IBM ®

@server

xSeries 330
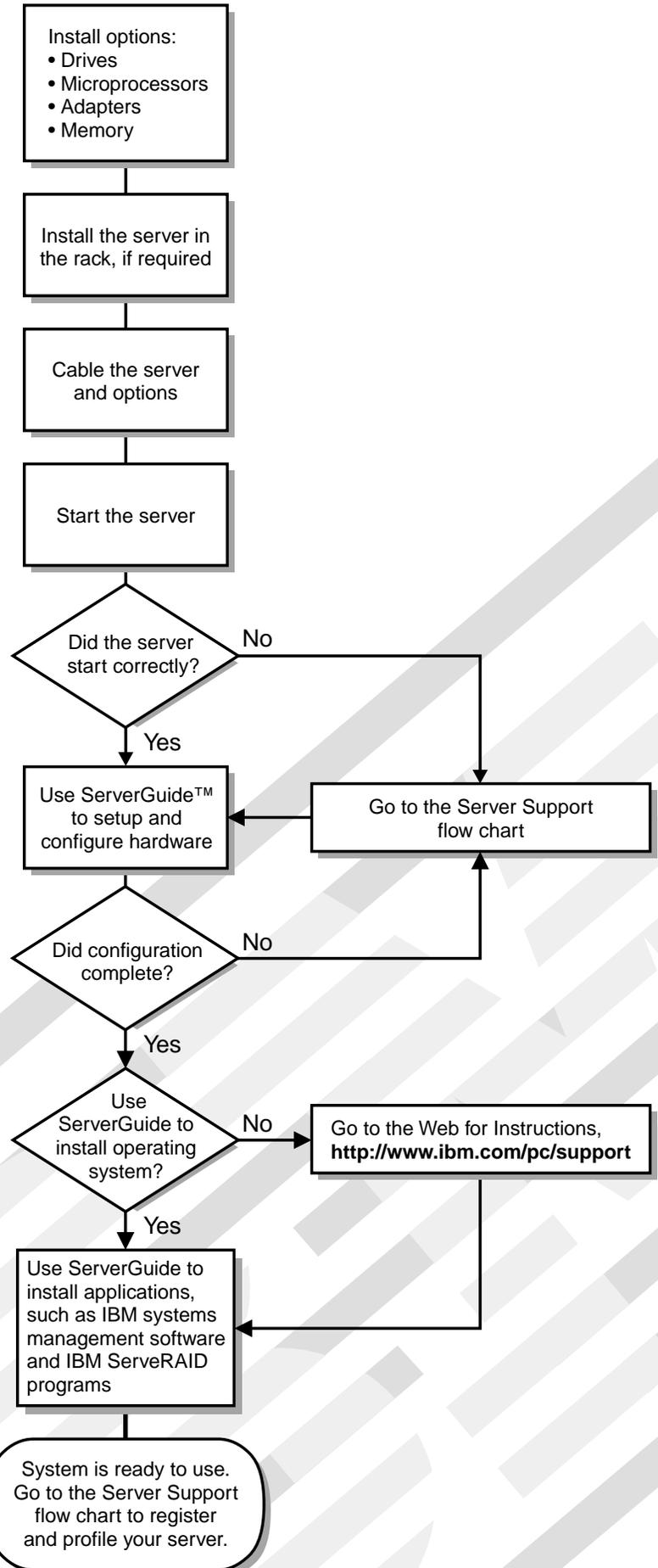## Type 8674

Installation Guide

Welcome. . .

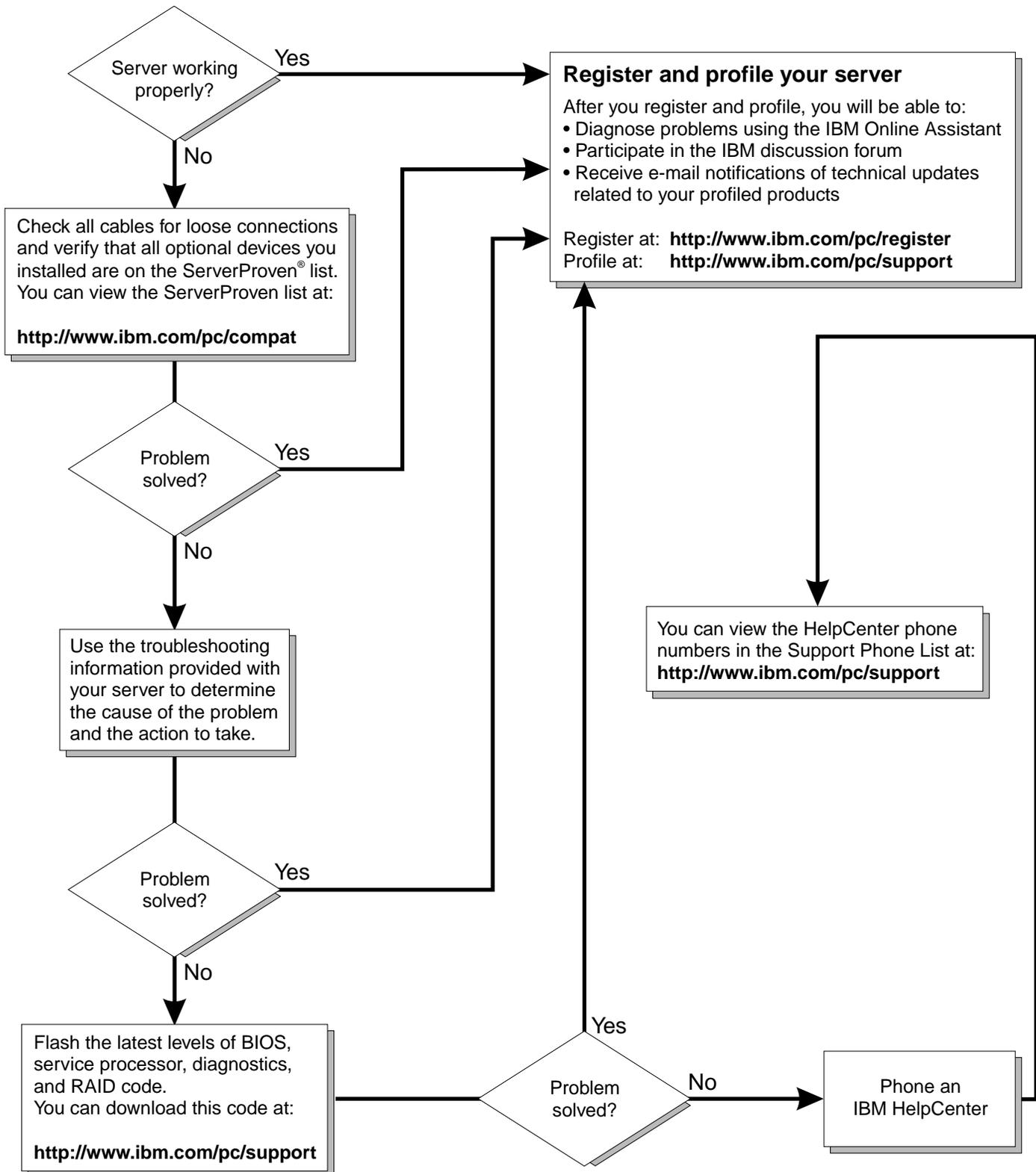Thank you for buying an
IBM xSeries server.

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

Install options:
• Drives
• Microprocessors
• Adapters
• Memory

↓

Install the server in
the rack, if required

↓

Cable the server
and options

↓

Start the server

↓

Did the server
start correctly? —— No ——→ Go to the Server Support
flow chart

Yes ↓

Use ServerGuide™
to setup and
configure hardware ←——

↓

Did configuration
complete? —— No ——→

Yes ↓

Use
ServerGuide to
install operating
system? —— No ——→ Go to the Web for Instructions,
http://www.ibm.com/pc/support

Yes ↓

Use ServerGuide to
install applications,
such as IBM systems
management software
and IBM ServeRAID
programs ←——

↓

System is ready to use.
Go to the Server Support
flow chart to register
and profile your server.

Server Support

Server working properly? — Yes →

Register and profile your server

After you register and profile, you will be able to:
- Diagnose problems using the IBM Online Assistant
- Participate in the IBM discussion forum
- Receive e-mail notifications of technical updates related to your profiled products

Register at: **http://www.ibm.com/pc/register**
Profile at: **http://www.ibm.com/pc/support**

Server working properly? — No ↓

Check all cables for loose connections and verify that all optional devices you installed are on the ServerProven® list. You can view the ServerProven list at:

http://www.ibm.com/pc/compat

Problem solved? — Yes →

Problem solved? — No ↓

Use the troubleshooting information provided with your server to determine the cause of the problem and the action to take.

Problem solved? — Yes →

Problem solved? — No ↓

Flash the latest levels of BIOS, service processor, diagnostics, and RAID code.
You can download this code at:

http://www.ibm.com/pc/support

→ **Problem solved?** — Yes ↑ / No →

You can view the HelpCenter phone numbers in the Support Phone List at:
http://www.ibm.com/pc/support

Phone an IBM HelpCenter

IBM® xSeries 330

IBM

Installation Guide

> **Note:**
>
> Before using this information and the product it supports, be sure to read the general information in Appendix 1, "Product warranty and notices," on page 45.

Contents

Safety

Before installing this product, read the Safety Information.

مج، يجب قراءة   دات السلامة

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

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.**
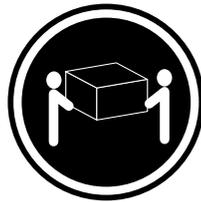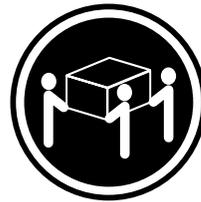
DANGER

> **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) |
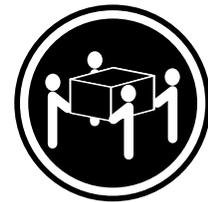
CAUTION:

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.

2

1
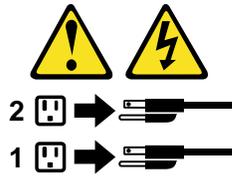
Statement 8

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.

Chapter 1. Introduction

Thank you for purchasing an IBM® @server xSeries 330. 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.

If you have access to the World Wide Web, you can obtain up-to-date information about your xSeries 330 server and other IBM server products at http://www.ibm.com/eserver/xseries.

Record your product information in this table.
Product name _____
Machine type _____
M**odel number** _____
Serial number _____

The machine type and serial number are located on the ID label located on the right edge of the bezel on the server as shown in the following illustration. You will need these numbers when you register your server with IBM.

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

ID label
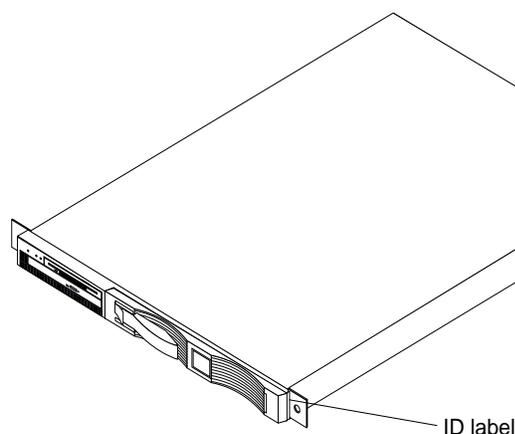
Features and specifications

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

Table 1. Features and Specifications.

Microprocessor:	Size	Environment:
• Intel® Pentium® III microprocessor with MMX™ technology and SIMD extensions • 133 MHz Front-Side Bus (FSB) • 512 KB Level-2 cache • Supports up to two microprocessors	• Height 43.69 mm (1.72 in.) • Depth: 653.29 mm (25.72 in.) • Width: 439.93 mm (17.32 in.) • Weight: approximately 12.7 kg (28 lb) when fully configured	• 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)
Memory:	**Integrated functions:**	• Humidity:
• Standard: 256 MB • Maximum: 4 GB • Type: 133 MHz, ECC, SDRAM, registered DIMMs • Slots: Four dual inline	• Advanced System Management (ASM) processor with support for IBM Remote Supervisor adapter • One Ultra160 SCSI controller • Two 10BASE-T/100BASE-TX Intel Ethernet controllers with Wake on LAN™ (WOL) support • Two Universal Serial Bus (USB) ports • Two RS-485 Advanced System Management processor ports (one In, one Out) • One serial port • Two cable chaining technology (C2T) ports (one In, one Out)	— Server on: 8% to 80% — Server off: 8% to 80%
Drives standard:		**Heat output:**
• Diskette: 1.44 MB • CD-ROM: 24X IDE		Approximate heat output in British thermal units (Btu) per hour • Minimum configuration: 273 Btu (80 watts) • Maximum configuration: 751 Btu (220 watts)
Expansion bays:		**Electrical input:**
Two 3.5-inch slim high bays for hard disk drives	**Acoustical noise emissions:**	• Sine-wave input (50-60 Hz) required
PCI expansion slots:	• Sound power, idling: 6.1 bel maximum • Sound power, operating: 6.1 bel maximum • Sound pressure, idling: 47 decibels • Sound pressure, operating: 47 decibels	• Input voltage low range: — Minimum: 100 V ac — Maximum: 127 V ac
Two 33 MHz/64-bit		• Input voltage high range: — Minimum: 200 V ac — Maximum: 240 V ac
Power supply:		• Input kilovolt-amperes (kVA) approximately: — Minimum: 0.08 kVA — Maximum: 0.22 kVA
One 200 watt (115-230 V ac)		
Video:		
• S3 Savage4 PRO Graphics/Video Accelerator (integrated on system board) • Compatible with SVGA • 8 MB SDRAM video memory		

Notices and statements used in this book

This information product contains notices and statements that relate to a specific topic. The Caution and Danger statements also appear in the multilingual safety information provided with your product. Each safety statement is numbered for easy reference to the corresponding statements in the safety information on the IBM *xSeries 330 Documentation* CD.

The notice and statements definitions are as follows:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate possible damage to programs, devices, or data. An attention statement is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Before you begin

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

- Become familiar with the information provided in "Safety" on page v and "Handling static-sensitive devices". These guidelines will help you work safely while working with your server options.
- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and any other options that you intend to install.
- Back up all important data before you make changes to disk drives.
- For a list of supported options for the xSeries 330, refer to http://www.ibm.com/pc/compat on the World Wide Web.

Handling static-sensitive devices

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

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

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.

- While the device is still in its static-protective package, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body.)

- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it in its static-protective package. Do not place the device on your system unit cover or on a metal table.

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

Major components of the xSeries 330

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

Clear shield

Clip

Air baffle

Terminator card

Heatsink

Memory module

Microprocessor

Fans

Light Path
Diagnostics panel

Hard disk drive
filler panel

Hard disk drive
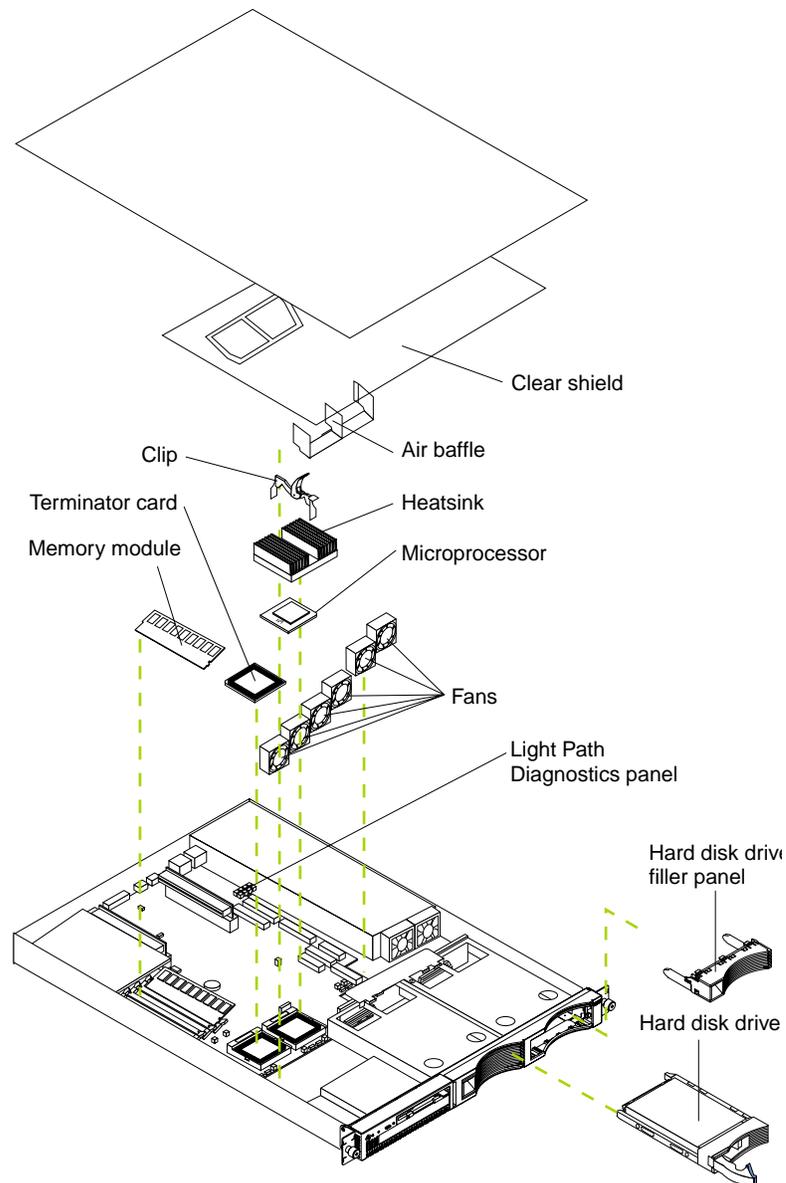
Chapter 2. Installing options

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

Removing the cover

Use the following procedure to remove the cover.

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 two screws on the rear of the server.
4. Pull the cover-release lever back.
5. Slide the cover off the server.
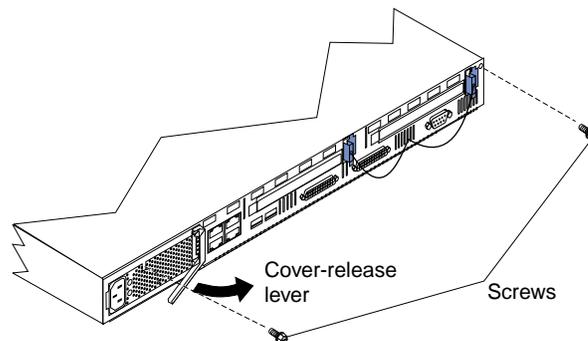
Note: You might need to remove the clear plastic shield to reach some parts in the server. For proper cooling and airflow, replace the clear plastic shield before replacing the cover.

Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the cover removed might damage server components.

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 enables 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.

PCI slot 2
64 bit
33 MHz (J23)

PCI slot 1
64 bit
33 MHz (J10)
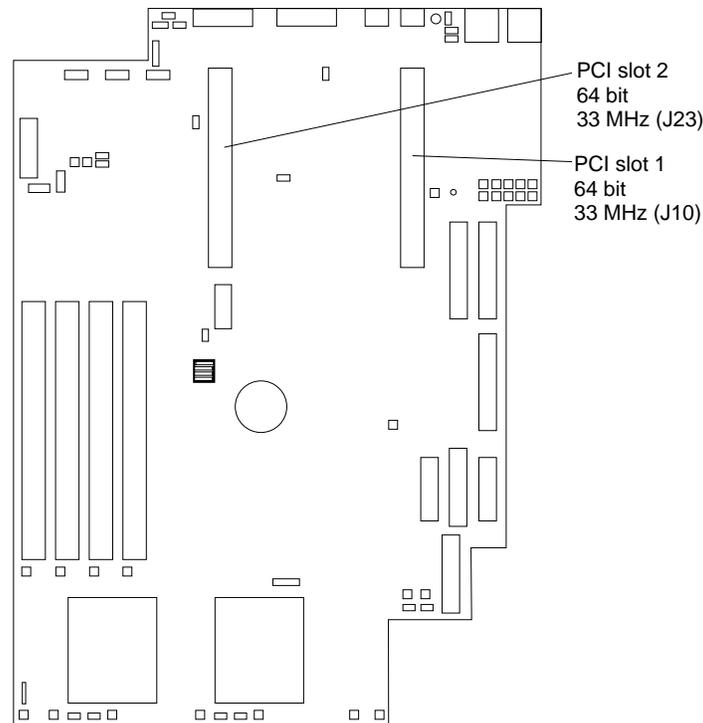
Adapter considerations

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 5.0 V and universal PCI adapters; it does not support 3.3 V only adapters.

- Your server uses a rotational interrupt technique to configure PCI adapters. You can use this technique to 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 is bus 0; PCI bus B is 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 IDE and SCSI devices, then PCI devices.

  Note: To change the startup order, start the Configuration/Setup Utility program, and 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 static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see "Handling static-sensitive devices" on page 3.

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 cover. For detailed instructions to remove the cover, see "Removing the cover" on page 5.

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.
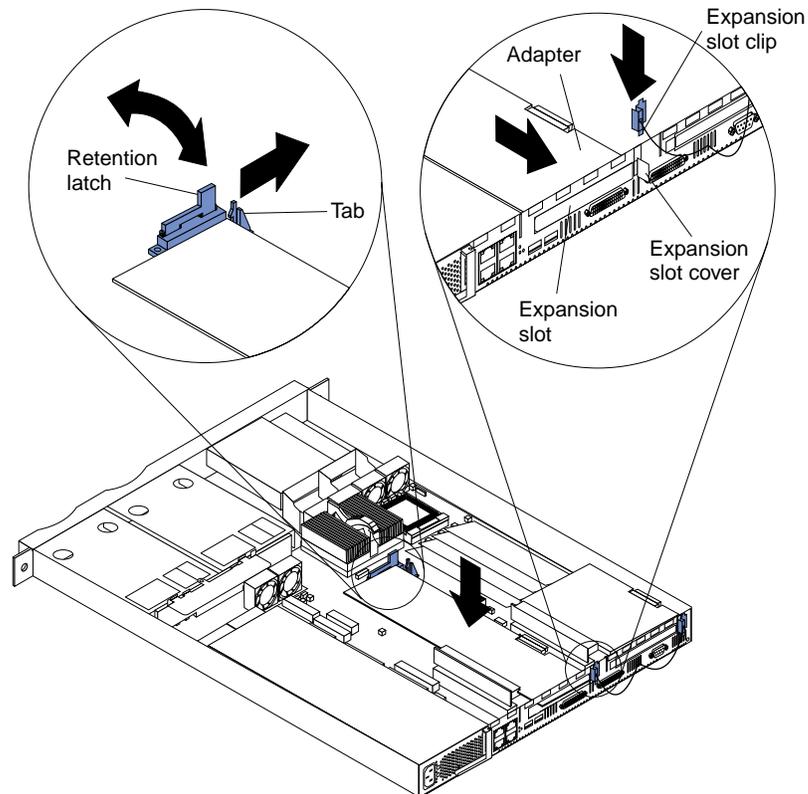
5. Remove the expansion-slot cover.

6. See the documentation that comes with your adapter for any cabling instructions for internal cables.

   Notes:

   a. Route internal adapter cables before you install the adapter.

   b. If you are installing a ServeRAID adapter and want it to control the internal hard disk drive, 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:

   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 that 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.
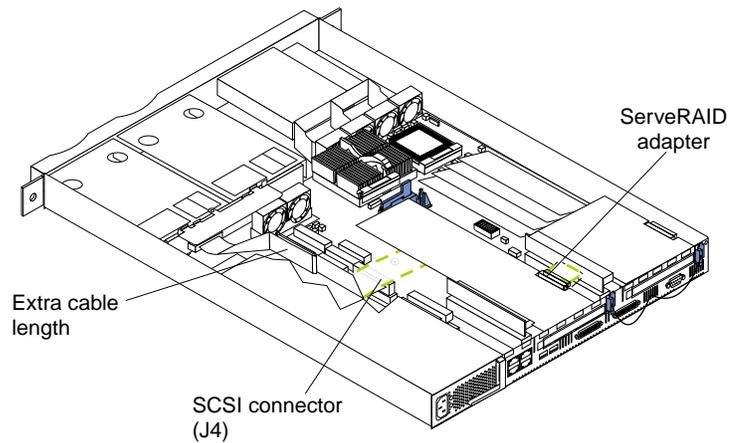
10. If you have other options to install, install them now. Otherwise, continue with "Installing the cover" on page 14.

Working with memory

Your xSeries 330 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

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

Connector 1

Connector 2

Connector 3

Connector 4
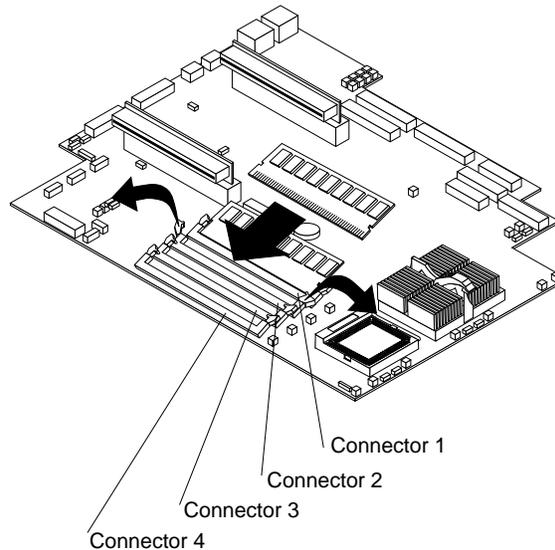
Installing memory modules

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 cover. For more information on removing the cover, see "Removing the cover" on page 5.

   Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see "Handling static-sensitive devices" on page 3.

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. Do not force the memory module into the connector.

   Notes:

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

   b. 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. See the illustration on page 8.

6. Turn the DIMM so that the index slots align correctly with the connector, and 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.

7. If you have other options to install, install them now. Otherwise, continue with "Installing the cover" on page 14.

Working with hard disk drives

Your server supports two 26-mm (1-in.), slim, 3.5-inch hard disk drives. If a ServeRAID adapter in a RAID 1 configuration and a hot-swap SCSI backplane are installed in your server, you can hot-swap hard disk drives.

Note: See the *User's Reference* and the ServeRAID documentation 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 2 minutes without either a drive or a filler panel installed in each bay.

- If your server has a ServeRAID adapter installed, see 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 that is configured as RAID 1 is installed in your system. If you use any other ServeRAID or SCSI configuration, you cannot hot-swap the hard disk drive.

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

Installing a hard disk drive

Some models of the xSeries 330 come with a non-hot-swap hard disk drive. Some models come with empty drive bays and a SCSI backplane. The xSeries 330 supports both hot-swap and non-hot-swap hard disk drives. Use the instructions that are appropriate for the type of hard disk drive that you intend to install. If you are installing a non-hot-swap hard disk drive, see "Installing a non-hot-swap hard disk drive". If you are installing a hot-swap hard disk drive, see "Installing a hot-swap SCSI hard disk drive" on page 11.

Installing a non-hot-swap hard disk drive

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

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see "Handling static-sensitive devices" on page 3.

Note: A hard disk drive is replaced in the same manner as a new hard disk drive is installed, but you must remove the old hard disk drive first.

1. Review the safety precautions beginning on page v.

2. If you are installing a SCSI hard disk drive, set the drive identification number to 0 or 1, depending on the configuration of your server. If you are installing an IDE hard disk drive, configure the hard disk drive as the primary (master) drive or the secondary (subordinate) drive. See the documentation that comes with the drive for instructions.

3. Turn off the server and peripheral devices, and disconnect all external cables and power cords.

4. Remove all external cables from the server; then, remove the server cover and the clear plastic shield. For more information on removing the cover, see "Removing the cover" on page 5.

5. Remove the filler panel or defective hard disk drive from one of the hard disk drive bays.

6. Install the new hard disk drive in the drive bay:

    a. Slide the drive into the bay, with the screw holes facing up, and align the screw holes in the drive with the screw holes in the server chassis.

    b. Use a screwdriver to insert the screw into the drive and secure it to the server chassis.

       Note: You might have to hold the drive up and in place to carefully align the drive with the screw holes in the chassis.

Filler panel

Hard disk drive

    c. Connect signal and power cables to the rear of the drive. Be sure to keep the signal and power cables clear of the path of the fans behind the drive bay.

7. Replace the clear plastic shield.

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

8. If you have other options to install, install them now. Otherwise, continue with "Installing the cover" on page 14.

Installing a hot-swap SCSI hard disk drive

Complete the following steps to install or replace a hot-swap SCSI hard disk drive:
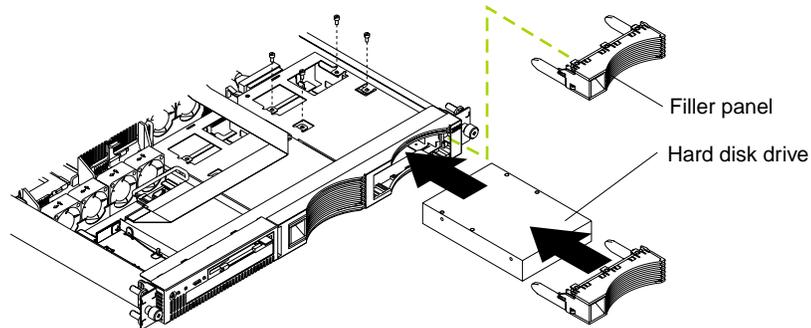
Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see "Handling static-sensitive devices" on page 3.

Notes:

1. A hard disk drive is replaced in the same manner as a new hard disk drive is installed, but you must remove the old hard disk drive first.

2. If your server has a ServeRAID adapter and a SCSI backplane installed, you can hot-swap SCSI drives. For more information about hot-swapping drives, see the documentation provided with the ServeRAID adapter and the *User's Reference* on the *IBM Documentation* CD.

1. Review the safety precautions beginning on page v.

2. Remove the filler panel from one of the hard disk drive bays.

3.   Install the new hard disk drive in the drive bay:

   a.   Ensure that 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.   Carefully 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.

Filler panel

Hard disk drive

Drive tray

Drive tray handle (in open position)
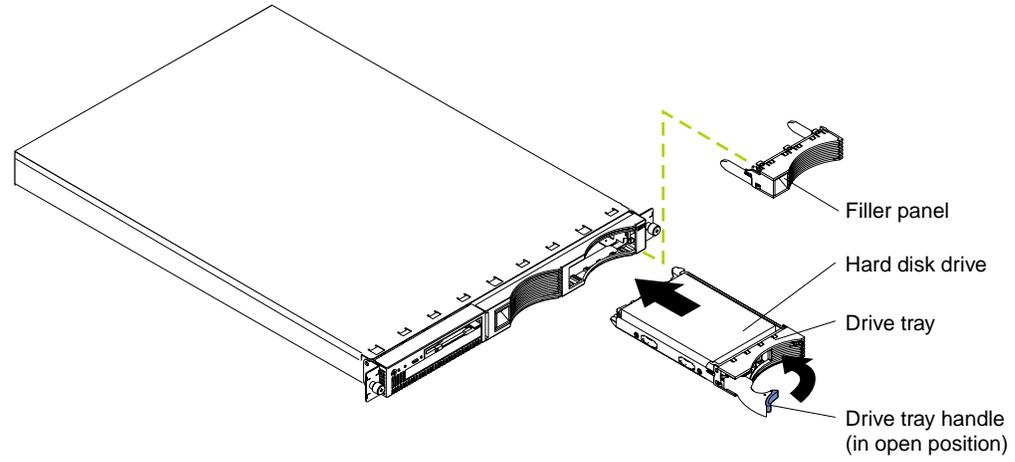
4.   Reconnect the external cables and power cords; then, turn on the server.

Working with microprocessors

Your server comes with one or two microprocessors installed. The following illustration will help you locate the microprocessor on the system board of your server.

Microprocessor 2 (U79)

Microprocessor 1 (U47)
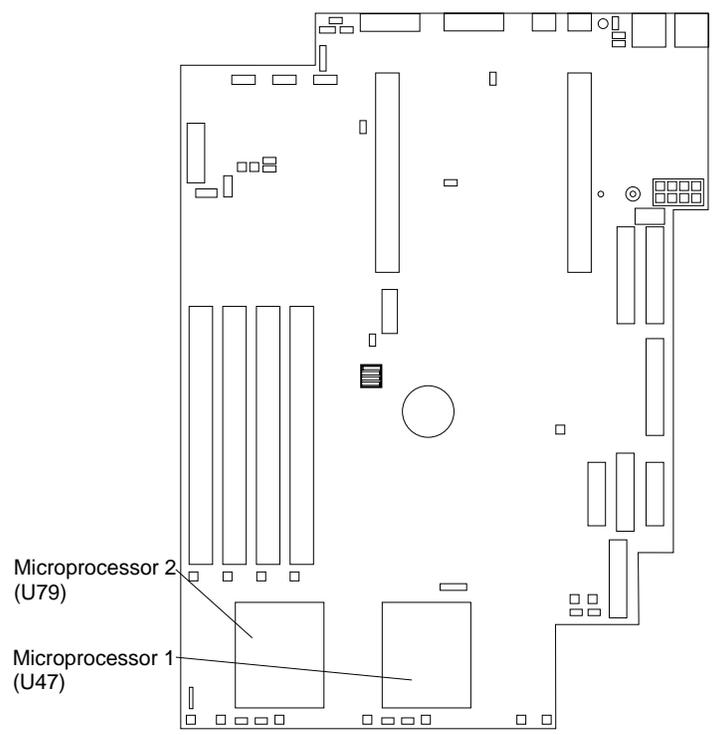
Servers with one microprocessor installed:

- 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 two 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.

Complete the following steps to install a microprocessor:

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

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

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see "Handling static-sensitive devices" on page 3.

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 cover. For more information on removing the cover, see "Removing the cover" on page 5.
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.

   a. Peel the plastic protective strip off the bottom of the heat sink. Make sure that the square of thermal material is still on the bottom of the heat sink.

   b. Align and place the heat sink on top of the microprocessor.

      Note: Locate the slot in the channel of the heat sink. Orient the heat sink so that the slot will be at the rear of the server.

   c. Align and place the clip over the heat sink; then, snap the clip into place over the heat sink with the heat sink release lever in the up position.

      Note: If you remove the microprocessor later, remember to install the terminator card in the appropriate microprocessor connector.

   d. When the clip is in place, press the heat-sink lever down into the locked position.
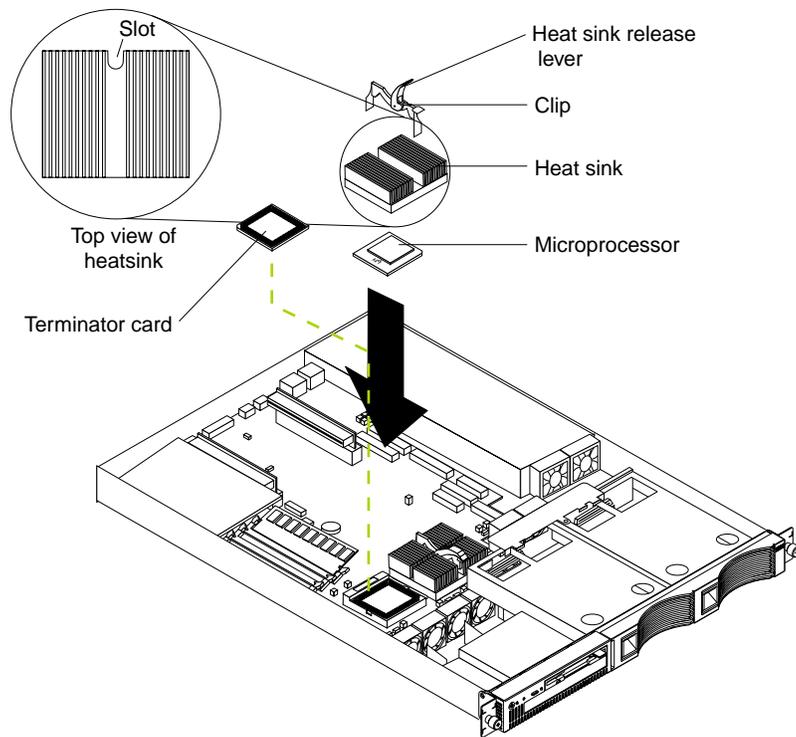
9. Replace the clear shield.

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

10. If you have other options to install, install them now. Otherwise, continue with "Installing the cover".

Installing the cover

Complete the following steps to install the server cover:

1. Clear any cables that might impede the replacement of the clear shield or the cover.

2. Install the clear shield, if it was removed.

   Attention: Before sliding the cover forward, make sure that all of the tabs on the cover will engage the ledge at the front of the server properly. If all the tabs do not engage the ledge properly, it will be extremely difficult to remove the cover later.

3. Install the cover by placing it into position and sliding it forward. Make sure that the cover engages the tabs at the front and rear of the server.

4. Install the screws and secure the cover as shown.

Screws
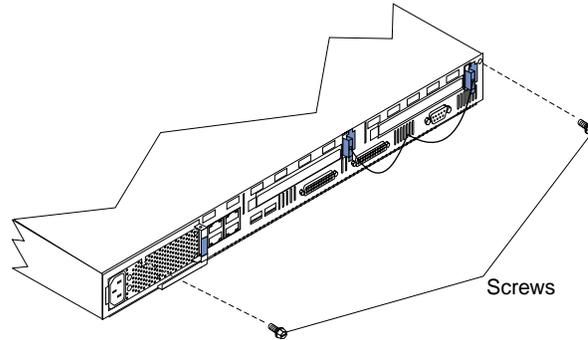
5. Install the server in the rack. See the Rack Installation Instructions that come with your server.

6. Continue with "Working with cables" for the instructions needed to cable the server.

Notes:

1. Depending on the options that you installed, you might need to run the Configuration/Setup Utility program to complete the server configuration. See the *User's Reference* for more information.

2. If you installed a SCSI drive, check the lights to verify proper operation.

Working with cables

Your server has two different cabling options, the Advanced System Management (ASM) bus 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.

1. Refer to the following illustration to locate the connectors on the back of your server.
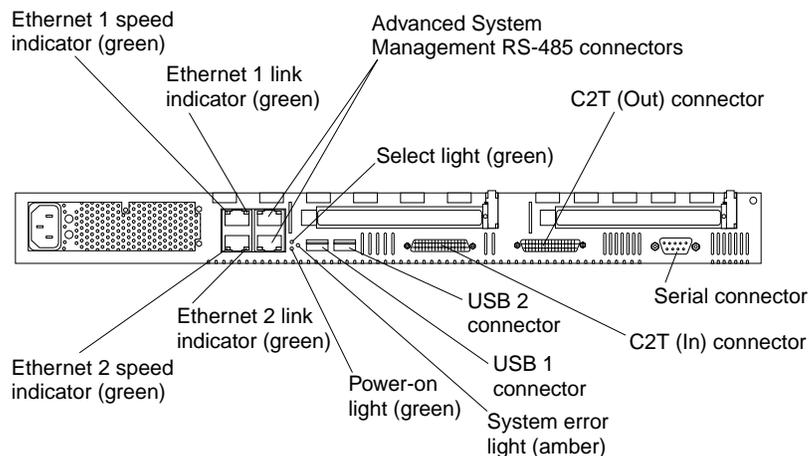
The ASM ports on the back of the server are referred to in this book as RS-485 (A) and RS-485 (B).

2. Connect the power cords and all external cables to the server; then, plug the power cords into properly grounded electrical outlets.

3. Continue with "Cabling the RS-485 ports" and "Connecting the servers with a C2T chain" on page 17.

Cabling the RS-485 ports

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

Before you begin, review the following:

- The ASM bus is designed to connect up to twelve units or servers. When using the IBM Remote Supervisor adapter, you can connect a total of eleven units or servers.

- You can hot-swap the cables in the ASM bus.

- Use standard unshielded twisted pair (UTP) cables with RJ-45 connectors.

Note: For more information about the IBM Remote Supervisor adapter, see the documentation that comes with the adapter.

Connecting the ASM bus

The servers in the ASM bus are referred to by their assigned addresses and not their position in the rack.

After you install the server in the rack, complete the following steps to connect the ASM bus:

1. Turn off the servers.

2. Locate the RS-485 connectors on the rear of the servers and several unshielded twisted pair (UTP) cables with RJ-45 connectors.

3. Starting at the topmost server to be included in the ASM bus, plug one end of the cable into the RS-485 (B) connector and the other end of the cable into the RS-485 (A) connector 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) connector of the second-to-last server to the RS-485 (B) connector of the last server. Refer to the following illustration to see how to connect the ASM bus.
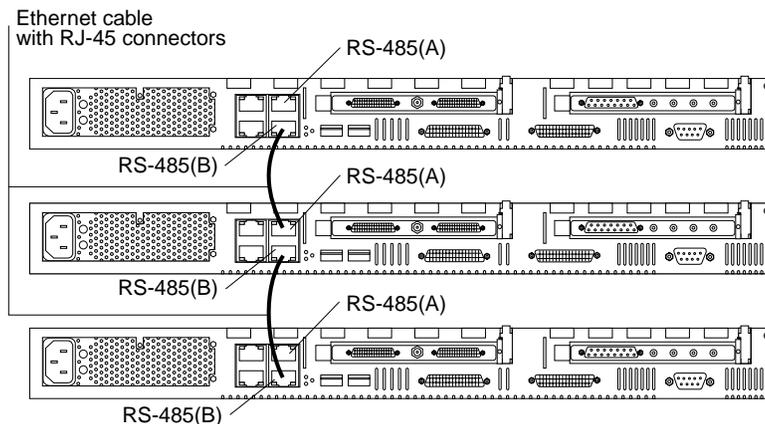
6. Turn on the servers. See "Turning on the server" on page 21.

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 C2T (In) and C2T (Out) connectors.

Before you begin, review the following:

- You can connect a maximum of 42 servers with the C2T chaining cables.
- When connecting servers in 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 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 n). 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 does not affect 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 breakout 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 electrical 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, see the documentation that comes 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 "Front view" on page 22.

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, 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 C2T (Out) connector of the top server.

   b. Connect the opposite end of the C2T chaining cable to the C2T (In) connector of the server below it.

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

   d. Connect the C2T breakout cable to the server 1 C2T (Out) connector.
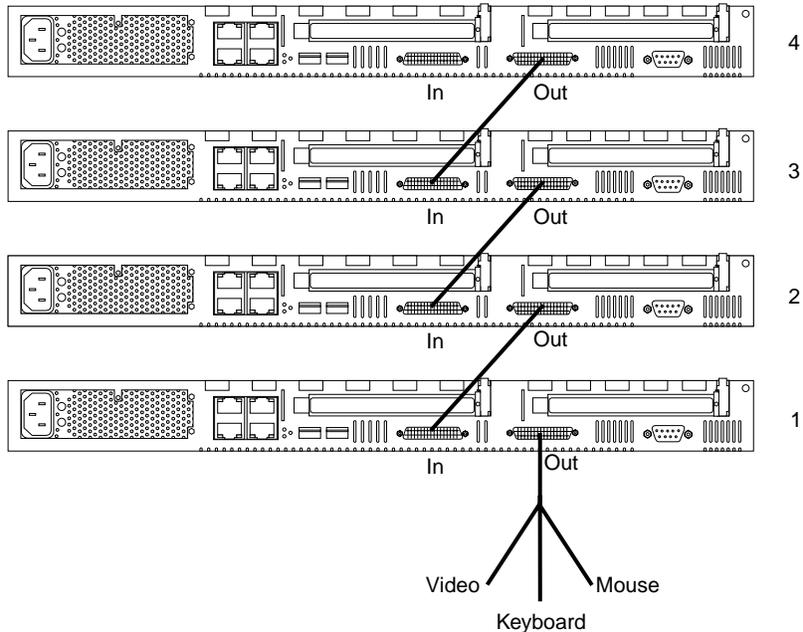
   Note: Server 1 (usually the server at the bottom of the rack) is the server to which you connect the C2T break out cable.

3. Turn the servers on and check the operation of the monitor, pointing device, and keyboard with each server. See "Turning on the server" on page 21 for instructions to turn on the server. See "Testing the C2T chain" 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 breakout cable directly to the C2T (Out) connector of the server. Turn on (power up) the server and retry the devices. If the devices work, 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 on the server:

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

   Note: Plugging the power cord into a power source might 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.

3. If you have a SCSI hard disk drive in your server, check the hard disk drive status light and activity light to verify that the hard disk drives are operating properly. (See "Server controls and indicators" on page 22 for the location of the status indicators.)

   Note: The green light flashes rapidly (three flashes per second) when the controller is identifying the drive.

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:

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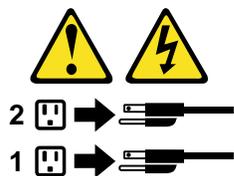
1. See your operating system documentation for the proper procedure to shut down the operating system.

   Note: Each operating system is different. Some allow an immediate shutdown. Others require an orderly shutdown procedure.

2. Press the power control button on the front of the server. This will put the server in standby 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.

Standby puts the server into 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 standby mode:

1. See your operating system documentation for the proper procedure to shutdown 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
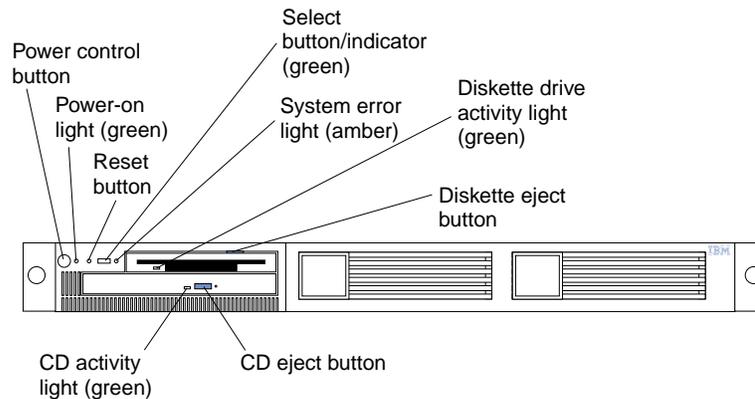
Power-control button: Press this button to manually turn the server on or off.

Power-on light: This green LED lights and stays on when you turn on your server and blinks when the server is in standby 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 paperclip 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 Diagnostics 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.

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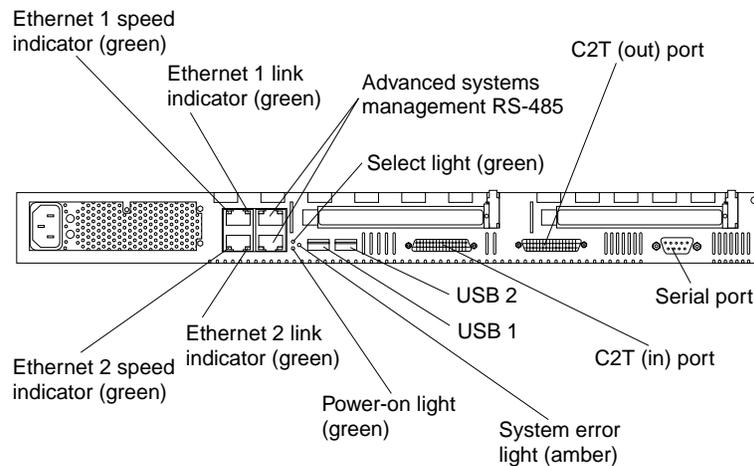
Ethernet 1 speed indicator: This green LED lights when the speed of the Ethernet LAN that is connected to Ethernet port 1 is 100 Mbps.

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.

C2T (Out) port: 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.

C2T (In) port: This port is used to connect multiple servers together to share a single keyboard, monitor, and pointing device.

USB 2 connector: This connector is used to attach Universal Serial Bus (USB) to Universal Serial Bus 2.

USB 1 connector: This connector is used to attach Universal Serial Bus (USB) to Universal Serial Bus 1.

System-error light: This amber LED lights when a system error occurs. An LED on the Light Path Diagnostics 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

You can use the following configuration programs to customize your server hardware:

- **Configuration/Setup Utility program**

  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 the drive startup sequence, set the date and time, and set passwords. For information about how to start this utility, see "Using the Configuration/Setup Utility program" on page 26.

- **SCSISelect Utility program**

  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. For information about how to start this utility, see "Using the SCSISelect Utility program" on page 26.

- **PXE Boot Agent Utility program**

  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 startup order, to select operating-system wake-up support, and to set menu wait times. For information about how to start this utility, see "Using the PXE Boot Agent Utility program" on page 27.

- **ServerGuide CDs**

  The *ServerGuide*™ CDs include software setup and installation tools that are 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 (NOS) 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 27 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: See the *User's Reference* on the *IBM xSeries Documentation* CD for detailed instructions for using the configuration programs.

- **ASM configuration programs**

  You can obtain ASM configuration programs from the IBM Support page at http://www.ibm.com/pc/support on the World Wide Web. You can use these programs to create an *xSeries 330/IntelliStation R Pro Advanced System Management Processor Firmware Update* diskette and configure the settings for the ASM processor.

Starting the utility programs

This section provides the instructions for starting the utility programs. For more detailed information about these utility programs, see the User's Reference on the IBM *xSeries Documentation* CD.

Using the Configuration/Setup Utility program

The Configuration/Setup Utility program is a menu-driven utility program that is part of the BIOS code that comes with your server. You can use it to:

- Configure serial port assignments
- Change the drive startup sequence
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set passwords

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

1. Turn on the server and watch the monitor screen.
2. When the message `Press F1 for Configuration/Setup` appears, press F1.
3. Follow the instructions that appear on the screen.

Using the SCSISelect Utility program

SCSISelect is a built-in, menu-driven configuration utility program that you can use to:

- View the default SCSI IDs
- Locate and correct configuration conflicts

Note: If your server has a redundant array of independent disks (RAID) adapter installed, use the configuration method that is supplied with the RAID adapter to view or change SCSI settings for devices attached to the adapter.

The following sections provide the instructions needed to start the SCSISelect Utility and descriptions of the menu choices available.

Complete the following steps to start the SCSISelect utility program:

1. Turn on the server.
2. When the `<<< Press <CTRL><A> for SCSISelect™ Utility! >>>` prompt appears, press Ctrl+A.
3. When the `Would you like to configure the host adapter or run the SCSI disk utility?` question appears, make your selection and press Enter.
4. Use the arrow keys to select a choice from the menu.
   - Press Esc to exit the SCSISelect Utility program.
   - Press the F5 key to switch between color and monochrome modes (if your monitor permits).
5. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

Using the PXE Boot Agent Utility program

The PXE Boot Agent Utility program is a built-in, menu-driven configuration utility program that you can use to:

- Change network startup (boot) protocols
- Change startup (boot) order
- Select whether to display setup prompt
- Set menu wait time
- Select operating system wake-up support

To start the PXE Boot Agent Utility program:

1. Turn on the server.
2. When the `Initializing Intel (R) Boot Agent Version X.X.XX PXE 2.0 Build XXX (WfM 2.0)` prompt appears, press Ctrl+S.

   Note: By default, you will have 2 seconds after the prompt appears on the screen to press Ctrl+S.

3. Use the arrow keys or press Enter to select a choice from the menu.

   - Press Esc to return to the previous menu.
   - Press the F4 key to exit.

4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

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 34.

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, see the *Setup and Installation* CD label.

Using the System Updates and Applications CD

Be sure to take advantage of the additional software that is provided on the *System Updates and Applications* CD.

Note: See the CD label for a current list of updates and applications to start the CD and view the online overview.

Updating and configuring the ASM processor

To update the Advanced System Management (ASM) firmware or configure the ASM processor, you must download the image of the xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility program from the IBM Support Web site at http://www.ibm.com/pc/support on the World Wide Web.

You can run the xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update Utility program to create an *xSeries/IntelliStation R Pro Advanced System Management Firmware Update Utility* diskette.

Updating the ASM firmware

Use the *xSeries 330/IntelliStation R Pro Advanced System Management Processor Firmware Update* diskette to configure the ASM processor. With the configuration utility, you can:

- Configure **Alert Settings** to enable or disable alert functions.
- Configure **Dial In/Out** settings.
- Configure **General Settings**, including the Name and Number that identify the ASM processor, the date and time reported by the ASM processor, assorted time-out values, and schedule a time for the system to be powered up.
- Configure **Modem Settings**.

This diskette updates the ASM software only. It does not affect any device drivers.

To update the ASM firmware, perform the following steps:

1. Turn off your server.
2. Insert the diskette in the diskette drive.
3. Turn on your server. If your server does not startup from the diskette drive, use the Configuration/Setup Utility program to configure the diskette drive as a startup device. See "Using the Configuration/Setup Utility program" on page 26. Then, go back and start with step 1.
4. From the main menu, select **Update System Management Firmware** and press Enter.
5. Follow the on-screen instructions to complete the update.

If there is an error in loading the ASM software, try installing the software again.

Configuring the ASM processor

Use the *xSeries 330/IntelliStation R Pro Advanced System Management Processor Firmware Update* diskette to configure ASM processor settings.

To configure the ASM processor, do the following:

1. Insert the *xSeries 330/IntelliStation R Pro Advanced System Management Firmware Update* diskette into the diskette drive and restart the server.
2. When the main menu appears, select **Configuration Settings** and press Enter.
3. Select **General Settings** and press Enter.
4. Type a name for the ASM processor of your server in the **Name** field. This value can be up to 15 characters long.
5. Type a number for the ASM processor of your server in the **Number** field. This value can be up to 15 characters long.

Notes:

   a. The **Name** and **Number** designations apply to the ASM processor and not to the server.

   b. Designate the ASM processor with names and numbers that correspond to the server designations to which they apply.

6. Press F6 to save the values and return to the main menu. To return to the main menu without saving, press Esc.

7. When you finish, select **Exit utility** from the main menu and press Enter.

8. When prompted, remove the diskette from the diskette drive and press Enter to restart your server.

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, see 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" and "POST error messages" on page 32 for more information.

- **Troubleshooting chart**

  This chart lists problem symptoms and suggested steps to correct the problems. See the "Troubleshooting charts" on page 34 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: See 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 feature**

  Use the Light Path Diagnostics feature to identify system errors quickly. For more information about the Light Path Diagnostics feature, see 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: See the "Solving Problems" section in the User's Reference on the I*BM xSeries Documentatio*n *CD* for more detailed information about the POST beep codes.

Table 2. Post beep code descriptions.

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, 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.

POST error messages

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

Note: See the "Solving Problems" section in the *User's Reference* on the *IBM xSeries Documentation* CD for more detailed information about POST error messages.

Table 3. 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 or 303	Keyboard and keyboard controller	Ensure that the keyboard cable is connected and nothing is resting on the keyboard keys.
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 or 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, call for service.
00180*xxx*	A PCI adapter requested a resource that is not available	Start the Configuration/Setup Utility program and ensure that the resources needed by the PCI adapter are available.
012980*xx* or 012981*xx*	Data for microprocessor *x*	Download and install the latest version of the system BIOS code.
01298200	Microprocessor speed mismatch	Install microprocessors with identical speeds.
I9990305	POST could not find an operating system.	Install your operating system.

ServerGuide startup problems

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

Table 4. ServerGuide startup problems.

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
System Updates and Applications CD gets "time out" or "Unknown host" errors	Ensure that you have direct access to the Internet through FTP.

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.

Table 5. Troubleshooting charts.

CD-ROM drive	Suggested action
CD-ROM drive is not recognized.	Verify that: 1. The IDE channels are 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.

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 breakout cable. 2. Make sure that the C2T 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, see "Testing the C2T chain" on page 18. If the problem persists, 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, see "Testing the C2T chain" on page 18. If the problem persists, 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, 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 program 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 problem persists, 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 breakout cable. 2. You installed the necessary device drivers for the applications. If the problem persists, call for service.
Wavy, unreadable, rolling, distorted screen, or screen jitter.	If the monitor self-tests show the monitor is working properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. **Notes:** 1. To prevent diskette drive read/write errors, be sure that 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 persists, call for service.

Monitor problems	Suggested action
Wrong characters appear on the screen.	If the wrong language is displayed, update the BIOS code with the correct language.
	If the problem persists, 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 "Server Support" flowchart for information about obtaining ServerProven™ compatibility information from the World Wide Web.
	2. You followed the installation instructions that came with the option.
	3. The option is installed correctly.
	4. You have not loosened any other installed options or cables.
	5. You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration.
	If the problem persists, 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 persists, 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 ASM connector is the same as a serial port connector, but it is used only by the integrated ASM 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 IBM Director.
	2. The serial-port adapter, if you installed one, is seated properly.
	If the problem persists, call for service.

Option problems	Suggested action
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 ASM 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 IBM Director. If the problem persists, 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 problem persists, 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 persists, call for service.

Getting information, help, and service

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your computer, and whom to call for service should it be necessary.

Getting information

Information about your IBM computer and preinstalled software, if any, is available in the documentation that comes with your computer. That documentation includes printed books, online books, README files, and help files. In addition, information about IBM products is available on the World Wide Web and through the IBM Automated Fax System.

Using the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM Personal Computer products and support. The address for the IBM Personal Computing home page is http://www.ibm.com/pc/.

You can find support information for your IBM products, including supported options, at http://www.ibm.com/pc/support/.

If you click **Profile** from the support page, you can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, Parts Information, Technical Hints and Tips, and Downloadable Files. In addition, you can choose to receive e-mail notifications whenever new information becomes available about your registered products.

You also can order publications through the IBM Publications Ordering System at http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi.

Getting information by fax

If you have a touch-tone telephone and access to a fax machine, in the U.S. and Canada, you can receive, by fax, marketing and technical information on many topics, including hardware, operating systems, and local area networks (LANs).

You can call the IBM Automated Fax System 24 hours a day, 7 days a week. Follow the recorded instructions, and the requested information will be sent to your fax machine. In the U.S. and Canada, to access the IBM Automated Fax System, call 1-800-426-3395.

Getting help and service

If you have a problem with your computer, you will find a wide variety of sources available to help you.

Using the documentation and diagnostic programs

Many computer problems can be solved without outside assistance. If you experience a problem with your computer, the first place to start is the troubleshooting information in your computer documentation. If you suspect a software problem, see the documentation, including README files and online help, that comes with the operating system or application program.

Most IBM computers and servers come with a set of diagnostic programs that you can use to help you identify hardware problems. See the troubleshooting information in your computer documentation for instructions on using the diagnostic programs.

The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/pc/support/ and follow the instructions.

Calling for service

If you have tried to correct the problem yourself and still need help, during the warranty period, you can get help and information by telephone through the IBM PC HelpCenter®. The following services are available during the warranty period:

- **Problem determination** - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.

- **IBM hardware repair** - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service.

- **Engineering Change management** - Occasionally, there might be changes that are required after a product has been sold. IBM or your reseller, if authorized by IBM, will make selected Engineering Changes (ECs) available that apply to your hardware.

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts. All warranted parts contain a 7-character identification in the format IBM FRU XXXXXXX.
- Identification of software problem sources.
- Configuration of BIOS as part of an installation or upgrade.
- Changes, modifications, or upgrades to device drivers.
- Installation and maintenance of network operating systems (NOS).
- Installation and maintenance of application programs.

Refer to your IBM hardware warranty for a full explanation of IBM warranty terms. Be sure to retain your proof of purchase to obtain warranty service.

In the U.S. and Canada, these services are available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9:00 a.m. to 6:00 p.m.

Note: Response time will vary depending on the number and complexity of incoming calls.

If possible, be at your computer when you call. Please have the following information ready:

- Machine type and model
- Serial numbers of your IBM hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

Phone numbers are subject to change without notice. For the most up-to-date phone numbers, go to http://www.ibm.com/pc/support/ and click **Support Phone List**.

Country		Telephone number
Austria	Österreich	01-24 592 5901
Belgium - Dutch	Belgie	02-210 9820
Belgium - French	Belgique	02-210 9800
Canada	Toronto only	416-383-3344
Canada	Canada - all other	1-800-565-3344
Denmark	Danmark	45 20 82 00
Finland	Suomi	09-22 931 840

Country		Telephone number
France	France	02 38 55 74 50
Germany	Deutschland	07032-1549 201
Ireland	Ireland	01-815 9200
Italy	Italia	02-4827 5040
Luxembourg	Luxembourg	298-977 5063
Netherlands	Nederland	020-514 5770
Norway	Norge	23 05 32 40
Portugal	Portugal	21-791 51 47
Spain	España	91-662 49 16
Sweden	Sverige	08-477 4420
Switzerland	Schweiz/Suisse/Svizzera	0848-80 52 52
United Kingdom	United Kingdom	01475-555 055
U.S.A. and Puerto Rico	U.S.A. and Puerto Rico	1-800-772-2227

In all other countries, contact your IBM reseller or IBM marketing representative.

Other services

IBM Update Connector™ is a remote communication tool that you can use with some IBM computers to communicate with the HelpCenter. Update Connector enables you to receive and download updates for some of the software that might come with your computer.

With some computer models, you can register for International Warranty Service. If you travel with your computer or need to move it to another country, you might be able to receive an International Warranty Service Certificate that is honored virtually worldwide, wherever IBM or IBM resellers sell and service IBM products.

For more information or to register for International Warranty Service:

- In the U.S. or Canada, call 1-800-497-7426.
- In Europe, call 44-1475-893638 (Greenock, U.K.).
- In Australia and New Zealand, call 61-2-9354-4171.
- In all other countries, contact your IBM reseller or IBM marketing representative.

IBM Integrated Technology Services offers a broad range of information technology support, implementation, and management services. For more information about these services, refer to the Integrated Technology Services Web site at http://www.ibm.com/services/its/.

For technical assistance with the installation of, or questions related to, Service Packs for your preinstalled Microsoft Windows product, refer to the Microsoft Product Support Services Web site at http://support.microsoft.com/directory/, or you can contact the IBM HelpCenter. Some fees might apply.

Purchasing additional services

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

For more information about these services, see the online information.

Chapter 1. Product warranty and notices

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

Warranty information

This section contains the warranty period for your product and the IBM Statement of Limited Warranty.

Warranty period

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

Machine - IBM ⓔserver xSeries 330 Type 8674

Warranty period - Three years

IBM Statement of Limited Warranty

Z125-4753-06 8/2000

Part 1 - General Terms

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

The IBM Warranty for Machines

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

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

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not

responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

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

Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

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

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

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

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

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

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided:

    a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides;
    b. secure all programs, data, and funds contained in a Machine;
    c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations; and
    d. inform IBM or your reseller of changes in a Machine's location.

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

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

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and

2. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

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

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

Governing Law

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

Part 2 - Country-unique Terms
AMERICAS

BRAZIL

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

NORTH AMERICA

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

CANADA

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

UNITED STATES

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

ASIA PACIFIC

AUSTRALIA

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

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

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

CAMBODIA, LAOS, AND VIETNAM

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

The following is added to this Section:
Disputes and differences arising out of or in connection with this Agreement shall be finally settled by arbitration which shall be held in Singapore in accordance with the rules of the International Chamber of Commerce (ICC). The arbitrator or arbitrators designated in conformity with those rules shall have the power to rule on their own

competence and on the validity of the Agreement to submit to arbitration. The arbitration award shall be final and binding for the parties without appeal and the arbitral award shall be in writing and set forth the findings of fact and the conclusions of law.

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

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

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

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

HONG KONG AND MACAU

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

INDIA

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

JAPAN

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

NEW ZEALAND

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

Limitation of Liability: *The following is added to this Section:*

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

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

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

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

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

EUROPE, MIDDLE EAST, AFRICA (EMEA)

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

Warranty Service:

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

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

Governing Law:

The applicable laws that govern, interpret and enforce rights, duties, and obligations of each of us arising from, or relating in any manner to, the subject matter of this Statement, without regard to conflict of laws principles, as well as Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided, except that in 1) Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Hungary, Former Yugoslav Republic of Macedonia, Romania,

Slovakia, Slovenia, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan, the laws of Austria apply; 2) Estonia, Latvia, and Lithuania, the laws of Finland apply; 3) Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Djibouti, Democratic Republic of Congo, Equatorial Guinea, France, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia, this Agreement will be construed and the legal relations between the parties will be determined in accordance with the French laws and all disputes arising out of this Agreement or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 4) Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe, this Agreement will be governed by English Law and disputes relating to it will be submitted to the exclusive jurisdiction of the English courts; and 5) in Greece, Israel, Italy, Portugal, and Spain any legal claim arising out of this Statement will be brought before, and finally settled by, the competent court of Athens, Tel Aviv, Milan, Lisbon, and Madrid, respectively.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND GERMANY

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

The following paragraphs are added to this Section:

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

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

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

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

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

EGYPT

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

Applicability of suppliers and resellers (unchanged).

FRANCE

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

IRELAND

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

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

Applicability of suppliers and resellers (unchanged).

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

ITALY

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:
1. *(unchanged)*
2. as to any other actual damage arising in all situations involving nonperformance 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 third paragraph of this Section:
Unless otherwise provided by mandatory law, IBM and your reseller are not liable for any of the following: *(items 1 and 2 unchanged)* 3) indirect damages, even if IBM or your reseller is informed of their possibility.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

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

UNITED KINGDOM

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

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence;
2. the amount of any other actual direct damages or loss, up to 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim;

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

Applicability of suppliers and resellers (unchanged).

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

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

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

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

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

Industry Canada Class A emission compliance statement
This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement
Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

European Union EMC Directive conformance statement
This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The Limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwan electrical emission statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

Japanese Voluntary Control Council for Interference (VCCI) statement

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Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries and regions
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dubai, Fiji, Ghana, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand

IBM power cord part number	Used in these countries and regions
6952301	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

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