



xSeries 335 Type 8676

Installation Guide

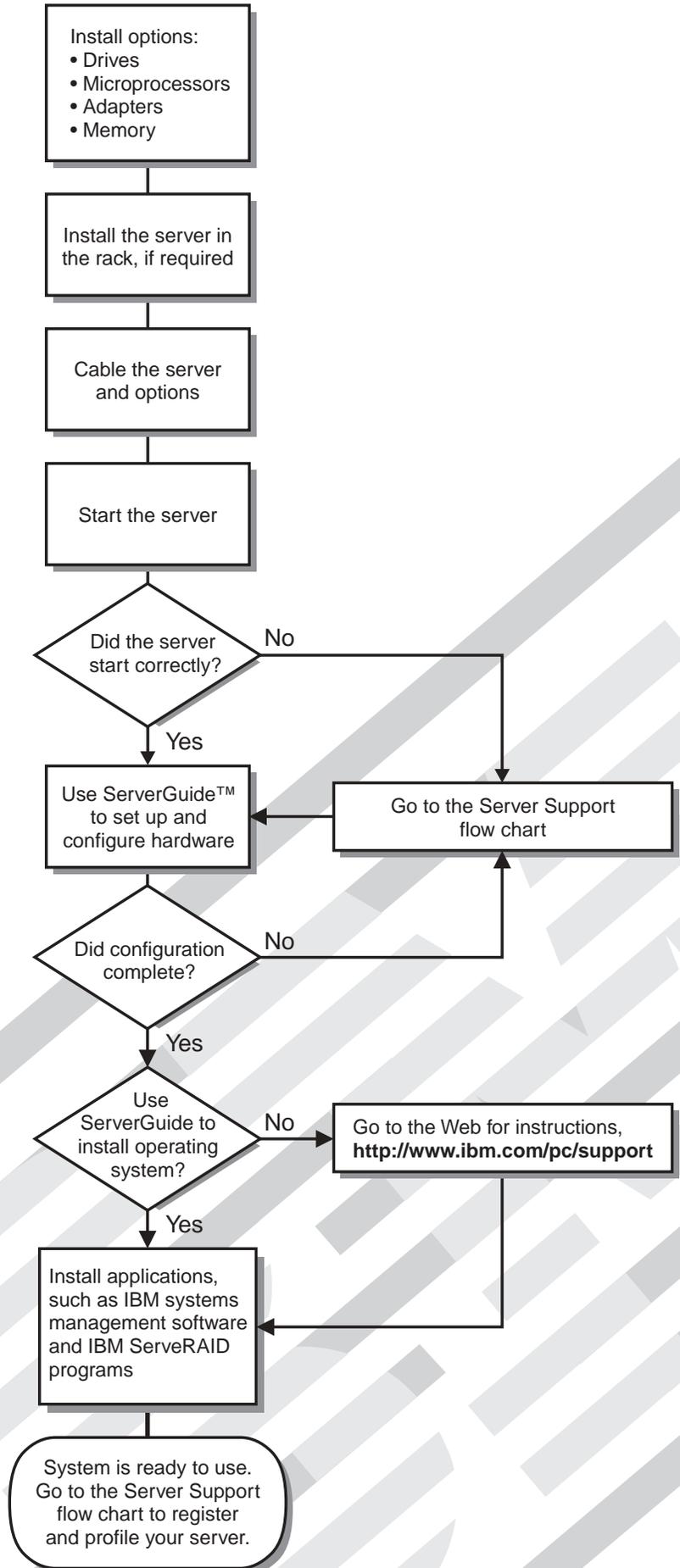
Welcome...

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

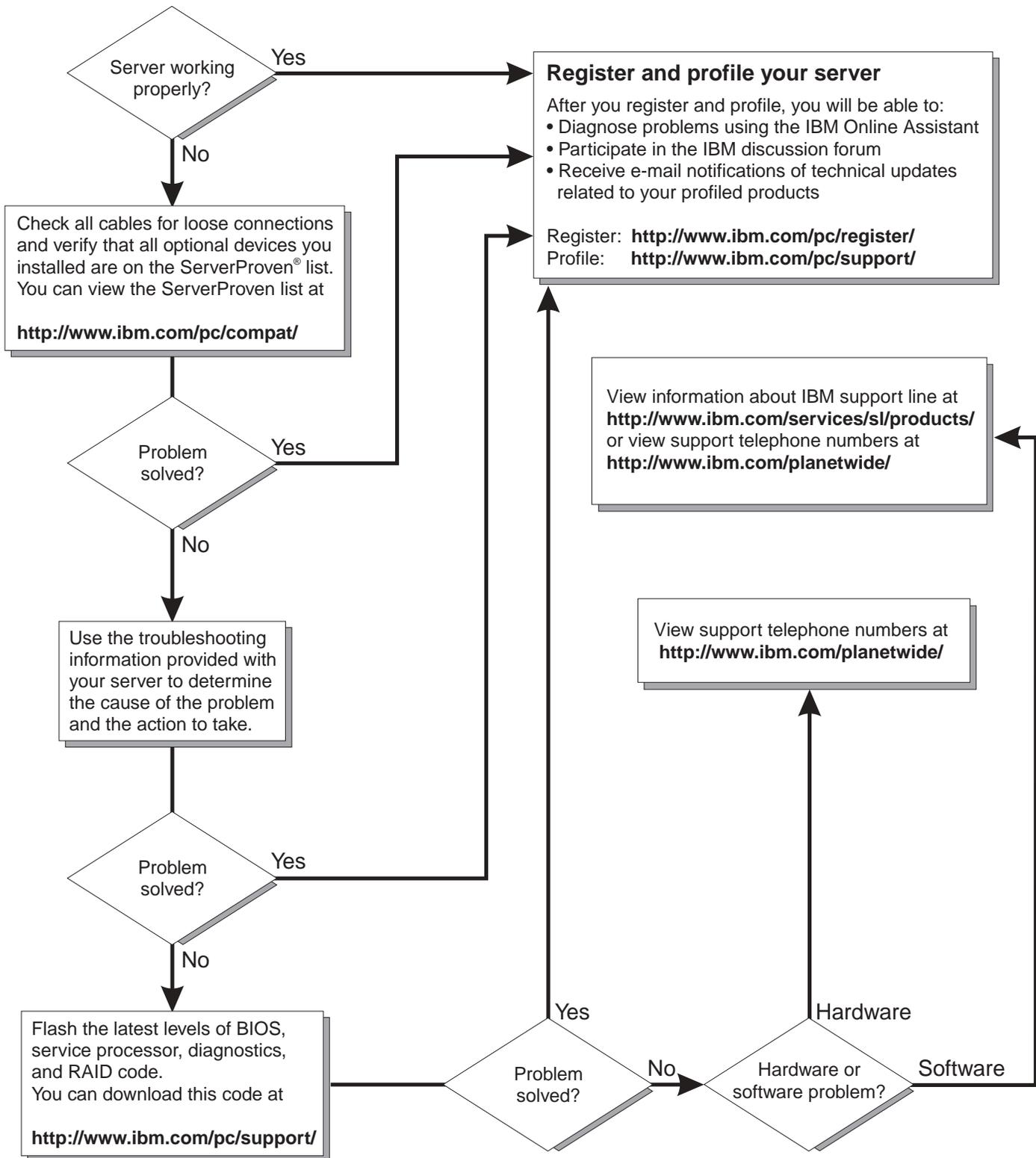
This server *Installation Guide* contains information for setting up and configuring your server.

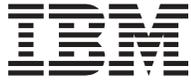
For detailed information about your server, view the publications on the Documentation CD.

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



Server Support





@server

IBM xSeries 335 Type 8676

Installation Guide

Note:

Before using this information and the product it supports, read the general information in Appendix B, "Warranty information", on page 55, and Appendix C, "Notices", on page 67.

Second Edition (February 2003)

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si 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.

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:

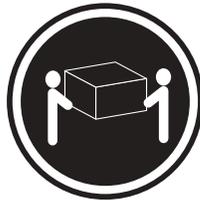
- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation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

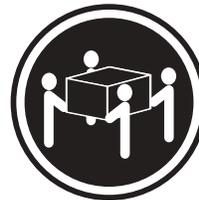
Statement 4



≥18 kg (39.7 lb)



≥32 kg (70.5 lb)



≥55 kg (121.2 lb)

CAUTION:

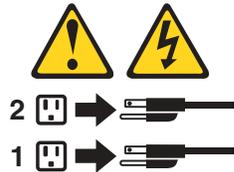
Use safe practices when lifting.

Statement 5



CAUTION:

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



Statement 8



CAUTION:

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



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

Statement 10



CAUTION:

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



>82 kg (180 lb)

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 your IBM® @server xSeries™ 335 Type 8676 server and basic instructions for installing some options. More detailed instructions for installing options are in the *Option Installation Guide* on the IBM *xSeries Documentation CD*, which comes with your server. This publication contains information about:

- Setting up and cabling your server
- Starting and configuring your server
- Installing your operating system

The latest version of this publication is available from the IBM Web site. Go to <http://www.ibm.com/> and click **Support & downloads**. In the **Technical support** keyword search field, type 8676 and click **Go**. A list of publications for your server is displayed.

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

Your server comes with the ServeRAID™ Manager program on the IBM *ServeRAID Support CD*. You can use this program to configure the integrated SCSI controller with RAID capabilities for managing a RAID level-1 SCSI hard disk drive array.

Also included is an IBM *xSeries Documentation CD*, which provides detailed information about this server.

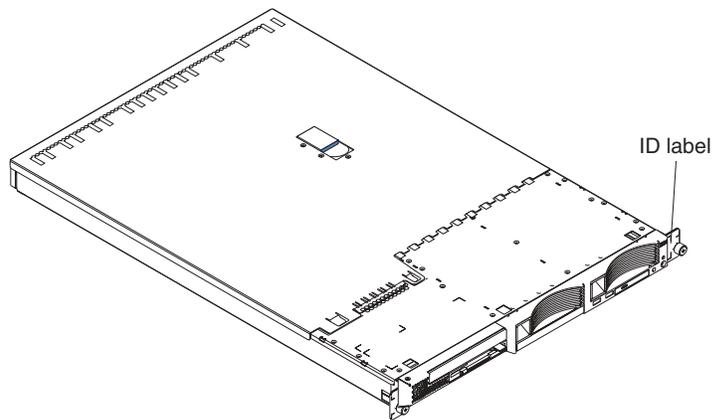
Your server comes with a limited warranty. If you have access to the World Wide Web, you can obtain up-to-date information about your server and other IBM server products at <http://www.ibm.com/eserver/xseries/>.

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

| | |
|----------------------|--------------------------------|
| Product name | IBM @server xSeries 335 server |
| Machine type | 8676 |
| Model number | _____ |
| Serial number | _____ |

The model number and serial number are on the ID label on the right mounting bracket on the server, as shown in the following illustration.

Note: This illustration shows a SCSI model server. An IDE non-hot-swap hard disk drive model is also available. This illustration might differ slightly from your hardware.



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

For a list of supported options for your server, see the ServerProven[®] list at <http://www.ibm.com/pc/compat/>.

Features and specifications

The following table provides a summary of the features and specifications of your xSeries 335 Type 8676 server. Depending on your server model, some features and specifications might not apply.

Racks are marked in vertical increments of 1.75 inches. Each increment is referred to as a unit, or “U.” A 1-U-high device is 1.75 inches tall.

Table 1. Features and specifications

| | | |
|--|---|---|
| <p>Microprocessor:</p> <ul style="list-style-type: none"> • Intel® Pentium® 4 microprocessor <ul style="list-style-type: none"> – Minimum: One – Maximum: Two • 512 KB Level-2 cache • 400 MHz front-side bus (FSB) <p>Memory:</p> <ul style="list-style-type: none"> • Type: error correcting code (ECC), double-data rate (DDR) SDRAM, registered DIMMs with Chipkill™ <ul style="list-style-type: none"> – Minimum: 512 MB – Maximum: 4 GB (8 GB with availability of 2 GB DIMMs) • Four slots, interleaved <p>Drives standard:</p> <ul style="list-style-type: none"> • Diskette: 1.44 MB • CD-ROM: IDE <p>Hard disk drives:</p> <ul style="list-style-type: none"> • Slim-high drives, hot-swap SCSI or non-hot-swap IDE (drive capacity and speed vary with model) • Maximum: Two <p>Expansion slots:</p> <ul style="list-style-type: none"> • One full-length adapter slot supports up to 100 MHz/64-bit PCI-X adapters (bus A) • One half-length adapter slot supports up to 100 MHz/64-bit PCI-X adapters (bus B) or 33 MHz 32-bit PCI adapters (bus C) • Supports 3.3 V or universal adapters only <p>Power supply:</p> <p>One 331 watt (115-230 V ac)</p> | <p>Video:</p> <ul style="list-style-type: none"> • ATI RageXL video controller integrated on system board • Compatible with SVGA • 8 MB SDRAM video memory <p>Size</p> <ul style="list-style-type: none"> • Height 43 mm (1.69 in.) • Depth: 660 mm (25.98 in.) • Width: 440 mm (17.32 in.) • Weight: approximately 12.7 kg (28 lb) when fully configured <p>Integrated functions:</p> <ul style="list-style-type: none"> • Integrated system management processor (ISMP) with one ISM connector • One LSI Ultra320 SCSI controller with RAID level-1 capability • Two Broadcom 10/100/1000 Ethernet controllers with Wake on LAN® and Alert Standard Format support • Three Universal Serial Bus (USB) ports • One serial port • Two Cable Chaining Technology (C2T) ports (one IN, one OUT) <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Declared sound power, idling: 6.5 bels • Declared sound power, operating: 6.5 bels | <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Server on: 10° to 35°C (50.0° to 95.0°F). Altitude: 0 to 914 m (2998.7 ft) – Server on: 10° to 32°C (50.0° to 89.6°F). Altitude: 914 m (2998.7 ft) to 2133 m (6998.0 ft.) – Server off: 10° to 43°C (50.0° to 109.4°F). Maximum altitude: 2133 m (6998.0 ft) • Humidity: <ul style="list-style-type: none"> – Server on: 8% to 80% – Server off: 8% to 80% • Airflow rates: <ul style="list-style-type: none"> – Minimum: 31.4 CFM – Maximum: 39.2 CFM <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 375 Btu (110 watts) • Maximum configuration: 1195 Btu (350 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50-60 Hz) required • 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: 0.110 kVA – Maximum: 0.350 kVA |
|--|---|---|

Notices and statements used in this book

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

The following notices and statements are used in the documentation:

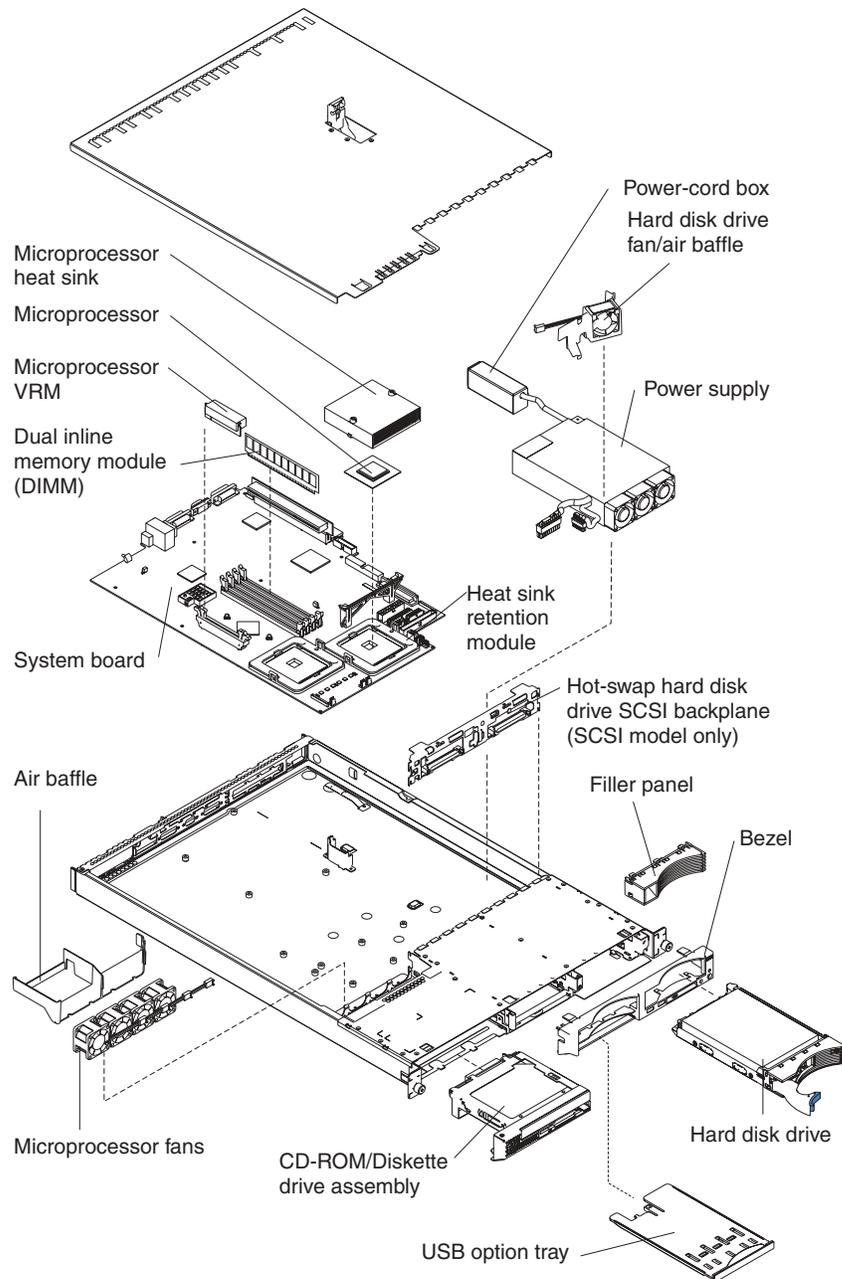
- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice 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.

Major components of the xSeries 335 Type 8676 server

The blue color on components and labels indicates touch points, where a component can be gripped, a latch moved, and so on.

The following illustration shows the locations of major components in a SCSI-model server. An IDE model is also available.

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



Chapter 2. Installing options

This chapter provides basic instructions for installing hardware options in your server. These instructions are intended for users who are experienced with setting up IBM server hardware. If you need more detailed instructions, see the *Option Installation Guide* on the IBM xSeries Documentation CD.

Installation guidelines

Before you begin installing options in your server, read the following information:

- Read the safety information beginning on page v, and the guidelines in “Handling static-sensitive devices”. This information will help you work safely with your server and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and other devices that you will connect to the server.
- Back up all important data before you make changes to disk drives.
- Have a small Phillips screwdriver available.
- For a list of supported options for your server, go to <http://www.ibm.com/pc/compat/> on the World Wide Web.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- Space is available around the server to allow the server cooling system to work properly. See the documentation that comes with the rack.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.

Handling static-sensitive devices

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

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

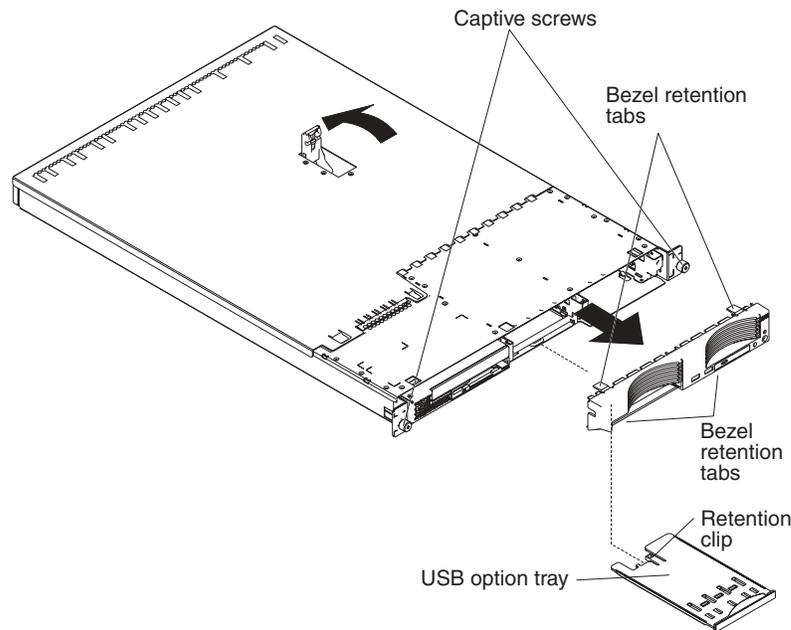
- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, place it back into its static-protective package. Do not place the device on your server cover or on a metal surface.

- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Removing the cover and bezel

Complete the following steps to remove the cover and bezel:

1. Read the safety information beginning on page v, and “Installation guidelines” on page 7.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Lift the cover release latch. The cover slides to the rear approximately 13 mm (0.5 inch).



4. Slide the cover back, and lift the cover off the server.
Attention: To ensure adequate cooling and airflow, do not operate the server with the cover removed. Operating the server with the cover removed might damage server components.
5. Press in on the USB option tray (below hard disk drive bay 1) to release it and slide the tray out until it stops; then, press the retention clip at the bottom rear of the tray and remove the tray from the server.

Note: You need to remove the USB option tray and the bezel only if you are installing a non-hot-swap hard disk drive. It is not necessary if you are installing other options in the server.

6. Press on the bezel retention tabs on the top, right side and bottom of the server, and pull the bezel directly away from the server.

Working with adapters

This section describes how to install an adapter in the server. Before you install an adapter, review the following information:

- Read the documentation that comes with your operating system.
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.
- The server comes with two 64-bit 100 MHz peripheral component interconnect-extended (PCI-X) adapter expansion slots on the system board. The server is designed specifically for PCI-X adapter support, but it also supports PCI adapters.
- The expansion slots support both 32-bit and 64-bit adapters. You can install half-length adapters in slot 1. You can install full-length adapters in slot 2.
- The server supports 3.3 V and universal PCI and PCI-X adapters; it does not support 5.0 V-only adapters.
- PCI-X slot 2 and the integrated SCSI controller are on PCI-X bus A (bus 1). The integrated Ethernet controllers are on PCI-X bus B (bus 2). The integrated video controller is on PCI bus C (bus 0). PCI-X slot 1 is switchable between PCI-X bus B and PCI bus C by means of the jumper on jumper block J12.

Note: If no jumper is installed on jumper block J12, the server determines automatically the optimal bus to which to attach PCI-X slot 1. If you install a jumper between pins 1 and 2 on J12, PCI-X slot 1 is forced to PCI bus C. If you install the jumper between pins 2 and 3 on J12, PCI-X slot 1 is forced to PCI-X bus B.

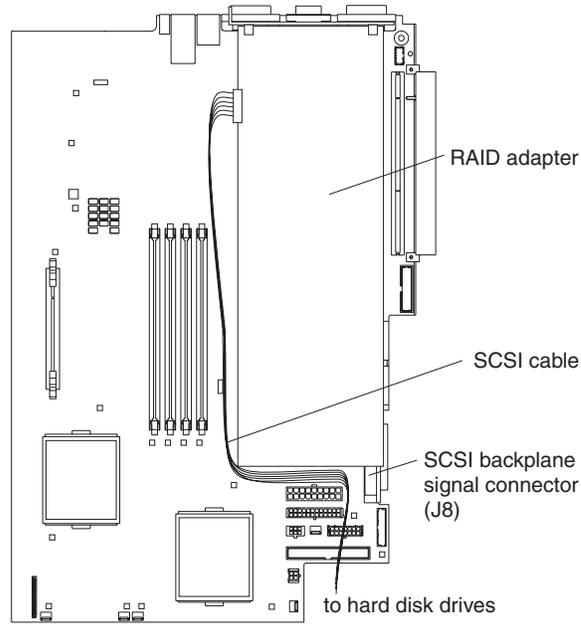
If you force slot 1 to bus B and you install an adapter that runs at less than 100 MHz in the slot, the integrated Ethernet controllers are forced to run at the slower speed.

- The server scans PCI-X slots 1 and 2 to assign system resources. By default, the server starts (boots) devices in the following order: system IDE and SCSI devices; then, PCI and PCI-X devices.

Note: To change the boot precedence for PCI and PCI-X devices you must disable the devices through the Configuration/Setup Utility program. Start the Configuration/Setup Utility program and select **Start Options** from the main menu. Then, select the **Startup Sequence Options** and use the arrow keys to specify the startup order.

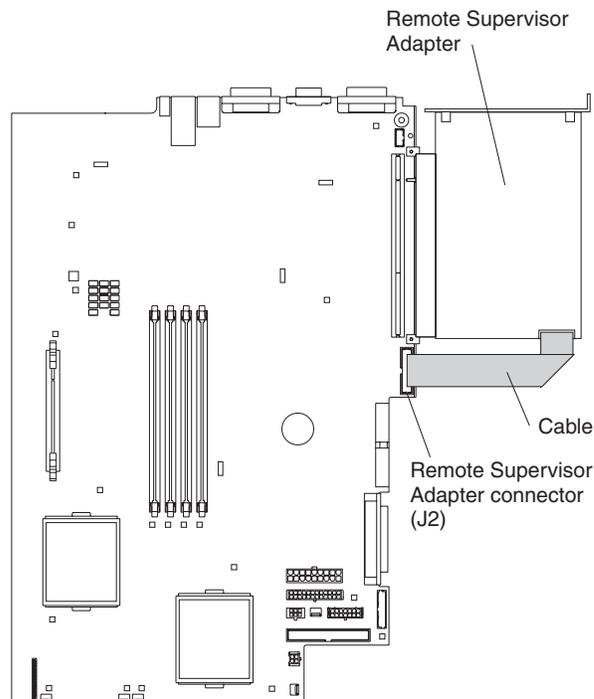
- If you plan to install either an optional SCSI adapter or an optional RAID adapter, you can install it in either of the PCI-X slots if the size of the adapter permits. The server supports a variety of RAID adapters for both internal and external configurations. For the most current list of supported RAID adapters, go to <http://www.ibm.com/pc/us/compat/> on the World Wide Web. For details about installing a RAID adapter, see the documentation that comes with the adapter.
- If you plan to use a RAID adapter to control internal hot-swap hard disk drives, disconnect the SCSI cable from the SCSI backplane signal connector (J8) on the system board and connect it to the RAID adapter. The following illustration shows

the cable routing if you are installing the RAID adapter in PCI-X slot 2.



Note: See the documentation that comes with the RAID adapter for any additional cabling instructions. That documentation also provides information about installing the RAID software and configuring the RAID adapter.

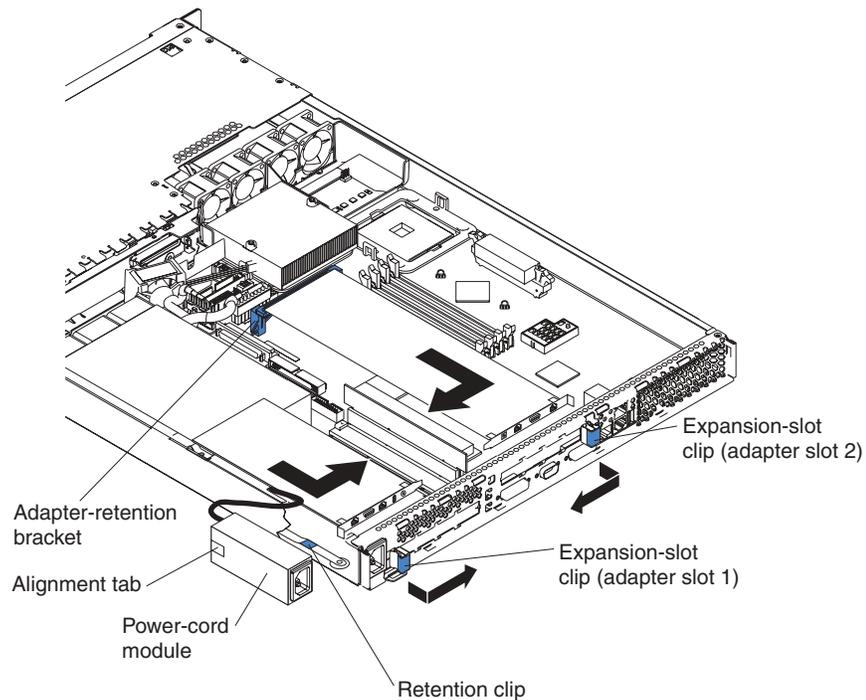
- If you plan to install an optional IBM Remote Supervisor Adapter, install it in PCI-X slot 1. Use the ribbon cable that comes with the Remote Supervisor Adapter to connect the 20-pin connector on the rear edge of the adapter to the Remote Supervisor Adapter connector (J2) on the system board. For details about installing a Remote Supervisor Adapter, see the documentation that comes with the adapter. The following illustration shows the cable routing.



Installing an adapter

Complete the following steps to install an adapter:

1. Review the safety information beginning on page v, and “Installation guidelines” on page 7.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server cover (see “Removing the cover and bezel” on page 8).
4. Determine which PCI-X slot you will use for the adapter.
5. On the rear panel, press the expansion-slot clip together to unlock the clip; then, pull the clip out from the server until it stops and rotate the clip as shown in the following illustration. It remains loosely attached to the server.



Attention: Avoid touching the components and gold-edge connectors on the adapter. Ensure that the adapter is completely and correctly seated in the slot. Incomplete insertion might cause damage to the system board or to the adapter.

6. Remove the expansion slot cover from the slot.
7. To gain access to PCI-X slot 1, remove the power-cord module.
 - a. Press down on the retention clip at the front of the power-cord module and slide the module toward the front of the server until the alignment tab is free of the slot on the side of the server.
 - b. Lift and place the power-cord module out of the server as far as the power supply cable permits.
8. Install the adapter:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 7.

- a. Remove the adapter from the static-protective package and set any jumpers or switches on the adapter as directed by the adapter

manufacturer. If you are installing a full-length adapter, you might have to remove a plastic bracket secured to the adapter with 2 screws before installing the adapter.

Attention: When you install an adapter, ensure that the adapter is correctly seated in the connector before you turn on the server. Improperly seated adapters might cause damage to the system board, the riser card for slot 1, or the adapter.

- b. Grasp the adapter by its top edge or upper corners, align it with the connector, and press it *firmly* into the connector.
9. Slide the expansion-slot clip toward the server until it snaps into place to secure the adapter in the adapter slot.
10. Connect any internal cables to the adapter. See the instructions that come with the adapter for details.

Attention: Ensure that the cables do not block the flow of air from the fans.

11. If you removed the power-cord module to install the adapter in PCI-X slot 1, install the module by reversing the procedure in step 7a on page 11. Ensure that the alignment tab is fully seated in the slot on the side of the server.
12. If you installed the adapter in PCI-X slot 2, secure the adapter by flexing the adapter-retention bracket toward the front of the server and inserting the front corners of the adapter into the recesses in the latch.
13. Perform any configuration tasks required for the adapter.

Note: If you installed a Remote Supervisor Adapter:

- a. Refer to the documentation provided with the Remote Supervisor Adapter for information about installing the Remote Supervisor Adapter firmware and configuring the adapter.
 - b. After you initially configure the adapter, you should create a backup copy of it so that if you need to replace the adapter in the future, you can restore the configuration and resume normal operation more quickly.
14. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 21.

Working with a hard disk drive

This section describes how to install a hard disk drive in the server. Before you install a hard disk drive, review the following information:

- The server supports two 25.4-mm (1-inch), slim, 3.5-inch hard disk drives. SCSI models of the server come with a hot-swap SCSI backplane.
- The SCSI server models support low voltage differential (LVD) hot-swap drives. Each hot-swap drive resides in a tray, which has a green activity LED and an amber status LED in the upper-right corner. These LEDs are lit if the drive is active and, in some cases, if the drive fails. Each hot-swap drive has a single-connector-attached (SCA) connector, which plugs directly into the hot-swap SCSI backplane. The backplane attaches to connector J18 on the system board and controls the SCSI IDs for the hot-swap drives.

Note: The drive in bay 1 is assigned SCSI ID 0; the drive in bay 2 is assigned SCSI ID 1.

- Non-hot-swap disk drives do not require a backplane or tray and they do not have indicator LEDs. However, you must attach the blue rails that come with the drive before installing it in the server.

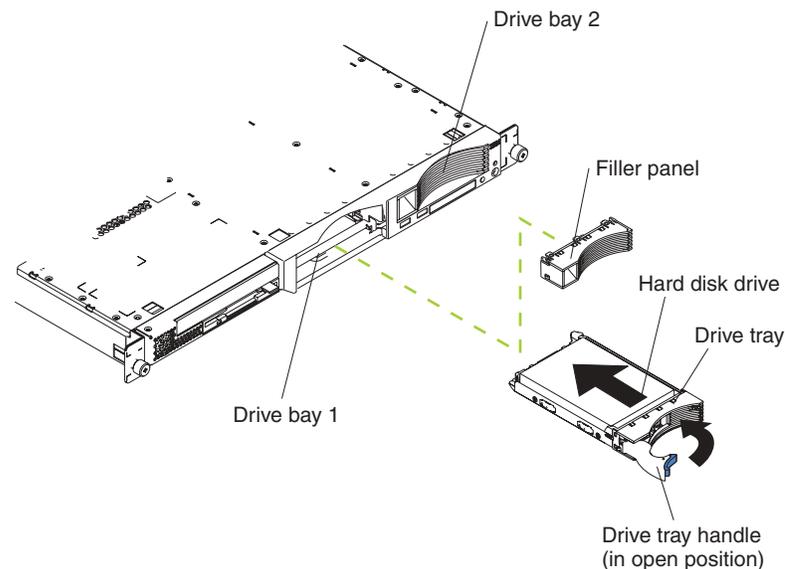
- Non-hot-swap disk drives have a jumper block on the rear. Install a jumper in the cable-selection position of the jumper block. For details, see the notes under step 4 on page 14, and the documentation that comes with the drive.
- If you install only one hard disk drive, for faster startup, install it in the primary boot device bay. For hot-swap SCSI drives, the drive in bay 1 is the primary boot device. For IDE drives, the drive in bay 2 is the primary boot device.
- If you are installing a hot-swap drive, continue with “Installing a hot-swap hard disk drive”. If you are installing a non-hot-swap drive, go to “Installing a non-hot-swap hard disk drive” on page 14.

Installing a hot-swap hard disk drive

Before you install a hot-swap hard disk drive, review the following information:

- Inspect the drive tray for any signs of damage.
- Ensure that the drive is installed in the tray correctly.
- If your server has an optional RAID adapter installed, see the documentation provided with the adapter for information about installing a hard disk drive.

Complete the following steps to install a hot-swap SCSI hard disk drive:



1. Review the safety information beginning on page v, and “Installation guidelines” on page 7.
2. Remove the filler panel from the appropriate drive bay.

Note: To ensure adequate system cooling, do not operate the server for more than two minutes without either a hard disk drive or a filler panel installed in each bay.

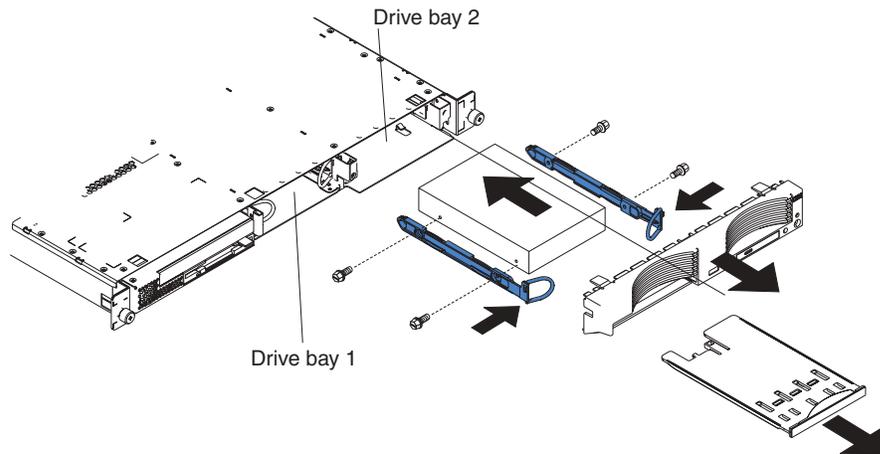
3. Install the new hard disk drive in the drive bay:
4. Check the hard disk drive status LED and activity LED to verify that the drive is operating correctly.
5. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 21.

Installing a non-hot-swap hard disk drive

Before you install a non-hot-swap hard disk drive, review the following information:

- See the documentation that comes with the drive for any cabling instructions.
- Route the cable *before* you install the drive. Do not block the airflow from the fans.

Complete the following steps to install a non-hot-swap hard disk drive:



1. Review the safety information beginning on page v, and “Installation guidelines” on page 7.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server cover (see “Removing the cover and bezel” on page 8).
4. Press in on the USB option tray to release it and slide the tray out until it stops; then, press the retention clip at the bottom rear of the tray and remove the tray from the server. Press on the bezel retention tabs and pull the bezel directly away from the server.

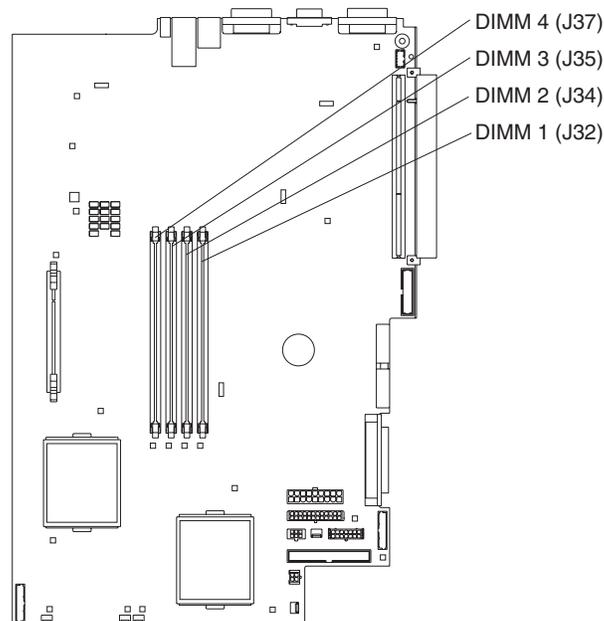
Notes:

- a. If you have only one non-hot-swap hard disk drive, install it in the right-hand bay (bay 2) with a jumper installed in the cable-selection-enabled position of the jumper block on the rear of the drive.
 - b. If you have two drives and you want the server to determine the master drive and subordinate drive automatically, install jumpers in the cable-selection-enabled position of the jumper block on both drives.
 - c. If you want to assign master and subordinate drives manually, install a jumper in the master position for the drive in bay 2 and install a jumper in the subordinate position for the drive in bay 1.
5. Install the hard disk drive in the drive bay:
 - a. Attach the rails to the sides of the drive using 2 screws for each rail.
 - b. Slide the drive into the bay until the rail latches snap into place.
 - c. Connect the signal and power cables to the rear of the drive. Keep the cables clear of the airflow path of the fan behind the drive bays.
 6. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 21.

Installing memory modules

This section describes how to install memory modules in the server. Before you install memory modules, review the following information:

- The xSeries 335 Type 8676 server uses interleaved dual inline memory modules (DIMMs), which requires that you add, remove, or replace DIMMs in pairs. Each pair must be of the same type, capacity, and speed. Adding memory to the server is an easy way to improve system performance. The server comes with one pair of DIMMs installed in DIMM slots 1 and 2 on the system board.
- You can increase the amount of memory in the server by replacing them with higher-capacity DIMMs or installing an additional pair of DIMMs in slots 3 and 4. The server supports 256 MB, 512 MB, and 1 GB DIMMs. See the ServerProven list at <http://www.ibm.com/pc/compat/> on the World Wide Web for a list of memory modules supported by the server. The following illustration shows the memory slots on the system board.



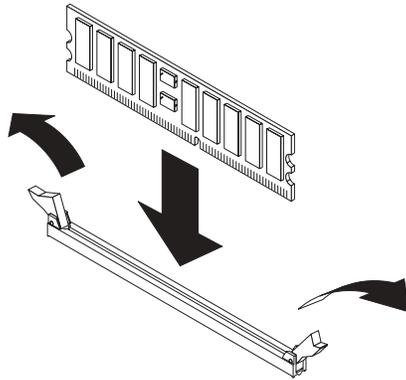
Complete the following steps to install DIMMs:

1. Review the safety information beginning on page v, and “Installation guidelines” on page 7.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server cover (see “Removing the cover and bezel” on page 8).

Attention:

- Avoid touching the components and gold-edge connectors on the DIMMs. Ensure that the DIMMs are completely and correctly seated in the slots. Incomplete insertion might cause damage to the system board or to the DIMMs.
 - When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 7.
 - To avoid breaking the retaining clips or damaging the DIMM slots, handle the clips gently. Do not force the DIMM into the slot.
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

5. Install the DIMM in the slot:



- a. Open the retention latches and insert the DIMM straight into the slot, pressing down on both corners of the DIMM at the same time. The side of the DIMM with the gold-edge connectors has an index slot, offset from the center of the DIMM. Align the index slot with the slot on the system board. Ensure that no gap exists between the DIMM and the retaining clips. If a gap does exist, remove the DIMM; then, reinsert it correctly.
- b. If you replaced a failed DIMM, start the Configuration/Setup Utility program, select **Advanced Setup**, select **Memory Settings**, highlight the connector or bank of connectors that you want to enable, and then select **Enable**.

With some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank display screen. If this occurs and the **Boot Fail Count** feature in the **Start Options** of the Configuration/Setup Utility program is enabled (its default setting), restart the server three times to force the BIOS to reset the memory connector or bank of connectors.

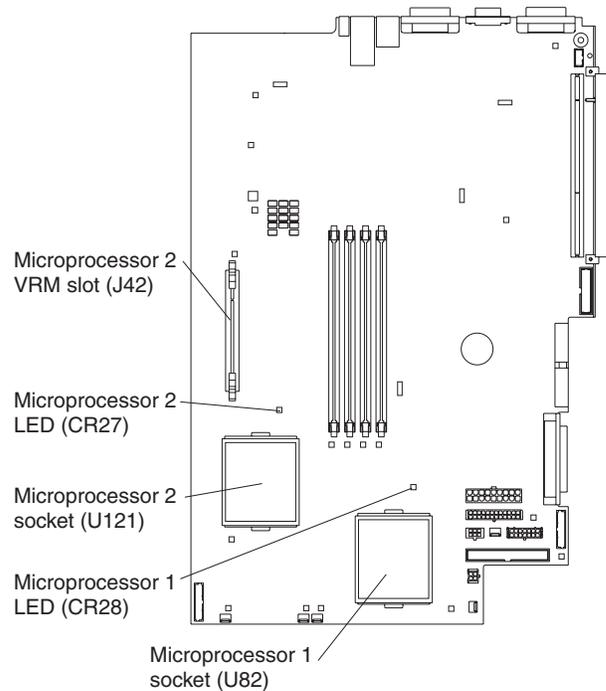
6. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 21.

Installing a microprocessor

This section describes how to install a microprocessor in the server. Before you install a microprocessor, review the following information:

- The server comes with one microprocessor installed. The following illustration shows the microprocessor sockets and the pluggable microprocessor 2 voltage regulator module (VRM) slot on the system board. (The VRM for microprocessor

1 is integrated on the system board.)



- If one microprocessor is installed:
 - The microprocessor is installed in microprocessor socket 1 (U82).
 - The microprocessor supports both the startup and application processes.
- If you install a second microprocessor in the server:
 - The server operates as a symmetric multiprocessing (SMP) server. With an SMP, operating system application programs can distribute the processing load between the microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.
 - Microprocessor 1 is installed in microprocessor socket 1 (U82); microprocessor 2 is installed in socket 2 (U121).

Notes:

1. Read the documentation that comes with the microprocessor to determine if you need to update the basic input/output system (BIOS) code. The most current level of BIOS code for the server is available through the World Wide Web at <http://www.ibm.com/pc/support/>.
2. To use SMP, obtain an SMP-capable operating system (optional). For a list of supported operating systems, go to <http://www.ibm.com/pc/us/compat/> on the World Wide Web.

Attention: To avoid damage and to ensure proper server operation, review the following information before you install a microprocessor:

- Ensure that the microprocessors are the same type, have the same cache size, and have the same clock speed.
- Ensure that the microprocessor internal and external clock frequencies are identical.
- See the ServerProven list at <http://www.ibm.com/pc/compat/> for a list of microprocessors supported by the server.

A new microprocessor comes in a kit with a VRM and a heat sink.

Complete the following steps to install a microprocessor:

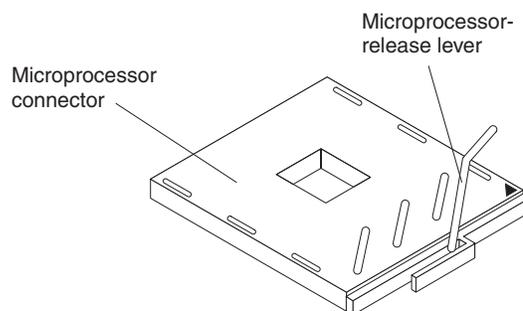
1. Review the safety information beginning on page v, and “Installation guidelines” on page 7.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server cover (see “Removing the cover and bezel” on page 8); then, determine the socket where the microprocessor is to be installed.

Attention:

- Avoid touching the components and gold-edge connectors on the microprocessor. Ensure that the microprocessor is completely and correctly seated in the socket. Incomplete insertion might cause damage to the system board or to the microprocessor.
- When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 7.

Note: A new microprocessor comes in a kit with a VRM and a heat sink.

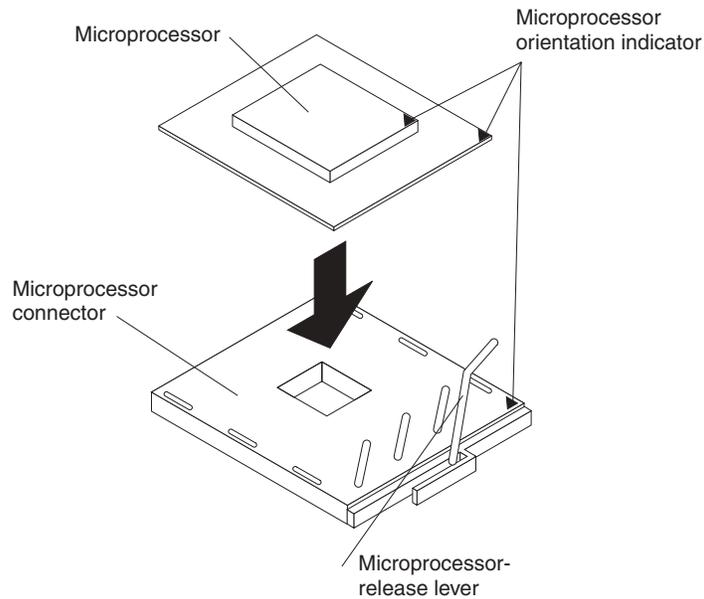
4. If you are installing a microprocessor in the microprocessor 2 socket, *first* install a VRM in the microprocessor 2 VRM slot (J42) and remove the protective cover from the microprocessor 2 socket; then, lift the microprocessor-release lever to the open position.



Note: The microprocessor-release lever is on the side of the socket that faces the rear of the server.

5. Install the microprocessor:
 - a. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.
 - b. Position the microprocessor over the microprocessor socket as shown in the following illustration. Carefully press the microprocessor into the socket.

Attention: To avoid bending the pins on the microprocessor, do not use excessive force when pressing it into the socket.



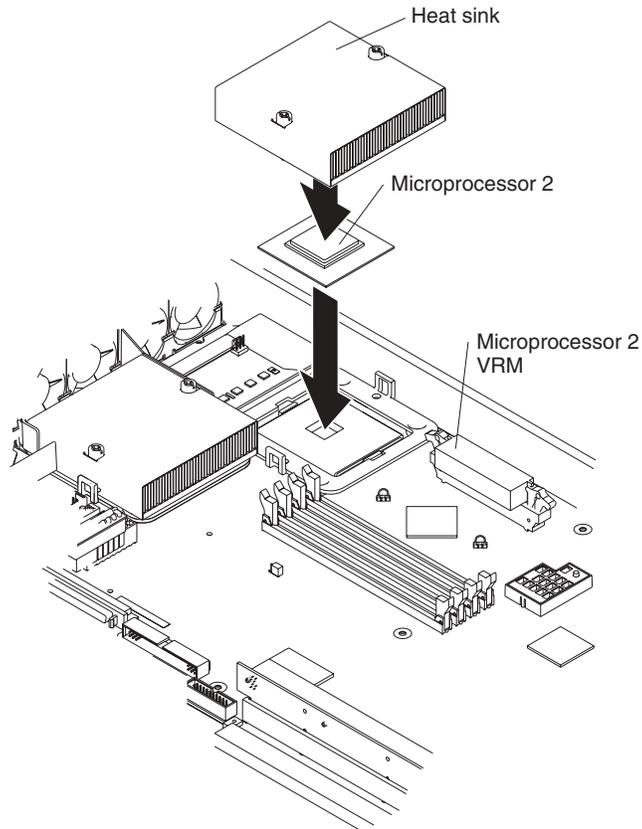
Note: The microprocessor-release lever is on the side of the socket that faces the rear of the server.

6. Close the microprocessor release lever to secure the microprocessor.

Attention:

- Do not disturb or contaminate the thermal material on the bottom of the new heat sink. Doing so damages its heat-conducting capability and exposes the new microprocessor to overheating.
 - If you need to remove the heat sink after installing it, note that the thermal material may have formed a strong bond between the heat sink and the microprocessor. Do not force the heat sink and microprocessor apart; doing so can damage the microprocessor pins. Loosening one captive screw fully before loosening the other captive screw helps break the bond between the components without damaging them.
7. Remove the heat sink from its package and remove the cover from the bottom of the heat sink. Ensure that the thermal material is still on the bottom of the heat sink and position the heat sink on top of the microprocessor. Press firmly on the captive screws and tighten them, alternating between screws until they

are tight. Do not overtighten the screws by using excessive force.



8. If you have other options to install, install them now. Otherwise, continue with “Completing the installation”.

Completing the installation

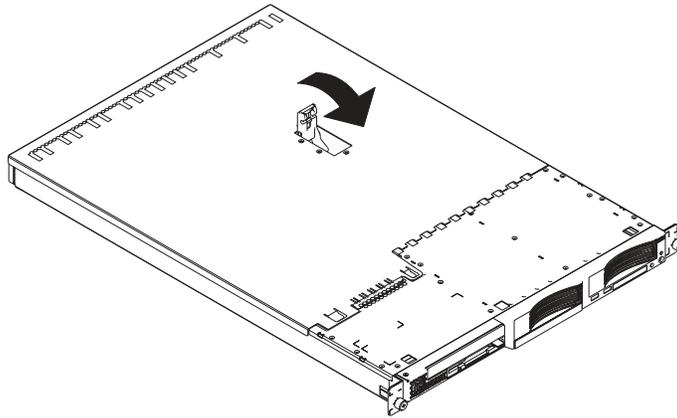
This section describes how to complete the installation.

Installing the cover and bezel

Complete the following steps to install the server cover and bezel:

1. Position the internal cables so they do not interfere with the cover installation.
Attention: Before sliding the cover forward, make sure that all the tabs on both the front and rear of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be very difficult to remove the cover later.
2. Position the cover on top of the server and slide it forward. Press down on the cover latch. The cover slides forward into position. Ensure that the cover

engages the tabs at the front and rear of the server.



3. If you removed the bezel, position the bezel directly in front of the server and press it into place so that the retention tabs snap into the holes on the top, right side, and bottom of the server.
4. If you removed the USB option tray, insert it fully into the slot below hard disk drive bay 1.
5. Install the server in the rack. See the *Rack Installation Instructions* that come with the server for details.

Notes:

- a. Depending on the options that you installed, after cabling the server you might need to run the Configuration/Setup Utility program to update the server configuration. See “Updating the server configuration” on page 24 and the *User’s Guide* for more information.
 - b. If you installed a SCSI drive, check the LEDs to verify proper operation.
6. To attach peripheral devices, connect the server to other servers, and connect the power cord, continue with “Cabling the server”.

Cabling the server

This section provides basic information about:

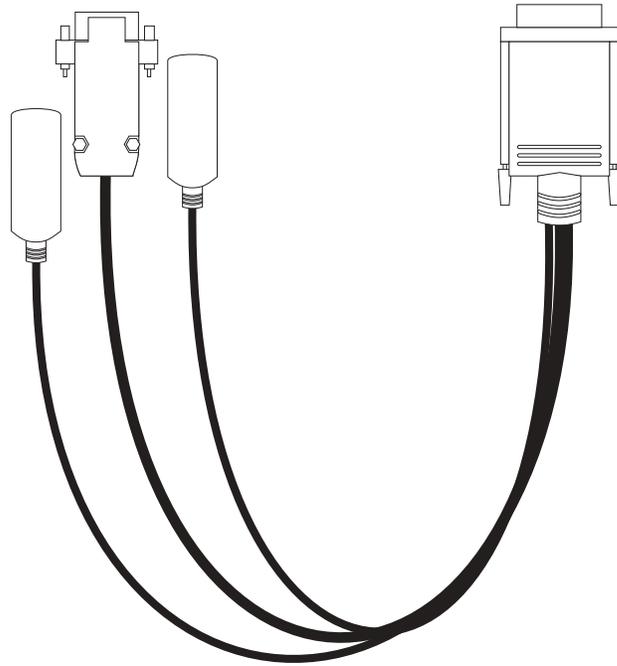
- Attaching peripheral devices such as a monitor, keyboard, and pointing device to the server.

Note: You can connect a USB keyboard to the server using one of the USB ports. After installing a USB keyboard, you might need to use the Configuration/Setup Utility program to enable keyboardless operation and prevent POST error message 301 from being displayed during startup. For detailed information about this option and how to connect it to your server, see the documentation that comes with the option.

- Connecting the server to additional servers.

To connect a monitor, keyboard, and pointing device to the server, use a Cable Chain Technology (C2T) breakout cable, which is provided in the optional C2T cable kit. The following illustration shows a C2T breakout cable. The end of the cable with a single connector attaches to the C2T OUT connector on the rear of the server.

The other three connectors connect to the monitor, keyboard, and pointing device.



You can share one monitor, keyboard, and pointing device (such as a mouse) among up to 42 servers using C2T interconnect cables. You can connect up to 23 servers together to create an Advanced System Management (ASM) interconnect network (ASM bus). The bus requires that at least one of the servers has an optional Remote Supervisor Adapter installed. You can create additional ASM buses, each consisting of up to 23 servers if at least one server in each bus has an optional Remote Supervisor Adapter installed.

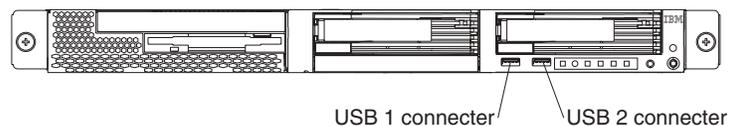
For more details about connecting the server to a C2T chain, creating an Advanced System Management (ASM) interconnect network, and sharing a monitor, keyboard, and pointing device between multiple servers, see the section about cabling the server in the *Option Installation Guide*.

Input/output ports and connectors

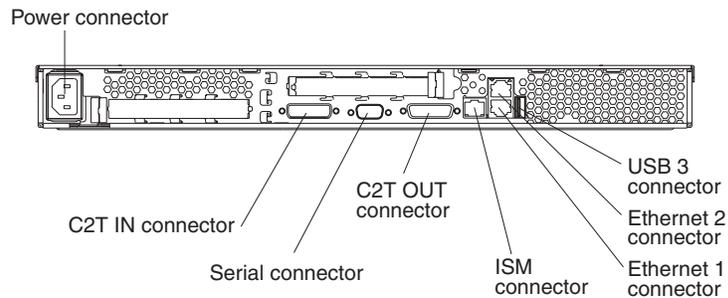
This section shows the I/O ports and connectors on the server. You can use them to attach external options to the server.

- Serial connector (1, rear)
- Universal Serial Bus (USB) connectors (2 front, 1 rear)
- ISM connector (1, rear)
- Cable Chaining Technology (C2T) connectors (2, rear)
- Ethernet connectors (2, rear)

The following illustration shows the USB connectors on the front panel of the server.



The following illustration shows the input/output connectors on the rear panel 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 SCSI device, you might see a message telling you that the configuration has changed. The Configuration/Setup Utility program automatically starts so that you can save the new configuration information. See the section about configuring the server in the *User's Guide* for more information.

Some options have device drivers that you need to install. See the documentation that comes with the option for information about installing any required device drivers.

The server comes with at least one microprocessor installed on the system board. If you have installed an additional microprocessor, the server can now operate as an SMP server. Therefore, you might need to upgrade the operating system to support SMP. See the section about using the ServerGuide CD in the *User's Guide* and the operating-system documentation for additional information.

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

If you have just installed a Remote Supervisor Adapter to manage the server from a remote location, see the section about setting up the adapter in the *IBM xSeries 335 Type 8676 User's Guide* and in the *Remote Supervisor Adapter User's Guide* for information about setting up and configuring the adapter and using the adapter to manage the server remotely. The *IBM xSeries 335 Type 8676 User's Guide* is on the *IBM xSeries Documentation CD*. The *Remote Supervisor Adapter User's Guide* comes with the adapter.

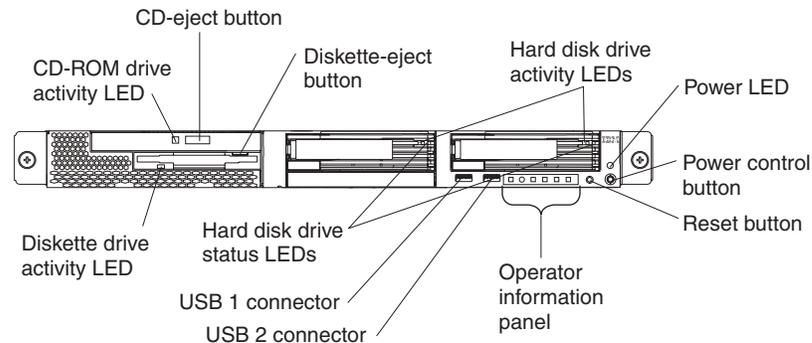
To configure the integrated Gigabit Ethernet controllers, see the section about configuring the Gigabit Ethernet controllers in the *User's Guide*.

Chapter 3. Server controls, LEDs, connectors, and power

This section describes the controls, light-emitting diodes (LEDs), and connectors. It also explains 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.



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

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

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

Hard disk drive activity LEDs: When these LEDs are flashing, it indicates that the associated SCSI hard disk drive is in use.

Power LED: When this LED is lit, it indicates that ac and dc power are present in the server. When this LED is flashing, it indicates that the server is in Standby mode. When this LED is off, ac power is not present, or the power supply or the LED itself has failed. A power LED is also on the rear of the server.

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

Power-control button: Press this button to turn the server on and off manually.

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

Operator information panel: This panel contains controls and LEDs. For details, see “Operator information panel” on page 27.

USB 2 connector: Connect a USB device to this connector.

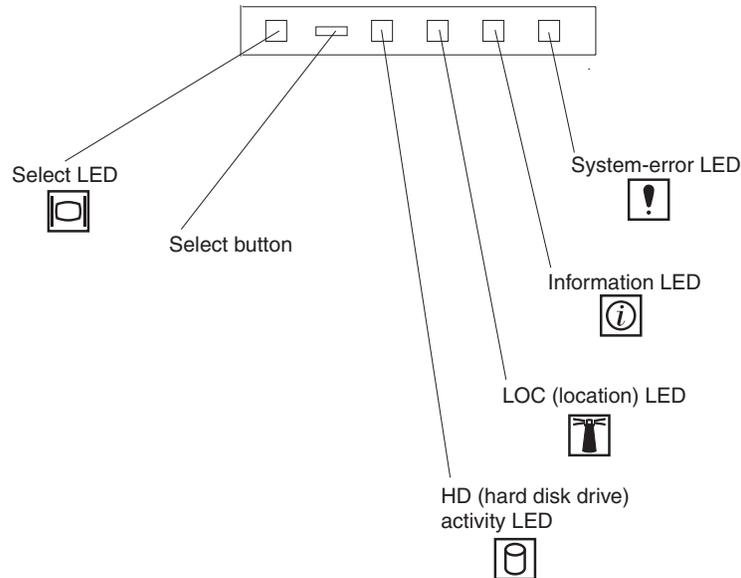
USB 1 connector: Connect a USB device to this connector.

Hard disk drive status LEDs: When these LEDs are lit, it indicates that the associated SCSI hard disk drive has failed. If an optional RAID 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 controller is identifying the drive.

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

Operator information panel

The following illustration shows the controls, LEDs, and connectors on the operator information panel.



System-error LED: When this LED is lit, it indicates that a system error has occurred. A System-error LED is also on the rear of the server. An LED on the Light Path Diagnostics panel on the system board is also lit to help isolate the error.

Information LED: When this LED is lit, it indicates that a noncritical event has occurred and is recorded in the error log.

LOC (location) LED: Use this blue LED to visually locate the server if it is in a location with numerous other servers. You can use IBM Director to light this LED remotely.

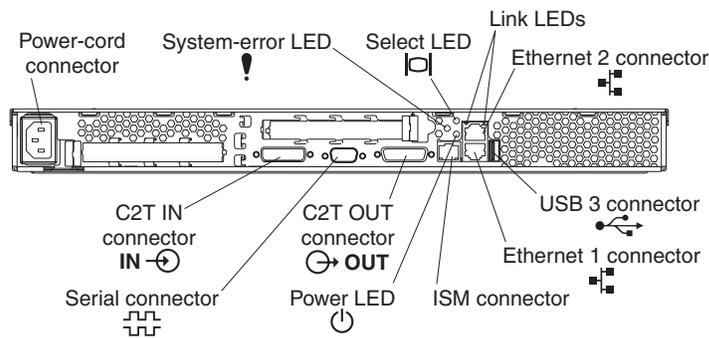
HD (hard disk drive) activity LED: When this LED is lit, it indicates that either of the hard disk drives is in use.

Select button: Press this button to use the monitor, keyboard, and mouse that are connected to the C2T chain.

Select LED: When this LED is lit, it indicates that this server is using the monitor, keyboard, and mouse that are connected to the C2T chain. If no other servers are chained to this server, this LED remains lit. A select LED is also on the rear of the server.

Rear view

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



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

System-error LED: When this LED is lit, it indicates that a system error has occurred. An LED on the Light Path Diagnostics panel on the system board is also lit to help isolate the error. A System-error LED is also on the front of the server.

Select LED: When this LED is lit, it indicates that this server is using the monitor, keyboard, and mouse that are connected to the C2T chain. If no other servers are chained to this server, this LED remains lit. A select LED is also on the front of the server.

Link LEDs: These LEDs are on the dual Ethernet connector. When either the up- or down-arrow LED is lit, it indicates an active link between the server and the network device attached through the upper or lower connector.

Ethernet 2 connector: Use this connector to connect the server to a network.

USB 3 connector: Connect a USB device to this connector.

Ethernet 1 connector: Use this connector to connect the server to a network.

ISM connector: Use this connector to connect to an optional Remote Supervisor Adapter.

Power LED: When this LED is lit, it indicates that ac and dc power are present in the server. When this LED is flashing, it indicates that the server is in Standby mode. When this LED is off, ac power is not present, or the power supply or the LED itself has failed. A power LED is also on the front of the server.

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

C2T OUT connector: Use this connector to connect to a breakout cable or to the C2T IN connector of another xSeries 335 or xSeries 330 server.

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

C2T IN connector: Use this connector to connect to the C2T OUT connector of another xSeries 335 or xSeries 330 server.

If you have an optional Remote Supervisor Adapter (system-management adapter) installed in PCI slot 1, your server has additional connectors and LEDs. See the documentation that comes with the adapter for more information about these connectors and LEDs.

Server power features

When you connect the server to an ac power source, the server goes into Standby mode. After approximately 20 seconds, the power-control button becomes active, and you can turn on the server and start the operating system by pressing the power-control button. The following section describes other ways in which the server can be turned on.

Turning on the server

After the server is connected to an ac power source, it can be turned on in any of the following ways:

- You can press the power-control button.
- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the system-management software for an optional Remote Supervisor Adapter, the system-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

Turning off the server

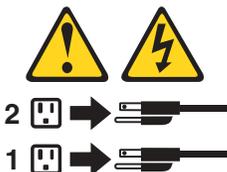
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:



CAUTION:

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



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

- You can press the power-control button to start an orderly shutdown of the operating system, if your operating system supports this feature, and turn off the server.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- If your operating system supports the system-management software for an optional Remote Supervisor Adapter, the system-management software can turn off the server.
- You can remove all power from the server by disconnecting the server from the ac power source.

Standby mode

When the server is connected to an ac power source but has not been turned on, it is in Standby mode. When the server is in Standby mode, the operating system is not running, and all core logic except for the service processor is shut down. The power-on LED flashes to indicate that the server is in Standby mode. The server can respond to requests from the service processor, such as a remote request to turn on the server.

To put the server into Standby mode when the server is turned on, shut down the operating system (see your operating-system documentation), and press the power-control button.

You can also put the server into Standby mode through a request from either the integrated system management processor (using IBM Director) or an optional Remote Supervisor Adapter. For details, see the documentation that comes with the option.

Chapter 4. Configuring the server

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

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
- LSI Logic Configuration utility program
- ServeRAID configuration programs
- Integrated system management firmware update utility
- IBM Director

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, configures the server hardware, provides device drivers, and helps you install your operating system. For information about the supported operating-system versions, see the label on the CD.

Complete the following steps to start the *ServerGuide Setup and Installation* CD:

1. Insert the CD, and restart the server. If the CD does not start, see “ServerGuide problems” on page 44.
2. Follow the instructions on the screen to:
 - a. Select your language.
 - b. Select your keyboard layout and country.
 - c. View the overview to learn about ServerGuide features.
 - d. View the README file to review installation tips about your operating system and adapter.
 - e. Start the setup and hardware configuration programs.
 - f. Start the operating-system installation. You will need your operating-system CD.

Using the Configuration/Setup Utility program

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

- 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

Complete the following steps to start the Configuration/Setup Utility program:

1. Turn on the server and watch the monitor screen.

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

Using the LSI Logic Configuration Utility program

The LSI Logic Configuration Utility program is part of the BIOS code. You can use it to:

- Perform a low-level format of a SCSI hard disk drive.
- Set a SCSI device scan order
- Set a SCSI ID for a controller

Note: The integrated SCSI controller with RAID capabilities in your server supports only RAID level-1. Installing an optional RAID adapter provides additional RAID levels. See “Using ServeRAID Manager” for information about configuring your server for RAID operation.

If you install a RAID adapter in your server, use the configuration method supplied with the RAID adapter to view or change SCSI settings for attached devices.

Complete the following steps to start the LSI Logic Configuration Utility program:

1. Turn on the server.
2. When the <<< Press <CTRL><C> to start LSI Logic Configuration Utility >>> prompt appears, press Ctrl+C.

Note: If an administrator password has been set, you are prompted to type the password to start the LSI Logic Configuration Utility program.

3. Use the arrow keys to select a controller (channel) from the list of adapters; then, press Enter.
4. Follow the instructions on the resulting screen to change the settings of the selected items; then, press Enter. The **Device Properties** and **Mirroring Properties** choices produce additional screens of parameters to review or change.

Using ServeRAID Manager

You can use the ServeRAID Manager program, provided on the *IBM ServeRAID Support* CD that is shipped with the server to:

- Configure a redundant array of independent disks (RAID)
- Restore a SCSI hard disk to factory-default settings, erasing all data
- View your RAID configuration and associated devices
- Monitor operation of your RAID controllers

The ServeRAID Manager program operates in two ways:

- Startable-CD mode
- As an installed software program

The following sections provide instructions for running ServeRAID Manager in startable-CD mode to configure your integrated SCSI controller with RAID capabilities and perform an initial RAID configuration on your server. See the

ServeRAID documentation on the *IBM ServeRAID Support CD* for additional information about RAID technology and instructions for using ServeRAID Manager to configure your integrated SCSI controller with RAID capabilities.

Notes:

1. The integrated SCSI controller with RAID capabilities in your server supports only RAID level-1. Installing an optional RAID adapter provides additional RAID levels.
2. If you install a different type of RAID adapter in your server, use the configuration method supplied with the RAID adapter to view or change SCSI settings for attached devices.

Using ServeRAID Manager in startable-CD mode

The information in this section focuses on using the ServeRAID Manager program in Startable CD mode to configure your controller. For information about installing ServeRAID Manager, see the documentation on the *IBM ServeRAID Support CD*.

When you run the ServeRAID Manager program from the startable *IBM ServeRAID Support CD*, you are using startable-CD mode, in which you can configure your controller *before* you install your operating system.

To run the ServeRAID Manager program in startable-CD mode, turn on the server; then, insert the *IBM ServeRAID Support CD* into the CD-ROM drive. If the ServeRAID Manager program detects an unconfigured controller and ready drives, the program automatically starts the Configuration wizard, and a window similar to that shown in Figure 1 opens.

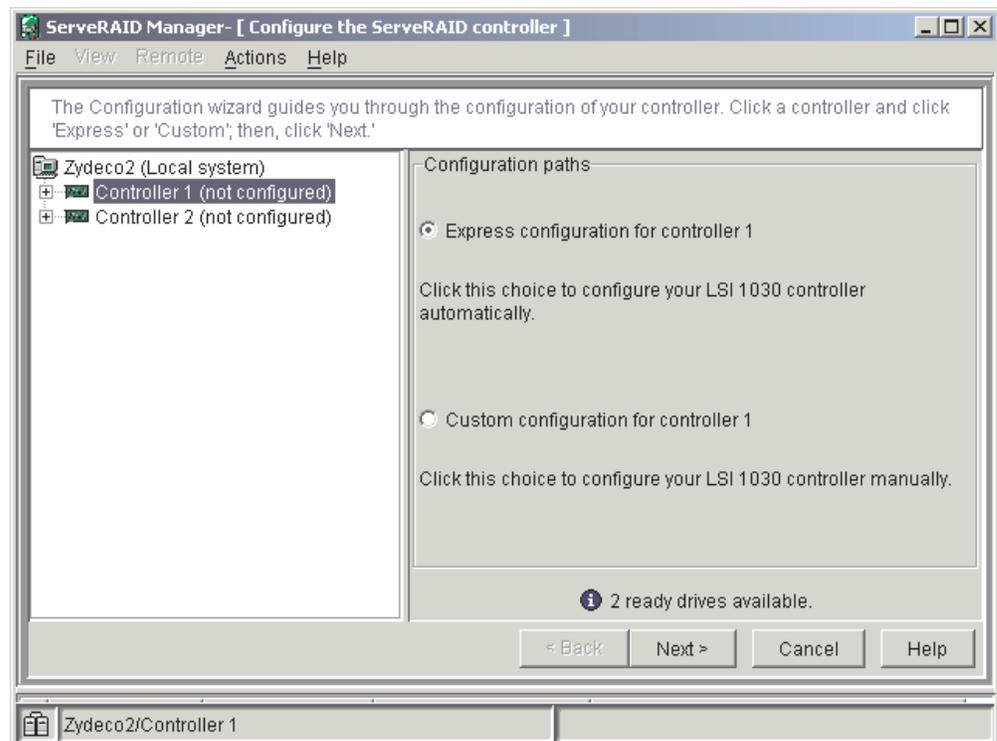


Figure 1. "Configuration wizard" window

Configuring the controller

You can use the Configuration wizard to configure your controller. The Configuration wizard provides two configuration options: Express and Custom. Express configuration automatically configures your controller, and you can use Custom configuration to configure your controller manually.

Note: If the integrated RAID controller has two channels, it will appear in the ServeRAID Manager tree as two controller objects. However, you can configure only one array and one RAID level-1 logical drive.

Using Express configuration: Express configuration automatically configures your controller. It creates an array by grouping together the first two physical drives that appear in the ServeRAID Manager tree, and it creates a RAID level-1 logical drive.

Complete the following steps to use Express configuration:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Express configuration**.
3. Click **Next**. The “Configuration summary” window opens.
4. Review the information that is displayed in the “Configuration summary” window. To change the configuration, click **Modify arrays**.

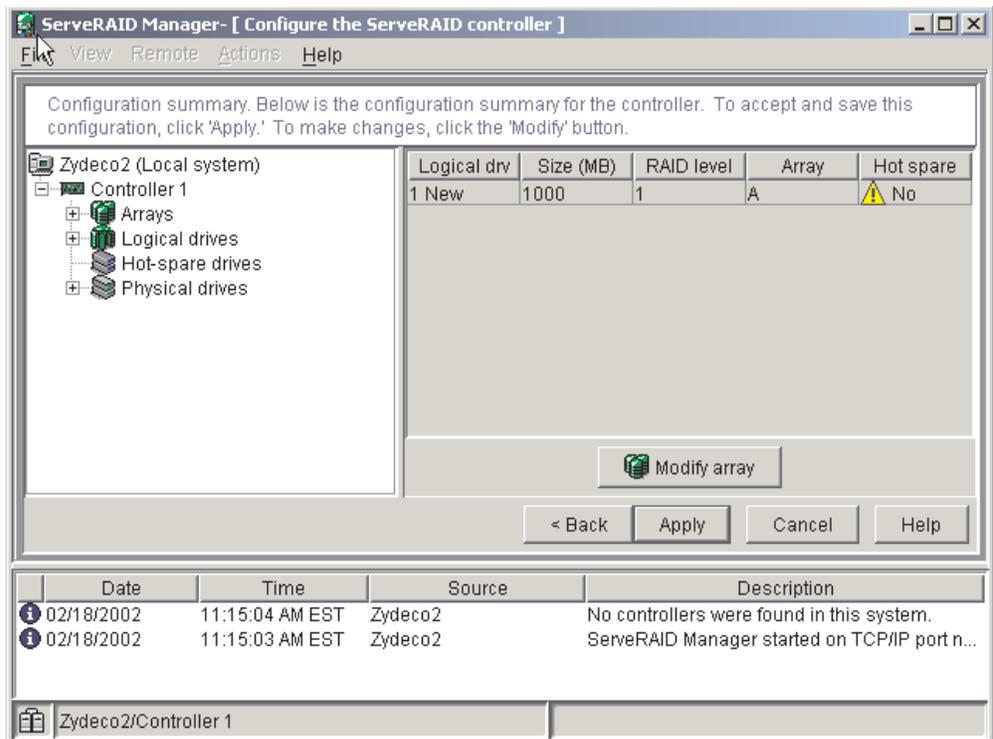


Figure 2. “Configuration summary” window

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

Using Custom configuration: To configure your controller manually, select Custom configuration. Using Custom configuration, you can select which two physical drives you want to configure and create a hot-spare drive.

Complete the following steps to use Custom configuration:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Custom configuration**.
3. Click **Next**. The “Create arrays” window opens.

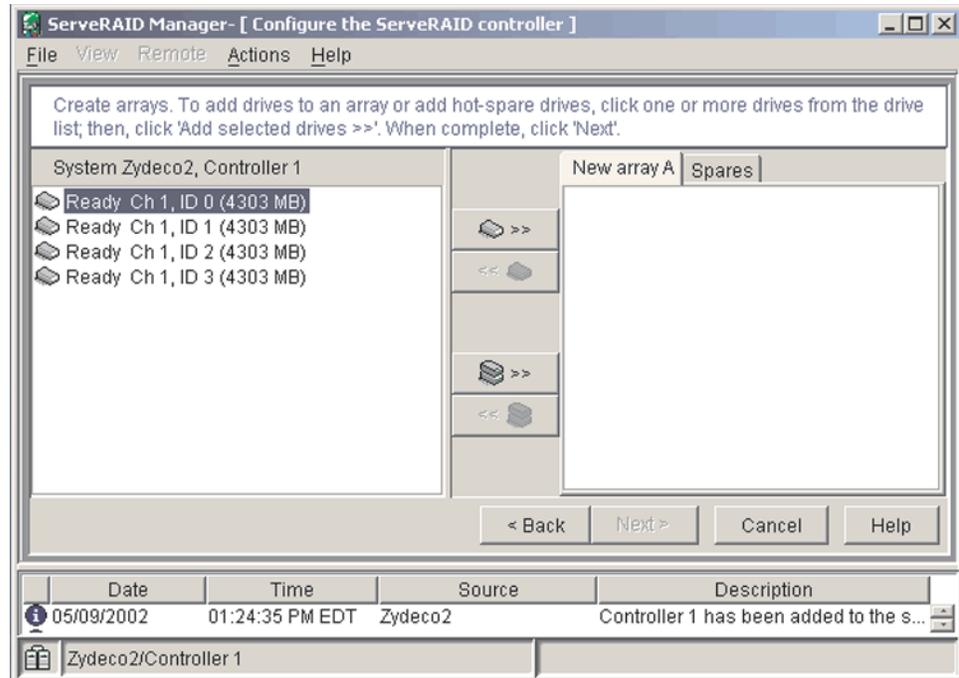


Figure 3. “Create arrays” window

4. From the list of ready drives, select the two drives you want to move to the array.
5. Click  >> (Add selected drives) to add the drives to the array.
6. Complete the following steps if you want to configure a hot-spare drive:
 - a. Click the **Spares** tab.
 - b. Select the physical drive you want to designate as the hot-spare drive; then, click  >> (Add selected drives).

7. Click **Next**. The “Configuration summary” window opens.

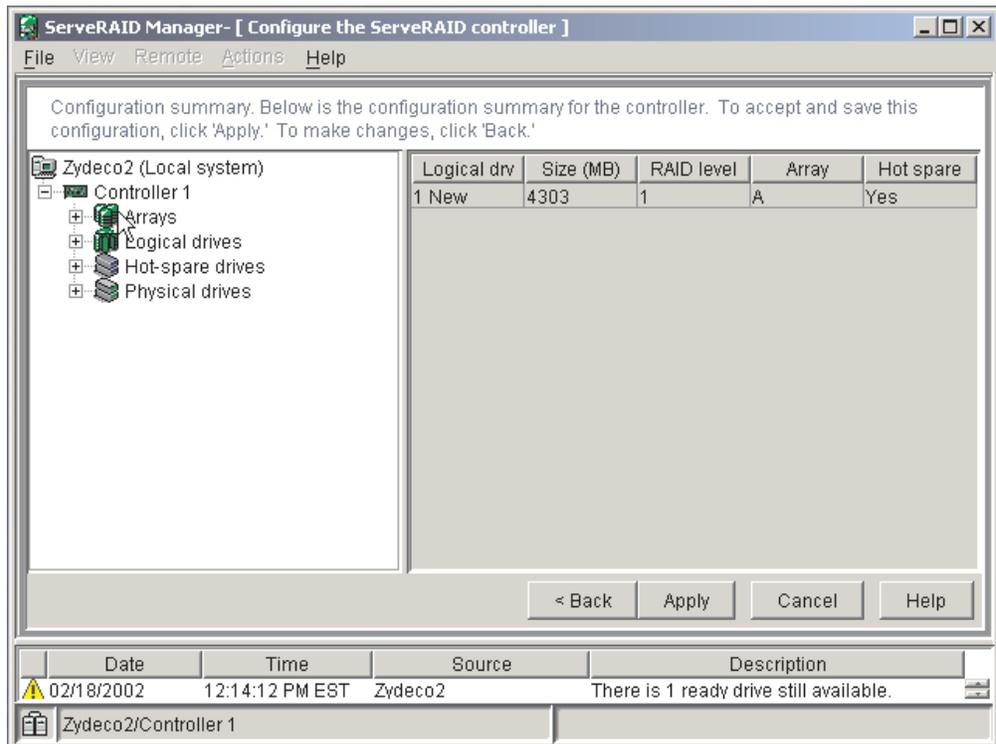


Figure 4. “Configuration summary” window

8. Review the information that is displayed in the “Configuration summary” window. To change the configuration, click **Back**.
9. Click **Apply**; then, click **Yes** when asked if you want to apply the new configuration. The configuration is saved in the controller and in the physical drives.
10. Exit from the ServeRAID Manager program, and remove the CD from the CD-ROM drive.
11. Restart the server.

Viewing your 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).

To view information, expand the ServeRAID Manager tree; then, click the relevant tree object. Detailed information about the selected device appears in the right pane.

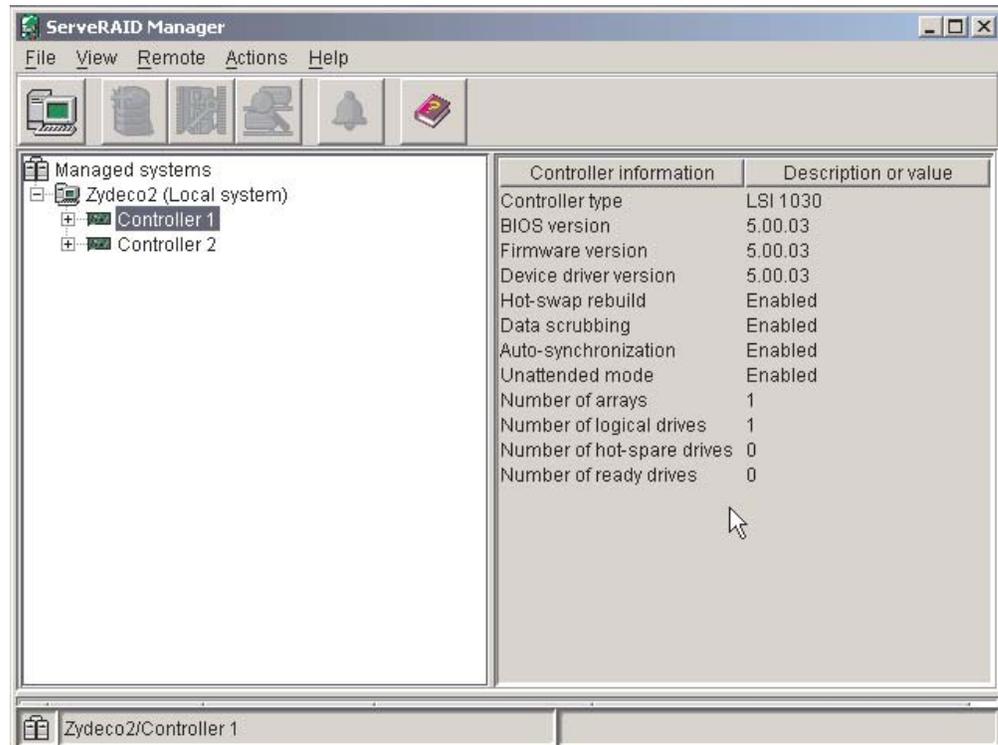


Figure 5. ServeRAID Manager window

To display available actions for an item, click the item in the ServeRAID Manager tree and click **Actions**.

Getting assistance

For more information about ServeRAID Manager, see the online help system. To start the help system, either click  (Information about this window) on the toolbar or select an item from the **Help** menu.

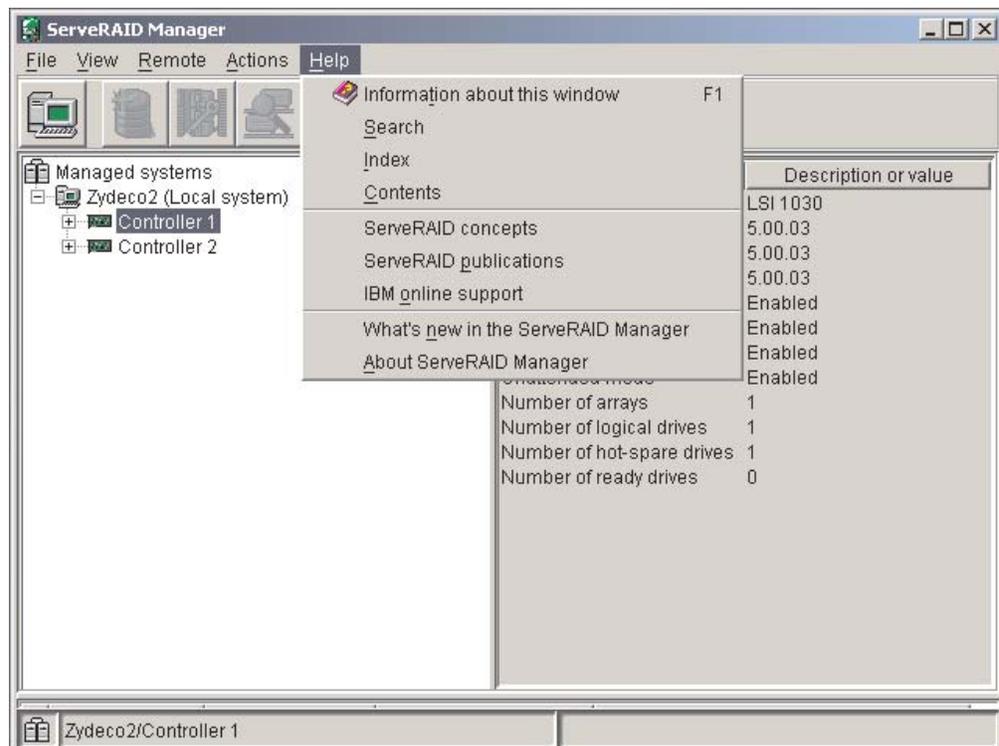


Figure 6. ServeRAID Manager help menu

The help system (ServeRAID Assist) will open within the ServeRAID Manager interface.

To learn more about the ServeRAID Manager tree objects and the actions that apply to them, select a tree object and click **Actions** → **Hints and tips**. ServeRAID Assist will start, and information about the tree object will appear in the right pane of ServeRAID Manager.

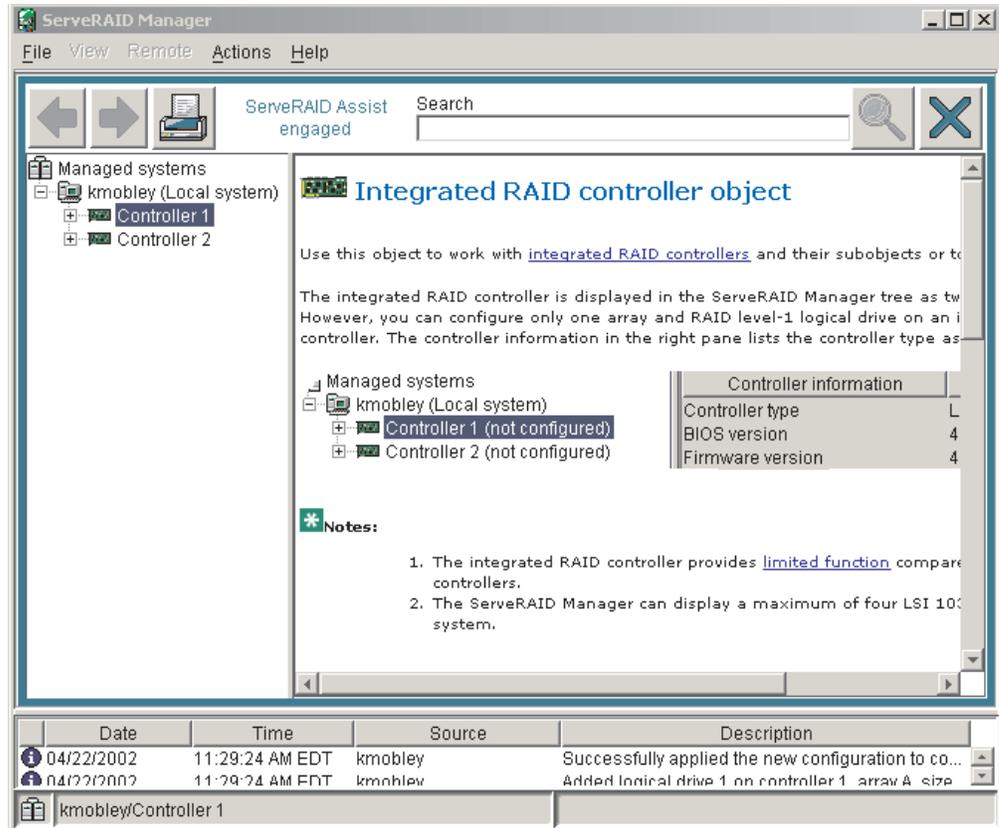


Figure 7. Hints and tips feature

Updating the integrated system management firmware

To update the firmware for the integrated system management processor (ISMP), download the Integrated System Management Firmware Update Utility program for your server from the IBM Support Web site at <http://www.ibm.com/pc/support/>. Run the utility program to create a diskette that you can use to update the firmware. The utility program updates the integrated system management firmware only and does not affect any device drivers.

Complete the following steps to update the firmware:

1. Turn off the server.
2. Insert the diskette into the diskette drive.
3. Turn on the server. If the server does not start from the diskette, use the Configuration/Setup Utility program to configure the diskette drive as a startup device. (For more information, see the information about Configuration/Setup Utility start options in the *User's Guide*.) Guide. Then, start again at step 1 of this procedure.
4. From the main menu, select **Update System Management Firmware** and press Enter.
5. Follow the instructions on the screen to complete the update.

If there is an error in updating the firmware, try installing the firmware again.

Using the IBM Director

IBM Director is a workgroup-hardware-management tool that you can use to centrally manage xSeries servers; IBM NetVista™, IntelliStation®, and ThinkPad® computers; and non-IBM Intel-microprocessor-based systems. IBM Director automates tasks such as inventory-taking, monitoring of environmental sensors (such as temperature, voltage and fans), alerting, and system-health information.

For more information and instructions about IBM Director, see the *IBM Director User's Guide* on the CD that comes with your server.

Chapter 5. Solving problems

This section provides basic troubleshooting information to help you resolve some common problems that might occur while you are setting up your server.

If you cannot locate and correct the problem using the information in this section, see the section about getting help and technical assistance in the *Hardware Maintenance Manual and Troubleshooting Guide*, and the “Server Support” flowchart in the front of this book.

POST beep codes

POST emits one beep to signal successful completion. If POST detects a problem during startup, other beep codes might occur. You can use the following beep code descriptions to help identify and resolve problems that are detected during startup.

Note: See the *Hardware Maintenance Manual and Troubleshooting Guide* for more information about the POST beep codes.

| Beep code | Description | Action |
|-----------------|---|---|
| None | Undetermined error. | Call for service. |
| 1 beep | POST was completed successfully. One beep also occurs after POST if you type an incorrect password. | None required. |
| 2 beeps | Undetermined error. | Follow the instructions that appear on the screen. |
| Repeating beeps | The system board might contain a failing component. | <ol style="list-style-type: none">1. Verify that the keyboard and pointing devices are connected properly.2. Ensure that nothing is resting on the keyboard.3. Disconnect the pointing device; then, restart the server. If the problem goes away, replace the pointing device. If the problem remains, call for service. |
| 1-1-2 | Microprocessor register test has failed. | Call for service. |
| 1-1-3 | CMOS write/read test has failed. | |
| 1-1-4 | BIOS ROM checksum has failed. | |
| 1-2-1 | Programmable Interval Timer test has failed. | |
| 1-2-2 | DMA initialization has failed. | |
| 1-2-3 | DMA page register write/read test has failed. | |
| 1-2-4 | RAM refresh verification has failed. | |
| 1-3-1 | First 64 Kb RAM test has failed. | Reseat the memory modules or install a memory module. If the problem remains, call for service. |
| 1-3-2 | First 64 Kb RAM parity test has failed. | |

| | | |
|-------|---|--|
| 1-4-3 | Interrupt vector loading test has failed. | Call for service. |
| 2-1-1 | Secondary DMA register test has failed. | |
| 2-1-2 | Primary DMA register test has failed. | |
| 2-1-3 | Primary interrupt mask register test has failed. | |
| 2-1-4 | Secondary interrupt mask register test has failed. | |
| 2-2-1 | Interrupt vector loading has failed. | |
| 2-2-2 | Keyboard controller test has failed. | |
| 2-2-3 | CMOS power failure and checksum checks have failed. | |
| 2-2-4 | CMOS configuration information validation has failed. | |
| 2-3-1 | Screen initialization has failed. | Turn off the server, unplug all power cords, and reconnect all power cords; then, restart the server. If the problem remains, call for service. |
| 2-3-2 | Screen memory test has failed. | Call for service. |
| 2-3-3 | Screen retrace tests have failed. | |
| 2-3-4 | Search for video ROM has failed. | |
| 2-4-1 | Screen test indicates the screen is operable. | |
| 3-1-1 | Timer tick interrupt test has failed. | |
| 3-1-2 | Interval timer channel 2 test has failed. | |
| 3-1-3 | RAM test has failed above address hex 0FFFF. | |
| 3-1-4 | Time-of-Day clock test has failed. | |
| 3-2-1 | Serial port test has failed. | |
| 3-2-2 | Parallel port test has failed. | |
| 3-2-4 | Comparison of CMOS memory size against actual has failed. | |
| 3-3-1 | A memory size mismatch has occurred. | Reseat the memory modules or install a memory module. If the problem remains, call for service. |
| 3-3-2 | I ² C bus has failed. | Turn off the server, unplug all power cords, and reconnect all power cords; then, restart the server. If the problem remains, call for service. |
| 3-3-3 | No memory has been detected in the server. | Reseat the memory modules or install a memory module. If the problem remains, call for service. Note: In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the Boot Fail Count feature in the Start Options of the Configuration/Setup Utility is set to Enabled (its default setting), you must restart the server three times to force the system BIOS code to reset the memory connector or bank of connectors from Disabled to Enabled . |

POST error messages

The following table provides an abbreviated list of the error messages that might appear during POST.

Note: See the *Hardware Maintenance Manual and Troubleshooting Guide* for more information about the POST error messages.

| POST message | Failing device or problem found | Suggested action |
|----------------------|---|--|
| 162 | Change in device configuration | <ol style="list-style-type: none">1. Run the Configuration/Setup Utility program; then, exit, saving the configuration settings.2. Verify that your optional devices are turned on and installed correctly. |
| 163 | Time of day has not been set | Set the correct date and time. |
| 201 | Change in memory configuration | Verify that your memory is fully seated and installed properly. |
| 289 | Failing DIMM was disabled | Verify that your memory is correct for your server and that it is installed properly. |
| 301 303 | Keyboard and keyboard controller | Ensure that the keyboard cable is connected and nothing is resting on the keyboard keys. |
| 1162 | Serial port configuration conflict | Start the Configuration/Setup Utility program and ensure that the IRQ and I/O port assignments needed by the serial port are available. |
| 00019xxx | Processor <i>x</i> is not functioning or failed the built-in test | Verify that processor <i>x</i> is installed correctly. If the problem remains, replace processor <i>x</i> . |
| 00180xxx | A PCI adapter requested a resource that is not available | Start the Configuration/Setup Utility program and ensure that the resources needed by the PCI adapter are available. |
| 012980xx 012981xx | Data for processor <i>x</i> | Download and install the latest system BIOS level. |
| I9990305 | POST could not find an operating system. | Install your operating system. |

ServerGuide problems

The following table lists problem symptoms and suggested solutions.

| Symptom | Suggested action |
|--|---|
| The <i>ServerGuide Setup and Installation</i> CD will not start. | <ul style="list-style-type: none">• Ensure that the server is supported and has a startable (bootable) CD-ROM drive.• If the startup (boot) sequence settings have been altered, ensure that the CD-ROM drive is first in the startup sequence.• If more than one CD-ROM drive is installed, ensure that only one drive is set as the primary drive. Start the CD from the primary drive. |
| The SCSI RAID program cannot view all installed drives, or the operating system cannot be installed. | <ul style="list-style-type: none">• Ensure that there are no duplicate SCSI IDs or IRQ assignments.• Ensure that the hard disk drive is connected properly. |
| The operating-system installation program continuously loops. | Make more space available on the hard disk. |
| The ServerGuide program will not start your operating-system CD. | Ensure that the operating-system CD you have 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. | Ensure that the operating system is supported on your server. If the operating system is supported, either there is no logical drive defined (SCSI RAID systems) or the ServerGuide System Partition is not present. Run the ServerGuide program and ensure that setup is complete. |

Troubleshooting chart

The following table lists problem symptoms and suggested solutions. See the *Hardware Maintenance Manual and Troubleshooting Guide* for more detailed troubleshooting charts. If you cannot find the problem in the troubleshooting charts, run the diagnostic programs. If you have run the diagnostic test programs, or if running the tests does not reveal the problem, call for service.

| Symptom | Suggested action |
|--|--|
| CD-ROM drive problems | |
| CD-ROM drive is not recognized. | Verify that: <ul style="list-style-type: none"> • The IDE channel to which the CD-ROM 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-ROM drive. |
| Diskette drive problems | |
| Diskette drive activity LED stays on, or the system bypasses the diskette drive. | If there is a diskette in the drive, verify 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 contains the necessary files to start the server. • Your software program is working properly. If the diskette drive activity LED stays on, or the system continues to bypass the diskette drive, call for service. |
| Expansion enclosure problems | |
| The SCSI expansion enclosure used to work but does not work now. | Verify that: <ul style="list-style-type: none"> • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. For more information, see your SCSI expansion enclosure documentation. |
| General problems | |
| Problems such as broken cover locks or indicator LEDs not working. | Call for service. |

| Symptom | Suggested action |
|---|--|
| Hard disk drive problems | |
| Not all drives are recognized by the hard disk drive diagnostic test ("Fixed Disk" test). | <ol style="list-style-type: none"> 1. Remove the first drive not recognized and try the hard disk drive diagnostic test again. 2. If the remaining drives are recognized, replace the drive you removed with a new one. |
| System stops responding during hard disk drive diagnostic test. | <ol style="list-style-type: none"> 1. Remove the hard disk drive being tested when the server stopped responding and try the diagnostic test again. 2. If the hard disk drive diagnostic test runs successfully, replace the drive you removed with a new one. |
| Intermittent problems | |
| A problem occurs only occasionally and is difficult to detect. | <p>Verify that:</p> <ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached options. • When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. • Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. <p>If you have verified these items and the problem remains, call for service.</p> |
| Keyboard, mouse, or pointing-device problems. | |
| All or some keys on the keyboard do not work. | <ul style="list-style-type: none"> • Make sure that the keyboard cable is securely connected to the system, and that the keyboard and mouse cables are not reversed. • Make sure that the server and the monitor are turned on. • Try using another keyboard. <p>If the problem remains, call for service.</p> |
| The mouse or pointing device does not work. | <ul style="list-style-type: none"> • Make sure that the mouse or pointing-device cable is securely connected, and that the keyboard and mouse cables are not reversed. • Verify that the mouse device drivers are installed correctly. • Try using another mouse or pointing device. <p>If the problem remains, call for service.</p> |

| Symptom | Suggested action |
|---|--|
| Memory problems | |
| The amount of system memory displayed is less than the amount of physical memory installed. | <p>Verify that:</p> <ul style="list-style-type: none"> The memory modules are seated properly. You have installed the correct type of memory. If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. <p>Look in the POST error log for error message 289:</p> <ul style="list-style-type: none"> If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. If the DIMM was disabled by the user or by POST: <ol style="list-style-type: none"> Start the Configuration/Setup Utility program. Enable the DIMM. Save the configuration and restart the server. If you continue to get this error, replace the DIMM. <p>If the problem remains, call for service.</p> |
| Microprocessor problems | |
| The server emits a continuous tone during POST. | <p>The startup (boot) microprocessor is not working properly.</p> <p>Verify that the startup microprocessor is seated properly. If it is, replace the startup microprocessor.</p> <p>If the problem remains, call for service.</p> |
| Monitor problems | |
| Testing the monitor. | <p>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 adjusting and testing instructions.</p> <p>If you still cannot find the problem, call for service.</p> |
| The screen is blank. | <p>Verify that:</p> <ul style="list-style-type: none"> The server power cord is plugged into the server and a working electrical outlet. The monitor cables are connected properly. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. <p>If the servers are C2T chained together, verify that:</p> <ul style="list-style-type: none"> The C2T chain cables are securely connected to the servers. The C2T breakout cable is connected properly. A server that is turned on is selected. <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 feature in the Start Options of the Configuration/Setup Utility program is enabled (its default setting), you must restart the server three times to force the system BIOS to reset the settings in CMOS memory to the default configuration (memory connector or bank of connectors enabled).</p> <p>If you have verified these items and the screen remains blank, call for service.</p> |
| Only the cursor appears. | Call for service. |

| Symptom | Suggested action |
|--|--|
| The monitor works when you turn on the server but goes blank when you start some application programs. | Verify that: <ul style="list-style-type: none"> • The primary monitor cable is connected to the C2T device breakout cable. • You installed the necessary device drivers for the applications. If you have verified these items and the screen remains blank, call for service. |
| The screen is wavy, unreadable, rolling, distorted, or has screen jitter. | If the monitor self-tests show the monitor is working properly, 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. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 300 mm (12 in.) apart. Turn on the monitor. <p>Notes:</p> <ol style="list-style-type: none"> 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 75 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative. If the problem remains, call for service. |
| Wrong characters appear on the screen. | If the wrong language is displayed, update the BIOS code with the correct language. <p>If the problem remains, call for service.</p> |
| Option problems | |
| An IBM option that was just installed does not work. | Verify that: <ul style="list-style-type: none"> • The option is designed for the server. See the “Server Support” flowchart for information about obtaining ServerProven compatibility information from the World Wide Web. • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. If the problem remains, call for service. |
| An IBM option that used to work does not work now. | Verify that all of the option hardware and cable connections are secure. <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the failing option is a SCSI option, verify that:</p> <ul style="list-style-type: none"> • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. If the problem remains, call for service. |

| Symptom | Suggested action |
|---|--|
| Power problems | |
| The server does not turn on. | <p>Verify that:</p> <ul style="list-style-type: none"> • The power cords are properly connected to the server. • The electrical outlet functions properly. • The type of memory installed is correct. • If you just installed an option, remove it, and restart the server. If the server now turns on, you might have installed more options than the power supply supports. <p>If the problem remains, call for service.</p> |
| The server does not turn off. | <p>Verify whether you are using an ACPI or non-ACPI operating system.</p> <p>If you are using a non-ACPI operating system:</p> <ol style="list-style-type: none"> 1. Press Ctrl+Alt+Delete. 2. Turn off the system by using the power-control button. You might need to press and hold the power-control button for 5 seconds to force the server to turn off. <p>If the problem remains or if you are using an ACPI-aware operating system, call for service.</p> |
| Serial port problems | |
| The number of serial ports identified by the operating system is less than the number of serial ports installed. | <p>Verify that:</p> <ul style="list-style-type: none"> • Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports is disabled. • The serial-port adapter, if you installed one, is seated properly. <p>If the problem remains, call for service.</p> |
| A serial device does not work. For more information about the serial port, see the <i>Option Installation Guide</i> . | <p>Verify that:</p> <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 serial port. <p>If the problem remains, call for service.</p> |
| Software problem | |
| Suspected software problem. | <p>To determine if problems are caused by the software, verify that:</p> <ul style="list-style-type: none"> • Your server has the minimum memory needed to use the software. For memory requirements, see the information that comes with the software. Note: If you have just installed an adapter or memory, you might have a memory address conflict. • The software is designed to operate on your server. • Other software works on your server. • The software that you are using works on another system. <p>If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and suggested solutions to the problem.</p> <p>If you have verified these items and the problem remains, contact your place of purchase.</p> |

| Symptom | Suggested action |
|---|--|
| Universal Serial Bus (USB) port problems | |
| A USB device does not work. | Verify that: <ul style="list-style-type: none"> • You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. Note: If a standard (non-USB) keyboard is attached to the keyboard port, the USB is disabled and no USB device will work during POST. • The correct USB device driver is installed. • Your operating system supports USB devices. If the problem remains, call for service. |

Chapter 6. Updating IBM Director

If you plan to use IBM Director to manage your server, you must install the applicable IBM Director updates, which could include a Service Pack for your release of IBM Director, individual emergency fixes (eFixes), and a Director System Support Package (DSSP) for this server. Complete the following steps, in order:

1. If you plan to enable the Automatic Server Restart (ASR) feature, install the ASR device driver, which is available from the IBM Web site:
 - a. Go to the IBM Web site at <http://www.ibm.com/>.
 - b. Click **Support & downloads**.
 - c. In the **Technical support** keyword search field, type Advanced System Management 8676 and click **Go**.
 - d. From the next page, click **IBM Advanced System Management Device Driver Diskette for Microsoft Windows 2000 and Windows NT 4.0 Version 2.07** (or a later version, if it is available).
 - e. From the next page, download the executable file and follow the instructions in the readme file to install the device driver.
2. Install the IBM Director application.
3. If the IBM Director CD that comes with your server includes the IBM Director Service Pack, install the Service Pack. If the CD does not contain the Service Pack, check the IBM Web site to see if a Service Pack is available. If it is, download and install the Service Pack according to the instructions in its readme file.
4. Install any applicable eFixes, DSSPs, and additional updates for your server from the IBM Web site.

Complete the following steps to obtain and install eFixes, DSSPs, or other updates:

1. Go to the IBM Web site at <http://www.ibm.com/>.
2. Click **Support & downloads**.
3. In the **Technical support** keyword search field, type Director 8676 and click **Go**.
4. From the next page, click the eFix, DSSP, or update that you want to download.
5. From the next page, download the executable file and follow the instructions in the readme file to install the update.

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 xSeries or IntelliStation system, 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 is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
- Go to the IBM Support Web site at <http://www.ibm.com/pc/support/> to check for technical information, hints, tips, and new device drivers.
- Use an IBM discussion forum on the IBM Web site to ask questions.

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

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, 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/pc/support/> and follow the instructions. Also, you can order publications 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 xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

You can find service information for your IBM products, including supported options, at <http://www.ibm.com/pc/support/>. If you click **Profile** from the support page, you can create a customized support page. The support page has many sources of information and ways for you to solve problems, including:

- Diagnosing problems, using the IBM Online Assistant
- Downloading the latest device drivers and updates for your products
- Viewing Frequently Asked Questions (FAQ)
- Viewing hints and tips to help you solve problems
- Participating in IBM discussion forums
- Setting up e-mail notification of technical updates about your products

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, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, go to <http://www.ibm.com/services/>, or go to <http://www.ibm.com/planetwide/> for support telephone numbers.

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to <http://www.ibm.com/planetwide/> for support telephone numbers.

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. Warranty information

This section contains information about your warranty period and the service and support that are provided by your warranty.

Warranty period

The warranty period varies by machine type and country or region.

Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country or region where service is performed.

Prior to on-site warranty service, you are required to go through problem determination with an IBM service specialist call center technician.

This paragraph applies only to products with a warranty period of 3 years on parts and 1 year on labor. A warranty period of 3 years on parts and 1 year on labor means that IBM will provide warranty service without charge for:

1. parts and labor during the first year of the warranty period
2. parts only, on an exchange basis, in the second and third years of the warranty period. IBM will charge you for any labor it provides in performance of the repair or replacement.

The IBM Machine Warranties Web site at http://www.ibm.com/servers/support/machine_warranties/ contains a worldwide overview of the IBM Statement of Limited Warranty for IBM Machines, a glossary of terms used in the Statement of Limited Warranty, Frequently Asked Questions (FAQ), and links to Product Support Web pages. The IBM Statement of Limited Warranty is available from this Web site in 29 languages in Portable Document Format (PDF).

Machine - IBM @server xSeries 335 Type 8676

| Country or region | Warranty period | Service delivery method |
|-------------------|----------------------------------|-------------------------|
| Worldwide | Parts - 3 years, labor - 3 years | On-site |

Problem determination

Prior to on-site warranty service, you are required to go through problem determination with an IBM service specialist call center technician. The service specialist will run diagnostic tests on the hardware and check the software.

Running diagnostics

The IBM service specialist will help you determine whether your equipment is functioning as specified. It might be necessary to isolate the failing xSeries, Netfinity®, or IntelliStation system; IBM component; or both from any active production environment to run diagnostics and perform defect-isolation programs. You are responsible for making the system, IBM component, or both available for running diagnostics and defect-isolation programs.

Checking software

The IBM service specialist will help you ensure that the correct BIOS code, firmware, device drivers, and other supporting IBM software are installed and

correctly configured. It might be necessary to manually gather information about the relevant software levels or run IBM-approved utility programs to gather this information. It might be necessary to isolate the failing system from any active production environment to gather this information. You are responsible, with assistance from the service specialist, for gathering this information. The IBM Statement of Limited Warranty does not include on-site assistance with this activity.

Warranty service and support

With the original purchase of an IBM xSeries or IntelliStation system, you have access to extensive service and support. During the IBM Machine warranty period, you may call IBM or your reseller for problem-determination assistance under the terms of the IBM Statement of Limited Warranty.

The following services are available during the warranty period:

- **Problem determination** - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.
- **IBM hardware repair** - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service, either on-site or at an IBM service center as determined by IBM.
- **Engineering Change management** - Occasionally, there might be changes that are required after a product has been shipped from IBM. In those instances, IBM will make Engineering Changes (ECs) available that apply to your hardware.
- **Customer replaceable units (CRUs)** - Some parts of IBM servers are designated as customer replaceable units. IBM ships CRUs to you for replacement by you. CRUs include keyboards, monitors, memory, diskette drives, hard disk drives, and mice (this list is not inclusive of all CRUs).

The following items are not covered under warranty service:

- Replacement or use of non-IBM parts. All IBM parts contain a 7-character identification in the format IBM FRU XXXXXXXX.
- Identification of software problem sources.
- Installation of customer replaceable units (CRUs).
- Installation and configuration of BIOS code, firmware, or device drivers that are designated as customer installable.

See the IBM Statement of Limited Warranty for a full explanation of IBM warranty terms. Be sure to retain your proof of purchase to obtain warranty service.

Please have the following information ready when you call:

- The machine type and model of your IBM hardware product (if available)
- Serial numbers of your IBM hardware products
- A description of the problem
- The exact wording of any error messages
- Hardware and software configuration information

International Warranty Service

If you travel with your xSeries or IntelliStation system or relocate it to a country where your system is sold and serviced by IBM or IBM resellers authorized to

perform warranty service, International Warranty Service (IWS) is available during the warranty period. Eligible IBM systems are identified by their four-digit machine types.

You can obtain IWS through the service delivery method (such as depot, carry-in, or on-site) provided in the servicing country. Service methods and procedures vary by country, and some service or parts might not be available in all countries. Service centers in certain countries might not be able to service all models of a particular machine type. In addition, some countries might have fees and restrictions that apply at the time of service.

To determine whether your system is eligible for IWS, go to <http://www.ibm.com/pc/support/> and click **Warranty lookup**.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for IBM and non-IBM hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and service name might vary by country or region.

For more information about these services, contact your IBM marketing representative.

IBM Statement of Limited Warranty Z125-4753-06 8/2000

Part 1 - General Terms

This Statement of Limited Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 replace or modify those of Part 1. The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Limited Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

The IBM Warranty for Machines: IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications ("Specifications"). The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded.

Extent of Warranty: The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty: IBM does not warrant uninterrupted or error-free operation of a Machine. Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service: To obtain warranty service for a Machine, contact IBM or your reseller. If you do not register your Machine with IBM, you may be required to present proof of purchase.

During the warranty period, IBM or your reseller, if approved by IBM to provide warranty service, provides without charge certain types of repair and exchange service to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. At its discretion, IBM or your reseller will 1) either repair or exchange the failing Machine and 2) provide the service either at your location or a service center. IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

Some parts of IBM Machines are designated as Customer Replaceable Units (called "CRUs"), e.g., keyboards, memory, or hard disk drives. IBM ships CRUs to you for replacement by you. You must return all defective CRUs to IBM within 30 days of your receipt of the replacement CRU. You are responsible for downloading designated Machine Code and Licensed Internal Code updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided:
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides;
 - b. secure all programs, data, and funds contained in a Machine;
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations; and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Limitation of Liability: Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other

contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES, LOST PROFITS OR LOST SAVINGS, EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Governing Law: Both you and IBM consent to the application of the laws of the country in which you acquired the Machine to govern, interpret, and enforce all of your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Part 2 - Country-unique Terms

AMERICAS

BRAZIL

Governing Law: *The following is added after the first sentence:* Any litigation arising from this Agreement will be settled exclusively by the court of Rio de Janeiro.

NORTH AMERICA

Warranty Service: *The following is added to this Section:* To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM-SERV (426-7378).

CANADA

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:* laws in the Province of Ontario.

UNITED STATES

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:* laws of the State of New York.

ASIA PACIFIC

AUSTRALIA

The IBM Warranty for Machines: *The following paragraph is added to this Section:* The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

Limitation of Liability: *The following is added to this Section:* Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974 or other similar legislation, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:* laws of the State or Territory.

CAMBODIA, LAOS, AND VIETNAM

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:* laws of the State of New York.

The following is added to this Section: Disputes and differences arising out of or in connection with this Agreement shall be finally settled by arbitration which shall be held in Singapore in accordance with the rules of the International Chamber of Commerce (ICC). The arbitrator or arbitrators designated in conformity with those rules shall have the power to rule on their own competence and on the validity of the Agreement to submit to arbitration. The arbitration award shall be final and binding for the parties without appeal and the arbitral award shall be in writing and set forth the findings of fact and the conclusions of law.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator.

The two arbitrators appointed by the parties shall appoint a third arbitrator before proceeding upon the reference. The third arbitrator shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the ICC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

The English language version of this Agreement prevails over any other language version.

HONG KONG AND MACAU

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:* laws of Hong Kong Special Administrative Region.

INDIA

Limitation of Liability: *The following replaces items 1 and 2 of this Section:*

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Limited Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

JAPAN

Governing Law: *The following sentence is added to this Section:* Any doubts concerning this Agreement will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

NEW ZEALAND

The IBM Warranty for Machines: *The following paragraph is added to this Section:* The warranties specified in this Section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

Limitation of Liability: *The following is added to this Section:* Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

Governing Law: *The following replaces this Section:* Both you and IBM consent to the application of the laws of the State of New York (except when local law requires otherwise) to govern, interpret, and enforce all your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Any disputes arising from or in connection with this Agreement will first be resolved by friendly negotiations, failing which either of us has the right to submit the dispute to the China International Economic and Trade Arbitration Commission in Beijing, the PRC, for arbitration in accordance with its arbitration rules in force at the time. The arbitration tribunal will consist of three arbitrators. The language to be used therein will be English and Chinese. An arbitral award will be final and binding on all the parties, and will be enforceable under the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958).

The arbitration fee will be borne by the losing party unless otherwise determined by the arbitral award.

During the course of arbitration, this Agreement will continue to be performed except for the part which the parties are disputing and which is undergoing arbitration.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES: The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

Warranty Service: If you purchase an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM. If you purchase an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchase an IBM Machine in a Middle Eastern or African country, you may obtain warranty service for that Machine from the IBM entity within the country of purchase, if that IBM entity provides warranty service in that country, or from an IBM reseller, approved by IBM to perform warranty service on that Machine in that country. Warranty service in Africa is available within 50 kilometers of an IBM authorized service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM authorized service provider.

Governing Law: The applicable laws that govern, interpret and enforce rights, duties, and obligations of each of us arising from, or relating in any manner to, the subject matter of this Statement, without regard to conflict of laws principles, as well as Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided, except that in 1) Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Hungary, Former Yugoslav Republic of Macedonia, Romania, Slovakia, Slovenia, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan, the laws of Austria apply; 2) Estonia, Latvia, and Lithuania, the laws of Finland apply; 3) Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Djibouti, Democratic Republic of Congo, Equatorial Guinea, France, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia, this Agreement will be construed and the legal relations between the parties will be determined in accordance with the French laws and all disputes arising out of this Agreement or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 4) Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe, this Agreement will be governed by English Law and disputes relating to it will be submitted to the exclusive jurisdiction of the English courts; and 5) in Greece, Israel, Italy, Portugal, and Spain any legal claim arising out of this Statement will be brought before, and finally settled by, the competent court of Athens, Tel Aviv, Milan, Lisbon, and Madrid, respectively.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND GERMANY

The IBM Warranty for Machines: *The following replaces the first sentence of the first paragraph of this Section:* The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this Section:

The minimum warranty period for Machines is six months. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

Extent of Warranty: *The second paragraph does not apply.*

Warranty Service: *The following is added to this Section:* During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Limitation of Liability: *The following paragraph is added to this Section:* The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2: IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

EGYPT

Limitation of Liability: *The following replaces item 2 in this Section:* as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

Applicability of suppliers and resellers (unchanged).

FRANCE

Limitation of Liability: *The following replaces the second sentence of the first paragraph of this Section:*In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: *(items 1 and 2 unchanged).*

IRELAND

Extent of Warranty: *The following is added to this Section:* Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: *The following replaces items one and two of the first paragraph of this Section:*1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and 2. the amount of any other actual direct damages, up to 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section: IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY

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Important notes

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

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

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

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

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

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Product recycling and disposal

This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. For country-specific instructions, refer to the following Web site:
<http://www.ibm.com/ibm/environment/products/prp.shtml>.

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, contact your local waste disposal facility.

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Electronic emission notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the

equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. 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 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

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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, Maceo, 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 |

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

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