IBM

eserver

xSeries 240

Installation Guide

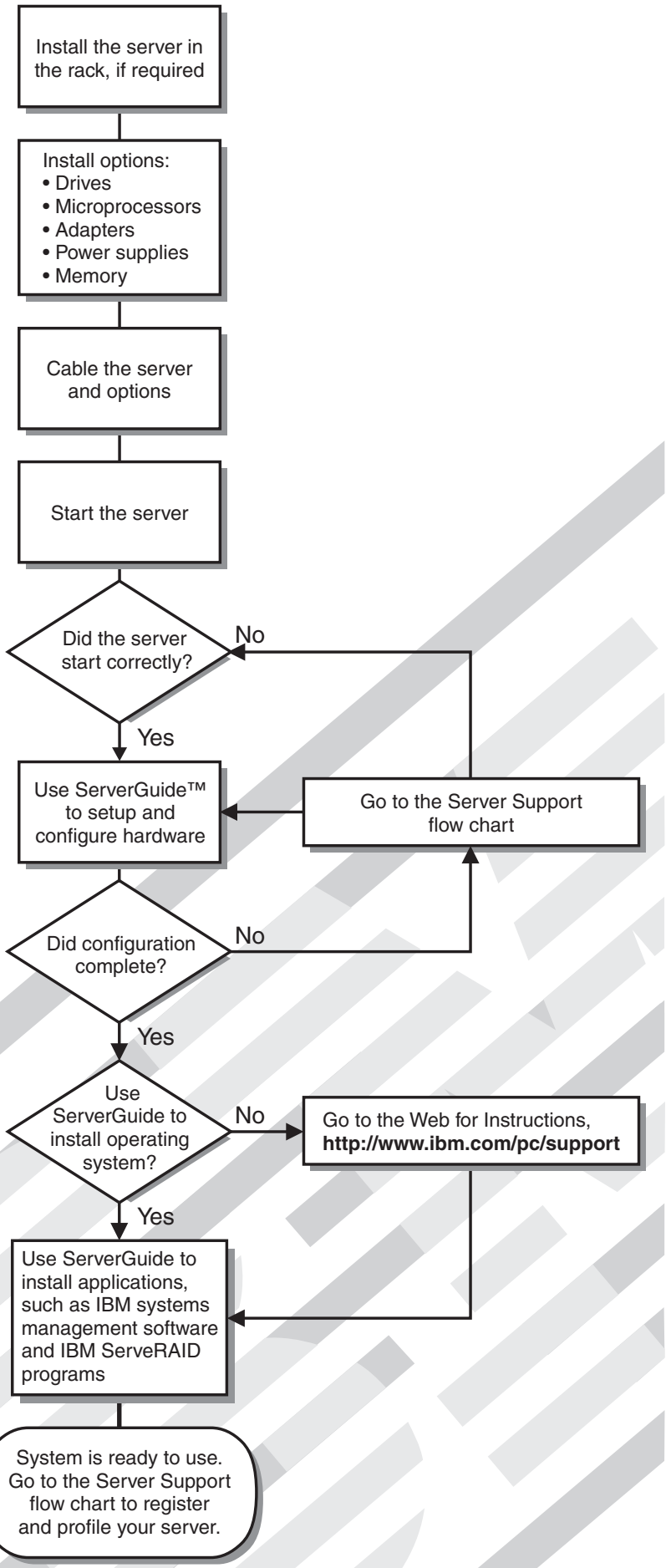
Welcome. . .

Thank you for buying an IBM xSeries server.

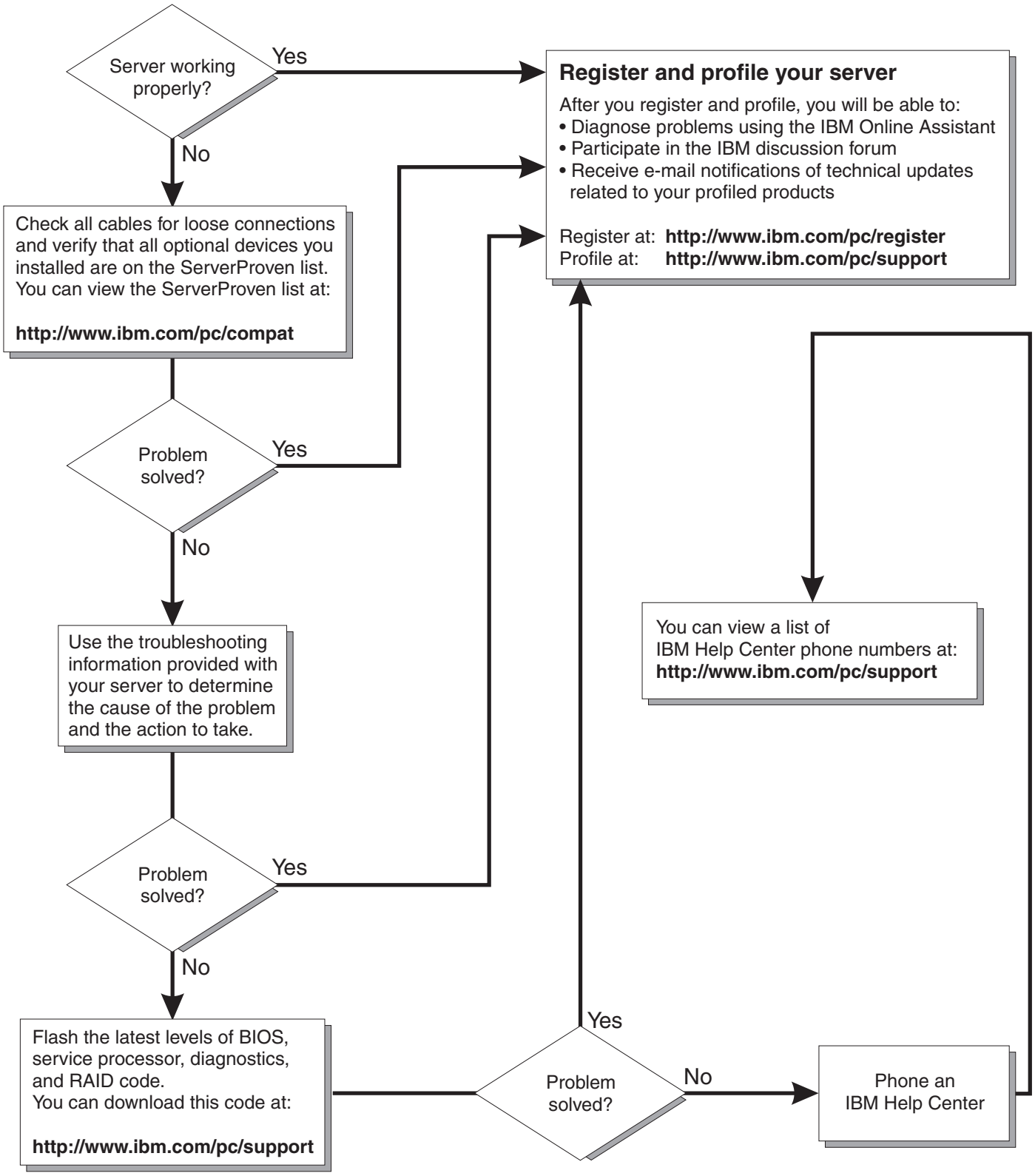
This server *Installation Guide* contains information for setting up and configuring your server.

For detailed information about your server, view the *User's Reference* 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



IBM xSeries 240
Installation Guide

Note

Before using this information and the product it supports, be sure to read the general information in Appendix A, “Product warranties and notices” on page 41.

First Edition (October 2000)

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Safety

Before installing this product, read the Safety Information.

مج، يجب قراءة دات السلامة

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）。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

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.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

安裝本產品之前，請先閱讀「安全資訊」。

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1

DANGER

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

To avoid a shock hazard:

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

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

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.

Some server models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

3

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

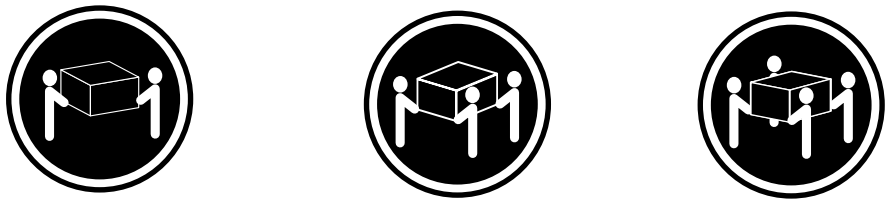
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous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

4



≥18 kg (37 lbs)

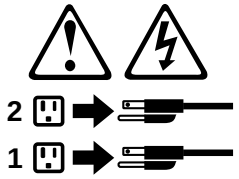
≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

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.



Handling static-sensitive devices

Attention: Static electricity can damage electronic devices and your system. To avoid damage, keep static sensitive devices in their static protective bag until you are ready to install them.

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

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its anti-static package, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body.)
- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it on its static-protective package. (If your device is an adapter, place it component side up.) Do not place the device on your system unit cover or on a metal table.
- Take additional care when handling devices during cold weather as heating reduces indoor humidity and increases static electricity.

Chapter 1. Introduction

Thank you for purchasing an IBM® @server xSeries 240. This *Installation Guide* provides the information needed to:

- Set up and cable your server
- Start and configure your server
- Install your network operating system (NOS)

Packaged with this *Installation Guide* are software CDs that you can use to configure hardware, install device drivers, and install the network operating system (NOS).

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

Your server comes with a three-year limited warranty and IBM Server Start Up Support. If you have access to the World Wide Web, you can obtain up-to-date information about your server model and other IBM server products at the following World Wide Web address:

http://www.ibm.com/eserver/xseries

If you purchased a rack model of the xSeries 240 server, use the *Rack Installation Instructions* provided with this book to install the server in a rack.

Record and retain the following information.

Product name	_____
Machine type	_____
Model	_____
Serial number	_____
Key serial number	_____

The server serial number and other identification numbers are located on labels on the rear of the server and on the front of the server under the trim bezel.

Note: Your server keys cannot be duplicated by locksmiths. If you lose them, order replacement keys from the key manufacturer. The key serial number and phone number of the manufacturer are on a tag attached to the keys.

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Features and specifications

The following table summarizes the features of the xSeries 240 server.

Microprocessor

- Intel® Pentium® III microprocessor with MMX™ technology and SIMD extensions
- 32 KB of level-1 cache
- 256 KB of level-2 cache (min.)
- Expandable to two microprocessors

Memory

- Standard: 128 MB (min), expandable to 4 GB
- 133 MHz, registered, error correcting code (ECC), synchronous dynamic random access memory (SDRAM) (complying with PC 133 SDRAM Registered DIMM Specification, Revision 1.0 or later). When installed in systems using 100 MHz front-side bus microprocessors, the memory operates at 100 MHz.
- Four dual inline memory-module (DIMM) sockets

Diskette Drive

- Standard: One 3.5-inch, 1.44 MB

Hard Disk Drives

- Up to six hot-swappable hard disk drives supported

CD-ROM Drive

- Standard: 40X IDE

Keyboard and Auxiliary Device
(standard only on tower models)

- Keyboard
- Mouse

Expansion Bays

- Six slim (1-inch) or three half-high (1.6-inch) hot-swap drive bays
- Three 5.25-inch non-hot-swap bays (one contains the CD-ROM drive)

Expansion Slots

Up to five PCI adapters supported.

- Three 64-bit hot-plug PCI slots
- Two standard (non-hot-plug) 32-bit PCI slots

Upgradable Microcode

- BIOS, diagnostics, and Advanced System Management Processor upgrades (when available) can update EEPROMs on the system board

Security Features

- Door and side cover lock (tower model only)
- Power-on and administrator passwords
- Selectable drive-startup
- Keyboard password
- System management security
  - User log-in password
  - Read-only or read/write access
  - Dial back

Predictive Failure Analysis™ (PFA) Alerts

- Power supplies
- Fans
- Memory
- Hard disk drives
- Microprocessors
- Voltage regulator modules (VRMs)

Integrated Functions

- Two serial ports
- Two universal serial bus (USB) ports
- One parallel port
- Mouse port
- Keyboard port
- Video port
- Advanced System Management Interconnect port
- Two SCSI ports (one internal, one external)
- 10BASE-T/100BASE-TX Ethernet port (controller on system board)
- Redundant Ethernet capability, through the use of an optional network interface card (NIC)
- Advanced System Management Processor on system board
- Dedicated Advanced System Management I/O port
- Video controller (with 4 MB video memory) compatible with:
  - Super video graphics array (SVGA)
  - Video graphics adapter (VGA)

Power Supply

- Two 250 W (115–230 V ac)
  - Standard - 500 W non-redundant, 250 W redundant
  - Optional - Additional 250 W power supply is available for 500 W redundancy
- Automatic voltage range selection
- Built-in overload and surge protection
- Automatic restart after a loss of power

Redundant Cooling

- Three hot-swap fans

Table 1. Server features

The following table provides the specifications for the xSeries 240 server.

Size (Tower Model)

- Depth: 659.3 mm (26 in.)
- Height: 426.5 mm (16.8 in.)
- Width: 217.3 mm (8.6 in.)

Size (Rack Model)

- Depth: 629.3 mm (24.8 in.)
- Height: 217.3 mm (8.6 in.) (5 U)
- Width: 426.6 mm (16.8 in.)

Weight (Tower Model)

- Minimum configuration: 26.6 kg (58.6 lb)
- Maximum configuration: 37.5 kg (82.7 lb)

Weight (Rack Model)

- Minimum configuration: 25.3 kg (55.8 lb)
- Maximum configuration: 36.2 kg (79.8 lb)

Heat Output

- Approximate heat output in British Thermal Units (Btu) per hour:
  - Minimum configuration: 683 Btu (200 watts)
  - Maximum configuration: 2048 Btu (600 watts)

Electrical Input

- Sine-wave input (50 to 60 Hz) is required
- Input voltage:
  - Low range:
    - Minimum: 90 V ac
    - Maximum: 137 V ac
  - High range:
    - Minimum: 180 V ac
    - Maximum: 265 V ac
  - Input kilovolt-amperes (kVA) approximately:
    - Minimum configuration as shipped: 0.08 kVA
    - Maximum configuration: 0.52 kVA

Power Available for Drives

- Each hot-swap drive bay:
  - +5 V dc line: 15 A
  - +12 V dc line: 17.2 A

Acoustical Noise Emissions Values

- Sound power, idling: 6.6 bel maximum
- Sound power, operating: 6.8 bel maximum
- Sound pressure, operating: 67 dBa maximum

Environment

- Air temperature:
  - Server on: 10° to 35° C (50° to 95° F) Altitude: 0 to 914 m (3000 ft.)
  - Server on: 10° to 32° C (50° to 90° F) Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)
  - Server off: 10° to 43° C (50° to 110° F) Maximum Altitude: 2133 m (7000 ft.)
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%
- Maximum altitude: 2133 m (7000 ft)

Table 2. Server specifications

Notices used in this book

This book contains information notices that relate to a specific topic. The Caution and Danger notices also appear in the multilingual *Safety Information* book provided on the *IBM xSeries Documentation* CD. Each notice is numbered for easy reference to the corresponding notices in the multilingual book.

The notice definitions are as follows:

- **Notes**

  These notices provide important tips, guidance, or advice.

- **Attention**

  These notices indicate possible damage to programs, devices, or data. An attention notice is placed just *before* the instruction or situation in which damage could occur.

- **Caution**

  These notices indicate situations that can be potentially hazardous to you. A caution notice is placed just *before* a description of a potentially hazardous procedure step or situation.

- **Danger**

  These notices indicate situations that can be potentially lethal or extremely hazardous to you. A danger notice is placed just *before* a description of a potentially lethal or extremely hazardous procedure step or situation.

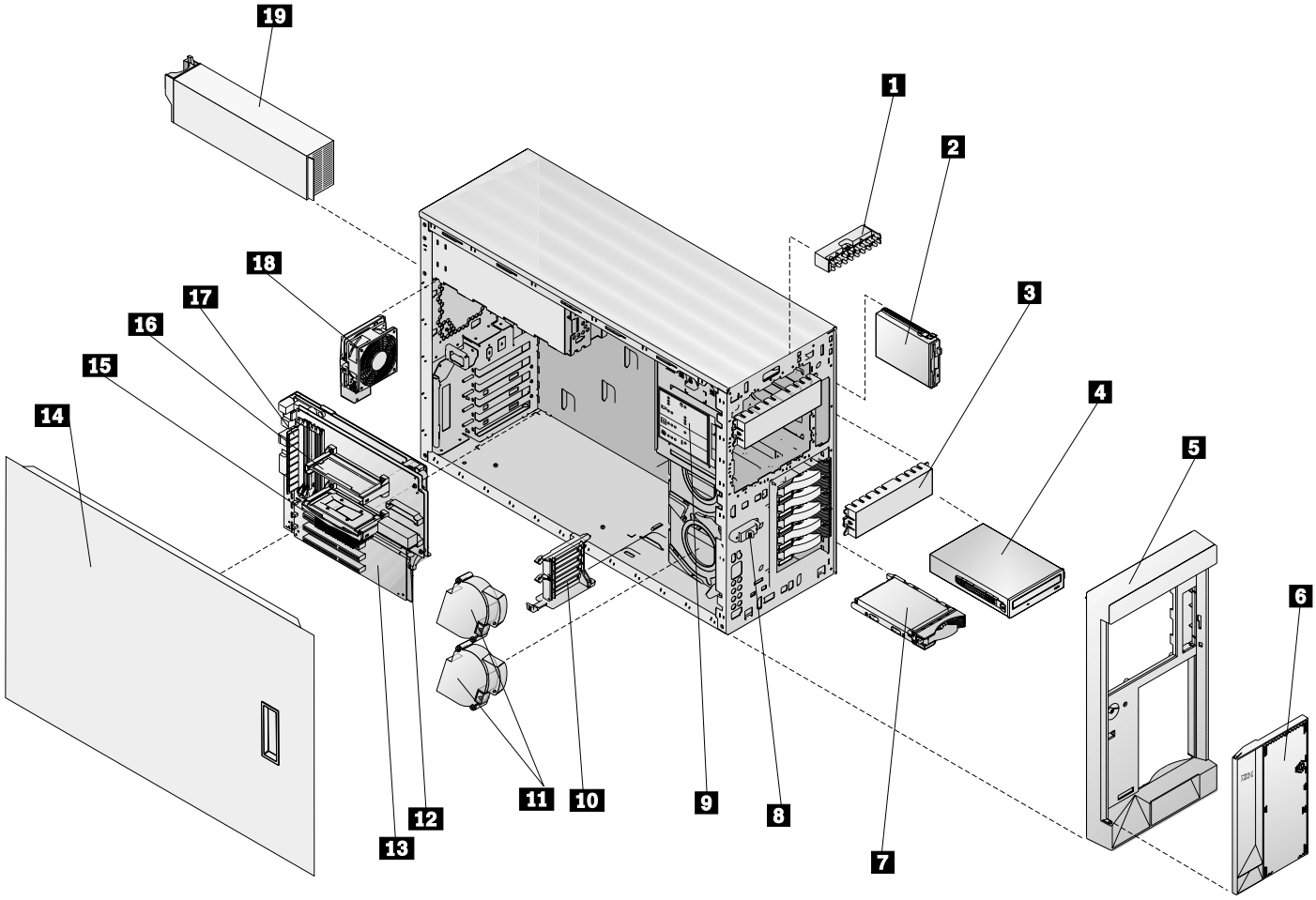
Major components of the xSeries 240 server

The orange color on components and labels in your server identifies hot–swap components. This means that you can install or remove the component while the system is running, provided that your system is configured to support this function.

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

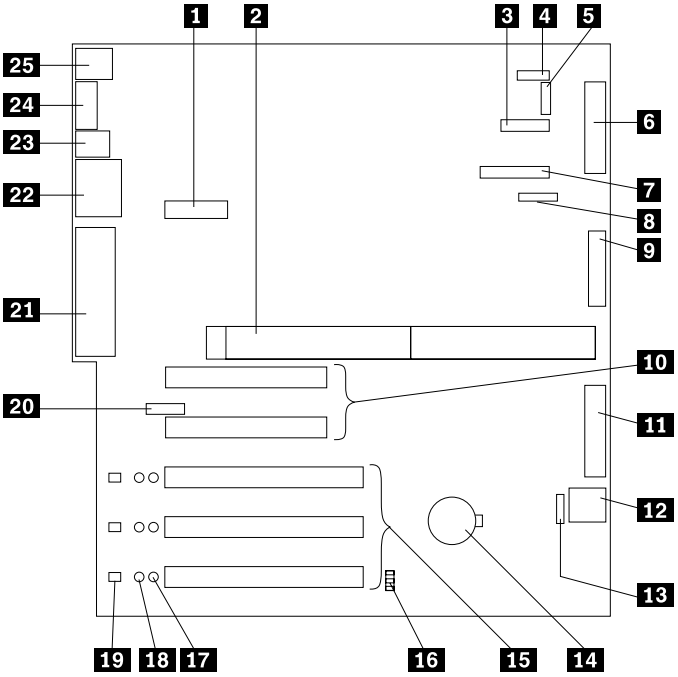
The following illustration shows the locations of major components in your server.

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



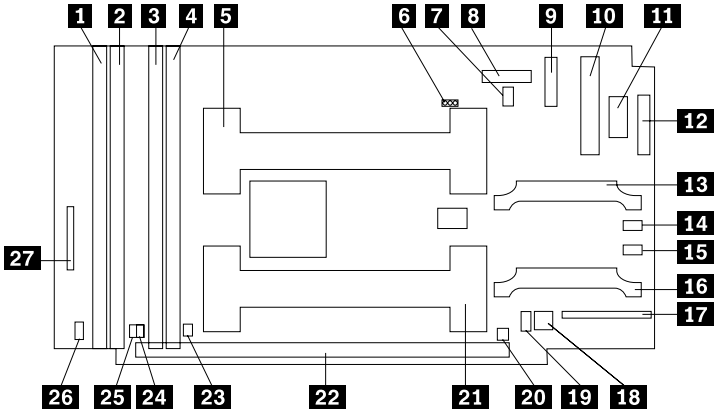
1 Operator information panel
2 Diskette drive
3 Removable-media-bay filler panel
4 CD-ROM drive
5 Bezel
6 Front door
7 Hot-swap hard disk drive
8 Side cover release lever
9 Diagnostic panel
10 Adapter support bracket
11 Fan assembly
12 Processor board
13 System board
14 Side cover
15 Microprocessor 1
16 Microprocessor terminator (or microprocessor 2)
17 DIMM sockets
18 Fan
19 Power supply

System board component locations



1 Dual serial and PCI hot-plug control switch connector (J1)
2 Processor board connector (J4, J8)
3 Operator information panel connector (J29)
4 Reserved (J32)
5 Reserved (J10)
6 Diskette drive connector (J23)
7 Diagnostic LED panel connector (J6)
8 Reserved (J17)
9 Internal LVD (low voltage differential) SCSI connector (J25) (with extender cable on bracket)
10 PCI slots 1 and 2 (on primary PCI bus A)
11 IDE connector (J27)
12 Power control and reset panel cable connector (J18)
13 Advanced System Management Interconnect connector (J35)
14 Battery
15 PCI (hot-plug) slots 3–5 (on primary PCI bus B)
16 Jumper block (J20)
17 PCI slot Power Good LEDs
18 Internal PCI slot Attention LEDs
19 External PCI slot Attention LEDs
20 Advanced System Management adapter connector (J21)
21 External LVD SCSI/parallel port connector (J19)
22 Serial/video port connector (J11)
23 USB 1 and USB 2 port connectors (J9) (USB 2 is below USB 1.)
24 Ethernet port connector (J7)
25 Mouse and keyboard connectors (J5) (The mouse connector is above the keyboard connector.)

Processor board component locations



1 DIMM connector 4 (J1)
2 DIMM connector 3 (J2)
3 DIMM connector 2 (J3)
4 DIMM connector 1 (J4)
5 Microprocessor 2 connector (U6)
6 Reserved (J15)
7 Microprocessor 2 Error LED (CR13)
8 Reserved (J19)
9 Power supply connector (J6)
10 Power supply connector (J11)
11 Power supply connector (J12)
12 Power supply connector (J14)
13 VRM 2 connector (J13)
14 VRM 2 Error LED (CR19)
15 VRM 1 Error LED (CR17)
16 VRM 1 connector (J5)
17 Fans 1 and 2 connector (J8)
18 Switch block 2 (SW2)
19 Switch block 1 (SW1) (might not be present on your server)
20 Microprocessor 1 Error LED (CR12)
21 Microprocessor 1 connector (U5)
22 System board connectors (J9 and J25) (on reverse side of processor board)
23 DIMM 1 Error LED (CR8)
24 DIMM 2 Error LED (CR9)
25 DIMM 3 Error LED (CR10)
26 DIMM 4 Error LED (CR11)
27 Fan 3 connector (J10)

Chapter 2. Installing options

This chapter provides the basic information needed to install hardware options in your server. This section is for all users, but is written with the experienced user in mind.

If you need more detailed installation information, refer to the *User's Reference* on the *xSeries Documentation* CD.

Working inside a server with power on

Your server supports hot-swap drives, fans, and power supplies and is designed to operate safely while turned on with the cover removed. Follow these guidelines when you work inside a server that is turned on:

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

Working with adapters

You can install up to five peripheral component interconnect (PCI) adapters in the expansion slots on the system board.

In three of the PCI slots, you can install a new PCI adapter or replace an existing PCI adapter with the same type of adapter without turning off the server power and restarting the system, if these features are supported by your operating system. These slots are called *hot-pluggable* PCI slots. They are also referred to as hot-plug PCI or *Active PCI*™ slots.

The two remaining PCI slots support standard (non-hot-plug) PCI adapters.

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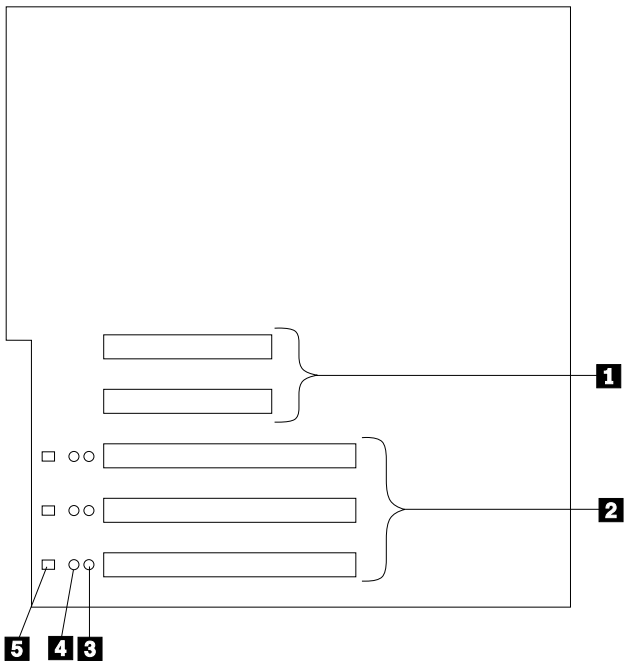
The following illustration shows the location of the PCI expansion slots on the system board.



1 Non-hot-plug 32-bit PCI slots 1 and 2 (on PCI bus A)
2 Hot-plug 64-bit PCI slots 3–5 (on PCI bus B)
3 Power LEDs for hot-swap slots
4 Internal Attention LEDs for hot-swap slots
5 External Attention LEDs for hot-swap slots

LEDs for hot-plug PCI slots

Each hot-plug PCI slot has three LEDs associated with it — two Attention LEDs and one Power LED.

- **Power LED:** This LED is on when the hot-plug PCI slot is active and has power. An adapter *must not* be added to or removed from the PCI slot when the Power LED is on. When this LED is off, the PCI slot is inactive and has no power applied. An adapter can be installed when the Power LED for the PCI slot is off. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters, and, if so, how to disable the hot-plug PCI slot.
- **Attention LEDs:** Each hot-plug PCI slot has an Attention LED that is visible from the rear of the server and one that can be seen from inside the server. (The LEDs have the same meaning; they are duplicated to be visible from outside or inside the server.) An Attention LED flashes approximately once per second when it is on. The meaning of the Attention LEDs is defined by your operating system. Refer to your operating system documentation to determine if it supports hot-plug PCI adapters and, if so, what the Attention LEDs indicate.

The following table describes the LEDs:

Power LED	Attention LED	Description
On	Flashing	The adapter requires attention. **Slot still has power applied.** Do not remove or install an adapter in the slot. Refer to your operating system documentation for instructions.
On	Off	Normal operation; no intervention is required.
Off	Flashing	The adapter requires intervention. **Power is removed from the slot.** An adapter can be removed or installed in the slot.
Off	Off	**Power is removed from the slot.** An adapter can be removed or installed in the slot.

Adapter considerations

Before you continue with the adapter-installation procedure:

- Review the documentation that comes with the adapter and follow those instructions in addition to the instructions given in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that come with the adapter documentation.
- You can install full-length adapters in all expansion slots.
- You can install hot-plug PCI adapters in PCI slots 3–5, if your operating system supports this feature. Non-hot-plug PCI adapters can also be installed in these slots.
- Your server supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.

  Note: A universal PCI adapter supports both 3.3 V and 5.0 V operation.
- PCI slots 1 and 2 are on PCI bus A, and PCI slots 3–5 are on PCI bus B. Both PCI buses are primary buses. The system scans PCI slots 1 through 5 to assign system resources; then the system starts (boots) the PCI devices in the following order, if the default boot precedence has not been changed: PCI slots 1 and 2, system board SCSI devices, and then PCI slots 3 through 5.

Enabling hot-plug PCI support

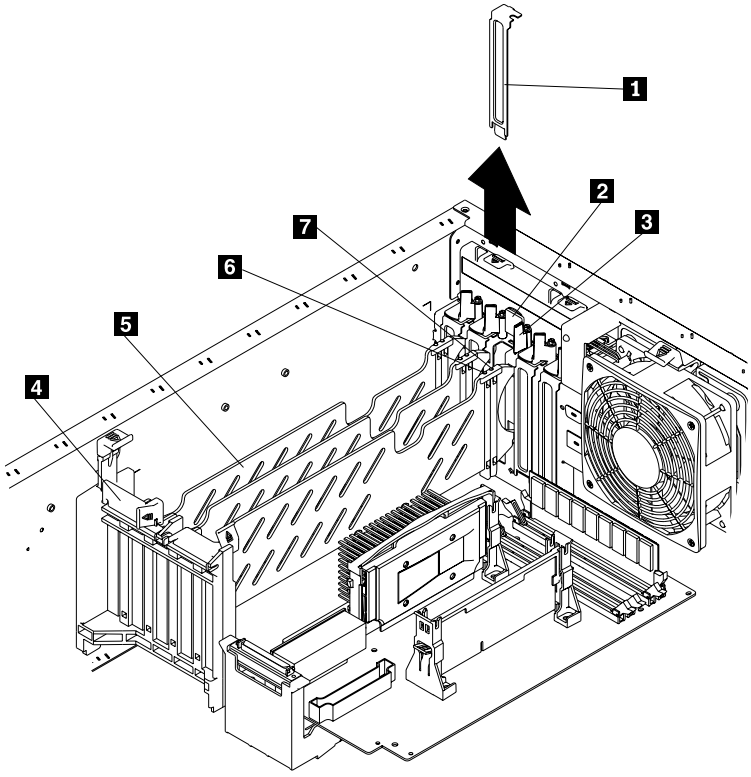
Your xSeries 240 server has hot-plug PCI capability. To enable this feature, you must install the operating system services for hot-plug PCI support code. To obtain the operating system hot-plug PCI support code, access http://www.ibm.com/pc/support on the World Wide Web.

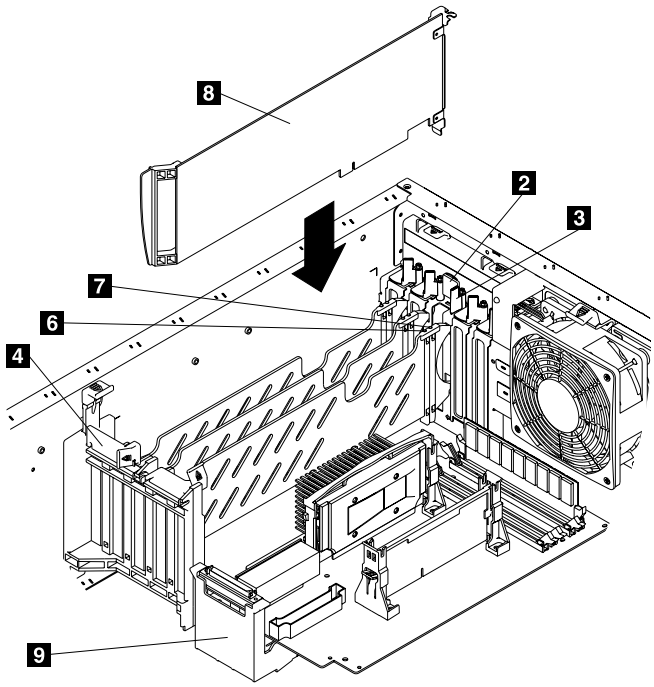
Installing a PCI adapter

This section contains the procedure for installing a hot-plug PCI adapter.

Attention:
All hot-plug operations must be done through the operating system console (or supported user interface). Otherwise, the system might lock up or serious damage to the adapter or system unit might occur.

Refer to the following illustrations of the rack model while you perform the steps in this procedure.





1. Expansion-slot cover
2. Tab
3. Adapter retention latch
4. Adapter retention flap
5. Plastic divider
6. Power light
7. Attention light
8. Adapter
9. SCSI cable extender

Note: For some models of the xSeries 240 server, the SCSI cable extender differs slightly from what is shown in the preceding illustration. In these models, the retaining bracket holding the cable connector has been removed.

To install a hot-plug PCI adapter:

1. Review the information in “Safety” on page v and “Handling static-sensitive devices” on page x.
2. If you are installing a non-hot-plug adapter, turn off the server and peripheral devices; then, remove the server cover.
3. Determine which PCI adapter expansion slot you will use for the adapter.

   Notes:

   a. Only PCI slots 3–5 support hot-plug PCI adapters.

   b. If you are installing a hot-plug adapter, disable the selected PCI slot from your operating system. (Refer to the documentation that comes with your operating system for information about disabling a hot-plug PCI slot.) Disabling the PCI slot turns off the Power light for that PCI slot.

Attention:
Make sure the Power light 6 for the hot-plug PCI slot is off before you continue to the next step.

4. Remove the expansion-slot cover 1 :
   a. Rotate the adapter retention latch 3 counterclockwise.
   b. Lift the tab 2 , if required, covering the top of the expansion-slot cover 1 and then remove the expansion-slot cover from the server. Store it in a safe place for future use.

   Attention:
   Expansion-slot covers must be installed on all vacant slots. This maintains the electromagnetic emissions characteristics of the system and ensures proper cooling of system components.
5. Refer to the documentation that comes with your adapter for any cabling instructions. It might be easier for you to route any cables before you install the adapter.
6. Press on the touchpoint on the adapter retainer flap 4 at the end of the slot nearest the front of the server and rotate the adapter retainer flap upward.
7. Remove the adapter from the static-protective package.

   Attention:
   Avoid touching the components and gold-edge connectors on the adapter.
8. Place the adapter, component-side up, on a flat, static-protective surface.
9. Set any jumpers or switches as described by the adapter manufacturer.
10. Install the adapter:
    a. Carefully grasp the adapter 8 by its top edge or upper corners, and align it with the expansion slot on the system board.
    b. Press the adapter *firmly* into the expansion slot.

       Attention:
       When you install an adapter in the server, be sure that it is completely and correctly seated in the system-board connector. Incomplete insertion might cause damage to the system board or the adapter.
    c. Lower the tab 2 on the adapter guide over the tab on the top corner of adapter; then, rotate the adapter retention latch 3 clockwise until it snaps into place.

       Attention:
       Power cannot be restored to the adapter slot if the tab is not lowered into place.
    d. Close the adapter retainer flap 4 .
11. Connect any needed cables to the adapter.

    Notes:
    a. Route cables so that the flow of air from the fans is not blocked.
    b. If you installed a hot-plug adapter, enable the PCI slot from your operating system. (Refer to the documentation that comes with your operating system for information about enabling a hot-plug PCI slot.) Make sure that the Power light 6 for the hot-plug PCI slot is on.

12. If you have other options to install or remove, do so now.

Special considerations for installing a ServeRAID adapter

You can install an optional ServeRAID adapter in your server to control the hot-swap hard disk drives.

To install the ServeRAID adapter:

1. Disconnect the SCSI cable from the SCSI cable extender on the system board. See the illustration in “Installing a PCI adapter” on page 12 for the location of the SCSI cable extender. (The other end of the SCSI cable is connected to the SCSI hard disk drive backplane.) The Service label on the inside of the cover of your server shows cable routing for an optional ServeRAID adapter.
2. Connect the end of the SCSI cable that you disconnected from the SCSI cable extender to the ServeRAID adapter. The other end of the cable is connected to the SCSI hard disk drive backplane; the drives in the hot-swap bays are now connected to the ServeRAID adapter.
3. Connect the 2-drop SCSI cable to the SCSI cable extender on the system board, and attach the device in the non-hot-swap bay to one of the drops on the other end of the 2-drop SCSI cable. The device is attached to the integrated SCSI controller.

Refer to the documentation provided with the ServeRAID adapter for more information about installing the adapter and configuring a disk array.

Installing memory modules

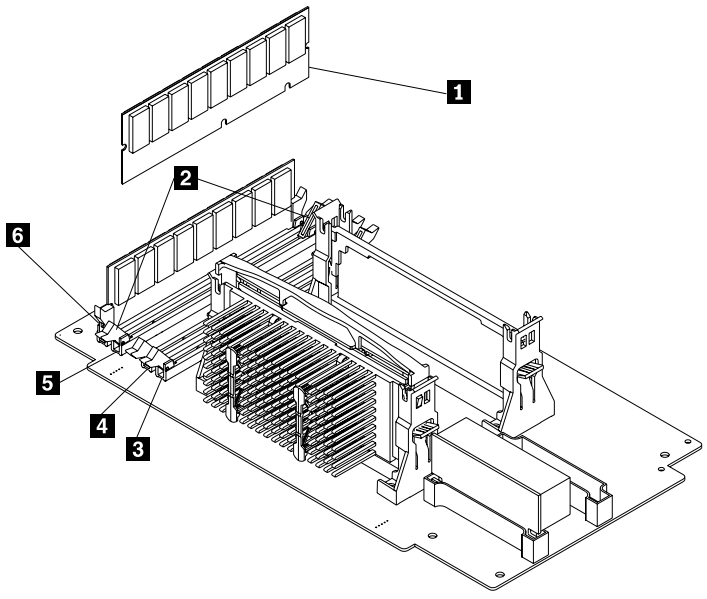
Your server comes with a DIMM installed on the processor board in DIMM connector 4 (J1). You must install the largest DIMM in the memory connector farthest from the microprocessor (DIMM connector 4). If you install two DIMMs, you must install the second one in the memory connector closest to the microprocessor (DIMM connector 1). If you install three DIMMs, you must install the third one in DIMM connector 2. If you install four DIMMs, you must install the fourth one in DIMM connector 3.

Note: The size of the DIMMs in the other memory connectors (DIMM connectors 1, 2, and 3) does not matter. Refer to the following table for some typical memory configurations.

DIMM 4	DIMM 3	DIMM 2	DIMM 1
512 MB			128 MB
512 MB		256 MB	128 MB
512 MB	512 MB	256 MB	512 MB
512 MB	512 MB	512 MB	512 MB

Table 3. Typical memory configurations

Your xSeries 240 server supports 128 MB, 256 MB, 512 MB, and 1 GB DIMMs. Your server supports a minimum of 128 MB and a maximum of 4 GB of system memory. Only 133 MHz, 3.3 V, 168-pin, 8-byte, 72-bit registered, synchronous-dynamic-random-access memory (SDRAM), error correcting code (ECC) with x4 configuration DIMM memory complying with PC 133 Registered DIMM Specification, Revision 1.0 or later is supported. When installed in systems using 100 MHz front-side bus processors, the memory operates at 100 MHz.



1 DIMM
2 Retaining clips
3 DIMM connector 1 (J4)
4 DIMM connector 2 (J3)
5 DIMM connector 3 (J2)
6 DIMM connector 4 (J1)

To install a DIMM:

1. Review the information in “Safety” on page v and “Handling static-sensitive devices” on page x.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover.
3. Determine the DIMM connector into which you will install the DIMM.
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

   Note: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
5. Install the DIMM:
   a. Turn the DIMM **1** so that the pins align correctly with the connector **5**.
   b. Insert the DIMM into the connector by pressing on one edge of the DIMM and then on the other edge of the DIMM. Be sure to press the DIMM straight into the connector.
   c. Make sure the retaining clips **2** snap into the closed position. If a gap exists between the DIMM and the retaining clips, the DIMM has not been installed properly. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.
   d. Repeat these steps for each DIMM that you install.
6. If you have other options to install or remove, do so now.

Attention:
When you restart the server, the system displays a message indicating that the memory configuration has changed.

- If you installed additional memory, start the Configuration/Setup Utility program and select **Save Settings**.
- If you just replaced a failed DIMM, you must start the Configuration/Setup Utility program, select **Advanced Setup**, select **Memory Settings**, highlight the connector or bank of connectors that you want to enable, then select **Enable**.
- In some memory configurations, the **3-3-3** beep code might sound during a 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 to reset the memory connector or bank of connectors from Disabled to Enabled.

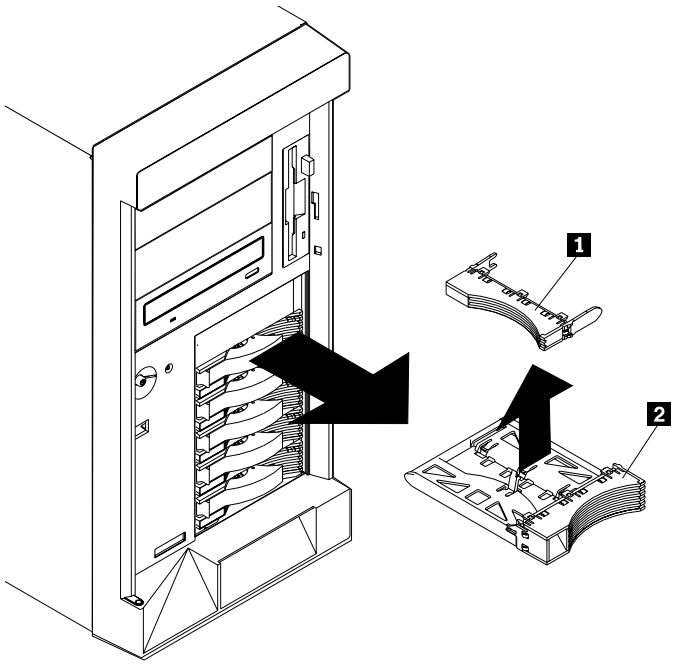
Installing a hot-swap drive

This section contains the instructions for installing a hot-swap hard disk drive.

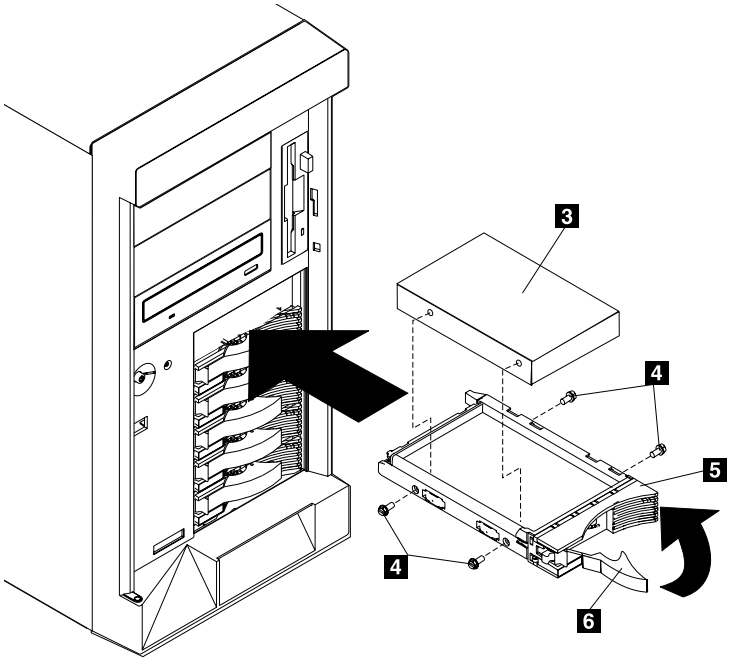
Notes:

1. The hot-swap drive bays support hot-swap drives only.
2. To minimize the possibility of damage to the hard disk drives when you are installing a hard disk drive in a rack model of the xSeries 240, install the server in the rack before installing the hard disk drives.
3. You do not need to turn off the server to install hot-swap drives. However, you must turn off the server when performing any steps that involve installing or removing cables.

Refer to the following illustrations of the tower model while you perform the steps in this procedure.



1 Filler panel for use with half-high drives
2 Filler panel (slim-high)



3 Drive
4 Screws
5 Drive tray
6 Drive tray handle (in open position)

To install a drive in a hot-swap drive bay:

1. Review the information in “Safety” on page v and “Handling static-sensitive devices” on page x.
2. If your server is a tower model, unlock and open the server door.

   Attention:
   To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed in each bay.
3. Remove the filler panel **2** from one of the empty hot-swap bays by inserting your finger into the depression at the left side of the filler panel and pulling it away from the server.

   Note: If you are installing a half-high hard disk drive, you will need to remove two adjacent filler panels. The two filler panels should be from either the top pair of bays, the middle pair of bays, or the bottom pair of bays.
4. If your hard disk drive is not installed on the drive tray **5**, place the drive in the drive tray and, *being careful not to over-tighten the screws*, attach the drive to the tray using the four screws provided with the option kit.
5. Install the hard disk drive **3** in the hot-swap bay:
   a. Ensure the tray handle **6** is open (that is, perpendicular to the drive).
   b. Align the drive/tray assembly so that it engages the guide rails in the bay.
   c. Gently push the drive/tray assembly into the bay until the drive connects to the backplane.
   d. Push the tray handle to the right until it locks.
6. If you installed a half-high hard disk drive, install a filler panel **1** in the gap above the drive:
   a. Locate the smaller filler panel **1** that is designed for use with half-high drives. It is stored on the slim-high filler panel **2** that you removed earlier in this procedure.
   b. Pull the half-high filler panel off the slim-high filler panel.
   c. Gently push the half-high filler panel **1** into place in the gap above the drive.
7. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly.
8. If your server is a tower model, close and lock the server door.

   Note: If your server has a RAID adapter installed, see your RAID documentation for the instructions needed to configure the hard disk drives.

Installing a microprocessor

Your server comes with one microprocessor installed on the processor board. If you install an additional microprocessor kit, your server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and 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.

Attention:
To avoid damage and ensure proper server operation when you install a new or an additional microprocessor, use microprocessors that have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical.

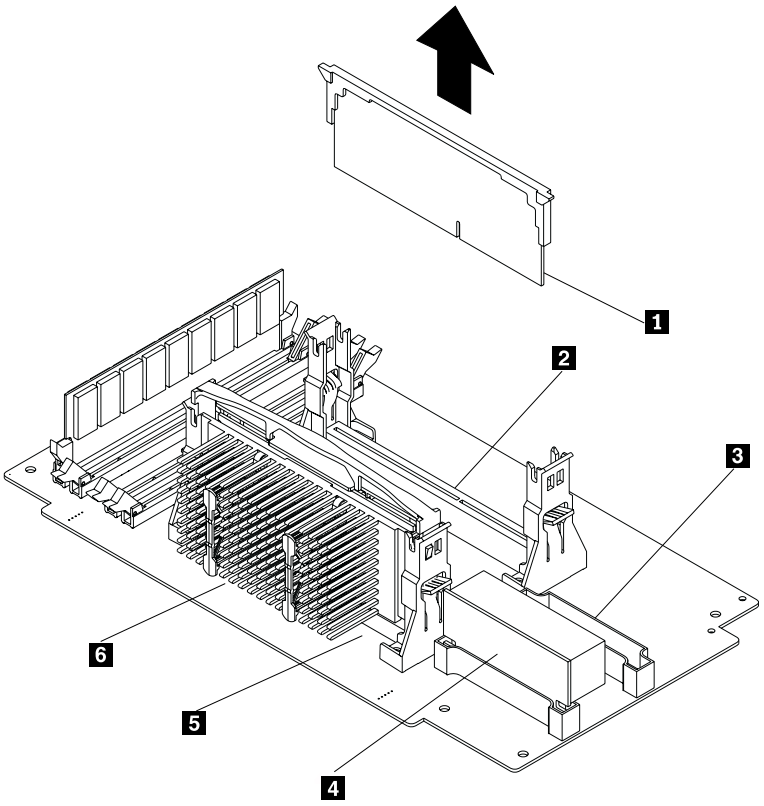
The microprocessor that is installed in microprocessor connector U5 is CPU or processor 1. If a microprocessor is installed in microprocessor connector U6, it is CPU or processor 2. If the server has only one microprocessor installed, that microprocessor is installed in microprocessor connector U5 and is the startup (boot) processor. If more than one microprocessor is installed, the microprocessor with the lower stepping level is the startup processor, and the microprocessor with the higher stepping level is the application processor. If both microprocessors have the same stepping level, the microprocessor installed in microprocessor connector U6 is the startup processor, and the microprocessor installed in U5 is the application processor.

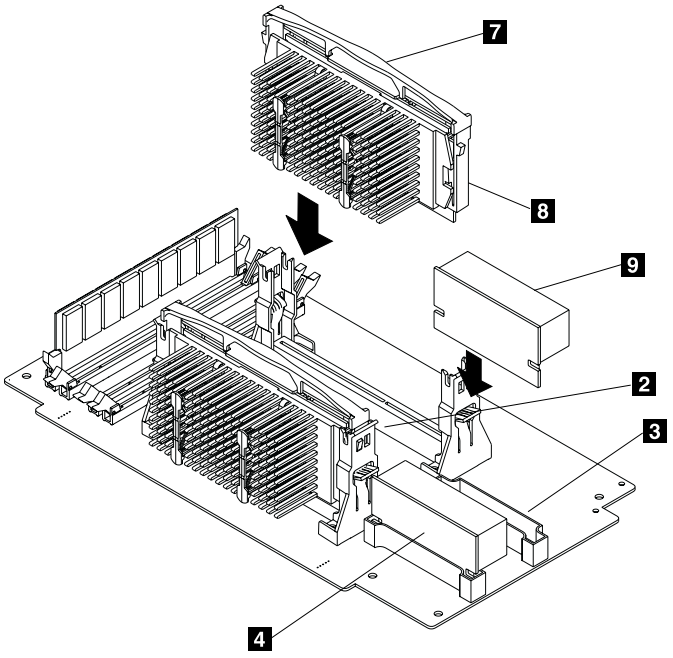
Note: You can determine the stepping levels of the installed microprocessors using the Configuration/Setup utility.

Before you begin:

- Thoroughly review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server basic input/output system (BIOS) code. The latest level of BIOS code for your server is available through the World Wide Web.
- Obtain an SMP-capable operating system (optional). For a list of supported operating systems, see http://www.ibm.com/pc/us/compat/ on the World Wide Web.

Refer to the following illustrations while you perform the steps in this section.





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

1 Terminator card
2 Microprocessor connector 2 (U6)
3 Voltage regulator module (VRM) connector for second VRM
4 VRM for first microprocessor (VRM 1)
5 Microprocessor connector 1 (U5)
6 Microprocessor 1
7 Microprocessor handle
8 Microprocessor 2
9 VRM for second microprocessor (VRM 2)

To install an additional microprocessor kit:

1. Review the information in "Safety" on page v and "Handling static-sensitive devices" on page x.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover.
3. Remove the terminator card 1 from the microprocessor connector 2. Store the terminator card in a safe place in the static-protective package that your new microprocessor is shipped in; you will need to install it again if you ever remove the microprocessor.
4. 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. Center the microprocessor 8 over the microprocessor connector 2 and carefully press the microprocessor into the connector.
5. Install the VRM 9 included in the microprocessor kit:

   Attention:
   When installing or replacing a VRM, use only VRMs specified for use with the xSeries 240 server. Use of other VRMs might cause your server to overheat.

   a. Center the VRM 9 over the VRM connector 3. Make sure that the VRM is oriented and aligned correctly.
   b. Press the VRM into the connector.

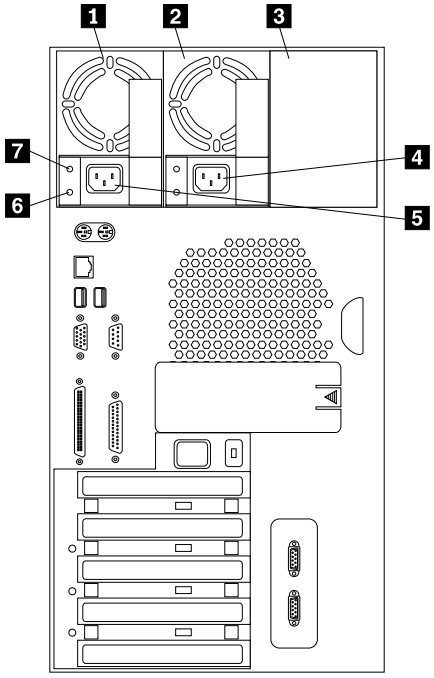
      Notes:

      1) To remove a microprocessor, pull upward on the microprocessor handle 7.
      2) If you remove the microprocessor later, remember to install the terminator card in the appropriate microprocessor connector and to remove the VRM for that microprocessor.
6. If you have other options to install or remove, do so now.

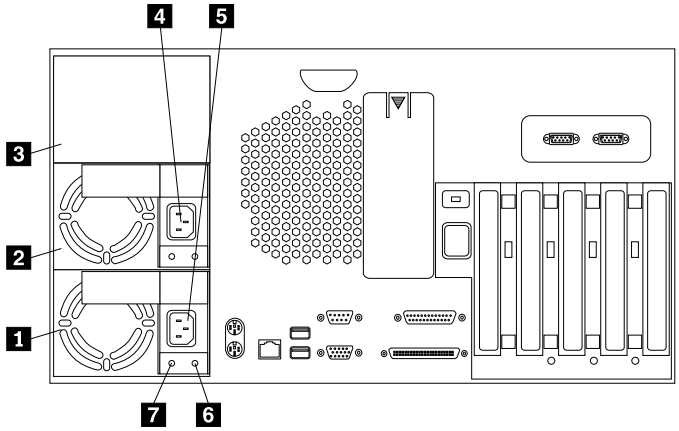
Installing a power supply

The following illustrations show the power supplies and power lights on your server.

Tower model



Rack model



1 **Power Supply 1:** Your server comes with two hot-swap power supplies installed. (See “Installing a power supply” on page 24 for instructions about installing an additional power supply and information about power redundancy.)

2 **Power Supply 2:** Your server comes with two hot-swap power supplies installed.

3 **Filler Panel**: You can remove this filler panel and install a third hot-swap power supply on power supply bay 3.

4 **Power Supply 2 Power Connector:** The power cord for power supply 2 connects here.

5 **Power Supply 1 Power Connector:** The power cord for power supply 1 connects here.

6 **DC Power Light:** This light provides status information about the power supply. During normal operation, both the AC and DC Power lights are on.

7 **AC Power Light:** This light provides status information about the power supply. During normal operation, both the AC and DC Power lights are on.

8

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

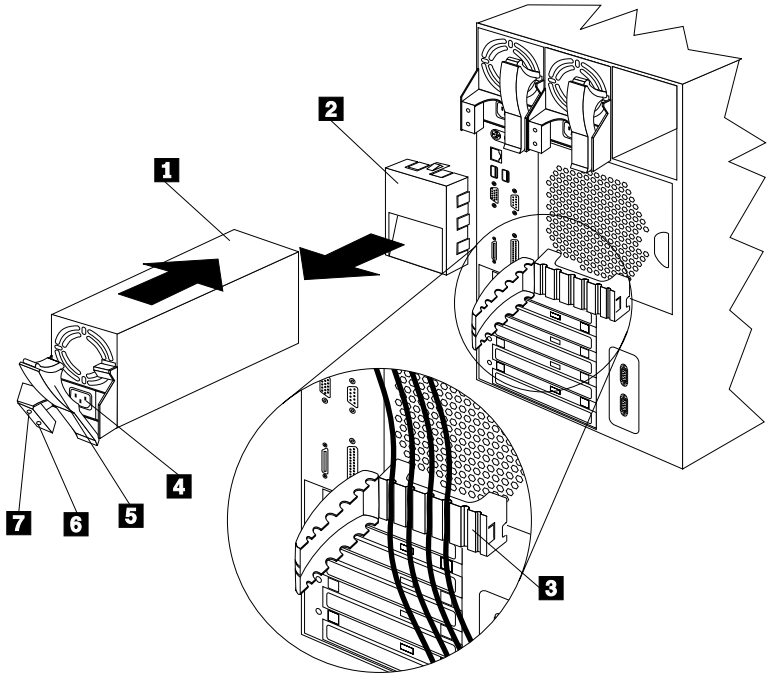
Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Adding a power supply

Your server comes with two power supplies. You can add a third power supply. After you install a power supply, check the power-supply status indicators to verify that the power supply is operating properly.

Refer to the following illustration of the tower model while performing the steps in this procedure.

Note: You do not need to turn off the power to the server to install hot-swap power supplies.



1. Power supply
2. Filler panel
3. Cable-restraint bracket
4. Power cord connector
5. Handle on power supply (in open position)
6. AC Power light
7. DC Power light

To add a power supply:

1. Review the information in “Safety” on page v and “Handling static-sensitive devices” on page x.
2. Remove the filler panel **2** from the empty power supply bay by inserting your finger into the depression on the filler panel and pulling it away from the server. Save the filler panel in case you remove the power supply at a later time.

   Note: During normal operation, each power-supply bay must have either a power supply or filler panel installed for proper cooling.
3. Install the power supply **1** in the bay:
   a. Place the handle **5** on the power supply in the open position (that is, perpendicular to the power supply) and slide the power supply into the chassis.
   b. Gently close the handle to seat the power supply in the bay.
4. Plug the power cord for the added power supply into the power cord connector **2**.
5. Route the power cord through the cable-restraint bracket **3**.
6. Plug the power cord into a properly grounded electrical outlet.
7. Verify that the DC Power light **7** and AC Power light **6** on the power supply are lit, indicating that the power supply is operating correctly.
8. If you have other options to install or remove, do so now.

Cabling the server

Use the following procedure to attach the cables to your xSeries 240 server.

1. Select a location that will allow for air circulation. Be sure to maintain the following minimum clearances around the server:

Front	102 mm (4 in.)
Rear	127 mm (5 in.)
Left and Right Sides	51 mm (2 in.)

2. Connect the device cables to the server. For the location of cable connectors, see “Cable connectors” on page 28.

   Important

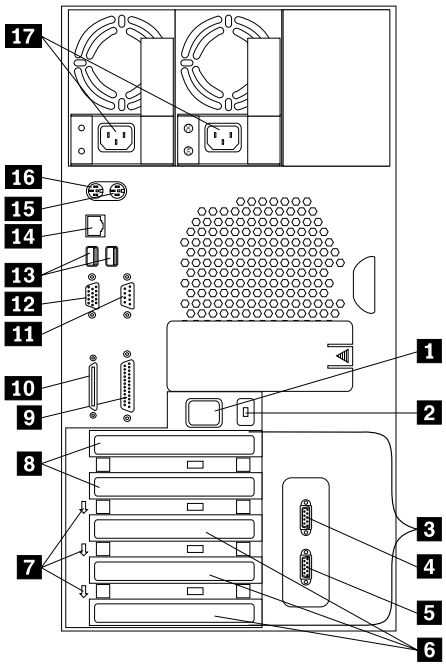
   To connect the server 10BASE-T or 100BASE-TX port to a hub, use an unshielded twisted pair (UTP) cable with RJ-45 connectors at both ends. An EIA/TIA-568 category 5 cable must be used for 100BASE-TX connectors to meet various standards, including electromagnetic compatibility.
3. Connect the power cord(s) to the server.
4. Connect all power cords to electrical outlets.

   Important

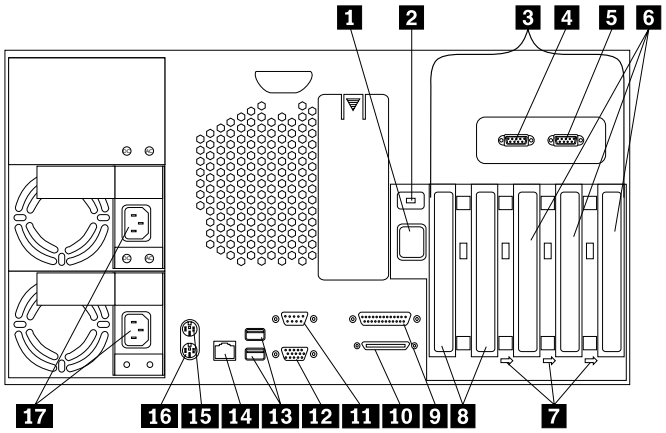
   After you plug the server power cord into an outlet and before you press the power control button, the power-on light will blink to indicate that power is present.

Cable connectors

Tower model



Rack model



1. Advanced System Management Interconnect Knockout
2. External Connector Knockout
3. PCI Expansion Slots
4. Serial A Connector
5. Serial B Connector
6. Hot-Plug PCI Expansion Slots
7. Attention Lights for Hot-Plug PCI Slots
8. Non-Hot-Plug PCI Expansion Slots
9. Parallel Connector
10. SCSI Connector
11. Management Port C Connector
12. Video Connector
13. Universal Serial Bus 1 and 2 Connectors
14. Ethernet Connector
15. Mouse Connector
16. Keyboard Connector
17. Power Connectors

Chapter 3. Starting the server

Use the following procedure to start your server.

1. Turn on all external devices, such as the monitor.

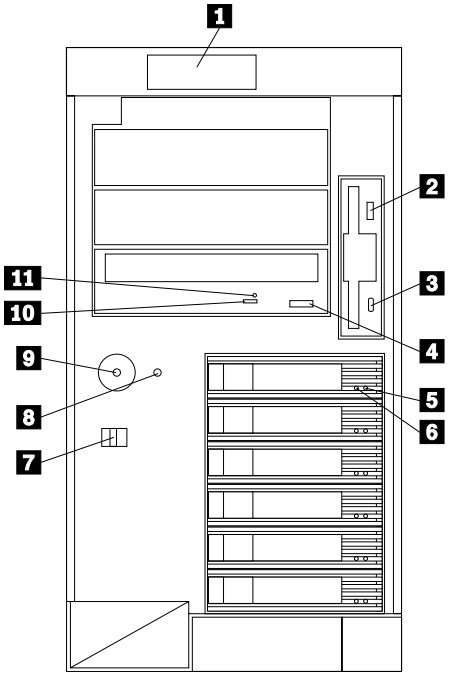
   Note: After you plug the power cord into an outlet, wait 20 seconds before pressing the power control button. During this time, the power control button will not respond because the Advanced System Management Processor is being initialized.

2. Press the power control button on the front of the server. The power control light comes on and the power-on self-test (POST) begins.

Controls and indicators

The most commonly used controls and indicators on the front of the server appear in the following illustrations.

Tower model



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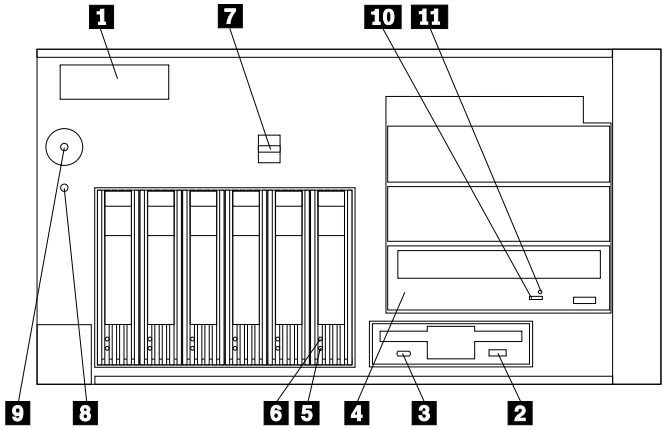
Rack model



1 **Operator Information Panel:** The lights on this panel provide status information for your server. See “Operator information panel” on page 32 for more information.

2 **Diskette-Eject Button:** Press this button to eject a diskette from the drive.

3 **Diskette Drive In-Use Light:** When this light is on, the diskette drive is being accessed.

4 **CD-ROM Eject/Load Button:** Press this button to eject or retract the CD-ROM tray so that you can insert or remove a CD.

5 **Hard Disk Status Light:** Each of the hot-swap drive bays has a Hard Disk Status light. When this amber light is on continuously, the drive has failed. When the light flashes slowly (one flash per second), the drive is being rebuilt. When the light flashes rapidly (three flashes per second), the controller is identifying the drive.

6 **Hard Disk Activity Light:** Each of the hot-swap drive bays has a Hard Disk Activity light. When this green light is flashing, the drive is being accessed.

7 **Cover Release Lever:** Use this lever to release the left-side cover on the tower model or the top cover on the rack model.

8 **Reset Button:** Press this button to reset the server and run the power-on self-test (POST).

9 **Power Control Button:** Press this button to manually turn the server on or off.

10 **CD-ROM Drive In-Use Light:** When this light is on, the CD-ROM drive is being accessed.

11 **CD-ROM Manual Tray-Release Opening:** Insert a straightened paper clip in the opening to release the CD-ROM tray when using the CD-ROM eject button is not successful.

Turning on the server

Use the following instructions to turn on the server.

- You can turn on the server by pressing the Power Control button on the front of the server.

  Note: If you have just plugged the power cord of your server into an electrical outlet, you will have to wait approximately 20 seconds before pressing the Power Control button.

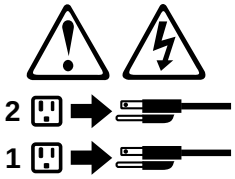
- If the server is turned on and a power failure occurs, the server will start automatically when power is restored.
- The Advanced System Management Processor also can turn on the server.

Turning off the server

Use the following instructions to turn off the server.

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.



- You can turn off the server by pressing the Power Control button on the front of the server. Pressing the Power Control button starts an orderly shutdown of the operating system, if this feature is supported by your operating system, and places the server in standby mode.

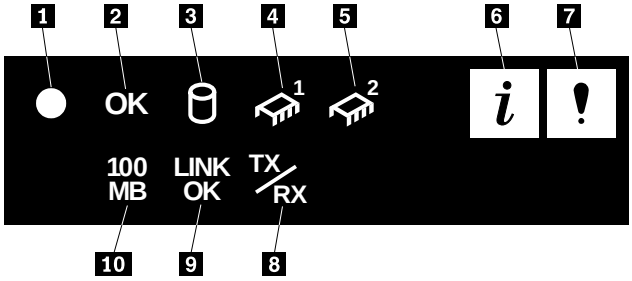
  Note: After turning off the server, wait at least 5 seconds before pressing the Power Control button to power the server on again.

- You can press and hold the Power Control button for more than 4 seconds to cause an immediate shutdown of the server and place the server in standby mode. This feature can be used if the operating system halts.
- You must disconnect the server power cords from the electrical outlets to shut off all power to the server.

  Note: Wait about 15 seconds after disconnecting the power cords for your system to stop running. Watch for the System Power light on the operator information panel to stop blinking.

Operator information panel

The operator information panel on the front of the server contains status lights.



1 **System Power Light:** When this green light is on, system power is present in the server. When this light flashes, the server is in standby mode (the system power supply is turned off and ac current is present). When this light is off, either a power supply, ac power, or a light has failed.

Attention:
If this light is off, it does not mean there is no electrical current present in the server. The light might be burned out. To remove all electrical current from the server, you must unplug the server power cords from the electrical outlets.

2 **System POST Complete Light:** This green light is on when the power-on self-test (POST) completes without any errors.

3 **SCSI Hard Disk Drive Activity Light:** This green light is on when there is activity on a hard disk drive.

4 **Processor 1 Activity Light:** This green light is on when there is microprocessor 1 activity.

5 **Processor 2 Activity Light:** This green light is on when there is microprocessor 2 activity.

6 **Information Light:** This amber light is on when the information log contains information about certain conditions in your server that might affect performance. For example, the light will be on if your server does not have redundant power. A light on the diagnostic LED panel will also be on.

7 **System Error Light:** This amber light is on when a system error occurs. A light on the diagnostic LED panel will also be on to further isolate the error.

8 **Ethernet Transmit/Receive Activity Light:** When this green light is on, there is transmit or receive activity to or from the server.

9 **Ethernet Link Status Light:** When this green light is on, there is an active connection on the Ethernet port.

10 **Ethernet Speed 100 Mbps Light:** When this green light is on, the Ethernet speed is 100 Mbps. When the light is off, the Ethernet speed is 10 Mbps.

Chapter 4. Configuring your server

The ServerGuide™ CDs provide software setup tools and installation tools that are specifically designed for your IBM server. Use these CDs during the initial installation of your server to configure basic hardware features and to simplify your network operating system installation. (See "Using the ServerGuide CDs" for more information.) The ServerGuide CDs also contain a collection of application programs, which you can install after your server is up and running.

In addition to the ServerGuide CDs, you can use the following configuration programs to customize your server hardware:

- **Configuration/Setup Utility**

  The Configuration/Setup Utility program is part of the *basic input/output system (BIOS)* code that comes with your server. You can use this program to configure serial and parallel port assignments, change interrupt request (IRQ) settings, change the drive startup sequence, set the date and time, and set passwords.

- **SCSISelect Utility**

  With the built-in SCSISelect Utility program, you can configure the devices that are attached to the integrated SCSI controller. Use this program to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive.

- **ServeRAID programs**

  If you have a ServeRAID adapter installed in your server, you must use the ServeRAID configuration program to define and configure your disk-array subsystem before you install your operating system.

Refer to the *User's Reference* on the *xSeries Documentation* CD for detailed instructions for using the configuration programs and ServerGuide CDs.

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Using the ServerGuide CDs

The ServerGuide CDs provide state-of-the-art programs to detect the server model and hardware options that are installed, configure xSeries server hardware, provide device drivers, and install your network operating system (NOS).

Note: If the ServerGuide CD does not start, see “ServerGuide startup problems” on page 37.

1. Insert the *Setup and Installation* CD, and restart the server.
2. Follow the instructions on the screens to:
   a. Select the 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 NOS and adapter.
   e. Start the setup and hardware configuration programs.
   f. Start the NOS installation. You will need your copy of the NOS CD.

      Note: For information on the supported NOS versions, refer to the *Setup and Installation* CD label.

System management solutions

The IBM systems-management software provided with your server enables you to manage Intel-processor-based server, desktop, workstation, and notebook systems when using Microsoft, SCO, Novell, or IBM network operating systems. This software supports multiple protocols, including TCP/IP, IPX, NetBIOS, SNA, SLIP, and HTTP. (See the documentation provided on the systems-management CD for more information.)

Chapter 5. Solving problems

This section provides basic troubleshooting information to help you resolve some common problems that might occur while setting up your server. If you cannot locate and correct the problem using the information in this section, refer to the "Solving problems" section on the *xSeries Documentation* CD and the "Server Support" flowchart in the front of this *Installation Guide*.

POST beep code descriptions

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.

Beep code	Descriptions of the POST beep codes
No beep	Call for service.
Continuous	If no video appears, the startup microprocessor failed. Verify that the startup microprocessor is installed correctly. If it is, replace the startup microprocessor. If the problem persists, call for service.
One short	POST completed successfully. One beep also occurs after POST if you enter an incorrect password.
Two short	Follow the instructions that appear on the screen.
Three short	POST detected a system memory error. Verify that the memory is installed correctly. If it is, replace the failing memory module. **Attention:** 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 to reset the memory connector or bank of connectors from Disabled to Enabled.
Repeating short	The system board might contain a failing component. 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.
One long and one short	If the video controller on the system board is being used, call for service. If you installed an optional video adapter, replace the failing adapter.
One long and two short	A video I/O adapter ROM is not readable, or the video subsystem is defective. If you installed an optional video adapter, replace the failing adapter. If the problem remains, call for service.
One long and three short	The system-board video subsystem has not detected a monitor connection to the server. Ensure that the monitor is connected to the server. If the problem persists, replace the monitor.
Two long and two short	POST does not support the optional video adapter. Replace the optional video adapter with one that is supported by the server or use the integrated video controller.
All other beep codes	1. Verify that the system memory modules are installed correctly. 2. Turn off the server; then, restart the server. If the problem remains, call for service.

Table 4. POST beep code descriptions

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Note: See the “Solving problems” section of the *User's Reference* on the *xSeries Documentation* CD for more information about the POST beep codes.

POST error messages

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

Note: See the “Solving problems” section of the *User's Reference* on the *xSeries Documentation* CD for more information about the POST error messages.

POST message	Failing device or problem found	Suggested action
129	L1 cache of a microprocessor	Check the installation of your microprocessors.
162	Change in device configuration	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.
164	Change in memory configuration	Verify that your memory is installed properly; then, restart the server and run the Configuration/Setup Utility program.
201	Change in memory configuration	Verify that your memory is fully seated and installed properly.
229	L2 cache of a microprocessor	Check the installation of your microprocessors.
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.
962	Parallel port configuration error	Start the Configuration/Setup program and verify that the parallel-port setting is correct.
11xx	Serial port error	Verify that the serial cable is connected correctly.
1162	Serial port configuration conflict	Start the Configuration/Setup program and ensure that the IRQ and I/O port assignments needed by the serial port are available.
1601	BIOS update needed	Download and install the latest system BIOS level.
1800	PCI adapter hardware interrupt	Start the Configuration/Setup program and verify that the interrupt resource settings are correct.
2400 2462	Video controller and memory	Verify that the monitor is connected correctly.
00019*xxx*	Processor *x* is not functioning or failed the built-in test	Verify that processor *x* is installed correctly. If the problem remains, replace processor *x*.
00180*xxx*	A PCI adapter requested a resource that is not available	Start the Configuration/Setup program and ensure that the resources needed by the PCI adapter are available.
012980*xx* 012981*xx*	Data for processor *x*	Download and install the latest system BIOS level.

POST message	Failing device or problem found	Suggested action
01298200	Microprocessor speed mismatch	Install microprocessors with identical speeds.
I9990305	POST could not find an operating system.	Install your operating system.

Table 5. Abbreviated list of POST error messages

ServerGuide startup problems

Look for the symptom in the left column of the chart. Probable solutions to the problem are in the right column.

Setup	Suggested action
Setup and Installation CD will not start.	• Ensure that the system is a supported server with a startable (bootable) CD-ROM drive. • If the startup (boot) sequence settings have been altered, be sure the CD-ROM is first in the boot sequence. • If more than one CD-ROM drive is installed, be sure that only one drive is set as the primary drive. Start the CD from the primary drive.
ServeRAID program cannot view all installed drives - or - cannot install NOS.	• 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.	Free up more space on the hard disk drive.
ServerGuide will not start *your* NOS CD.	Ensure that the NOS CD you have is supported by ServerGuide. See the *Setup and Installation* CD label for a list of NOS versions supported.
Cannot install NOS - option is grayed out.	Either there is no logical drive defined (ServeRAID systems) or the ServerGuide System Partition is not present. Run the ServerGuide setup and configuration program and ensure that setup is complete.
Get "time out" or "Unknown host" errors	Ensure that you have access to the Internet through FTP directly.

Table 6. ServerGuide startup problems

Troubleshooting charts

Note: Refer to the “Solving problems” section of the *User's Reference* on the *xSeries Documentation* CD for more detailed troubleshooting charts.

Expansion enclosure problems	Suggested action
The SCSI expansion enclosure used to work, but does not work now.	Verify that: 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. 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 and expansion enclosure documentation.

Table 7. Expansion enclosure problems

Memory problems	Suggested action
The amount of memory displayed is less than the amount of memory installed.	Verify that: 1. The memory modules are seated properly. 2. You have installed the correct type of memory. 3. If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. 4. 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. If the above items are correct, run the memory diagnostic program. The system might have detected a bad memory module and automatically reallocated memory to enable you to continue to operate. If the memory tests fail, call for service or replace the failing DIMM.

Table 8. Memory problems

Microprocessor problems	Suggested action
The server emits a continuous tone during POST.	The startup (boot) microprocessor is not working properly. Verify that the startup microprocessor is seated properly. If it is, replace the startup microprocessor. If the problem remains, call for service.

Table 9. Microprocessor problems

Monitor problems	Suggested action
The screen is blank.	Verify that: 1. The server power cord is plugged into the server and a working electrical outlet. 2. The monitor cables are connected properly. 3. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. **Attention**: 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 to reset the memory connector or bank of connectors from Disabled to Enabled. If the items above are correct and the screen remains blank, call for service.
Only the cursor appears.	Call for service.
The monitor works when you turn on the server, but goes blank when you start some application programs.	Verify that: 1. The primary monitor cable is connected to the video port. 2. You installed the necessary device drivers for the applications. If the items above are correct and the screen remains blank, call for service.
Wavy, unreadable, rolling, distorted screen, or screen jitter.	Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, refer to the information that comes with the monitor for adjusting and testing instructions. If the monitor self-tests show the monitor is OK, 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 305 mm (12 in.) apart. Turn on the monitor. **Notes:** 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 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, see 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 with the correct language. If the problem remains, call for service.

Table 10. Monitor problems

Option problems	Suggested action
An IBM option that was just installed does not work.	Verify that: 1. The option is designed for the server. Refer to the "Server Support" flowchart for information about obtaining ServerProven™ compatibility information from the World Wide Web. 2. You followed the installation instructions that came with the option. 3. The option is installed correctly. 4. You have not loosened any other installed options or cables. 5. 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.

Table 11. Option problems

Power problems	Suggested action
The server does not power on.	Verify that: 1. The power cables are properly connected to the server. 2. The electrical outlet functions properly. 3. The type of memory that is installed is correct. 4. If you just installed an option, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports. 5. The LEDs on the power supply are on. If the problem remains, call for service.

Table 12. Power problems

Service processor problems	Suggested action
Service Processor reports a general monitor failure	Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server. If the problem remains, call for service.

Table 13. Service processor problems

Appendix A. Product warranties and notices

This chapter contains warranty and emission notices. It also contains trademarks and general-information notices.

Warranty Statements

The warranty statements consist of two parts: Part 1 and Part 2. Part 1 varies by country. Part 2 is the same for both statements. Be sure to read both the Part 1 that applies to your country and Part 2.

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)**
  (Part 1 - General Terms on page 41)
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)**
  (Part 1 - General Terms on page 43)
- **Worldwide Country-Unique Terms**
  (Part 2 - Country-Unique Terms on page 45)

IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (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 may 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 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.*

Machine - IBM @server xSeries 240

Warranty Period* - Three Years

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

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. 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.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

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. The replacement may not be new, but will be in good working order.

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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.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

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 the Machine, contact your reseller or IBM. In the United States, call IBM at 1-800-772-2227. In Canada, call IBM at 1-800-565-3344. (In Toronto, call 416-383-3344.) You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, 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. IBM may repair the failing Machine or exchange it at its discretion.

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.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. 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.

Production Status
Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

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), 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 greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

   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 (INCLUDING LOST PROFITS OR 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.

IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)

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Machine - IBM @server xSeries 240

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During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

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. The replacement may not be new, but will be in good working order.

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.

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IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, 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. IBM may repair the failing Machine or exchange it at its discretion.

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.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. 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 fulfil 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.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

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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), 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 greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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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 (INCLUDING LOST PROFITS OR 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.

Part 2 - Worldwide Country-Unique Terms

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 legislation and are only limited to the extent permitted by the applicable legislation.

Extent of Warranty: The following replaces the first and second sentences of this Section:
The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

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Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974, 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.

PEOPLE'S REPUBLIC OF CHINA: Governing Law: The following is added to this Statement:
The laws of the State of New York govern this Statement.

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 Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

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.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

The following terms apply to all EMEA countries.

The terms of this Statement of Warranty apply to Machines purchased from an IBM reseller. If you purchased this Machine from IBM, the terms and conditions of the applicable IBM agreement prevail over this warranty statement.

Warranty Service
If you purchased 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 purchased 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.

The applicable laws, Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided. However, the laws of Austria govern this Statement if the warranty service is provided in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Federal Republic of Yugoslavia, Georgia, Hungary, Kazakhstan, Kirghizia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, and Ukraine.

The following terms apply to the country specified:

EGYPT: Limitation of Liability: The following replaces item 2 in this Section:
2. 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.

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).

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 are 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.

Production Status: The following paragraph replaces this Section:
Each Machine is newly manufactured. It may incorporate in addition to new parts, re-used parts as well.

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

In item 2, replace “U.S. $100,000” with “1.000.000 DEM.”

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

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 the greater of Irish Pounds 75,000 or 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: Limitation of Liability: The following replaces the second sentence in the first paragraph:
In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than: (item 1 unchanged) 2)as to any other actual damage arising in all situations involving non-performance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

The following replaces the second paragraph of this Section:
Unless otherwise provided by mandatory law, IBM and your reseller are not liable for any of the following: (items 1 and 2 unchanged) 3) indirect damages, even if IBM or your reseller is informed of their possibility.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND: Limitation of Liability: The following is added to this Section:
IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

TURKIYE: Production Status: The following replaces this Section:
IBM fulfils customer orders for IBM Machines as newly manufactured in accordance with IBM's production standards.

UNITED KINGDOM: Limitation of Liability: The following replaces items 1 and 2 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; 2. the amount of any other actual direct damages or loss, up to the greater of Pounds Sterling 150,000 or 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.

The following item is added to this paragraph:
3. breach of IBM's obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982.

Applicability of suppliers and resellers (unchanged).

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

NORTH AMERICA

CANADA: Warranty Service: The following is added to this Section:
To obtain warranty service from IBM, call **1-800-565-3344**. In Toronto, call **416-383-3344**.

UNITED STATES OF AMERICA: Warranty Service: The following is added to this Section:
To obtain warranty service from IBM, call **1-800-772-2227**.

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 legislation and are only limited to the extent permitted by the applicable legislation.

Extent of Warranty: The following replaces the first and second sentences of this Section:
The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

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, 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.

PEOPLE'S REPUBLIC OF CHINA: Governing Law: The following is added to this Statement:
The laws of the State of New York govern this Statement.

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 Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

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.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

The following terms apply to all EMEA countries.

The terms of this Statement of Warranty apply to Machines purchased from an IBM reseller. If you purchased this Machine from IBM, the terms and conditions of the applicable IBM agreement prevail over this warranty statement.

Warranty Service
If you purchased 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 purchased 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.

The applicable laws, Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided. However, the laws of Austria govern this Statement if the warranty service is provided in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Federal Republic of Yugoslavia, Georgia, Hungary, Kazakhstan, Kirghizia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, and Ukraine.

The following terms apply to the country specified:

EGYPT: Limitation of Liability: The following replaces item 2 in this Section:
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Applicability of suppliers and resellers (unchanged).

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The following item is added to this paragraph:
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UNITED STATES OF AMERICA: Warranty Service: The following is added to this Section:
To obtain warranty service from IBM, call **1-800-772-2227**.

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de 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 community directive conformance statement

This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electro-magnetic compatibility.

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.

Taiwan electrical emission statement

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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，在這種情形下，使用者會被要求採取某些適當的對策。

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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**
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dubai, Fiji, Ghana, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
62X1045	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

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