IBM

eserver

xSeries 330

Installation Guide

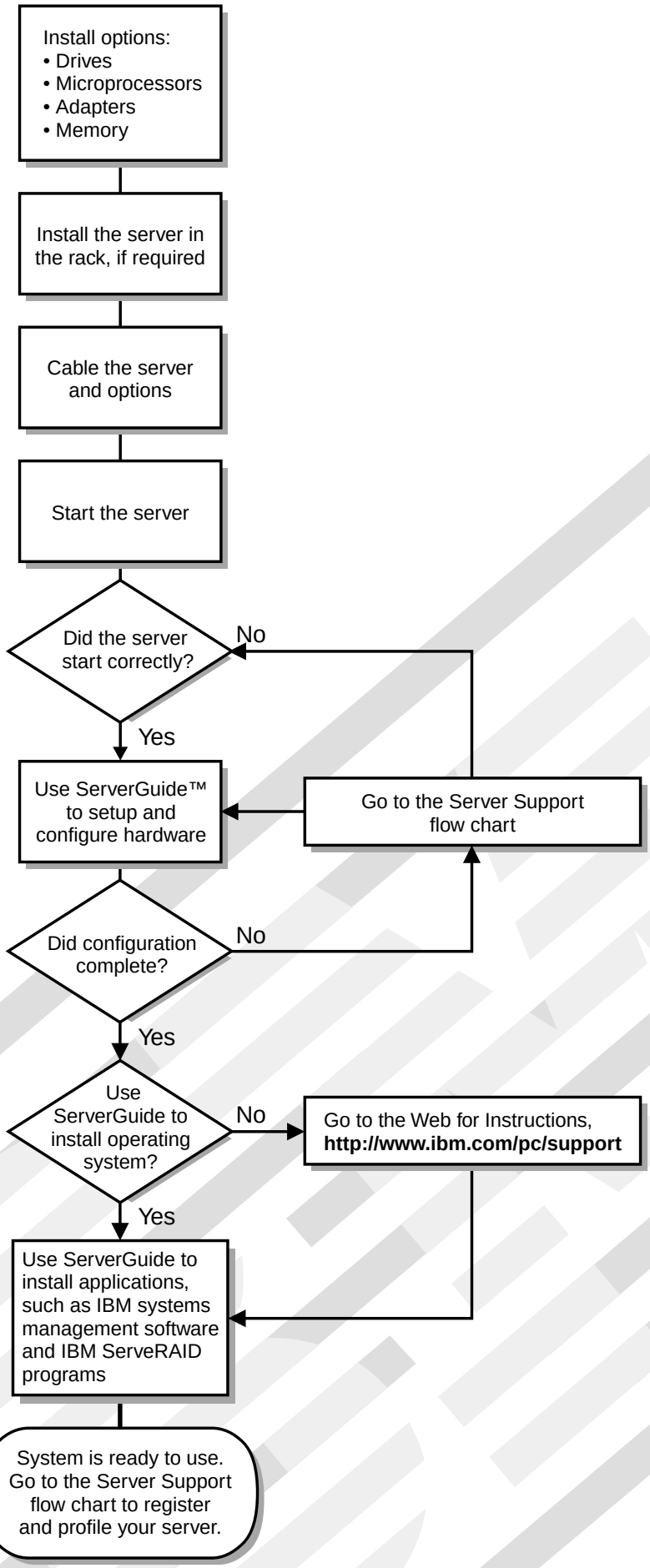
Welcome. . .

Thank you for buying an IBM xSeries server.

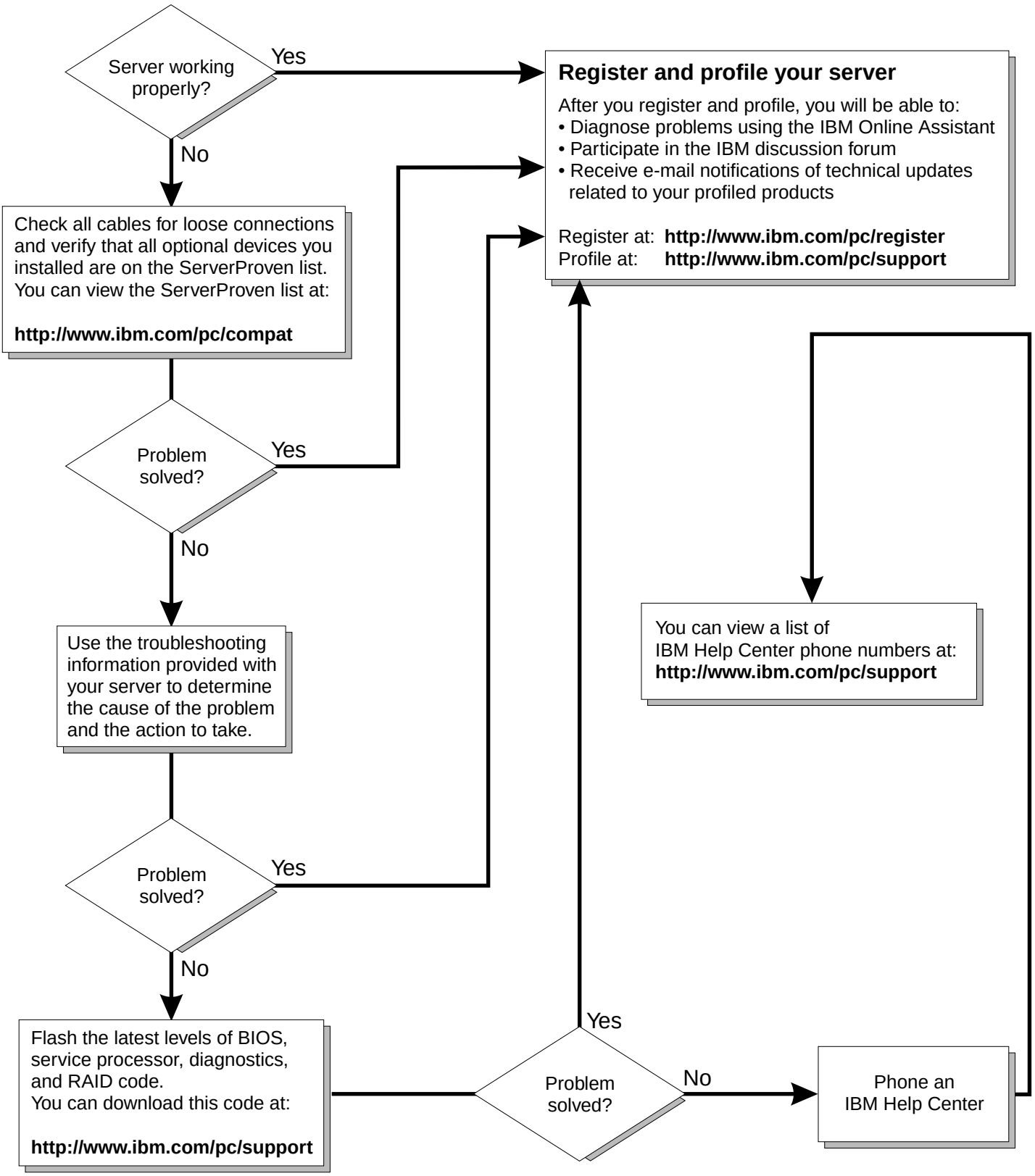
This server *Installation Guide* contains information for setting up and configuring your server.

For detailed information about your server, view the *User's Reference* on the Documentation CD.

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



Server Support



IBM® xSeries 330

Installation Guide

SC06-P455-80

Note

Before using this information and the product it supports, be sure to read the general information in "Appendix A. Product warranties and notices," page 33.

First Edition (October 2000)

Contents

Safety

Before installing this product, read the Safety Information book.

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Antes de instalar este produto, leia o Manual de Informações sobre Segurança.

安装本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

Lue Safety Information -kirjanen, ennen kuin asennat tämän tuotteen.

Avant de procéder à l'installation de ce produit, lisez le manuel Safety Information.

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

Πριν εγκαταστήσετε αυτό το προϊόν, διαβάστε το εγχειρίδιο Safety Information.

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

Prima di installare questo prodotto, leggere l'opuscolo contenente le informazioni sulla sicurezza.

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

Пред да го инсталирате овој производ прочитајте ја книгата со безбедносни информации.

Lees voordat u dit product installeert eerst het boekje met veiligheidsvoorschriften.

Les heftet om sikkerhetsinformasjon (Safety Information) før du installerer dette produktet.

Antes de instalar este produto, leia o folheto Informações sobre Segurança.

Перед установкой продукта прочтите брошюру по технике безопасности (Safety Information).

Pred inštaláciou tohto produktu si pre ítajte Informa nú brožúrku o bezpe nosti.

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

Antes de instalar este producto, lea la Información de Seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Statement 1

DANGER

Electrical current from power, telephone, and communication cables is hazardous. To avoid a shock hazard:

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

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

Statement 2

CAUTION:

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

Do not:

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

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

Statement 3

CAUTION:

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

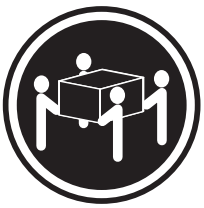
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous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

DANGER

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

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

Statement 4



≥18 kg (37 lbs) ≥32 kg (70.5 lbs) ≥55 kg (121.2 lbs)

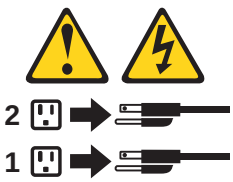
CAUTION:

Use safe practices when lifting.

Statement 5

CAUTION:

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



Statement 8

CAUTION:

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

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

Handling static devices

This is a test of the emergency

Chapter 1. Introduction

Thank you for purchasing an IBM® @server xSeries 330 server. This *Installation Guide* provides the information that is needed to:

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

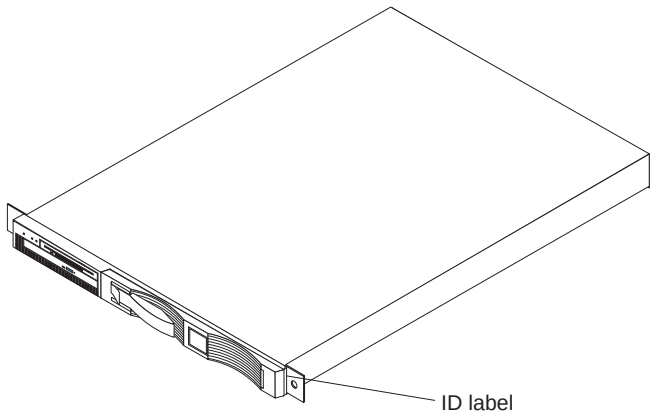
Packaged with the *Installation Guide* are software CDs that help you to configure hardware, install device drivers, and install the network operating system.

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

Your xSeries 330 server comes with a three-year limited warranty and IBM Server Start Up Support. If you have access to the World Wide Web, you can obtain up-to-date information about your xSeries 330 model and other IBM server products at http://www.ibm.com/eserver/xseries.

Record your product information in this table.	
Product name	_____
Machine type	_____
Model number	_____
Serial number	_____

The machine type, and serial number are located on the ID label located on the top of the server just behind the bezel on the right.



Features and specifications

The following table provides a summary of the features and specifications for your xSeries 330 server.

Microprocessor:

- Intel® Pentium® III microprocessor with MMX™ technology and SIMD extensions
- 256 KB Level-2 cache
- Supports up to two microprocessors

Memory:

- Standard: 256 MB
- Maximum: 4 GB
- Type: 133 MHz, ECC, SDRAM, Registered DIMMs
- Slots: 4 dual inline

Drives standard:

- Diskette: 1.44 MB
- CD-ROM: 24X IDE

Expansion bays:

- Two 3.5-inch slim high bays for LVD SCSI hard disk drives

PCI expansion slots:

- Two 33 MHz / 64-bit

Power supply:

One 200 watt (115-230 Vac)

Video:

- S3 video controller (integrated on system board)
- Compatible with SVGA
- 8 MB SDRAM video memory

Size

- Height 43.69 mm (1.72")
- Depth: 653.29 mm (25.72")
- Width: 439.93 mm (17.32")
- Weight: approximately 12.7 kg (28lb) when fully configured

Integrated functions:

- Advanced System Management processor
- One Ultra160 SCSI controller
- Two 10BASE-T / 100BASE-TX Intel Ethernet controllers
- Two Universal Serial Bus (USB) ports
- Two RS-485 Advanced System Management processor ports (one In, one Out)
- One serial port
- Two console ports (one In, one Out)

Acoustical noise emissions:

- Sound power, idling: 6.1 bel maximum
- Sound power, operating: 6.2 bel maximum

Environment:

- Air temperature:
  - Server on: 10° to 35° C (50.0° to 95.0° F). Altitude: 0 to 914 m (2998.7 ft.)
  - Server on: 10° to 32° C (50.0° to 89.6° F). Altitude: 914 m (2998.7 ft.) to 2133 m (6998.0 ft.)
  - Server off: 10° to 43° C (50.0° to 109.4° F). Maximum altitude: 2133 m (6998.0 ft.)
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%

Heat output:

Approximate heat output in British Thermal Units (BTU) per hour

- Minimum configuration: 273 BTU (80 watts)
- Maximum configuration: 751 BTU (220 watts)

Electrical input:

- Sine-wave input (50-60 Hz) required
- Input voltage low range:
  - Minimum: 100 V ac
  - Maximum: 127 V ac
- Input voltage high range:
  - Minimum: 200 V ac
  - Maximum: 240 V ac
- Input kilovolt-amperes (kVA) approximately:
  - Minimum: 0.08 kVA
  - Maximum: 0.22 kVA

Table 1. Features and Specifications

Notices used in this book

This information product contains notices that relate to a specific topic. The Caution and Danger notices also appear in the multilingual safety information provided with your product. Each safety notice is numbered for easy reference to the corresponding notices in the safety information on the documentation CD.

The following is a list of the notices and their definitions as used in this book:

- **Notes:** These notices provide important tips, guidance, or advice.
- I**mportant**: These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **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 the description of 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 the description of potentially lethal or extremely hazardous procedure step or situation.

Handling static sensitive devices

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

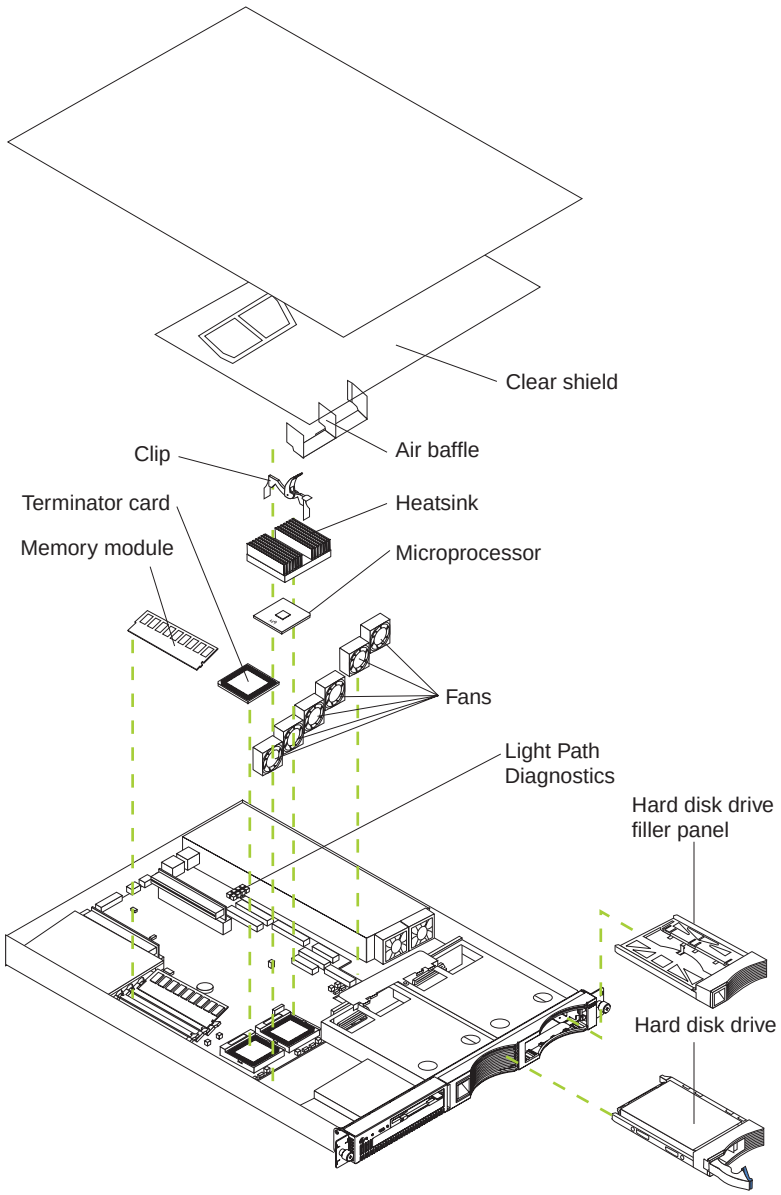
To reduce the possibility of electrostatic discharge, observe the following precautions:

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

Major components of the xSeries 330 server

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

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



Chapter 2. Installing Options

This chapter provides basic information that is needed to install hardware options in your server. For more detailed installation information, refer to the *User's Reference* on the *IBM xSeries Documentation* CD.

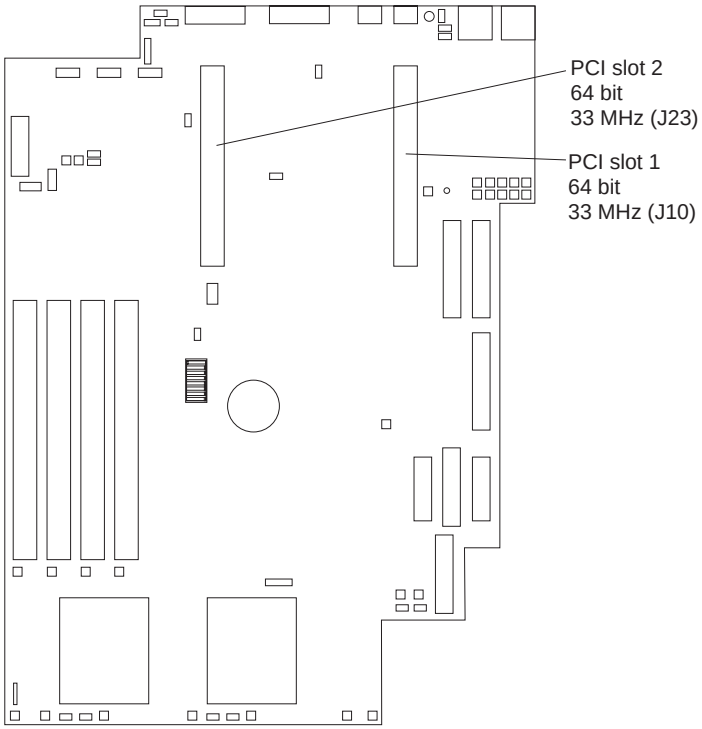
Working with adapters

Your server comes with two peripheral component interconnect (PCI) adapter slots on the system board with riser cards installed in them.

Attention: Your server comes with an integrated video controller on the system board. When you install a video adapter in a PCI slot, the server BIOS automatically disables the integrated video controller. This allows the video adapter in the PCI slot to control the video functions for your monitor.

The following illustration shows the location of the 33 MHz PCI expansion slots on the system board.

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



Adapter considerations

Before you install adapters, review the following:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change the switch settings or jumper settings on your adapter, follow the instructions that come with the adapter.
- You can install 32-bit or 64-bit full-length or half-length adapters in the expansion slots. Full-length adapters are installed in slot 1; half-length adapters are installed in either slot 1 or 2.
- Your server supports 5.0V and universal PCI adapters; it does not support 3.3V only adapters.
- Your server uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install PCI adapters that currently do not support sharing of PCI interrupts.
- PCI slots 1 and 2 and the integrated SCSI controller are on PCI bus B; the system board and all other integrated devices are on PCI bus A.

  Note: PCI bus A = bus 0; PCI bus B = bus 1.
- The system scans PCI slots 1 and 2 to assign system resources. By default, the system starts (boots) devices in the following order: System SCSI devices, then PCI devices.

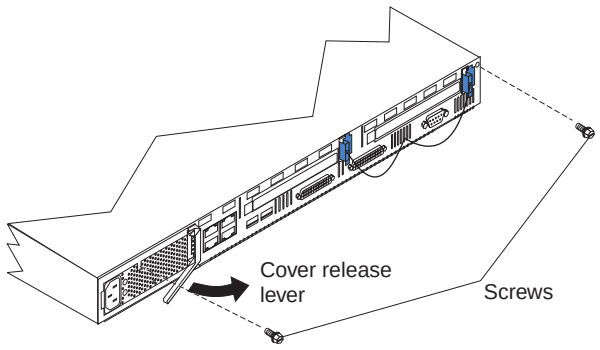
  Note: To change the boot precedence, start the Configuration/Setup Utility, select **Start Options** from the main menu. Then, select the **PCI SCSI adapter boot option**.

Installing an adapter

Complete the following steps to install an adapter:

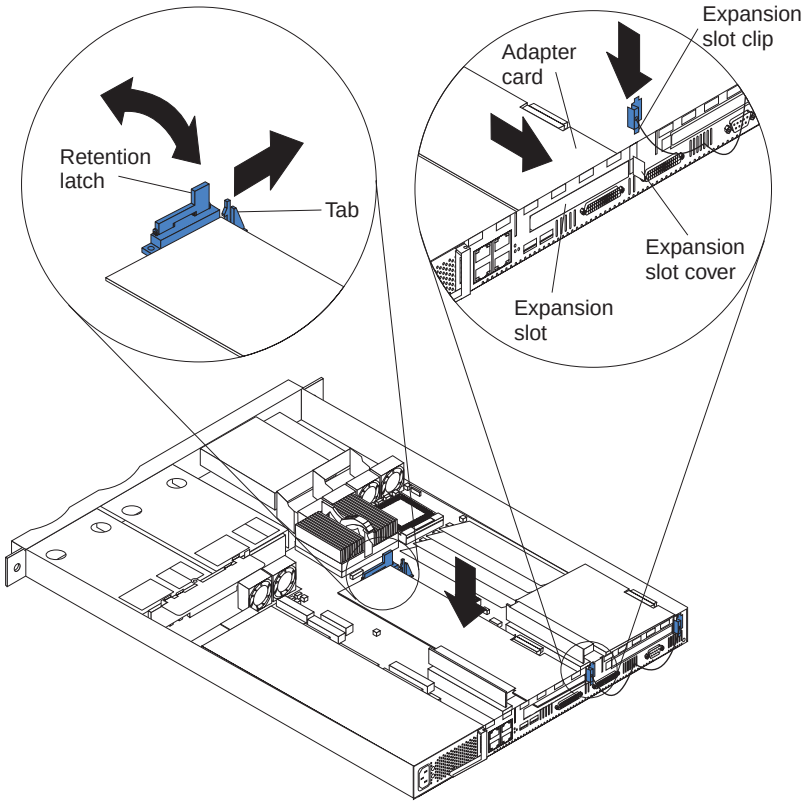
Attention: When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to "Handling static sensitive devices" on page 4.

1. Review the safety precautions beginning on page v.
2. Turn off the server and peripheral devices.
3. Remove all external cables from the server; then, remove the server from the rack and remove the cover as shown. For more information on removing the cover, refer to the *User's Reference* on the *IBM xSeries Documentation* CD.



4. Remove the expansion slot clip that holds the expansion slot cover in place by sliding it upward and off the frame of the server.

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



5. Remove the expansion-slot cover.
6. Refer to the documentation that comes with your adapter for any cabling instructions.

   Attention: You should route adapter cables before you install the adapter.

   Note: When installing a ServeRAID adapter, remove the cable from the SCSI connector (J4) on the system board and attach it to the ServeRAID adapter.
7. Set any jumpers or switches as described by the adapter manufacturer.
8. Install the adapter:

   Note: When installing an adapter into slot 2, skip steps a and d.

   a. Open the adapter retention latch by pushing the blue tab to release it. Then, push the latch up to the full open position.
   b. Carefully grasp the adapter by its top edge or upper corners, and align it with the connector on the PCI riser card.
   c. Press the adapter *firmly* into the riser-card connector.

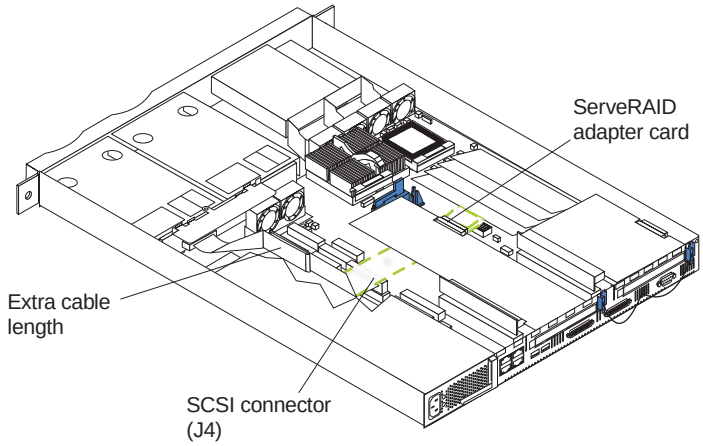
      Attention: When you install an adapter, be sure the adapter is correctly seated in the riser-card connector before you turn on the server. Improperly seated adapters might cause damage to the system board, the riser card, or the adapter.

d. Push down on the blue adapter retention latch until it clicks into place, securing the adapter.

e. Replace the expansion slot clip by sliding it down until it latches into place and holds the adapter securely.

9. Connect the internal cables to the adapter.

   Attention: Route cables so that they do not block the flow of air from the fans.



10. If you have other options to install, install them now.
11. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information on replacing the cover, refer to the *User's Reference* on the *IBM xSeries Documentation* CD.
12. Turn on the server.

Working with memory

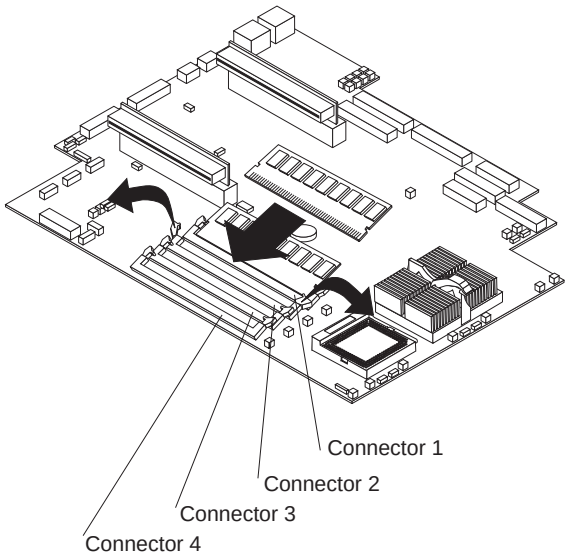
Your xSeries 330 server supports 128 MB, 256 MB, 512 MB , and 1 GB DIMMs. See the ServerProven list at http://www.ibm.com/pc/compat for a list of memory modules for use with your server.

Memory considerations

Before you install memory, review the following:

Install additional DIMMs in the following order: DIMM connector 2, then 3, then 4. (See the following illustration for memory connector locations.)

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



Installing memory modules

Complete the following steps to install a DIMM:

1. Review the safety precautions beginning on page v.
2. Turn off the server and peripheral devices.
3. Remove all external cables from the server; then, remove the server from the rack and remove the cover. For more information on removing the cover, refer to the *User's Reference* on the *IBM xSeries Documentation* CD.

   Attention: When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to "Handling static sensitive devices" on page 4.
4. If necessary, remove the PCI adapter in slot 2 for easier access to the DIMM connectors.
5. 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.
6. Install the DIMM in the connector.

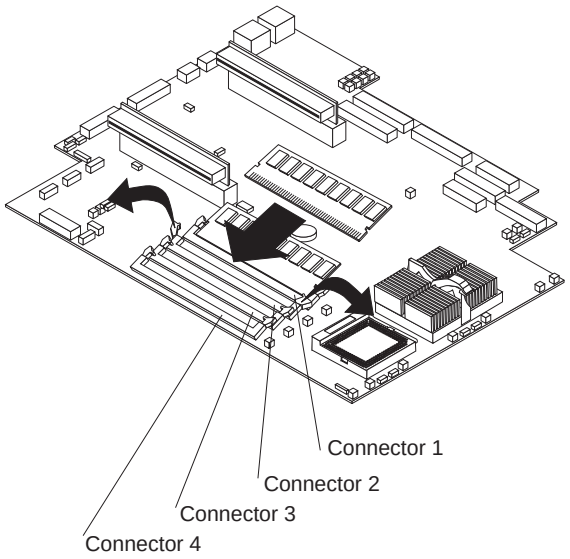
   Attention: To prevent damage to the DIMM connectors, do not force the memory module into the connector.

   a. Turn the DIMM so that the index slots align correctly with the connector.

      Note: The DIMM has two index slots, one in the center and the other on the left half of the DIMM connector edge.

   b. Insert the DIMM into the connector by pressing on both corners of the DIMM at the same time. Be sure to press it straight into the connector.

   c. When installing a memory module, be sure that no gap exists between the DIMM and the retaining clips. If a gap does exist between the memory module and the retaining clips, remove the DIMM; then, reinsert the DIMM properly.



Note: If you have other options to install, install them now.

7. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information on replacing the cover, refer to the *User's Reference* on the *IBM xSeries Documentation* CD.
8. Turn on the server.

Working with hard disk drives

Your server supports two, 1-inch (26 mm) slim 3.5-inch low voltage differential (LVD) hard disk drives. If a ServeRAID adapter configured in a RAID 1 configuration is installed in your system, you can hot swap hard disk drives.

Note: Refer to the *User's Reference* on the *IBM xSeries Documentation* CD for information on ServeRAID adapters and hot swapping hard disk drives.

Hard disk drive considerations

Before you install a hard disk drive, review the following:

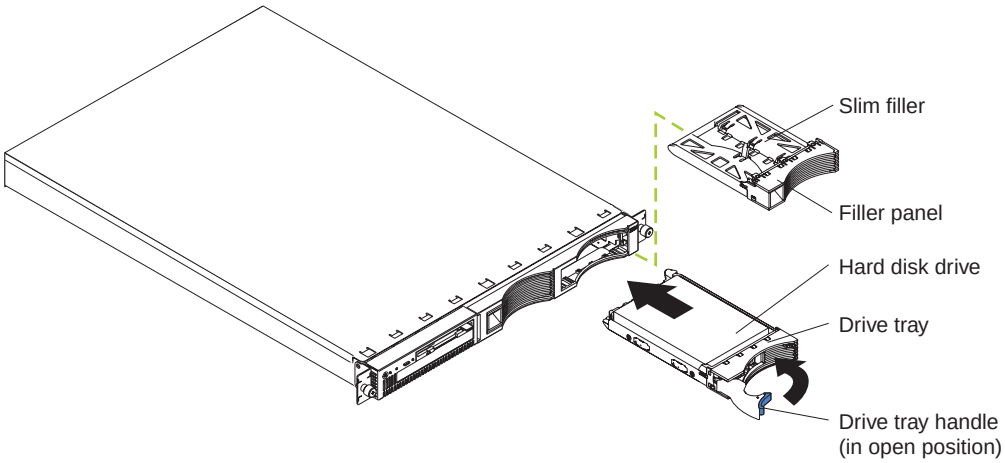
- Inspect the drive tray for any signs of damage.
- Ensure that the drive is installed properly in the tray.
- To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed in each bay.
- If your server has a ServeRAID adapter installed, refer to the documentation provided with the ServeRAID adapter for information about adding a drive.
- You can hot swap a hard disk drive only if a ServeRAID adapter configured as RAID 1 is installed in your system. If you use any other ServeRAID or SCSI configuration, you can not hot swap the hard disk drive.

  Note: For instructions on how to install and replace a hot-swap drive, refer to the documentation provided with the ServeRAID adapter and to the *User's Reference* on the *IBM xSeries Documentation* CD.

Installing a hard disk drive

Refer to the following illustration to install a hard disk drive.

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



Attention: When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to "Handling static sensitive devices" on page 4.

Complete the following steps to install or replace a hard disk drive:

1. Review the safety precautions beginning on page v.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords.

3. Remove the filler panel or defective hard drive from one of the hard disk drive bays.
4. Install the new hard disk drive in the drive bay:
   a. Ensure the tray handle is open (that is, perpendicular to the drive).
   b. Align the rails on the drive assembly with the guide rails in the drive bay.
   c. Gently push the drive assembly into the bay until the drive connects to the backplane.
   d. Push the tray handle toward the closed position until it locks the drive in place.
5. Reconnect the external cables and power cords; then, turn on the server.
6. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly. (See "Server controls and indicators" on page 25 for the location of the status indicators.)

   Notes:

   a. The green light flashes rapidly (three flashes per second) when the controller is identifying the drive.
   b. Replacing a hard disk drive is done in the same manner as installing a new hard disk drive, but you must remove the old hard disk drive first.
   c. If your server has a ServeRAID adapter installed, you can hot swap drives. For more information about hot swapping drives, refer to the documentation provided with the ServeRAID adapter and to the *User's Reference* on the *IBM Documentation* CD.

Working with microprocessors

Microprocessors are sensitive to electrostatic discharge (ESD) and should be handled with care.

Attention: When you handle electrostatic discharge sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to "Handling static sensitive devices" on page 4.

Your server comes with one or two microprocessors installed.

Servers with 1 microprocessor installed:

- Microprocessor is installed in microprocessor socket 1 (U47).
- Microprocessor supports both the startup and application processes.
- A terminator card is installed in microprocessor socket 2 (U79).

Servers with 2 microprocessors installed:

- One microprocessor is installed in microprocessor socket 1 (U47) and the second microprocessor is installed in socket 2 (U79).
- Both microprocessors share the system load.

Microprocessor considerations

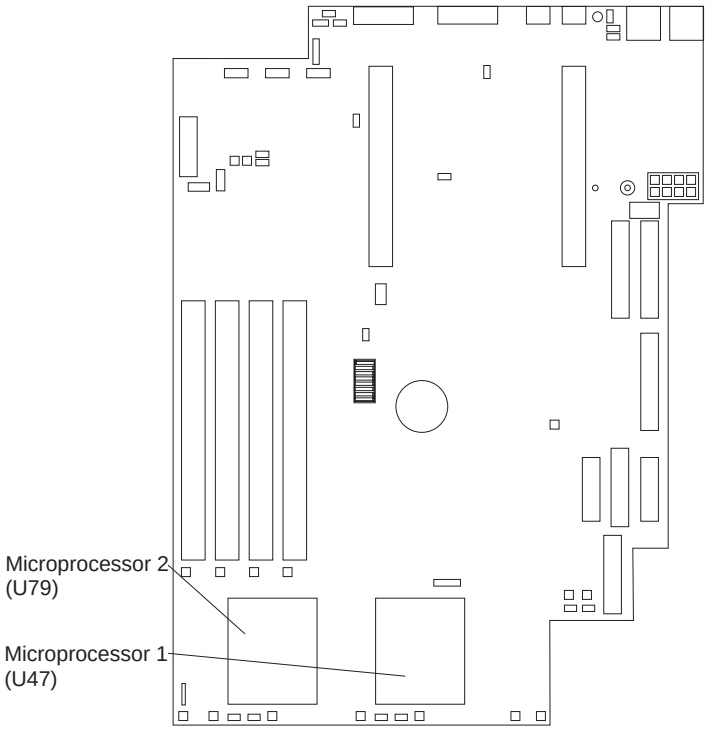
Before you install a microprocessor, review the following:

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

Installing a microprocessor

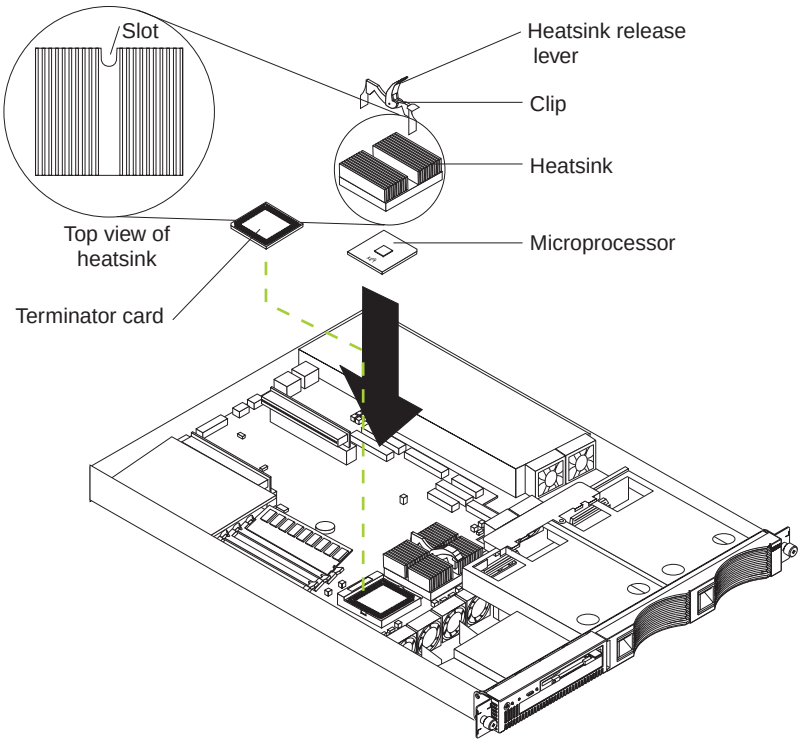
Complete the following steps to install a microprocessor:

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



Attention: To avoid damage and ensure proper server operation, install microprocessors that are the same type, and have the same cache size, and have the same clock speed. Microprocessor internal clock frequencies and external clock frequencies must be identical. See the ServerProven list at http://www.ibm.com/pc/compat for a list of microprocessors for use with your server.

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



Attention: When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to "Handling static sensitive devices" on page 4.

1. Review the safety precautions beginning on page v.
2. Turn off the server and peripheral devices.
3. Remove all external cables from the server; then, remove the server from the rack and remove the cover. For more information on removing the cover, refer to the *User's Reference* on the *IBM xSeries Documentation* CD.
4. Remove the plastic shield from the server.
5. Lift up the microprocessor release lever and remove the terminator card from the microprocessor connector.
6. Install the microprocessor in the microprocessor connector.

   Attention: To avoid bending the pins, do not use excessive force.
7. Push the release lever down to lock the microprocessor into place.
8. Install the heat sink onto the microprocessor.
9. Replace the clear shield.

   Notes:

   a. The clear shield must be installed to maintain proper air flow and cooling inside the server.

   b. If you have other options to install, install them now.
10. Replace the cover on the server; then, reinstall the server in the rack and connect all external cables. For more information on replacing the cover, refer to the *User's Reference* on the *IBM xSeries Documentation* CD.
11. Turn on the server and run the Configuration/Setup Utility program.

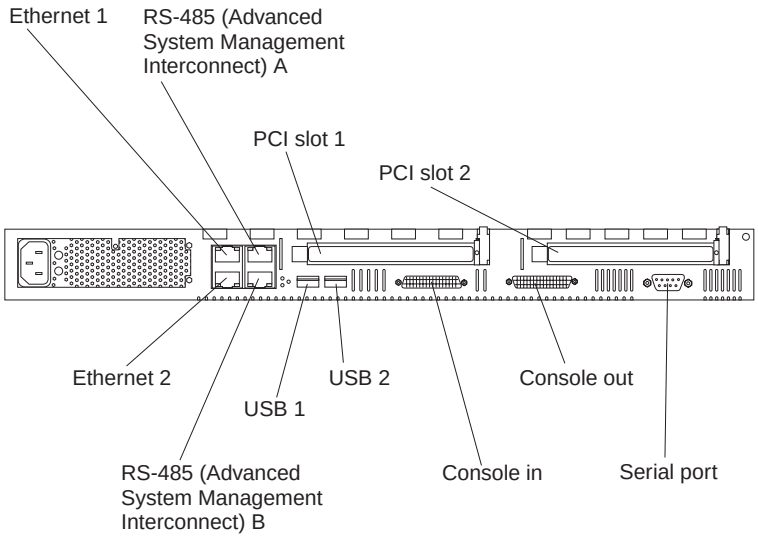
Working with cables

Your server has two different cabling options, the Advanced System Management bus (ASM) and the cable chain technology (C2T). The following sections discuss each of these options. While reading about these options, keep in mind that they are independent of each other.

Note: Refer to the following illustration to locate the connectors on the back of your server.

The ASM ports on the back of the server will be referred to in this book as RS-485 (A) and RS-485 (B).

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



Cabling the RS-485 ports

You can use the RS-485 connectors to create an Advanced System Management bus between several xSeries 330 servers.

Before you begin, review the following:

Important: The Advanced System Management bus is designed to support up to 12 units or servers. However, when using the Advanced System Management PCI adapter, the bus uses the PCI adapter as another unit. In this case, you can connect a maximum of 11 units or servers together.

- You can hot swap the cables in the Advanced System Management bus.
- You can connect up to 12 units together, if you are using serial (management) port A as your Advanced System Management port.
- When connecting an xSeries 330 server to another server type, you must install an Advanced System Management adapter in PCI slot 1 or use the serial port as your Advanced System Management port.
- Use standard cables with RJ-14 connectors.

Note: For more information about the Advanced System Management PCI adapter, refer to the documentation that came with the adapter.

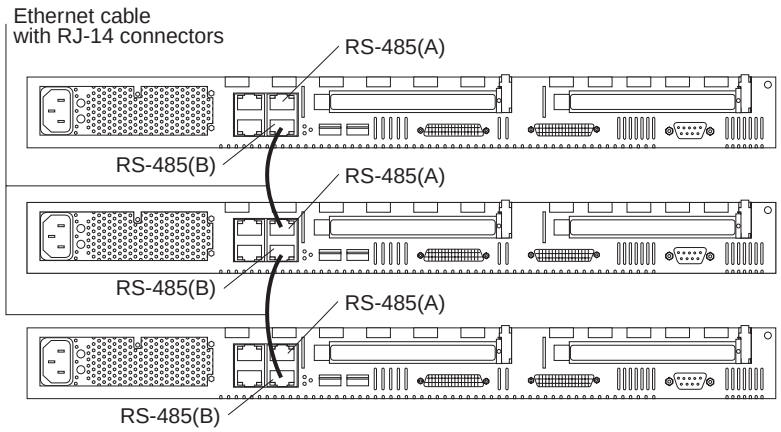
Connecting the ASM bus

The servers in the Advanced System Management (ASM) bus are referenced by their assigned addresses and not their position in the rack.

Complete the following steps to connect the ASM bus:

1. Turn off the servers.
2. Locate the RS-485 ports on the rear of the servers and several cables with RJ-14 connectors on both ends.
3. Starting at the top most server to be included in the ASM bus connect one end of the cable into the RS-485 (B) port and the other end of the cable into the RS-485 (A) port of the next server.
4. Continue connecting the servers together in this manner until you reach the second to last server in the ASM bus.
5. Connect a cable from the RS-485 (B) port of the second to last server to the RS-485 (B) port of the last server. Refer to the following illustration to see how to connect the ASM bus.

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



6. Turn on the servers.

Connecting the servers with a C2T chain

To share the same monitor, keyboard, and pointing device with several servers, you must connect the servers together with Cable Chain Technology (C2T) chaining cables through the Console (In) and Console (Out) ports.

Before you begin, review the following:

- You can connect a maximum of 40 servers with the C2T chaining cables.
- When connecting servers on two separate racks, you must use a C2T chaining cable that is 2-m (6.5 ft.) long, which is available in the C2T option cable kit.

  Note: Only one 2-m (6.5 ft.) cable can be used in the C2T chain.
- The C2T chaining cables can not be hot swapped.

  Attention: For best results, shut down the servers above and below the server being removed from or added to the chain.
- Servers are numbered by their position in the chain (1 through nn). If one server is removed from the chain, all successive servers are renumbered. For example, if the twelfth server is removed from a chain of 15 servers, then servers 13 through 15 will be renumbered to 12 through 14.
- The C2T numbering is independent of any other server reference. Changing the server position in the C2T chain will not effect its IP address.

Operational notes:

1. Server 1 (usually the server at the bottom of the rack) is the server to which you connect the C2T device break out cable.
2. Server 1 must not be turned off (powered down), for the chain to work properly.
3. If server 1 is turned off (powered down), it must be removed from the chain and replaced by the next server in the chain.
4. For the chain to operate properly, no more than two adjacent servers can be unplugged from the wall outlet at the same time.
5. If you are using a flat-panel monitor, you might need to adjust the image lock on your monitor when multiple servers are connected using C2T chaining cables. To adjust this image, select one of the middle servers in the chain by pressing the select button on the front of the server; then, adjust the image lock accordingly. For more information on how to adjust the image lock, refer to the documentation that came with your flat-panel monitor.
6. When removing or replacing servers, or changing cables in the chain, it is possible for more than one select LED to be illuminated on the servers in the chain. To clear all but the selected server LED, press the select button on any one of the servers in the chain.
7. If you turn off a selected server, you must select another server that is powered up. For the location of the select button, see page “Front view” on page 25.

Complete the following steps to connect the servers:

1. Gather several of the C2T chaining cables.

   Note: Your server comes with a short C2T chaining cable that can span approximately 3 U's, if needed. A longer C2T cable is available in the C2T cable kit.

2. Connect the servers together:

   a. Connect one end of the C2T chaining cable to the Console (Out) port of the top server.

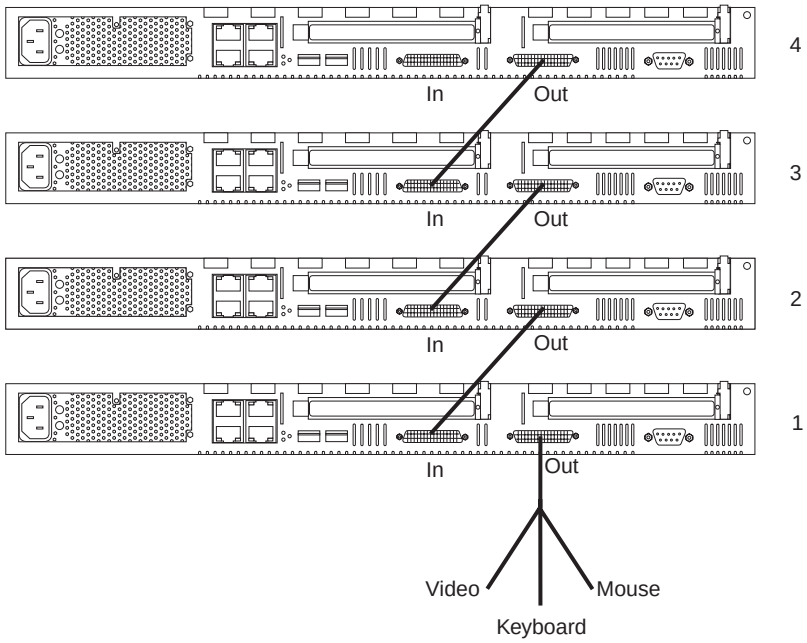
   b. Connect the opposite end of the C2T chaining cable to the Console (In) port of the server below it. Refer to the following illustration for additional information.

   c. Repeat these steps until all of the servers are connected together.

   d. Connect the C2T device break out cable to the server 1 Console (Out) port.

   Note: Server 1 (usually the server at the bottom of the rack) is the server to which you connect the device break out cable.

3. Turn the servers on and check the operation of the monitor, pointing device, and keyboard with each server. (See "Testing the C2T chain" on page 21 for testing instructions.)



Note: Write-on adhesive labels have been provided so that you can label the server position in the rack.

Testing the C2T chain

After connecting the C2T chain, you will need to test the monitor, keyboard, and pointing device to be sure that they work with each of the servers.

Follow these steps to test the C2T cabling:

1. With the servers powered up and the monitor on, press the select button on server 1 in the C2T chain.
2. Check the monitor to see if it is working.
3. Use the mouse or pointing device to open an application.
4. Test your keyboard by typing a few words within an application.
5. Repeat steps 1 through 4 for each of the servers in the chain.

Note: If you cannot use the devices, check your cable connections and retry the test. If the problem persists, turn off the servers and connect the C2T device break out cable directly to the Console (Out) port of the server. Power up the server and retry the devices. If the devices work, then you probably have a bad C2T chaining cable. Replace the cable and retry the devices in the C2T chain configuration.

Cable management

Use the cable ties and hook-and-loop straps that are supplied with your server to secure the cables.

Note: Do not secure cables too tightly. Over tightening can cause internal damage to cables.

Chapter 3. Server power, controls and indicators

This chapter describes how to turn on and turn off the server, and what the controls and indicators mean.

Turning on the server

Turning on the server refers to the act of plugging the power cord of your server into the power source and starting the operating system.

Complete the following steps to turn the server on:

1. Plug the power cord of your server into the power source.

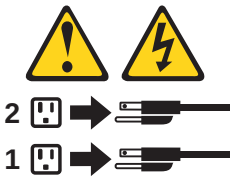
   Note: Plugging the power cord into a power source may cause the server to start automatically. This is an acceptable action.

2. Wait 30 seconds then press the power control button on the front of the server.

Statement 5

CAUTION:

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



Turning off the server

Turning off the server refers to the act of disconnecting the server from the power source.

Complete the following steps to turn off the server:

1. Refer to your operating system documentation for the proper procedure to shut down the operating system.

   Note: Each operating system is different. Some will allow an immediate shut down, while others require an orderly shut-down procedure.

2. Press the power control button on the front of the server. This will put the server in stand-by mode.
3. Disconnect the server from the power source.

   Note: After you turn off the server, wait at least 5 seconds before you turn on the server again.

Stand-by mode

Stand-by puts the server in a wait state. When in a wait state, the server is not running the operating system, and all core logic is shut down except for the service processor.

Complete the following steps to put the server into the stand-by mode:

1. Refer to your operating system documentation for the proper procedure to shut-down the operating system.

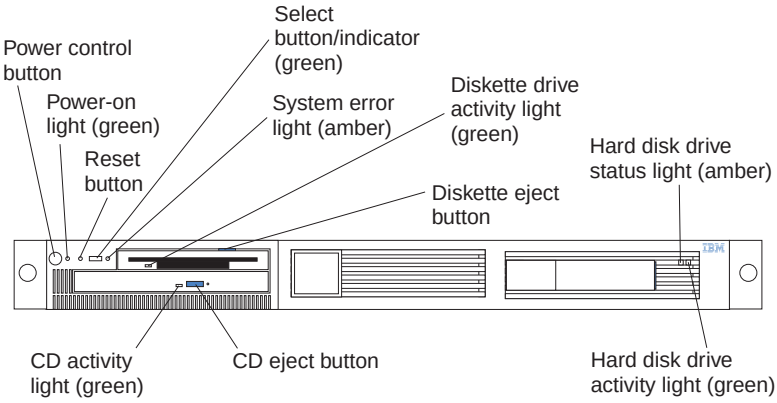
   Note: Each operating system is different. Read all the documentation about shutting down the operating system before continuing.

2. Press the power control button on the front of the server.

Server controls and indicators

This section identifies the controls and indicators on the front and the back of your server.

Front view



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

Power-on light: This green LED lights and stays on when you turn on your server and blinks when the server is in stand-by mode.

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

Select button/indicator: Press this button to select the server in the C2T chain. The green LED on this button lights when the monitor, keyboard, and mouse are logically connected to this server.

System-error light: This amber LED lights when a system error occurs. An LED on the Light Path Diagnostic panel on the system board will also be on to further isolate the error.

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

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

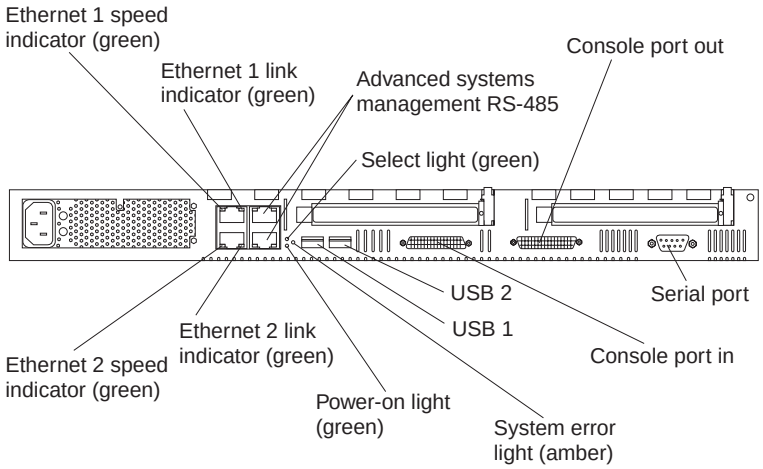
Hard disk drive status light: Each of the hot-swap drives has a hard disk drive status light. When this amber LED is on continuously, the drive has failed. This status light is active only with a ServeRAID adapter installed in the server.

Hard disk drive activity light: Each of the hot-swap drives has a Hard Disk Activity light. When this green LED is flashing, the controller is accessing the drive.

CD eject button: Push this button to release a CD from the drive.

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

Rear view



Ethernet 1 speed indicator: This green LED lights when the speed of the Ethernet LAN that is connected to Ethernet port 1 is 100 Mbps.

Ethernet 1 link indicator: This green LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 1.

Advanced system management: The RS-485 ports are used for creating a system management bus between several servers.

Select light: This green LED lights when the monitor, keyboard, and mouse are logically connected to this server. This light duplicates the Select button LED on the front of the server.

Console port out: This port is used to connect the server to a keyboard, monitor, and pointing device. It is also used to connect multiple servers together to share a single keyboard, monitor, and pointing device.

Serial port: Signal cables for modems or other serial devices connect here to the 9-pin serial port connector.

Console port in: This port is used to connect multiple servers together to share a single keyboard, monitor, and pointing device.

USB 2: Universal Serial Bus 2

USB 1: Universal Serial Bus 1

System-error light: This amber LED lights when a system error occurs. An LED on the Light Path Diagnostic panel on the system board will also be on to further isolate the error. This light duplicates the system error light on the front of the server.

Power-on light: This green LED lights and stays on when you turn on your server and will blink when the server is in standby mode. This light duplicates the power on light on the front of the server.

Ethernet 2 link indicator: This green LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 2.

Ethernet 2 speed indicator: This green LED lights when the speed of the Ethernet LAN connected to Ethernet port 2 is 100 Mbps.

Chapter 4. Configuring your server

The following configuration programs are provided with your server:

- **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 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.

- **PXE Boot Agent Utility**

  The Preboot eXecution Environment (PXE) Boot Agent Utility program is part of the *basic input/output system* (*BIOS*) code that comes with your server. You can use this program to change network boot protocols and boot order, to select OS wake up support, and to set menu wait times.

- **ServerGuide CDs**

  The ServerGuide CDs include software setup and installation tools specifically designed for IBM servers. You can use these CDs during the initial installation of your server to configure the server hardware and simplify your network operating system installation. The ServerGuide CDs also contain a collection of application programs, which you can install after your server is up and running. See “Using the ServerGuide CDs” on page 28 for more detailed information.

- **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.

  Note: Refer to the *User’s Reference* on the *IBM xSeries Documentation* CD for detailed instructions for using the configuration programs.

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 32.

1. Insert the *Setup and Installation* CD, and restart the server.
2. Follow the on-screen instructions to:
   a. Select your language.
   b. Select your keyboard layout and country.
   c. View the overview to learn about ServerGuide features.
   d. View the README file to review installation tips about your 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

Your server includes IBM system management software. This system management software is a comprehensive set of hardware management utilities. These utilities enable you to manage industry-standard, Intel-processor-based, server, desktop, workstation, and notebook systems over network operating systems from Microsoft, SCO, Novell, and IBM. These utilities support multiple protocols, including TCP/IP, IPX, NetBIOS, SNA, SLIP, and HTTP. This robust set of systems management software tools delivers comprehensive local and remote system control over the entire life cycle of the system.

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 in the *User's Reference* on the *IBM xSeries Documentation* CD and the "Server Support" flowchart in the front of this booklet for additional information.

Diagnostic tools overview

The following tools are available to help you identify and resolve hardware-related problems:

- **Beep codes and error messages**

  The power-on self-test (POST) generates beep codes to indicate successful test completion or the detection of a problem.

  — One beep indicates successful completion of POST.
  — More than one beep indicates that POST detected a problem. Error messages also appear during startup if POST detects a hardware-configuration problem.

  See "POST beep code descriptions" on page 30 and "POST error messages" on page 30 for more information.

- **Troubleshooting chart**

  This chart lists problem symptoms and suggested steps to correct the problems. See the "Troubleshooting charts" on page 33 for more information.

- **Event or error logs**

  The system event or error log contains all error messages that are issued during POST and all system status messages from the Advanced System Management Processor.

  To view the contents of the error logs, start the Configuration/Setup Utility program; then, select **Event/Error Logs** from the main menu.

- **Diagnostic programs and error messages**

  The server diagnostic programs are stored in the read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of your server.

  Note: Refer to the "Solving Problems" section in the *User's Reference* on the *IBM xSeries Documentation* CD for more detailed information about the diagnostic programs.

- **Light Path Diagnostics**

  The Light Path Diagnostics is used to quickly identify system errors. For more information about the Light Path Diagnostic refer to the "Solving Problems" section in the *User's Reference on the IBM xSeries Documentation* CD.

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.

Note: Refer to the "Solving Problems" section in the *User's Reference* on the *IBM Documentation CD* for more detailed information about the POST beep codes.

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.
Repeating short	The system board might contain a failing component. 1. Verify that the keyboard and pointing devices are connected properly. 2. Ensure that nothing is resting on the keyboard. 3. Disconnect the pointing device; then, restart the server. If the problem goes away, replace the pointing device. If the problem remains, call for service.
One long and one short	If the video controller on the system board is being used, call for service. If you installed an optional video adapter, replace the failing adapter.
One long and two short	A video I/O adapter ROM is not readable, or the video subsystem is defective. If you installed an optional video adapter, replace the failing adapter. If the problem remains, call for service.
One long and three short	The system-board video subsystem has not detected a monitor connection to the server. Ensure that the monitor is connected to the server. If the problem persists, replace the monitor.
Two long and two short	POST does not support the optional video adapter. Replace the optional video adapter with one that is supported by the server or use the integrated video controller.
All other beep codes	1. Verify that the system memory modules are installed correctly. 2. Turn off the server; then, restart the server. If the problem remains, call for service.

Table 2. Post beep code descriptions

POST error messages

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

Note: Refer to the "Solving Problems" section in the *User's Reference* on the *IBM xSeries Documentation* CD for more detailed information about 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.
11*xx*	Serial port error	Verify that the serial cable is connected correctly.
1162	Serial port configuration conflict	Start the Configuration / Setup program and ensure that the IRQ and I / O port assignments needed by the serial port are available.
1601	Service Processor update needed	Download and install the latest system Service Processor level.
1800	PCI adapter hardware interrupt	Start the Configuration / Setup program and verify that the interrupt resource settings are correct.
1801	PCI adapter out of ROM space error	Remove a PCI adapter or disable a PCI device in the Configuration / Setup program.
2400 2462	Video controller and memory	Verify that the monitor is connected correctly.
00019*xxx*	Microprocessor *x is* not functioning or failed the built-in test	Verify that microprocessor *x* is installed correctly. If the problem remains, replace microprocessor *x*.
00180*xxx*	A PCI adapter requested a resource that is not available	Start the Configuration / Setup program and ensure that the resources needed by the PCI adapter are available.
012980*xx* 012981*xx*	Data for microprocessor *x*	Download and install the latest version of the system BIOS.
01298200	Microprocessor speed mismatch	Install microprocessors with identical speeds.
I9990305	POST could not find an operating system.	Install your operating system.

Table 3. Post error messages

ServerGuide startup problems

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

Setup	Suggested action
Setup and Installation CD will not start.	• Ensure that the system is a supported server with a startable (bootable) CD-ROM drive. • If the startup (boot) sequence settings have been altered, be sure the CD-ROM is first in the boot sequence.
ServeRAID program cannot view all installed drives - or - cannot install NOS.	• Ensure that there are no duplicate SCSI IDs or IRQ assignments. • Ensure that the hard disk drive is connected properly.
The *Operating System Installation* program continuously loops.	Free up more space on the hard disk drive.
ServerGuide will not start *your* NOS CD.	Ensure that the NOS CD you have is supported by ServerGuide. See the *Setup and Installation* CD label for a list of NOS versions supported.
Cannot install NOS - option is grayed out.	Either there is no logical drive defined (ServeRAID systems) or the ServerGuide system partition is not present. Run the server guide setup and configuration program and ensure that setup is complete

Table 4. ServerGuide startup problems

System updates and applications CD	Suggested action
Get "time out" or "Unknown host" errors	Ensure that you have access to the Internet through FTP directly.

Table 5. System updates and applications CD

Troubleshooting charts

You can use the troubleshooting charts in this section to find solutions to problems that have definite symptoms.

Attention: If diagnostic error messages appear that are not listed in the following tables, make sure that your server has the latest levels of BIOS, ServeRAID, and diagnostics microcode installed.

Look for the symptom in the left column of the chart. Instructions and probable solutions to the problem are in the right column. If you have just added new software or a new option and your server is not working, do the following before using the troubleshooting charts:

- Remove the software or device that you just added.
- Run the diagnostic tests to determine if your server is running correctly.
- Reinstall the new software or new device.

CD-ROM drive	Suggested action
CD-ROM drive is not recognized.	Verify that: 1. The primary IDE channel is enabled in the Configuration/Setup Utility program. 2. All cables and jumpers are installed correctly. 3. The correct device driver is installed for the CD-ROM drive.
Diskette drive	**Suggested 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: 1. The diskette drive is enabled in the Configuration/Setup Utility program. 2. The diskette is good and not damaged. (Try another diskette if you have one.) 3. The diskette contains the necessary files to start the server. 4. Your software program is OK. If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, call for service.
Expansion enclosure problems	**Suggested action**
The SCSI expansion enclosure used to work, but does not work now.	Verify that: 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. For more information, see your SCSI and expansion enclosure documentation.
General problems	**Suggested action**
Problems such as broken cover locks or indicator lights not working.	Call for service.
Intermittent problems	**Suggested action**
A problem occurs only occasionally and is difficult to detect.	Verify that: 1. All cables and cords are connected securely to the rear of the server and attached options. 2. When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no air flow, the fan is not working. This causes the server to overheat and shut down. 3. Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. If the items above are correct, call for service.

Table 6. Troubleshooting charts

Keyboard, mouse, or pointing-device problems.	Suggested action
All or some keys on the keyboard do not work.	1. Make sure that the keyboard cable is properly connected to the C2T device breakout cable. 2. Make sure that the C2T device breakout cable is properly connected to the server. 3. Make sure that the server and the monitor are turned on. 4. Try using another keyboard. **Note:** If you are using the C2T chain, refer to . If the items above are correct, call for service.
The mouse or pointing device does not work.	1. Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly. 2. Try using another mouse or pointing device. **Note:** If you are using the C2T chain, refer to "Testing the C2T chain" on page 21. If the problem remains, call for service.
Memory problems	**Suggested actions**
The amount of memory displayed is less than the amount of memory installed.	Verify that: 1. The memory modules are seated properly. 2. You have installed the correct type of memory. 3. If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. 4. All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. Look in the POST error log for error message 289: • If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If the DIMM was disabled by the user or by POST: 1. Start the Configuration/Setup Utility program. 2. Enable the DIMM. 3. Save the configuration and restart the server. • If you continue to get this error, replace the DIMM. If the problem persists, call for service.

Keyboard, mouse, or pointing-device problems.	Suggested action
All or some keys on the keyboard do not work.	1. Make sure that the keyboard cable is properly connected to the C2T device breakout cable. 2. Make sure that the C2T device breakout cable is properly connected to the server. 3. Make sure that the server and the monitor are turned on. 4. Try using another keyboard. **Note:** If you are using the C2T chain, refer to "Testing the C2T chain" on page 21. If the items above are correct, call for service.
The mouse or pointing device does not work.	1. Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly. 2. Try using another mouse or pointing device. **Note:** If you are using the C2T chain, refer to "Testing the C2T chain" on page 21. If the problem remains, call for service.
Memory problems	**Suggested action**
The amount of memory displayed is less than the amount of memory installed.	Verify that: 1. The memory modules are seated properly. 2. You have installed the correct type of memory. 3. If you changed the memory, you updated the memory configuration with the Configuration / Setup Utility program. 4. All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. Look in the POST error log for error message 289: • If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If the DIMM was disabled by the user or by POST: 1. Start the Configuration / Setup Utility program. 2. Enable the DIMM. 3. Save the configuration and restart the server. • If you continue to get this error, replace the DIMM. If the problem persists, call for service.
Microprocessor problems	**Suggested action**
The server emits a continuous tone during POST.	The startup (boot) microprocessor is not working properly. Verify that the startup microprocessor is seated properly. If it is, replace the startup microprocessor. If the problem remains, call for service.

Monitor problems	Suggested action
Testing the monitor.	Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, refer to the information that comes with the monitor for adjusting and testing instructions. If you still cannot find the problem, call for service.
The screen is blank.	Verify that: 1. The server power cord is plugged into the server and a working electrical outlet. 2. The monitor cables are connected properly. 3. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. If the servers are C2T chained together, verify that: 1. The C2T chain cables are securely connected to the servers. 2. The C2T breakout cable is connected properly. 3. A powered-up server is selected. **Attention:** In some memory configurations, the **3-3-3** beep code might sound during POST followed by a blank display screen. If this occurs and the **Boot Fail Count** feature in the Start Options of the Configuration/Setup Utility is set to Enabled (its default setting), you must restart the server three times to force the system BIOS to reset the memory connector or bank of connectors from Disabled to Enabled. If the items above are correct and the screen remains blank, call for service.
Only the cursor appears.	Call for service.
The monitor works when you turn on the server, but goes blank when you start some application programs.	Verify that: 1. The primary monitor cable is connected to the C2T device breakout cable. 2. You installed the necessary device drivers for the applications. If the items above are correct and the screen remains blank, call for service.
Wavy, unreadable, rolling, distorted screen, or screen jitter.	If the monitor self-tests show the monitor is OK, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. **Notes:** 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, see your IBM reseller or IBM marketing representative. If the problem remains, call for service.
Wrong characters appear on the screen.	If the wrong language is displayed, update the BIOS with the correct language. If the problem remains, call for service.

Option problems	Suggested action
An IBM option that was just installed does not work.	Verify that: 1. The option is designed for the server. Refer to the "Support for Servers" flowchart for information about obtaining ServerProven™ compatibility information from the World Wide Web. 2. You followed the installation instructions that came with the option. 3. The option is installed correctly. 4. You have not loosened any other installed options or cables. 5. You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. If the problem remains, call for service.
Power problems	**Suggested action**
The server does not power on.	Verify that: 1. The power cables are properly connected to the server. 2. The electrical outlets are operating properly. 3. The type of memory installed is correct. 4. If you have just installed adapter, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports. If the problem still exists, call for service.
Serial port problems	**Suggested action**
The number of serial ports identified by the operating system is less than the number of serial ports installed.	Verify that: 1. Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports are disabled. **Note:** The Management connector is the same as a serial port connector, but it is used only by the integrated Advanced System Management Processor, and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured using Netfinity Manager. 2. The serial-port adapter, if you installed one, is seated properly. If the problem still exists, call for service.
A serial device does not work. For more information about the serial port see the *User's Reference* on the *IBM xSeries Documentation* CD.	Verify that: 1. The device is compatible with the server. 2. The serial port is enabled and is assigned a unique address. 3. Make sure that the device is not connected to the management port C. **Note:** The management C connector is the same as a serial port connector, but it is used only by the integrated Advanced System Management Processor and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured using Netfinity Manager. If the problem still exists, call for service.

Software problem	Suggested action
Suspected software problem.	To determine if problems are caused by the software, verify that: 1. Your server has the minimum memory requirements needed to use the software. For memory requirements, refer to the information that comes with the software. **Note:** If you have just installed an adapter or memory, you might have a memory address conflict. 2. The software is designed to operate on your server. 3. Other software works on your server. 4. The software that you are using works on another system. If you received any error messages when using the software program, refer to the information that comes with the software for a description of the messages and solutions to the problem. If the items above are correct and the problem remains, contact your place of purchase.
Universal Serial Bus (USB) port problems	**Suggested action**
A USB device does not work.	Verify that: 1. You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. **Note:** If a standard (non-USB) keyboard is attached to the keyboard port, then the USB is disabled and no USB device will work during POST. 2. The correct USB device driver is installed. 3. Your operating system supports USB devices. If the problem still exists, call for service.

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 all countries. 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)**

  ("IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)")

- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)**

  ("IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 – General Terms)" on page 44)

- **Worldwide Country-Unique Terms**

  ("Part 2 - Worldwide Country-Unique Terms" on page 46)

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 330

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. 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 330

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 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.

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, LESOTHOAND 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 fulfills 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:
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IBM power cord part number	Used in these countries and regions
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13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, 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, Cyprus, Dubai, Fiji, Ghana, Hong Kong, 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
6952300	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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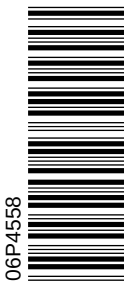

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