID 41
 - ServeRAID Manager 45
- reliability, system 8
- removable-media drives, installing 16, 17
- removing
 - cover 10
 - lower bezel 11
 - upper bezel 12
- resetting the configuration 70
- retaining clips, dual inline memory module (DIMM) 15

S

- safety information
 - handling static-sensitive devices 9
 - introduction vi
 - multilingual pointer v
 - power-cord warning xii
 - statements vii
 - system reliability considerations 8
 - when the server is on 8
- SAS/SATA Configuration Utility 40, 44
- SAS/SATA controller
 - configuring 44
 - viewing the configuration 45
- SAS/SATA HostRAID feature
 - enabling 44
 - using 44
- SATA
 - See Serial Advanced Technology Attachment (SATA)
- scanning order for adapters 26
- SCSI (small computer system interface)
 - See Serial Attached SCSI (SAS)
- serial 1 connector 35
- serial 2 connector 35
- Serial Advanced Technology Attachment (SATA)
 - controller
 - configuring 42
 - starting the Array Configuration Utility 42
 - viewing the configuration 43
 - HostRAID feature
 - enabling 42
 - using 42
 - hot-swap drives 19, 20
 - non-hot-swap drives 23
 - options, enabling, on Configuration/Setup Utility menu 40
 - simple-swap drives 21
 - status LEDs for hot-swap drives 34
- Serial Attached SCSI (SAS)
 - activity LEDs for hot-swap drives 34
 - Serial Attached SCSI (SAS) (*continued*)
 - backplane
 - activity LEDs for hot-swap drives 34
 - description 19
 - IDs for hot-swap drives 21
 - status LEDs for hot-swap drives 34
 - hot-swap drives 19, 20
 - status LEDs for hot-swap drives 34
 - serial port problems 74
 - server
 - configuration 39
 - features 5
 - power features 36
 - specifications 5
 - ServeRAID Manager
 - Configuration wizard 45
 - description 45
 - overview 45
 - Startable CD mode 45
 - using to configure arrays 45
 - viewing the configuration 46
 - ServerGuide
 - CDs 1, 39
 - error symptoms 63
 - starting the Setup and Installation CD 39
 - using 39
 - simple-swap drives 21
 - size 5
 - software problems 75
 - solving problems 49
 - specifications 5
 - Startable CD mode 45
 - starting
 - Array Configuration Utility 42
 - Configuration/Setup Utility program 40
 - SAS/SATA Configuration Utility 40
 - ServeRAID Manager 45
 - ServerGuide Setup and Installation CD 39
 - statements and notices 4
 - static electricity 9
 - static-sensitive devices, handling 9
 - status LEDs 33
 - system board
 - LEDs 76
 - memory connectors 14
 - system reliability 8
 - system specifications 5
 - system-error LED 33

T

- tape drive, installing 16
- temperature 5
- trademarks 80
- troubleshooting chart 63
- two-piece bezel 11, 28

U

- United States electronic emission Class A notice 83
- United States electronic emission Class B notice 85

- United States FCC Class A notice 83
- United States FCC Class B notice 85
- Universal Serial Bus (USB)
 - connectors
 - front 34
 - rear 35
 - problems 67, 75
- upper bezel
 - installing 28
 - removing 12
- using
 - Adaptec HostRAID configuration programs 41
 - Adaptec RAID Configuration Utility 42
 - Boot Menu program 47
 - SAS/SATA HostRAID feature 44
 - Serial ATA HostRAID feature 42
 - ServeRAID Manager 45
 - ServerGuide 39
- utility
 - Array Configuration 42
 - Configuration/Setup 40
 - SAS/SATA Configuration 44
 - ServeRAID Manager 45

V

- video
 - connector 35
 - controller 5
 - specifications 5
- viewing the configuration
 - SAS/SATA controller 45
 - Serial ATA controller 43
 - ServeRAID Manager 46

W

- Web site
 - compatible options 2, 7, 13
 - IBM eServer and xSeries products 1, 78
 - IBM support 1, 77
 - ordering publications 77
 - ServerProven list 2, 7, 13
 - software service and support 78
- weight 5



Part Number: 40K2367

Printed in USA

(1P) P/N: 40K2367

