

xSeries 370

Installation Guide

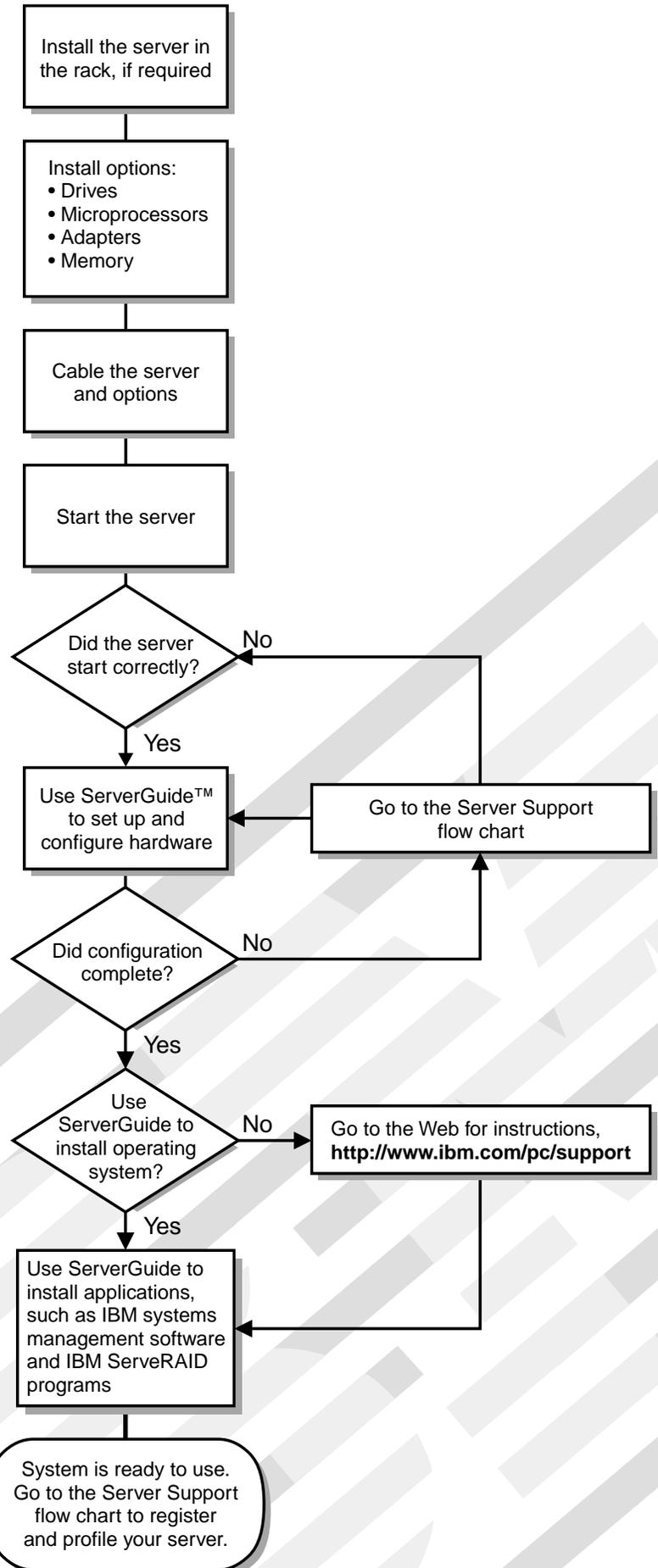
Welcome...

Thank you for buying an IBM xSeries server.

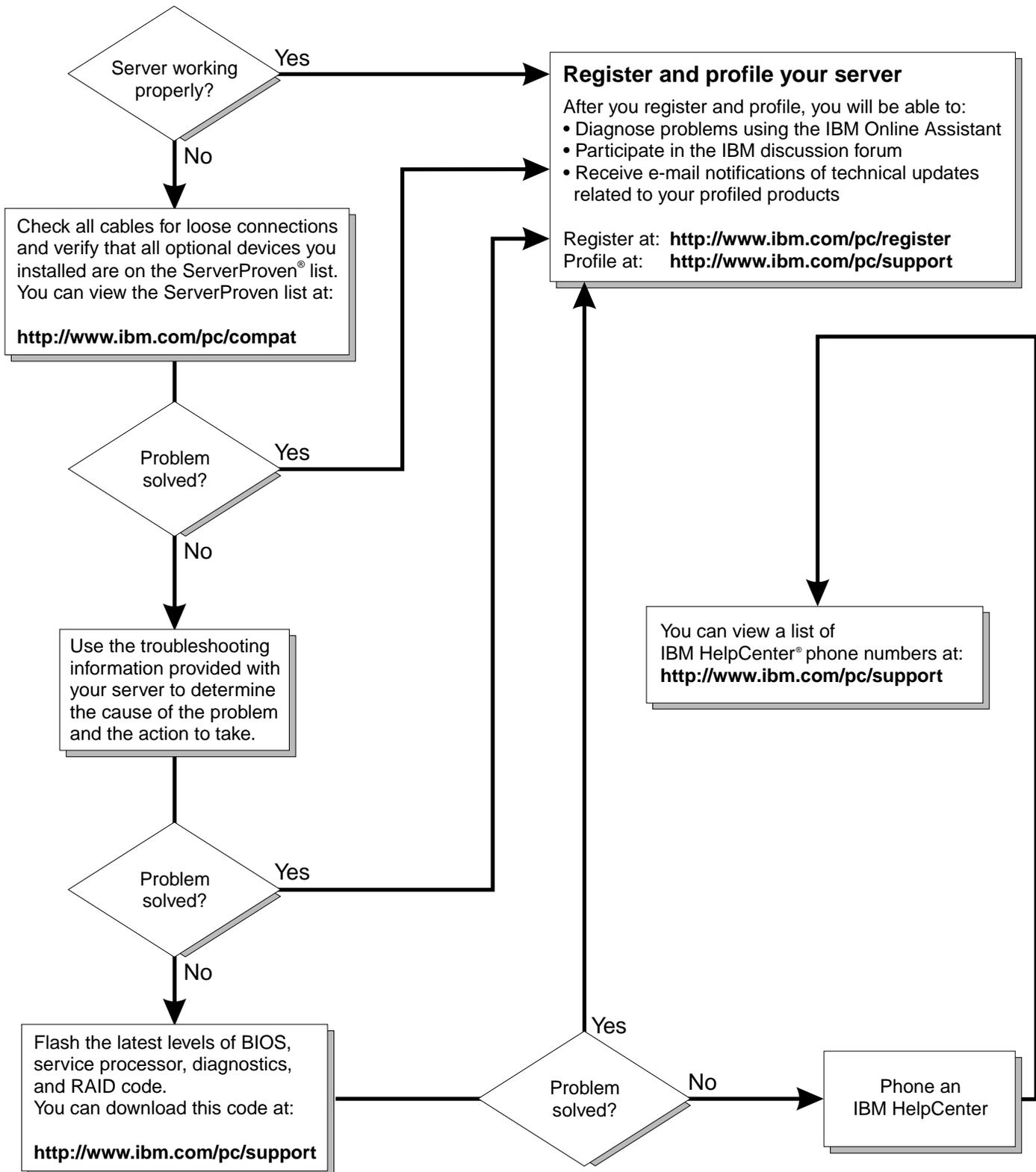
This server *Installation Guide* contains information for setting up and configuring your server.

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





xSeries 370

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 57.

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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 pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

安裝本產品之前，請先閱讀「安全資訊」。

1



DANGER

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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

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.

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.

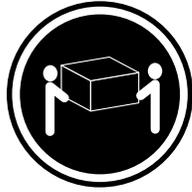


DANGER

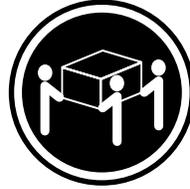
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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

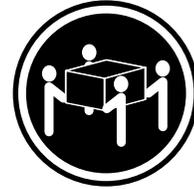
4



≥18 kg (39.7 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 package 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 static-protective 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 because heating reduces indoor humidity and increases static electricity.

Chapter 1. Introduction

Thank you for purchasing an IBM® @server xSeries 370. 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. You can obtain up-to-date information about your xSeries 370 and other IBM server products at <http://www.ibm.com/eserver/xseries> on the World Wide Web.

If you purchased a rack model of the xSeries 370 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	IBM xSeries 370
Machine Type	8681
Model	_____
Serial Number	_____
Key Serial Number	_____

Your server serial number and model number are located near the bottom of the front bezel and on the front panel.

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.

Features and specifications

The following table summarizes the features of the xSeries 370 server.

<p>Processors</p> <ul style="list-style-type: none"> • Intel® Pentium® III Xeon™ processor with Streaming SIMD Extensions • Expandable to eight processors • 100 MHz Front Side Bus (FSB) • 16 KB of level-1 cache memory • 512 KB, 1 MB, or 2 MB of level-2 cache with error checking and correction (ECC) memory integrated into processor • Upgradable processor speeds <p>Memory</p> <ul style="list-style-type: none"> • One memory board standard <ul style="list-style-type: none"> – Sixteen 168-pin, dual inline memory-module (DIMM) connectors – Supports up to 16 GB¹ • Expandable to 32 GB • 100 MHz, PC100, registered synchronous dynamic random-access memory (SDRAM) with error checking and correction (ECC) • Support for 128 MB, 256 MB, 512 MB, and 1 GB DIMMs • Support for a second memory board (optional) <p>Diskette drive</p> <ul style="list-style-type: none"> • Supports one diskette drive • Standard: One 3.5-inch, 1.44 MB <p>Hard disk drives</p> <ul style="list-style-type: none"> • Two half-high, 3.5-inch drive bays • Supports up to two internal hard disk drives <p>CD-ROM drive</p> <ul style="list-style-type: none"> • Supports one CD-ROM drive • Standard: Integrated drive electronics (IDE) 	<p>Expansion-slot connectors</p> <p>Supports up to 14 adapters:</p> <ul style="list-style-type: none"> • 12 available PCI slot connectors <ul style="list-style-type: none"> – Eight 64-bit, 33 MHz, hot-plug PCI slot connectors – Four 64-bit, 66 MHz, hot-plug PCI slot connectors • Standard: I/O integrated function card • Standard: Advanced System Management PCI adapter <p>Upgradable features</p> <ul style="list-style-type: none"> • Advanced System Management PCI adapter upgrades (when available) • Diagnostics upgrades (when available) • Memory upgrades (when available) • POST/BIOS upgrades (when available) to update electrically erasable programmable read-only memory (EEPROM) on the I/O integrated function card <p>Security features</p> <ul style="list-style-type: none"> • Chassis-intrusion detector (tower option only) • Power-on and administrator passwords • Security-error indicator (tower option only) • Selectable drive-startup sequence • Side cover lock (tower option only) • Unattended start mode <p>SCSI features</p> <ul style="list-style-type: none"> • Wide Ultra-2 SCSI (LVD) controller² <ul style="list-style-type: none"> – One external connector – One internal connector • Two bays available for internal SCSI hard disk drives 	<p>Power supplies</p> <ul style="list-style-type: none"> • Standard: Three hot-swap power supplies • 750 Watts each • Auto-sensing function • Built-in overload and surge protection • Automatic restart after a loss of power • Redundant power available <p>Predictive Failure Analysis™ (PFA) alerts</p> <ul style="list-style-type: none"> • Fans • Power supplies • Memory • Hard disk drives • Processors • Voltage regulator modules (VRMs) <p>Integrated functions</p> <ul style="list-style-type: none"> • I/O integrated function card • Two serial ports • Two Universal Serial Bus (USB) ports • One parallel port • Mouse port • Keyboard port • Video port • Wake on LAN™ capability • Alert on LAN™ capability • Advanced System Management PCI adapter <ul style="list-style-type: none"> – Full-duplex 10/100 Mbps Ethernet controller for system management use – Advanced System Management Interconnect port – Two serial ports • Built-in programmable read-only memory (PROM) based diagnostics
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¹ GB equals approximately 1 000 000 000 bytes.

² LVD = low-voltage differential

The following tables provide the specifications for the xSeries 370 server.

<i>Table 2. System specifications</i>		
<p>Size</p> <ul style="list-style-type: none"> • Depth: 747 mm (29.4 in.) • Height: 356 mm (14 in.) (8 U) • Width: 440 mm (17.3 in.) <p>Weight</p> <ul style="list-style-type: none"> • Unpacked, minimum configuration: 67 kg (147 lb.) • Unpacked, maximum configuration: 77.5 kg (170 lb.) <p>Electrical input</p> <ul style="list-style-type: none"> • Sine-wave input (50± or 60± Hz) is required • Input voltage <ul style="list-style-type: none"> – Low range <ul style="list-style-type: none"> - Minimum: 90 V ac - Maximum: 137 V ac – High range <ul style="list-style-type: none"> - Minimum: 180 V ac - Maximum: 265 V ac – Input kilovolt-amperes (KVA) approximately <ul style="list-style-type: none"> - Minimum configuration as shipped: 0.5 KVA - Maximum configuration: 2.1 KVA 	<p>Environment</p> <ul style="list-style-type: none"> • Air temperature <ul style="list-style-type: none"> – System on: 10° to 35° C (50° to 95° F) Altitude: 0 to 914 m (3000 ft.) – System on: 10° to 32° C (50° to 89.6° F) Altitude: 0 to 2133 m (7000 ft.) – System off: 10° to 43° C (50° to 110° F) • Humidity <ul style="list-style-type: none"> – System on: 8% to 80%; maximum wet-bulb 23° C (73.4° F) – System off: 8% to 80%; maximum wet-bulb 27° C (80.6° F) <p>Electrostatic discharge</p> <p>Tested to 20 KV</p> <p>Immunity</p> <p>Verified to comply with EN 50082-2</p>	<p>Acoustical noise emission values</p> <p>See Table 3.</p> <p>Heat output</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 1700 Btu/hr. • Maximum configuration: 7000 Btu/hr. <p>Safety standards</p> <ul style="list-style-type: none"> • UL 1950, Third Edition • CSA C22.2 No. 950-95 • EN 60950 and countries deviations • IEC 950 • NOM-019

<i>Table 3. Acoustical noise emission values</i>		
<p>Declared (upper limit) sound power levels</p> <ul style="list-style-type: none"> • Rack server <ul style="list-style-type: none"> – 6.1 bels operating – 6.1 bels idle • Tower server <ul style="list-style-type: none"> – 6.2 bels operating – 6.2 bels idle 	<p>Mean value of the A-weighted sound pressure levels at the operator position (if any)</p> <ul style="list-style-type: none"> • Rack server <ul style="list-style-type: none"> – dB operating — Not applicable – dB idle — Not applicable • Tower server <ul style="list-style-type: none"> – dB operating — Not applicable – dB idle — Not applicable 	<p>Mean value of the A-weighted sound pressure levels at the bystander (1 meter) position</p> <ul style="list-style-type: none"> • Rack server <ul style="list-style-type: none"> – 45.0 dB operating – 45.0 dB idle • Tower server <ul style="list-style-type: none"> – 43.5 dB operating – 43.0 dB idle
<p>Notes:</p> <ol style="list-style-type: none"> 1. These levels are measured in controlled acoustical environments according to ISO 7779, and are reported in accordance with ISO 9296. The declared sound power levels indicate an upper limit, below which a large portion of machines operate. 2. These values apply to a random sample of machines. 3. There is no impulsive noise, and there are no prominent tones. 4. For additional information on the server tower model, refer to <i>IBM 8Ux28D Rack-to-Tower Conversion Kit Installation Instructions</i>. 		

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 370 server

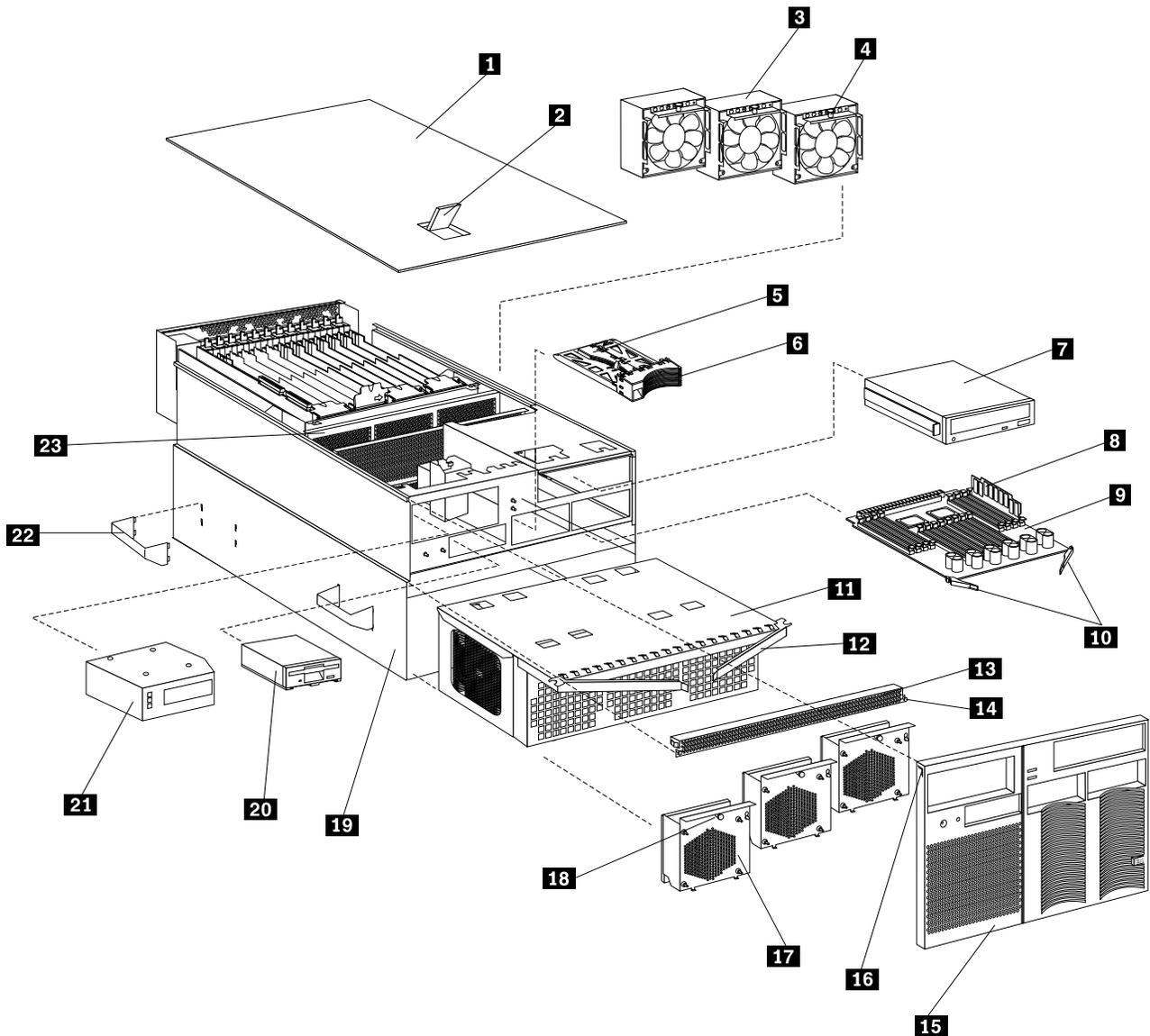
The orange color on components and labels in your server identifies hot-swap components. This means that you can install or remove the component while the system is running, provided that your system is configured to support this function.

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

The following illustrations show the locations of major components in your server.

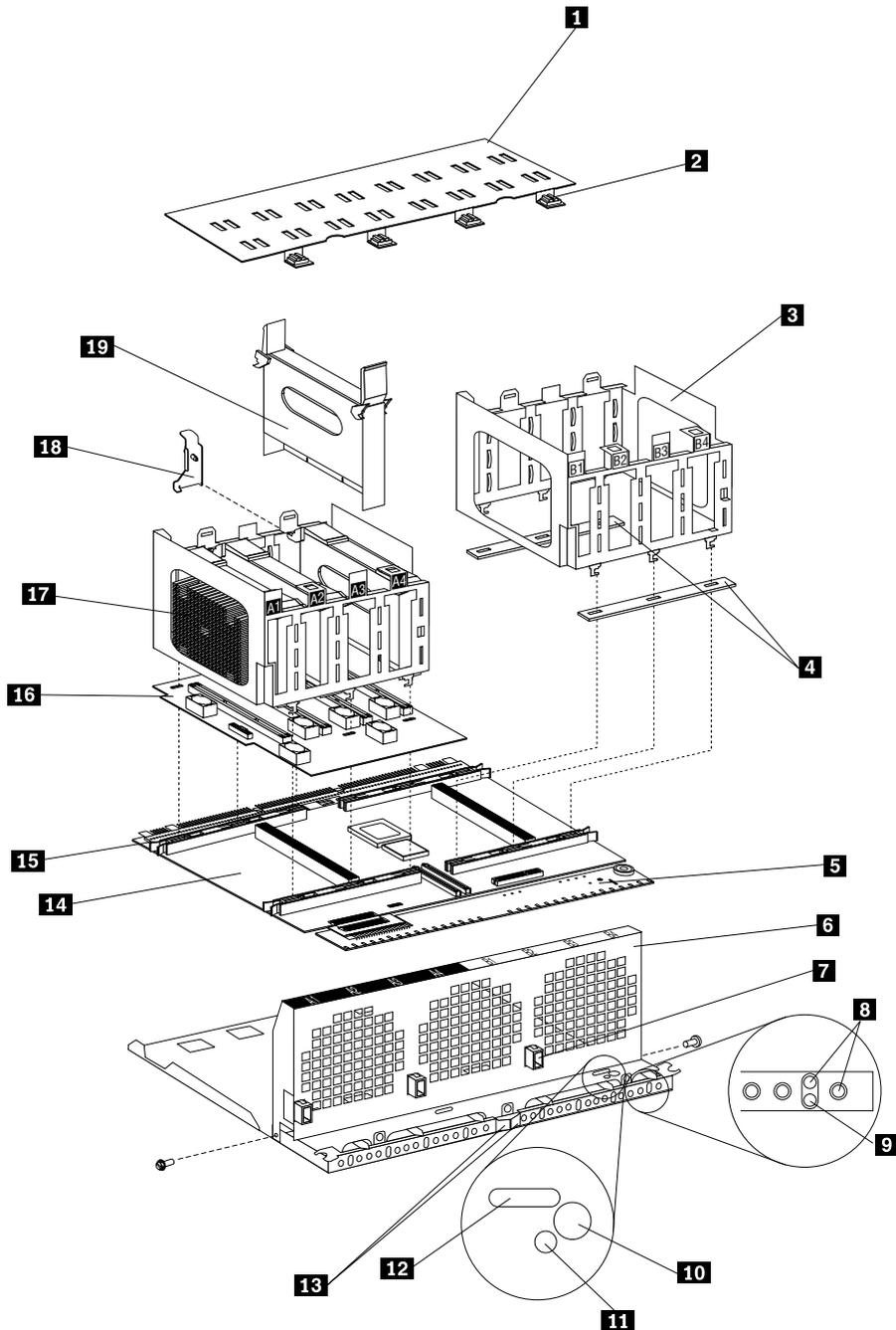
Note: The illustrations in this document might differ slightly from your hardware.

Exploded view of the xSeries 370 server (front)



- | | | | | | |
|----------|---------------------------|-----------|----------------------------------|-----------|-------------------------|
| 1 | Top cover | 9 | Memory board | 17 | Processor fan |
| 2 | Cover-release latch | 10 | Memory-board latches | 18 | Processor-fan fastener |
| 3 | System fan | 11 | Processor housing assembly | 19 | Chassis |
| 4 | System-fan fastener | 12 | Processor-housing-assembly latch | 20 | Diskette drive |
| 5 | Slim-high filler bezel | 13 | Memory access panel | 21 | Operator panel assembly |
| 6 | Half-high filler bezel | 14 | Memory-access-panel fastener | 22 | Server handle |
| 7 | CD-ROM drive | 15 | Front bezel | 23 | Midplane |
| 8 | Dual inline memory module | 16 | Front-bezel tab | | |

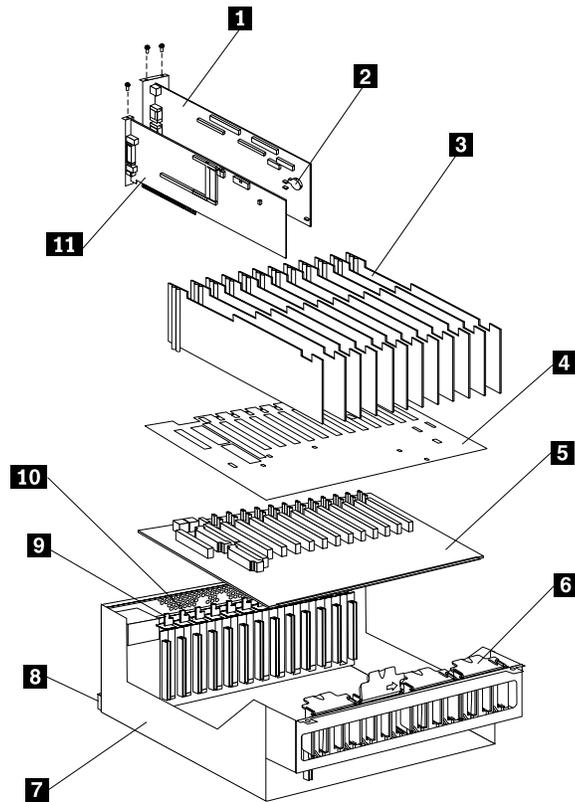
Exploded view of the xSeries 370 processor housing assembly



Note: Assembly has been rotated to show servicing orientation.

- | | | |
|--|--|---|
| 1 Processor cage cover | 7 Fan connector | 14 Processor controller board |
| 2 Processor-cage-cover fastener | 8 Processor fail LED | 15 Processor-cage latch |
| 3 Processor cage | 9 Memory fail LED | 16 Processor daughterboard |
| 4 Spacers | 10 Press To Show Fault button | 17 Processor A1 |
| 5 LED card | 11 Capacitor Testing LED | 18 Processor-daughterboard extraction tool |
| 6 Fan guard | 12 Processor fail LED | 19 Terminator card |
| | 13 Processor-housing-assembly latches | |

Exploded view of the xSeries 370 I/O housing assembly



1 I/O function card

2 Battery

3 Insulator

4 I/O board protector shield

5 I/O board

6 Adapter retention cover

7 I/O housing

8 I/O-housing-assembly latch

9 Adapter retention latch

10 Tab

11 Advanced System Management PCI adapter

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 is designed to operate safely while powered on with the top cover removed. Follow these guidelines when you work inside your server while the server is on:

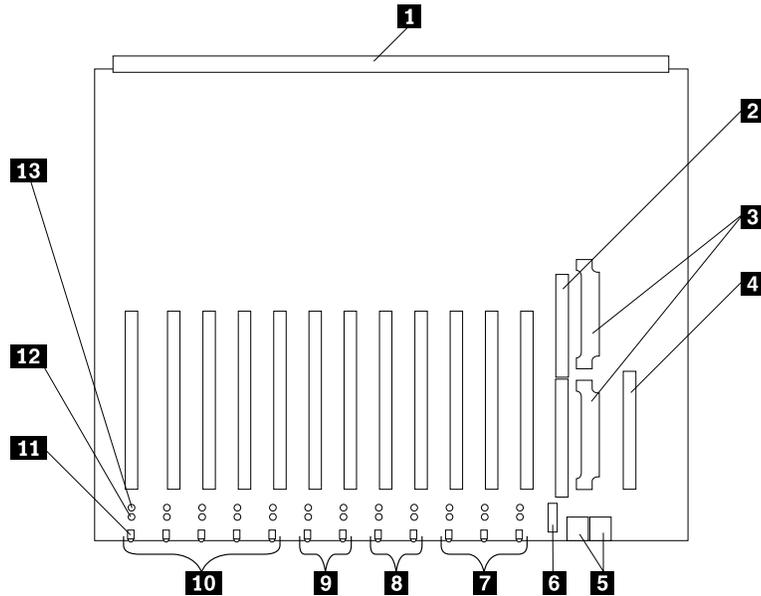
- Avoid loose-fitting clothing on your forearms. (Button the cuffs on long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.)
- Do not allow any clothing (such as neckties or scarves) to hang inside the server.
- Remove all jewelry, such as necklaces, bracelets, and loose-fitting wrist watches.
- Remove items from your shirt pocket (such as pens and pencils) that could fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hair pins, or screws, into the server.
- If the server is on, do not leave the top cover off for more than 30 minutes at a time.

Working with adapters

Your server supports up to 12 peripheral component interconnect (PCI) adapters in the expansion slots on the I/O board. There are two additional dedicated slots for the I/O function card and the Advanced System Management PCI adapter.

You can install a new PCI adapter or replace an existing PCI adapter with the same type of adapter without turning the server power off and restarting the system. These slots are called *hot-pluggable* PCI slots. They are also referred to as hot-plug PCI slots.

The following illustration shows the location of the expansion slots and other components referred to in these steps.



- 1** Midplane connector
- 2** I/O function card slot
- 3** Voltage regulator module (VRM) connectors
- 4** Advanced System Management PCI adapter slot
- 5** USB 1 and USB 2 port connectors
- 6** PCI switch card connector
- 7** Hot-plug, 64-bit, PCI slots 10–12 (bus A, 33 MHz)
- 8** Hot-plug, 64-bit, PCI slots 8–9 (bus B, 66 MHz)
- 9** Hot-plug, 64-bit, PCI slots 6–7 (bus C, 66 MHz)
- 10** Hot-plug, 64-bit, PCI slots 1–5 (bus D, 33 MHz)
- 11** Hot-plug external attention/fail LED for PCI slot (green blink = attention, amber = defective PCI adapter)
- 12** Hot-plug internal attention/fail LED for PCI slot (green blink = attention, amber = defective PCI adapter)
- 13** Hot-plug power LED for PCI slot (green solid, on)

PCI slot LED descriptions

Each PCI slot has two lights associated with it — one Attention/Fail light and one Power On light.

- **Power On Light:** This light is on when the PCI slot is active and has power. Do not add or remove an adapter from the PCI slot when the Power On light is on. When this light is off, the PCI slot is inactive and has no power applied. You can install or remove an adapter when the Power On light is off. Refer to your operating-system documentation to determine if your operating system supports hot-plug PCI adapters.
- **Attention/Fail Lights:** These are bicolor lights. When an Attention/Fail light flashes green, it indicates the PCI Hot-Plug Attention function. The meaning of the Attention light is defined by your operating system. Refer to your operating-system documentation to determine if your operating system supports

hot-plug PCI adapters and, if so, what the Attention light indicates. When this light is solid amber, it indicates a failure on the PCI adapter installed in the slot.

Adapter considerations

Before you continue with the adapter-installation procedure:

- Review the instructions that come with the adapter and your operating system 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.
- Although you can manually assign interrupts through the Configuration/Setup Utility program, most adapters designed for PCI slots are auto-configuring. If the required resources are available, the BIOS software automatically configures an adapter around the resources already in use by other devices. The default setting is generally the most appropriate.
- Your server has assigned PCI slots 10, 11, and 12 as PCI priority slots. The system BIOS scans the PCI priority slots for startable (bootable) devices before scanning the I/O function card.

Note: If you install additional storage adapters and external hard disk drives, and you do not want to change the startup hard disk drive, you must install the adapters in PCI slots 1 through 9.

- The I/O function card slot can support only the I/O function card. It is not an expansion slot.
- The Advanced System Management PCI adapter slot can support only the Advanced System Management PCI adapter. It is not an expansion slot.

Attention: You must have the Advanced System Management PCI adapter installed for proper operation of your server and to use the system-management functions that the adapter provides. Refer to the *User's Reference* on the *IBM xSeries Documentation* CD for more information about the Advanced System Management PCI adapter.

The integrated video controller is not removable. If you want to disable this controller and use a video adapter instead, you can install a video adapter in an expansion slot. If you want a monitor to be the startup monitor, install a video adapter in slot 10, 11, or 12. When you install a PCI video adapter in one of these slots, the server BIOS automatically disables the integrated video controller.

Table 4 on page 12 contains information on the requirements for the PCI adapter slots and PCI buses in your server.

<i>Table 4. PCI adapter information</i>			
Bus	Slots	Speed	PCI slot keying
A	10–12	33 MHz	5.0 V
B	8–9	66 MHz	3.3 V
C	6–7	66 MHz	3.3 V
D	1–5	33 MHz	5.0 V

Notes:

1. All expansion slots are hot-plug, 64-bit, PCI slots.
2. You can install:
 - a. A full-length or half-length, 32-bit or 64-bit, 5 V or Universal, hot-plug or non-hot-plug PCI adapter in slots 1–5 or 10–12. 66 MHz PCI adapters plugged into these slots will operate at 33 MHz.
 - b. A full-length or half-length, 32-bit or 64-bit, 3.3 V or Universal, hot-plug or non-hot-plug PCI adapter in slots 6–7 and 8–9. A 33 MHz PCI adapter installed in one of these slots limits a 66 MHz PCI adapter installed on the same bus to 33 MHz.
3. To optimize performance, spread the installation of high-speed adapters, such as 66 MHz Ethernet adapters, between the two 66 MHz PCI buses.

Enabling hot-plug PCI support

Your xSeries 370 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 gives the procedure for installing a PCI adapter. If you want to remove an adapter, reverse the steps.

Notes:

1. You do not need to turn off the server to install or remove a hot-plug PCI adapter.
2. When you install an adapter, be sure that the gold-edge connectors on the adapter match the connectors in the PCI slot.

Attention:

Do not remove a hot-plug adapter before performing the operating-system-defined procedure for disabling the hot-plug PCI slot that contains the adapter. Failure to do so might cause your system to lock up. Refer to your operating system documentation.

To install a PCI adapter:

1. Review the information in “Safety” on page v through “Handling static-sensitive devices” on page x.
2. If you are installing a hot-plug adapter, continue with step 3 on page 13. Otherwise, do the following:
 - a. Run the shutdown procedure for the operating system.

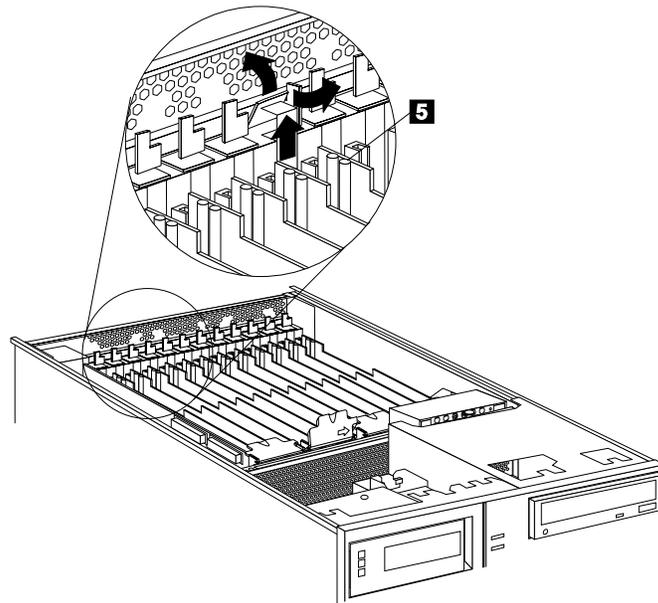
- b. Turn off the server and peripheral devices.
 - c. Disconnect all external cables and power cords.
3. If you have not already done so, remove the top cover.

Attention: If the server is on, do not leave the top cover off for more than 30 minutes at a time.

4. Determine which expansion slot you will use for the adapter.

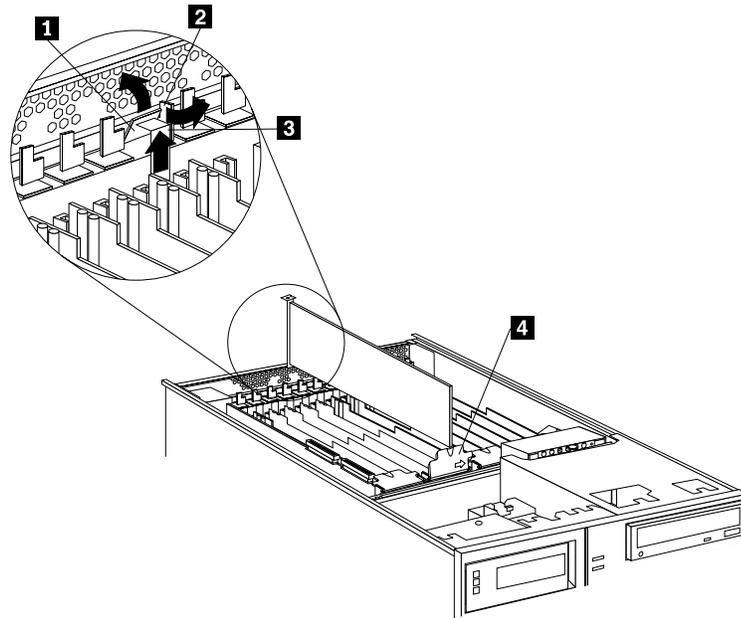
Note: Check the instructions that come with the adapter for any requirements or restrictions.

Refer to the following illustration while you perform the following step.



5. If you are installing a hot-plug adapter, disable the PCI slot from your operating system. Make sure that the Power On light **5** for the PCI slot is off. (Refer to the documentation that comes with your operating system for information about disabling a hot-plug PCI slot.)

Refer to the following illustration while you perform the following steps.

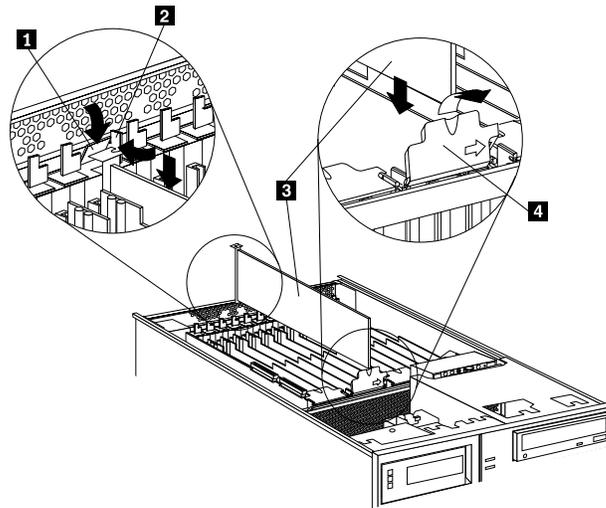


6. Remove the expansion-slot cover **3** :
 - a. Rotate the adapter retention latch **2** to the open (unlocked) position.
 - b. Lift the tab **1** at the top of the expansion-slot cover to the open (unlocked) position.
 - c. Remove the expansion-slot cover **3** from the server. Store it in a safe place 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.
7. If you are installing a full-length adapter, open the adapter retention cover **4** .
 - a. Press outward on the adapter retention assembly where indicated by the arrow.
 - b. Continue pressing on the assembly as described in step 7a, and lift the adapter retention cover **4** .
8. Refer to the documentation that comes with your adapter for any cabling instructions. It might be easier for you to route any internal cables before you install the adapter.
9. Touch the static-protective package containing the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package.

Note: Avoid touching the components and gold-edge connectors on the adapter.
10. Place the adapter, component-side up, on a flat, static-protective surface.
11. Set any jumpers or switches as described by the adapter manufacturer.

Refer to the following illustration while you perform the following step.



- 1** Tab
- 2** Adapter retention latch
- 3** Adapter
- 4** Adapter retention cover

12. Install the adapter:

- a. Carefully grasp the adapter **3** by its top edge or upper corners, and align it with the expansion slot on the I/O board.

Attention: When you install an adapter in the server, be sure that it is completely and correctly seated in the connector. Incomplete insertion might cause damage to server components or the adapter.

- b. Press the adapter *firmly* into the expansion slot.
- c. If you are installing a full-length adapter, close the adapter retention cover **4**.
- d. Lower the tab **1** over the adapter. Rotate the adapter retention latch **2** until it snaps in place (the locked position).

13. If you have not already done so, connect any cables to the adapter.

14. If the adapter is a hot-plug adapter, enable the PCI slot from your operating system. Make sure that the Power On light for the PCI slot is on.

Attention: If the installed adapter is not supported by the hot-plug capability of your operating system, shut down and restart the server.

15. If you have other options to install, do so now. Otherwise, go to “Completing the installation” on page 35.

Verifying compatibility between network adapters and device drivers

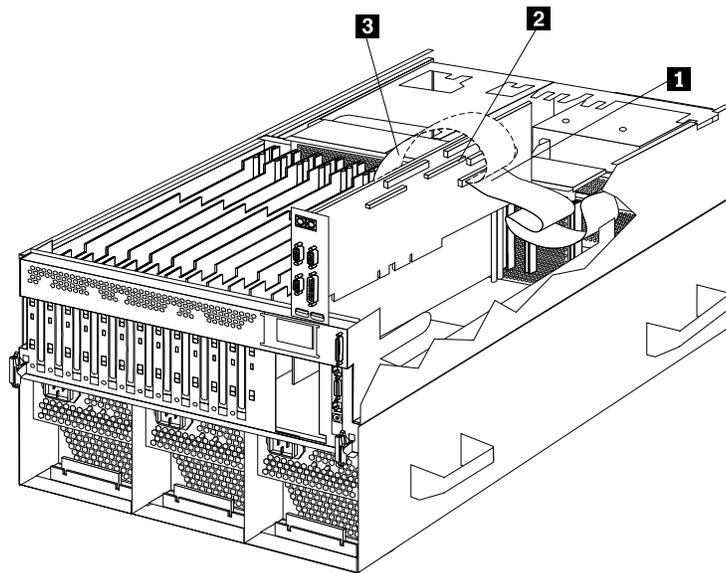
Your server supports several types of network adapters. If you are having trouble with the installation or operation of a network adapter or network operating system, ensure that the network-adapter device driver supports multiple processors. Refer to your network-adapter documentation for additional information about adapter compatibility requirements.

Installing and cabling a ServeRAID adapter (optional)

You can install an optional ServeRAID adapter in your server to enable you to configure the internal hot-swap hard disk drives into disk arrays. To do this, you must disconnect the cable from the integrated SCSI controller on the I/O function card, and connect the cable to a ServeRAID adapter. To cable a ServeRAID adapter to the internal hard disk drives in your server, or to make this adapter a startup device, you must install the ServeRAID adapter in PCI slot 10, 11, or 12. Refer to your ServeRAID adapter option documentation for complete instructions on installing a ServeRAID adapter in your server.

The following procedure describes the cable routing that is necessary when you install the ServeRAID adapter. Refer to the following illustration while you perform the steps in this procedure.

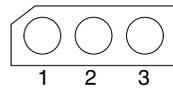
Note: It might be easier for you to route the cable before you install the adapter.



- 1** Standard internal SCSI cable location for connection to internal SCSI port B
- 2** Internal SCSI port B
- 3** New internal SCSI cable location for connection to ServeRAID adapter

1. Review the information in “Safety” on page v through “Handling static-sensitive devices” on page x.
2. Disconnect the internal SCSI cable **1** from internal SCSI port B **2** on the I/O function card.

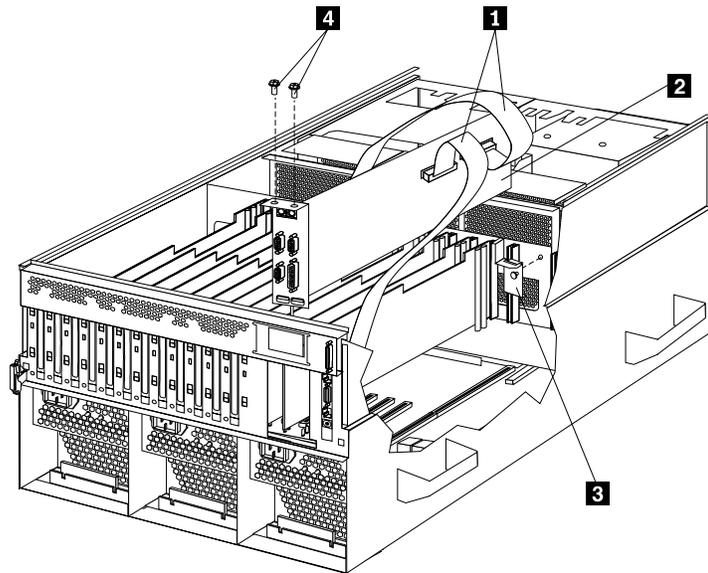
3. Change the setting of the three-pin, SCSI B detect jumper (identifier J19) on the I/O function card from pins 1 and 2 to pins 2 and 3. This prevents the server from displaying a non-applicable error message, Cable not present.



Note: For the jumper location, refer to the illustration of the I/O function card in the system label on the server cover.

- a. Remove the I/O function card from the server:

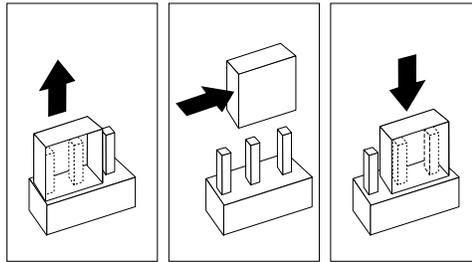
- 1) Refer to the following illustration while you perform the steps in this procedure.



- 2) Disconnect all cables **1** from the I/O function card **2**. Note carefully where each cable is connected before you remove it. Refer to the system label on the server cover for the connector locations on the I/O function card.
- 3) Remove the two screws **4** located on the metal connector plate inside the server.
- 4) Remove the I/O function card retention bracket **3** on the right side of the card by pulling out the fastener on the bracket.
- 5) Carefully grasp the I/O function card by its top edge and pull the I/O function card out of the server.
- 6) Place the I/O function card connector-side up on a flat, static-protective surface.

- b. Lift the jumper straight off the pin block.

- c. Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.



- d. Slide the jumper fully onto these pins.

- e. Reinstall the I/O function card:

- 1) Refer to the illustration in step 3a1 on page 17 while you perform the steps in this procedure.
- 2) Carefully grasp the I/O function card by its top edge, and insert the tabs on the bottom edge of the metal connector plate into the matching openings on the server back panel.
- 3) Align the I/O function card with the guide on the opposite end of the adapter and the slot on the I/O board.
- 4) Press the I/O function card *firmly* into the slot.

Attention: When you install the I/O function card in the server, be sure that it is completely and correctly seated. Incomplete insertion might cause damage to server components.

- 5) Reinstall the I/O function card retention bracket that you removed in step 3a4 on page 17 by pressing in the fastener on the bracket.
 - 6) Insert the two screws that you removed in step 3a3 on page 17.
 - 7) Connect the cables that you disconnected in step 3a2 on page 17. Refer to the illustration of the I/O function card in the system label on the server cover for the connector locations on the I/O function card.
- f. The SCSI cable comes with two standard folds. Unfold the SCSI cable at the fold that is closer to the connector on the end of the cable. If necessary, refer to the illustration at the beginning of this procedure.
- g. Install the ServeRAID adapter in PCI slot 10, 11, or 12.
- h. Connect the internal SCSI port B end of the SCSI cable to the appropriate channel on the ServeRAID adapter **3**. Refer to your ServeRAID adapter option documentation for more information about installing the adapter and configuring a disk array.
- i. If you have other options to install or remove, do so now; otherwise, continue with “Completing the installation” on page 35.

Installing DIMMs and memory boards

Your server uses 100 MHz, 168-pin, PC100 registered synchronous dynamic random-access memory (SDRAM), industry-standard DIMMs with error checking and correction (ECC). You can add extra DIMMs or replace existing DIMMs.

Notes:

1. You can install an optional memory board that contains an additional 16 DIMM connectors and supports cache-line interleaving. To obtain an optional memory board, contact an IBM reseller or IBM marketing representative.
2. The connector identifiers on both the standard and the optional memory boards are J1–J16. To distinguish the two memory boards, use the labels provided on the processor housing assembly. These labels refer to the connector identifiers as A1–A16 on the standard memory board (A), and B1–B16 on the optional memory board (B).
3. Your server comes with a system label on the server cover. The numbers located to the right of the memory boards on the system label do not indicate DIMM connector identifiers. These numbers indicate the DIMMs; for example, **1** means the first DIMM that you install, **9** means the ninth DIMM that you install, and so on.
4. *Cache-line interleaving* can occur only if two memory boards are installed in the server. This process allows the two memory boards to share a common address range, with one memory board responding to even-numbered cache lines, and the other memory board responding to odd-numbered cache lines. This configuration has the highest performance because it allows the two SDRAM arrays to be used in a balanced fashion, reducing access conflicts.
5. Installing or removing DIMMs changes the server configuration. Therefore, after installing or removing a DIMM, save the new configuration information in the Configuration/Setup Utility program. See “Using the Configuration/Setup Utility main menu” in the *xSeries 370 User's Reference* provided on the *IBM xSeries Documentation* CD that comes with your server for more information.
6. If you replaced a defective DIMM, you must manually enable the DIMM slot in the Configuration/Setup Utility program. In this case, the system does not automatically access the Configuration/Setup Utility program to enable the DIMM slot.
7. To verify the correct amount of memory installed in your server, review the information on the Logo screen during system startup. The operating system might not reflect the correct amount of memory.

Table 5 shows the memory installation requirements for your server.

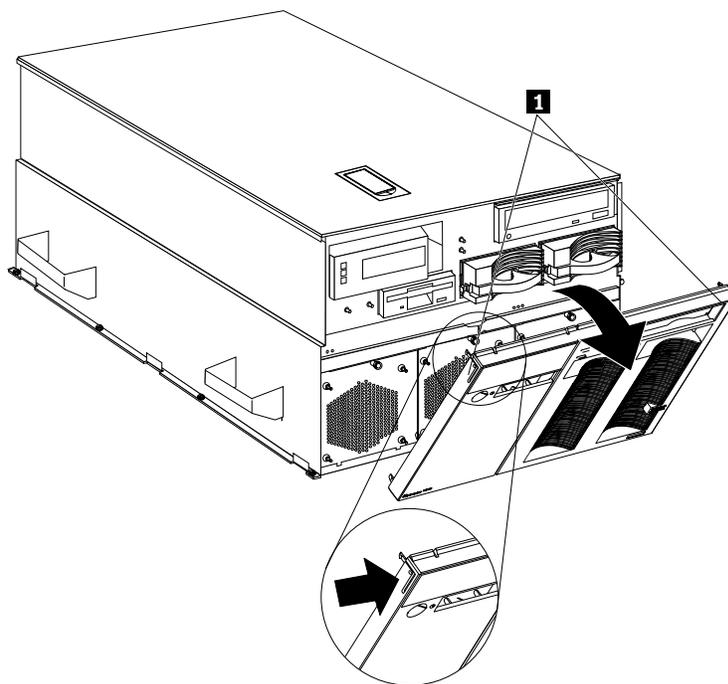
<i>Table 5. Memory installation requirements</i>	
DIMM sizes	128 MB, 256 MB, 512 MB, 1 GB
DIMM population order for a single board configuration — standard memory board (A)	A1, A5, A9, A13, A3, A7, A11, A15, A2, A6, A10, A14, A4, A8, A12, A16
DIMM population order for a dual board configuration — standard memory board (A) and optional memory board (B)	A1/B1, A5/B5, A9/B9, A13/B13, A3/B3, A7/B7, A11/B11, A15/B15, A2/B2, A6/B6, A10/B10, A14/B14, A4/B4, A8/B8, A12/B12, A16/B16
<p>Notes:</p> <ol style="list-style-type: none"> 1. The 100 MHz DIMMs support the registered mode of operation. 2. Install DIMMs with a maximum height of 4.32 cm (1.7 inches). 3. Your server comes with one standard (preinstalled) memory board (A), and one or more DIMMs installed on this memory board. You can install an optional memory board (B). Both the standard memory board (A) and the optional memory board (B) contain 16 DIMM connectors (J1–J16). 4. When you install DIMMs in both the standard memory board (A) and the optional memory board (B), you must install them in matching pairs with the same part number, in the same slot on each memory board; for example, J1/J1, J5/J5, J9/J9, and so on. 	

Table 6 shows the available memory configurations.

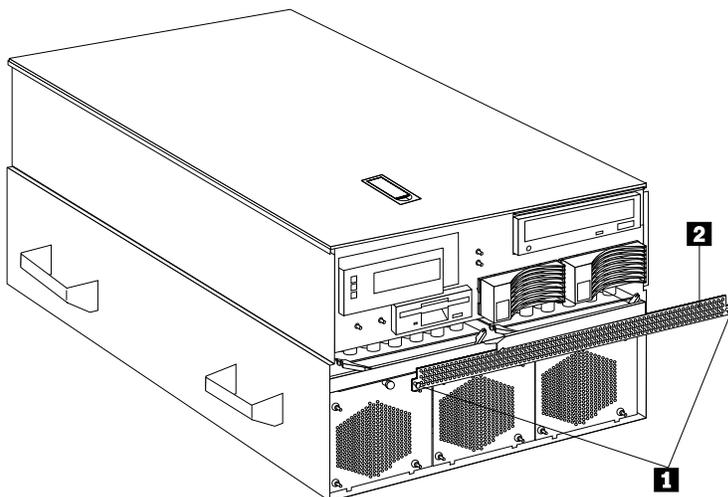
<i>Table 6. Memory expansion</i>		
DIMM size	16 Connectors (1 Board)	32 Connectors (2 Boards)
128 MB	2 GB	4 GB
256 MB	4 GB	8 GB
512 MB	8 GB	16 GB
1 GB	16 GB	32 GB

To install a DIMM:

1. Review the information in “Safety” on page v through “Handling static-sensitive devices” on page x.



2. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices, and disconnect all external cables and power cords.
3. Remove the front bezel.



4. Remove the server memory-access panel.
 - a. Pull out the two plastic fasteners **1** on the memory-access panel **2** to the unlocked position.
 - b. Remove the memory-access panel from the server.

Note: Do not remove the plastic fasteners from the memory-access panel.

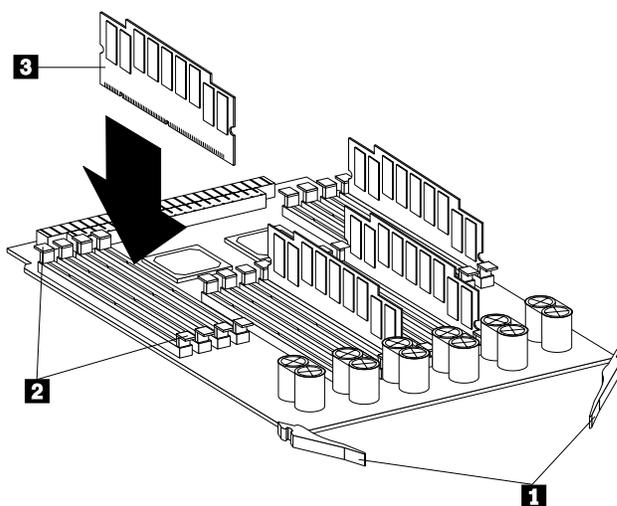
5. If you are not installing an optional memory board, continue with step 6 on page 22.

If you are installing an optional memory board, touch the static-protective package containing the memory board to any unpainted metal surface on the server. Then, remove the memory board from the package. Continue with step 7.

6. Remove the memory board from the server:
 - a. Pull both latches **1** simultaneously so that they fully extend from the memory board.
 - b. Grasp the two latches and pull the memory board from the server.
 - c. Place the memory board connector-side up on a flat, static-protective surface.
7. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.

8. Install the DIMM:



- 1** Latches
- 2** Retaining clips
- 3** DIMM

Note: Install the DIMMs in the order indicated on the system label on the server cover (see note 3 on page 19).

- a. Turn the DIMM **3** so that the keys align correctly with the connector.
- b. Align the keyed DIMM **3**, and press on both sides of the DIMM as you insert it into the connector. Be sure to press the DIMM straight into the connector.

Note: If a gap exists between the DIMM and the retaining clips, the DIMM has not been properly installed. Open the retaining clips and remove the DIMM; then, reinsert the DIMM.

- c. Make sure that the retaining clips **2** are in the closed position.
 - d. Repeat these steps for each DIMM that you install.
9. Reinstall the memory board:
- a. Insert the memory board into the guides and gently press the memory board into the connector. When you install the memory board in the server, be sure that it is correctly seated in the connector before you apply force to close the latches.
 - b. Push the latches **1** until they close and lock in place.
- Attention:** To ensure proper EMC containment and cooling for your server, reinstall the memory-access panel before turning on the server.
10. Reinstall the memory-access panel:
- a. Ensure that the memory-access panel is fully seated in the appropriate location.
 - b. Press in the two plastic fasteners on the memory-access panel to secure it into place.
11. Reinstall the front bezel.
12. If you have other options to install, do so now. Otherwise, go to “Completing the installation” on page 35.

Installing a hot-swap drive

Before you install drives in your server, verify that you have all the cables and any other equipment specified in the documentation that comes with the internal drive.

Notes:

1. Each hot-swap drive that you plan to install must have a hot-swap-drive tray attached. The drive must have a single connector attachment (SCA) connector. Hot-swap-drive trays come with the hot-swap-drives.
2. Empty hot-swap bays and trays that contain slim-high drives must contain a filler bezel.
3. Your server automatically sets SCSI IDs for hot-swap hard disk drives. The server uses the hard disk drive SCSI IDs to send status information to the indicator lights located on each hot-swap drive.

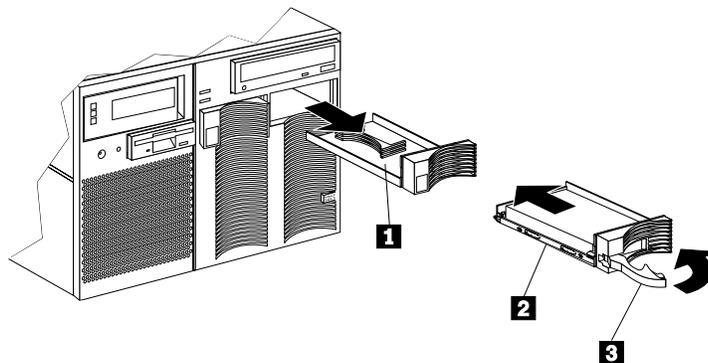
Attention: Do not set the SCSI ID jumpers on hard disk drives.

4. All the internal hot-swap drives in your server have automatic termination.

Attention:

To avoid damage to a hard disk drive, **do not** remove the drive from the hot-swap bay until it has had time to spin down (approximately 30 seconds after disconnecting). Handle the drive gently.

Refer to the following illustration while you perform the steps in this procedure.



- 1** Filler panel (tray and slim filler bezel)
- 2** Hot-swap hard disk drive
- 3** Drive tray handle (open position)

To install a hard disk drive:

1. Review the information in “Safety” on page v through “Handling static-sensitive devices” on page x.
2. Determine the bay in which you want to install the drive.
3. Verify that all jumpers are removed from the drive.
4. Remove the filler panel **1** from the empty hot-swap bay 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 slim-high drive, you must separate the slim filler bezel from the tray, and insert the slim filler bezel into the top of the hard disk drive cage. Otherwise, store the filler panel in a safe place.

5. Install the hard disk drive **2** in the hot-swap bay:
 - a. Remove the new drive assembly from the static-protective package.
 - b. Touch the static-protective package containing the drive assembly to any unpainted metal surface on the server. Then, remove the drive assembly from the static-protective package.
 - c. If you are installing a slim-high drive, separate the slim filler bezel from the tray, and insert the slim filler bezel into the top of the hard disk drive cage.
 - d. Ensure that the tray handle **3** is open (that is, perpendicular to the drive).
 - e. Align the drive assembly so that it engages the guide rails in the bay.
 - f. Gently push the drive assembly into the bay until the drive stops.
 - g. Push the tray handle to the closed (locked) position.
6. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly. See “Controls and indicators” on page 41 for details.

Notes:

- a. The front of each hot-swap hard disk drive has two indicator lights (see “Controls and indicators” on page 41). If the amber hard disk status light for a drive is lit continuously, that individual drive is defective and needs to be replaced. When the hard disk status light indicates a defective drive, you can replace a hot-swap drive without turning off the server.
 - b. If your server has a ServeRAID adapter installed, refer to the ServeRAID adapter documentation for details about configuration requirements.
 - c. If the hot-swap disk drive bays are not connected to a ServeRAID adapter, you might need to shut down and restart the server for the drive to be recognized.
7. If you have other options to install, do so now. Otherwise, go to “Completing the installation” on page 35.

Installing a processor

Your xSeries 370 server comes with at least one processor installed on the standard processor daughterboard. When you install one or more additional processors, your server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load among the processors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.

Note: To ensure that your operating system supports multiprocessing operations, load the appropriate multiprocessor option software in your operating system programs.

Your server supports a maximum of eight Intel Pentium III Xeon processors. For a list of supported operating systems, see <http://www.ibm.com/pc/us/compat/> on the World Wide Web.

Before you begin:

- Thoroughly review the documentation that comes with the processor, so that you can determine whether you need to update the xSeries 370 server basic input/output system (BIOS). Verify that you have the latest BIOS level for your server by accessing <http://www.ibm.com/pc/us/compat/> on the World Wide Web. Refer to the “Getting Help, service and information” section of the *User's Reference* on the *IBM xSeries Documentation* for the appropriate World Wide Web addresses.
- If you plan to use the processor serial-number security feature, you must change the setting of the **Processor Serial Number Access** menu choice in the Advanced Setup menu of the Configuration/Setup Utility program. The default value is **Disabled**; change this value to **Enabled**.

Notes:

1. The illustrations in this section might differ slightly from your hardware.
2. To ensure proper server operation, when you install an additional processor, use processors with the same cache size and core frequency as those of the currently installed processor.
3. If you replace the processors in your server with processors of a different speed, be sure the processor core frequency selection jumper block is set correctly. (See “Processor-controller board jumpers” on page 34 for more information. For a list of supported processor speeds, see <http://www.ibm.com/pc/us/support/> on the World Wide Web.)
4. To maintain signal quality and system reliability, either a processor or a processor terminator card must be installed in each processor connector. A processor must be installed in processor connector A1 on the standard processor daughterboard (A).
5. You will need to install a second processor daughterboard if you plan to use more than four processors in your server.
6. If you are installing an optional processor daughterboard (B), you must also install the two cache coherency filter cards in the two adjacent, vertical slots between the two processor daughterboards on the processor controller board.

(Refer to the layout of the processor controller card in the *User's Reference* on the *IBM xSeries Documentation CD* for the location of the cache coherency filter card A and the cache coherency filter card B connectors.)

7. Your server comes with a processor installed in connector A1, on the standard processor daughterboard (A). If you need to install additional processors, install them in the following order:

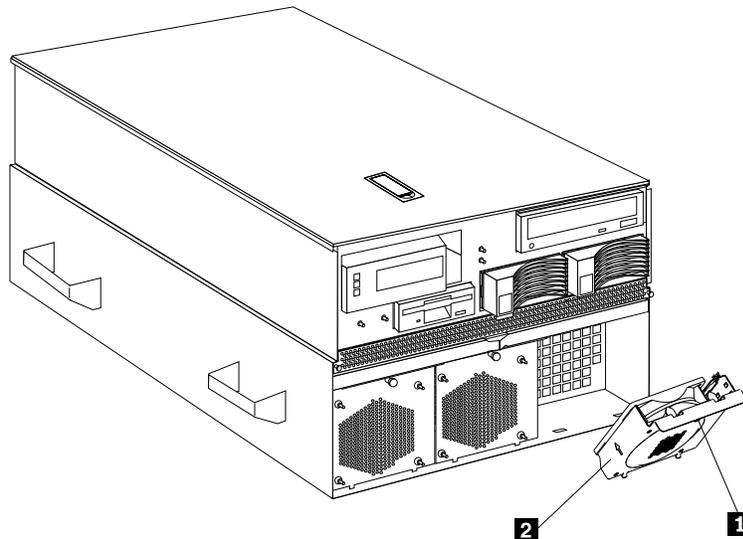
A1, A3, A2, A4

If you need to install processors on the optional processor daughterboard (B), install them in the following order:

B1, B3, B2, B4

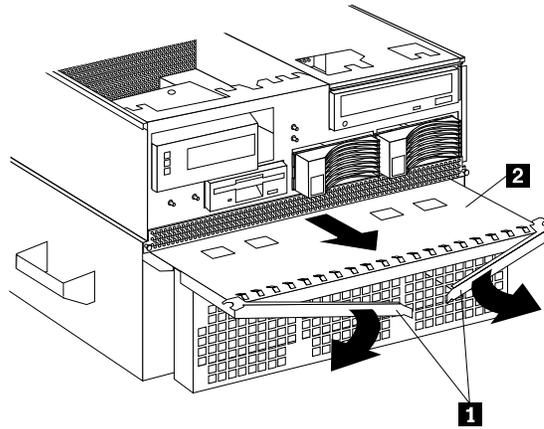
To install a processor:

1. Review the information in “Safety” on page v through “Handling static-sensitive devices” on page x.
2. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices, and disconnect all external cables and power cords; then, remove the front bezel.



3. Remove the three processor fans:

- a. Pull the fastener **1** in the top center of the fan housing **2**. This places the fastener in the unlocked position.
- b. Pivot the fan downward and remove it from the server.
- c. Repeat steps 3a and 3b for each additional fan.



4. Remove the processor housing assembly from the server:

- a. Open the two latches **1** at the top of the processor housing assembly **2**. Fully extend the latches.

- b. Pull the processor housing assembly partially out of the server, approximately 203.2 mm (8 in.).

Attention: To avoid injury, do not place your fingers immediately behind the latches at the top of the processor housing assembly.

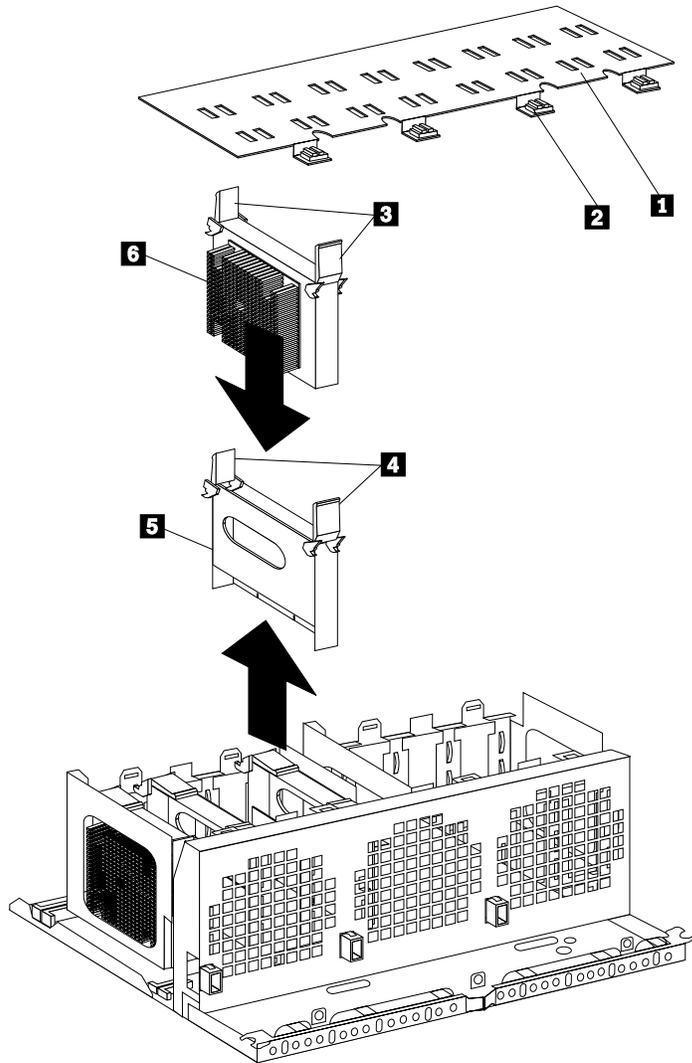
- c. Close the latches at the top of the processor housing assembly.

Attention: Do not lift the processor housing assembly by the latches.

- d. Grasp the bottom sides of the processor housing assembly. Lift and slide the assembly out of the server until it stops, approximately 228.6 mm (9 in.); then, lift the assembly slightly and remove it from the server.

Note: If the assembly stops before you can slide it out of the server, lift it slightly and continue to remove it from the server.

- e. Place the processor housing assembly on a flat, static-protective surface, with processor labels A1–A4 and B1–B4 right side up.

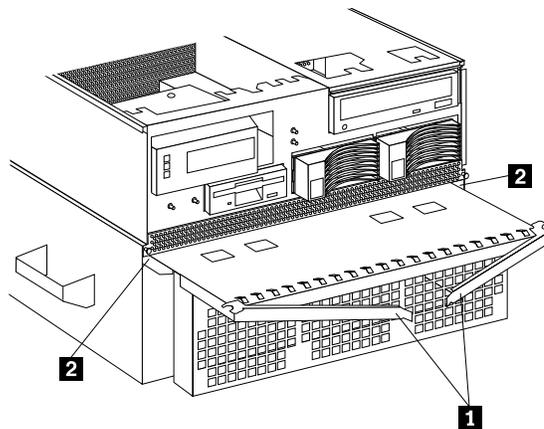


5. Turn the four plastic fasteners **2** on the processor-cage cover **1** until they are in the unlocked position (one quarter-turn). You may use a flat-blade screwdriver or a coin.
6. Remove the processor-cage cover **1** and set it aside.
7. Determine the processor connector in which you want to install the new processor. If the connector contains a processor terminator card **5** :
 - a. Pull the processor terminator card latches **4** so that they rotate to the unlocked position.
 - b. Remove the processor terminator card **5** from the processor connector.
 - c. Store the processor terminator card in a safe place.

Note: After you install the new processor in your server, place the terminator card in the empty static-protective package.
8. If you are installing processors in the optional processor-daughterboard assembly, first follow the instructions in “Installing a processor daughterboard” on page 32; then, return here to continue.

9. Install the processor:
 - a. Touch the static-protective package containing the new processor to any *unpainted* metal surface on the server; then, remove the processor from the package.
 - b. Rotate the processor latches **3** to the open position.

Attention: Before you press the processor into the connector, make sure that the processor has the same orientation as the original A1 processor.
 - c. Insert the processor **6** into the guides and gently press the processor into the connector. When the processor is correctly inserted, all the processor heat sinks in both processor cages face the same direction, toward connector A1.
 - d. Rotate the processor latches **3** until they close and lock in place.
 10. If you plan to install more than one processor, repeat step 7 on page 29 and step 9 in this section.
 11. Install terminator cards **5** in the connectors that do not contain processors. The arrows on the terminators must face toward the large connector on the processor housing assembly and away from the fan guard.
 12. Reinstall the processor-cage cover by inserting the cover tabs into the slots on the top of the processor cage.
 13. Turn the four plastic fasteners on the processor-cage cover until they are in the locked position (one quarter-turn). You may use a flat-blade screwdriver or a coin.
- Attention:** Do not lift the processor housing assembly by the latches.
14. Reinstall the processor housing assembly in the server:



Attention: To avoid injury, do not place your fingers immediately behind the latches at the top of the processor housing assembly.

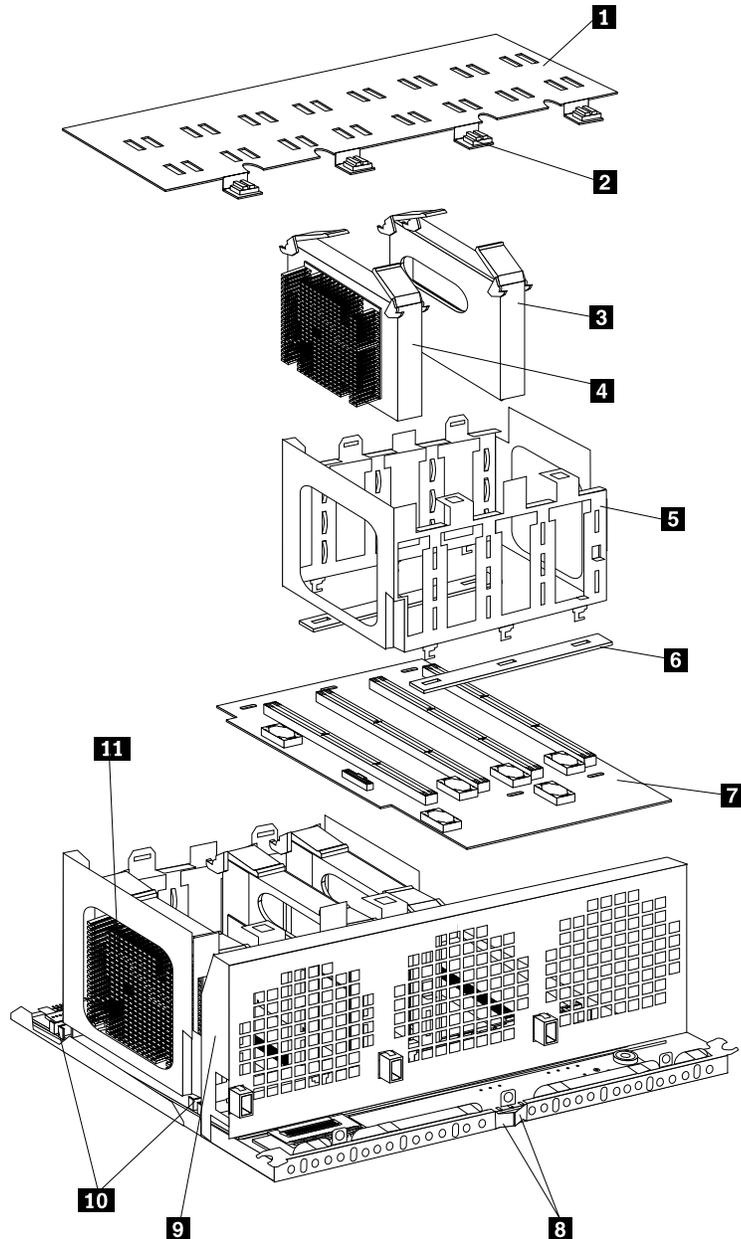
- a. With the processor housing assembly positioned so that the processors are pointing downward and the latches **1** are closed, align the processor housing assembly with the guides **2** on the inside walls of the server.
- b. Grasp the bottom sides of the processor housing assembly. Slide the processor housing assembly partially into the server; then, open the latches fully.

- c. Lift and slide the assembly into the server until it stops.
- d. Close the processor housing assembly latches.
- e. Reinstall the three processor fans:
 - 1) Insert the fans in the server. Align the tabs on the bottom edge of the fans with the matching slots in the server chassis.
 - 2) When you have the fans correctly seated, press the fasteners in the top center of the fans to secure the fans in the server.
- f. Reinstall the front bezel.
- g. If you have other options to install, do so now. Otherwise, go to “Completing the installation” on page 35.

Installing a processor daughterboard

Refer to the following illustration while you perform the steps in this section. In this illustration, the standard processor cage is installed in the processor housing assembly, with a processor **11** in connector A1. The optional processor cage is item **5**.

Note: When you install the optional processor daughterboard, you must also install the two cache coherency filter cards that come with the daughterboard.



To install an optional processor daughterboard and the cache coherency filter cards:

Attention: Do not lift the processor housing assembly by the latches **8**.

1. If you have not already removed the processor housing assembly, do so now. Perform step 1 on page 27 through step 4e on page 28; then, return here.
2. If you have not already removed the processor-cage cover **1**, do so now. Rotate the four fasteners **2** to the unlocked position; then, lift the cover and set it aside.
3. Remove the empty processor cage **5**:
 - a. Squeeze and slide out the release latches **10** as far as they will go, until they reach the unlocked position; then, release.
 - b. Lift the empty processor cage out of the processor housing assembly, and remove the spacers **6**.

Note: When you are removing the processor cage from the processor housing assembly, be sure that the processor cage release latches remain in place. Store the spacers in a safe place for future use.
4. Remove the fan guard **9**:
 - a. Remove the two screws from the sides of the fan guard.
 - b. Lift the fan guard off the processor housing assembly.
 - c. Rotate the fan guard away from the processors.
 - d. Slide the fan guard toward the processors to remove the tabs on the bottom of the fan guard from the slots. Do not disconnect the power cables.
5. Install the two cache coherency filter cards in the two adjacent, vertical slots between the two processor daughterboards on the processor controller board. (Refer to the layout of the processor controller card in the *User's Reference* on the *IBM xSeries Documentation* CD for the location of the slots.)
6. Reinstall the fan guard:
 - a. Ensure that the power cables are routed over the top of the retainer bracket that holds the two cache coherency filter cards in place.
 - b. Slide the tabs on the bottom of the fan guard into the slots.
 - c. Place the fan guard on the processor housing assembly.
 - d. Reinstall the two screws that you removed in step 4a to secure the fan guard.
7. Touch the static-protective package containing the new processor daughterboard to any *unpainted* metal surface on the server; then, remove the new processor daughterboard **7** from its static-protective package.
8. Align the processor-daughterboard connector with the keyed connector on the processor controller board.

Note: For the location of the processor-daughterboard connectors on the processor controller board, or for a layout of the processor daughterboard, refer to the board layouts in the *User's Reference* on the *IBM xSeries Documentation* CD.
9. Firmly press the processor daughterboard **7** down into the keyed connector on the processor controller board. Push in the center of the board, until the processor daughterboard is fully seated.

10. Ensure that the two processor cage release latches are still in the unlocked (pulled out) position.
11. Align the processor cage with its tabs over the corresponding slots on the processor daughterboard. Match the labels on the processor cage with the corresponding labels on the fan guard **9**; for example, A1/A1.
12. Firmly press the processor cage down into the slots in the processor housing assembly, until the processor cage is fully seated.
13. Squeeze and firmly push the release latches **10** back into the locked position; then, release.
Attention: Ensure that the release latches are in the fully locked position.
14. Return to step 9 on page 30 to install the processors.

Processor-controller board jumpers

Table 7 on page 35 describes the jumper on the processor controller board.

Notes:

1. Be sure the processor bus-to-core ratio is set correctly (see Table 7 on page 35). For example, if you have a 700 MHz processor installed and the system bus speed is 100 MHz (the default), be sure that the jumpers are set to a bus-to-core ratio of 7.0 (700/100).
2. Be sure the processor-core-frequency-selection jumper block is set for the slowest speed processor installed in your server. For example, if your server has a 700 MHz processor installed and you install three 900 MHz processors, make sure the processor-core-frequency-selection jumper block is set for the 700 MHz processor.

MHz denotes internal clock speed of the processor only; other factors also affect application performance.
3. If you plan to use the processor serial-number security feature, you must change the setting of the **Processor Serial Number** menu choice in the Advanced Setup menu of the Configuration/Setup Utility program. The default value is **Disabled**; change this value to **Enabled**.

Attention: Be sure that the processor bus-to-core ratio jumper is properly set. If the processor bus-to-core ratio does not match the processor speed in your server, your server might operate with a degraded performance or not at all. For the exact location of the processor-core-frequency jumper block, refer to the *User's Reference* on the *IBM xSeries Documentation CD*.

The highlighted number in the table corresponds to the highlighted number on the illustration of the processor-controller board in the *User's Reference* on the *IBM xSeries Documentation CD*.

Processors listed in Table 7 are not necessarily available or planned for your model. If a processor becomes available for your model, use these jumper settings.

<i>Table 7. Processor-controller board jumper</i>	
Jumper name	Description
5 Processor-core-frequency-selection	The default core/bus fraction is 7.0 (700/100 MHz). Pins 9/10 and 11/12 are open, and pins 13/14 and 15/16 are closed. For the core/bus fraction 9.0 (900/100 MHz), any jumper settings are ignored; the core frequency is set automatically.
Note: Open = No jumper is present. Closed = A jumper is present.	

Completing the installation

Depending on the options that you have installed, you must reinstall the top cover and the front bezel to complete the installation. You must also reconnect all the cables and power cords that you disconnected in these procedures, and, after installing certain options, you must run the Configuration/Setup Utility program.

Cabling the server

Use the following procedure to attach the cables to your xSeries 370 server.

1. Select a location that will allow for air circulation. In a rack enclosure, be sure to maintain a minimum clearance of 203.2 mm (8 in.) between the rear of the chassis and the surface of the rear door when the door is closed.

Note: To accommodate the xSeries 370 server, a *Rack Extension Option* can be installed on the IBM rack enclosure.

2. Connect the device cables to the server. For the location of cable connectors, see "Cable connectors."

Important

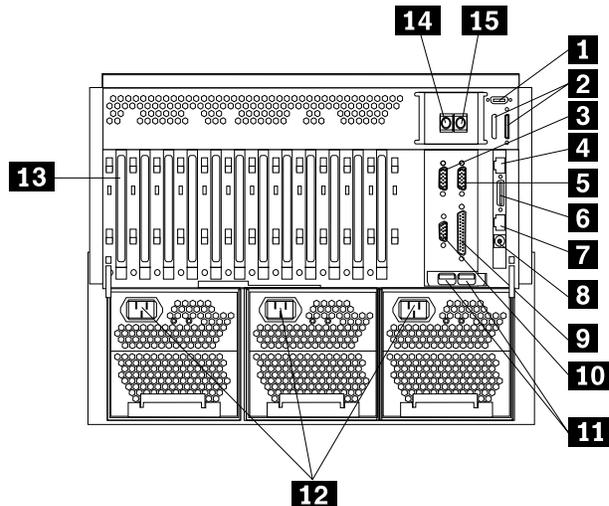
To connect the server 10BASE-T or 100BASE-TX port to a hub, use an unshielded twisted pair (UTP) cable with RJ-45 connectors at both ends. An EIA/TIA-568 category 5 cable must be used for 100BASE-TX connectors to meet various standards, including electromagnetic compatibility.

3. Connect the power cord(s) to the server.
4. Connect all power cords to electrical outlets.

Cable connectors

Refer to the following illustration for the location of the input and output connectors on your server.

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



- 1 External connector knockouts for Advanced System Management PCI adapter token-ring option:** The chassis has an external connector knockout that can be used when you install the Advanced System Management PCI adapter token-ring option.
- 2 External SCSI device connector:** External SCSI devices attach here. The knockout for a second external SCSI connector is not used.

- 3 Serial port A connector:** Serial signal cables for modems and other serial devices connect here to the 9-pin serial port A connector. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.
- 4 Advanced System Management PCI adapter 10/100 Mbps Ethernet port connector:** This connector attaches the Advanced System Management PCI adapter to a network hub for remote communication.
Note: The Advanced System Management PCI adapter 10/100 Mbps Ethernet connector cannot be accessed from the network operating system. The connector is dedicated to connecting your Advanced System Management PCI adapter to an Ethernet network through a service-processor interface, such as the system management software that comes with your server.
- 5 Serial port B connector:** Serial signal cables for modems and other serial devices connect here to the 9-pin serial port B connector. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.
- 6 Advanced System Management PCI adapter dual serial port connector:** This connector can be used to attach to a *Y-cable* that is shipped with your server. This Y-cable can be used to attach to a modem that is dedicated to communication with the Advanced System Management PCI adapter.
- 7 Advanced System Management Interconnect port connector:** This connector is used to attach other compatible service processors for remote access.
- 8 Advanced System Management external power connector:** This connector is not used.
- 9 Parallel port connector:** A signal cable for a parallel device, such as a printer connects here.
- 10 Video port connector:** The monitor signal cable connects here.
- 11 Universal Serial Bus connectors:** You can attach I/O devices to these two Universal Serial Bus (USB) connectors. You need a 4-pin cable to connect devices to USB 1 or 2.
Note: If a standard (non-USB) keyboard is attached to the keyboard port, the USB ports are disabled while the power-on self-test (POST) is running, and no USB devices will work during POST.
- 12 Power supply connectors:** The three system power cords connect here.
- 13 PCI expansion slots:** Your server has twelve 64-bit, PCI expansion slots. All PCI slots support hot-plug PCI adapters.
- 14 Keyboard port connector:** The keyboard cable connects here.
- 15 Mouse port connector:** The mouse cable connects here. This port sometimes is called an auxiliary-device or pointing-device port.

Chapter 3. Server power, controls, and indicators

This chapter describes how to start the server, and what the controls and indicators mean.

Turning on the server

Use the following instructions to turn on the server.

13



DANGER

Overloading an electrical circuit breaker is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, adhere to the instructions in the following statements.

- 1. If you are connecting to a 100–127 V ac power source, connect each power cord to a separate branch circuit.**
- 2. If you are connecting to a 200–240 V ac power source and the branch circuit breaker rating is:**
 - a. 13 amps or less, connect each power cord to a separate branch circuit.**
 - b. 14 amps to 19 amps, do not connect more than two power cords to the same branch circuit.**
 - c. 20 amps or greater, you may connect up to three power cords to the same branch circuit.**

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

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

Note: After you plug the power cords into outlets, wait 20 seconds before pressing the power control button. During this time, the power control button will not respond because the system management microprocessor is being initialized.

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

- The server can also be powered on by the Advanced System Management PCI adapter, Wake on LAN, Wake on Real-Time Clock Alarm, or Wake on Ring.

Note: To enable the wakeup features, you must install the appropriate software and hardware in your server. For complete details, refer to the documentation that comes with your Ethernet adapter.

Turning off the server

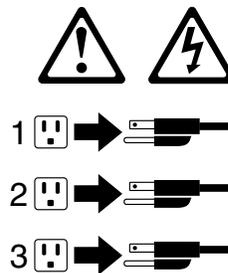
Use the following instructions to turn off the server.

5



CAUTION:

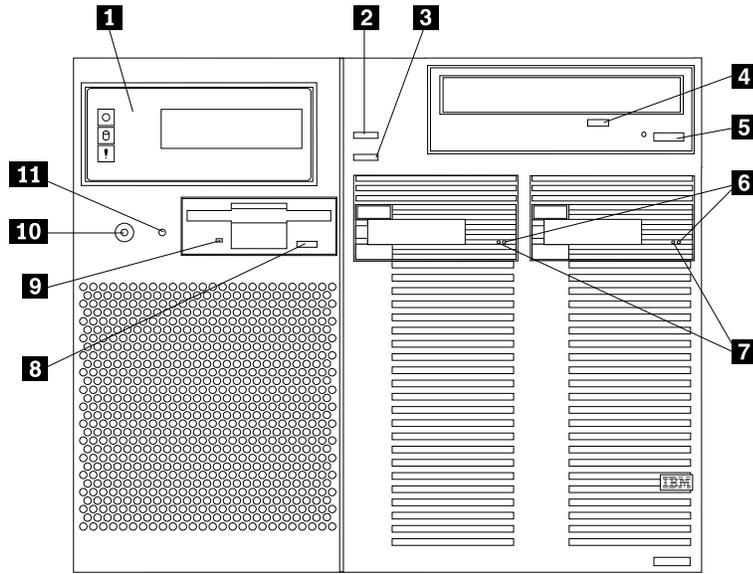
The Power Control button on the front of the server does not turn off the electrical current supplied to the server. The server also might have more than one power cord. To remove all electrical current from the server, ensure that all power cords are disconnected from the power source.



- Pressing the Power Control button causes an immediate shutdown of the server, and places the server in standby mode. This feature can be used if the operating system hangs.
Note: After turning off the server, wait at least five seconds before pressing the Power Control button to power on the server again.
- Disconnecting all of the server power cords from the electrical outlet will 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 front panel to stop flashing or illuminating.
- The server can also be powered off by the Advanced System Management PCI adapter.

Controls and indicators

The most commonly used controls and status indicators are on the front of your server.

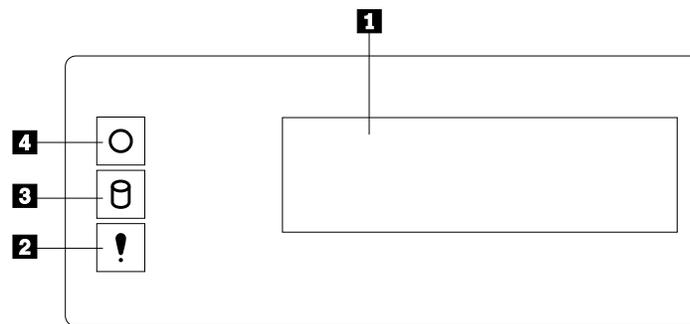


- 1 Front panel:** The lights and messages on this panel give status information for your server. See “Front panel” on page 43 for more information.
- 2 Scroll button:** Press this button to select an action to perform on a system-monitoring message; then, press the Enter button to perform the action. You can select:
 - **Keep** to retain the message on the front panel and enable the system error light to continue to flash
 - **Remind** to retain the message on the front panel and enable the system error light to flash slowly
 - **Clear** to clear the message from the front panel and enable the system error light to stop flashing
- 3 Enter button:** Press this button to perform an action on system-monitoring messages that appear on the front panel.
- 4 CD-ROM drive in-use light:** When this light is on, the CD-ROM drive is being accessed.
- 5 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.
- 6 Hard disk drive status light:** This light operates only in a ServeRAID environment. Each of the hot-swap drives has a Hard Disk Drive Status light. When the amber light for a hard disk drive 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 ServeRAID controller is identifying the drive.

- 7 Hard disk drive in-use light:** Each hot-swap hard disk drive has a Hard Disk Drive In-Use light. When the green light for a hard disk drive is on, the drive is being accessed.
- 8 Diskette-eject button:** Press this button to eject a diskette from the drive.
- 9 Diskette drive in-use light:** When this light is lit, the diskette drive is being accessed.
- 10 Power control button:** Press this button to manually turn the server on or off. See “Turning on the server” on page 39 and “Turning off the server” on page 40 for more information.
- 11 Reset button:** Press this button to reset the system and run the power-on self-test (POST).

Front panel

The front panel on the server contains status lights and system messages.



- 1 Information message panel:** System monitor information appears on this display. The Advanced System Management PCI adapter monitors system functions and generates the messages.

When the server is in standby mode (the system power supply is turned off and ac current is present), the information message panel can display system monitor information.

- 2 System error light:** This amber light is on when a system error occurs. Information about the condition displays on the information message panel.
- 3 SCSI hard disk drive in-use light:** This green light is on when there is activity on a hard disk drive.

Attention: If the System Power Light is off, it does not mean there is no electrical current present in the server. To remove all electrical current from the server, you must unplug the server power cords.

- 4 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 (ac current is present). When this light is off, it indicates either power supply failure or an ac power failure, or the power cords have been disconnected.

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” on page 46 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.

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 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 49.

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 with the systems-management software 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 370 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. <ol style="list-style-type: none">1. Verify that the keyboard and pointing devices are connected properly.2. Ensure that nothing is resting on the keyboard.3. Disconnect the pointing device; then, restart the server. If the problem goes away, replace the pointing device. If the problem remains, call for service.
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	<ol style="list-style-type: none">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 8. POST beep code descriptions

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.
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.
00019xxx	Processor <i>x</i> is not functioning or failed the built-in test	Verify that processor <i>x</i> is installed correctly. If the problem remains, replace processor <i>x</i> .
012980xx 012981xx	Data for processor <i>x</i>	Download and install the latest system BIOS level.
I9990305	POST could not find an operating system.	Install your operating system.

Table 9. 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
<i>Setup and Installation</i> CD will not start.	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• Ensure that there are no duplicate SCSI IDs or IRQ assignments.• Ensure that the hard disk drive is connected properly.
The <i>Operating System Installation</i> program continuously loops.	Free up more space on the hard disk drive.
ServerGuide will not start <i>your</i> NOS CD.	Ensure that the NOS CD you have is supported by ServerGuide. See the <i>Setup and Installation</i> 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 10. 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.

CD-ROM drive problems	Action
The CD is not working properly.	Clean the CD by wiping it with a soft, lint-free cloth, from the center of the CD to the outer edge. Do not clean in a circular pattern. This can cause loss of data. If this does not correct the problem, clean the optical-head lens. Discs for cleaning the lens are available from your place of purchase.
The CD-ROM drive tray is not working.	The server must be turned on. If the system is on and the tray does not eject, insert the end of a paper clip into the small hole (to the left of the tray eject/load button) on the front of the CD-ROM drive, and push in approximately 25.4 mm (1 in.).
The server programs do not recognize the CD-ROM drive.	Use the Configuration/Setup Utility program to verify that the CD-ROM drive is enabled.

Diskette drive problems	Action
Diskette Drive In-Use light stays on, or the system bypasses the diskette drive.	If there is a diskette in the drive, verify that: <ol style="list-style-type: none"> 1. The diskette is good and not damaged. (Try another diskette, if you have one.) 2. The diskette is inserted correctly (label up and metal-shutter end first) in the drive. 3. The diskette contains the necessary files to start the system. 4. The system is not in unattended-start mode (refer to the System Security portion of the Configuration/Setup Utility section of the <i>User's Reference</i> on the <i>IBM xSeries Documentation CD</i>). 5. The diskette drive is enabled. Check the drive startup sequence setting in the Configuration/Setup Utility program. 6. Your software program is OK (see the Software problems troubleshooting chart provided later in this section). 7. Your drive startup sequence is set correctly. <p>If the Diskette Drive In-Use light stays on, or the system continues to bypass the diskette drive, have the system serviced.</p>

Monitor problems	Action
Wavy, unreadable, rolling, distorted screen, or screen jitter.	<p>Verify that the correct device driver is properly installed.</p> <p>If the monitor self-tests show that 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.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The distance between monitors and diskette drives should be at least 76 mm (3 in.) to prevent diskette drive read/write errors. 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. See your IBM reseller or IBM marketing representative for information on the enhanced monitor cable. <p>If the problem recurs, have the monitor and system serviced.</p>
The monitor works when you turn on the system, but goes blank when you start some application programs.	<p>Verify that the primary monitor cable is connected to the video port.</p> <p>Be sure that you installed the necessary drivers for the application.</p>
Blank screen	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The server power cord is plugged into the server and a working electrical outlet. 2. The monitor power cord is plugged into the monitor and a working electrical outlet. 3. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. 4. The monitor signal cable is connected to the correct connector on the system. <p>If the items above are correct and the screen remains blank, have the system serviced.</p>
Only the cursor appears.	Have the system serviced.
Wrong characters appear on the screen.	Have the system serviced.

General problems	Action
problems such as indicator lights not working.	Have the system serviced.
System continuously restarts.	Run the diagnostic programs. If the problem recurs, have the system serviced.
Server does not respond to the Power On or Reset button.	<p>Unattended-start mode might be enabled; enter the user password to disable unattended-start mode and try again (refer to the System Security portion of the Configuration/Setup Utility section of the <i>User's Reference</i> on the <i>IBM xSeries Documentation CD</i>).</p> <p>If the server still does not respond, have the system serviced.</p>

Intermittent problems	Action
A problem occurs only occasionally and is difficult to detect.	Verify that: <ol style="list-style-type: none"> 1. All cables and cords are securely connected to the rear of the system and to attached options. 2. The last external device in each SCSI chain is terminated correctly. (Refer to the <i>User's Reference</i> on the <i>IBM xSeries Documentation</i> CD more information on SCSI termination.) If the items above are correct, have the system serviced.

Keyboard, mouse, or pointing-device problems	Action
All or some keys on the keyboard do not work.	Do the following: <ol style="list-style-type: none"> 1. Verify that the keyboard cable is properly connected to the system and that the system and the monitor are turned on. 2. Attach another keyboard to the keyboard connector. If the problem persists, have the system serviced.
The mouse or pointing device does not work.	Do the following: <ol style="list-style-type: none"> 1. Verify that the mouse or pointing-device cable is securely connected. 2. Verify that the device drivers are installed correctly. 3. Attach another mouse or pointing device to the pointing-device port. <p>Note: The pointing-device port is also known as the auxiliary-device port or mouse port.</p> If the problem recurs, have the system and the device serviced.

Memory problems	Action
The amount of memory displayed is less than the amount of memory installed.	Verify that: <ol style="list-style-type: none"> 1. The memory modules and memory boards are seated properly. 2. You have installed the correct type of memory (see "Installing DIMMs and memory boards" on page 19). 3. If you changed the memory, you must update the configuration by running the Configuration/Setup Utility program. If the above items are correct, run the memory diagnostic program. The system might have detected a defective memory module and automatically reallocated memory to enable you to continue to operate. If the memory tests fail, have the system serviced or replace the failing DIMM.

Option problems	Action
An IBM option that was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The option is designed for your server. For a list of supported options, refer to http://www.ibm.com/pc/us/compat/ on the World Wide Web. 2. You followed the installation instructions that were supplied 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. Whenever you change the memory or an option, you must update the configuration by running the Configuration/Setup Utility program. <p>If all of the above items are correct, start the diagnostic programs. If the diagnostic programs find no problem, have the system and the option serviced.</p>
An IBM option that used to work does not work now.	<p>Verify that all of the option hardware and cable connections are secure.</p> <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the items above are correct and the test programs found no problem, have the system and the option serviced.</p> <p>If the failing option is a SCSI option, verify that:</p> <ol style="list-style-type: none"> 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. (Refer to the <i>User's Reference</i> on the <i>IBM xSeries Documentation</i> CD for more information on SCSI termination.) 3. All external SCSI options are turned on. External SCSI options must be turned on before the system is turned on. <p>If the problem recurs, have the system serviced.</p>

Parallel port problems	Action
The number of parallel ports displayed is less than the number of parallel ports installed.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. Each port is assigned a unique address. 2. The parallel-port adapter, if you installed one, is seated properly. <p>If the items above are correct, have the system serviced.</p>

Serial port problems	Action
The number of serial ports displayed is less than the number of serial ports installed.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. Each port is assigned a unique address. 2. The serial-port adapter, if you installed one, is seated properly. <p>If the items above are correct, have the system serviced.</p>

Universal Serial Bus (USB) port problems	Action
The number of serial buses displayed is less than the number of serial buses installed.	Verify that: <ol style="list-style-type: none"> Each bus is assigned a unique address. The serial-port adapter, if you installed one, is seated properly. If the items above are correct, have the system serviced.
A USB device does not work.	Verify that: <ol style="list-style-type: none"> You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. <p>Note: If a standard (non-USB) keyboard is attached to the keyboard port, then the USB is disabled and no USB device will work during POST.</p> The correct USB device driver is installed. If the problem still persists, have the system serviced.

Printer problems	Action
The printer does not work.	Verify that: <ol style="list-style-type: none"> The printer is turned on and is online. The printer signal cable is connected to the correct serial or parallel port on the system. (For the location of the serial and parallel ports, see "Cabling the server" on page 36.) <p>Note: Non-IBM printer cables might cause unpredictable problems.</p> You have assigned the printer port correctly in your operating system or application program. You have assigned the printer port correctly using the Configuration/Setup Utility program. If the items above are correct and the printer still does not work, run the tests described in the manual that comes with your printer. If the tests show the printer is OK, have the system serviced.

Expansion enclosure problems	Action
The SCSI expansion enclosure used to work, but does not now work.	Verify that all of the SCSI expansion enclosure hardware and cable connections are secure. <p>Verify that:</p> <ol style="list-style-type: none"> The cables for all external SCSI options are connected correctly. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. (Refer to the <i>User's Reference</i> on the <i>IBM xSeries Documentation</i> CD for more information on SCSI termination.) 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. <p>If the SCSI expansion enclosure comes with its own test instructions, use those instructions to test it. In addition, test the power supply.</p> If the items above are correct and the test programs found no problem, have the server and SCSI expansion enclosure serviced.

Software problem	Action
Suspected software problem	<p>To determine if problems are caused by the software, verify that:</p> <ol style="list-style-type: none"> 1. Your system has the minimum memory requirements needed to use the software. Refer to the information supplied with the software to verify memory requirements. <p>Note: If you have just installed an adapter or memory, you might have a memory address conflict (see “Resolving configuration conflicts” in the <i>User’s Reference</i> on the <i>IBM xSeries Documentation CD</i>).</p> <ol style="list-style-type: none"> 2. The software is designed to operate on your system. 3. Other software works on your system. 4. The software you are using works on another system. <p>If you received any error messages when using the software program, refer to the information supplied with the software for a description of the messages and solutions to the problem.</p> <p>If the items above are correct and the problem remains, contact your place of purchase or service technician for help.</p>

Advanced System Management PCI Adapter problems	Action
The Advanced System Management PCI adapter is not working properly	<p>Disconnect the server from all electrical sources, wait for 30 seconds, and reconnect the server to the electrical sources. If the processor error LED (CR2 top) lights continuously, have your system serviced. (See the Advanced System Management PCI adapter layout in the <i>User’s Reference</i> on the <i>IBM xSeries Documentation CD</i> for the location of the processor error LED.)</p>

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 57)
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)**
(Part 1 - General Terms on page 59)
- **Worldwide Country-Unique Terms**
(Part 2 - Country-Unique Terms on page 61)

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 370

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.

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)

This Statement of 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 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 370

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.

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. 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 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.

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.

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.

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:

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:

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**.

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

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

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

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Federal Communications Commission (FCC) Statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de 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

警告使用者：
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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
6952301	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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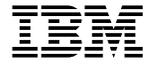
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