

IBM NetVista™



# User Guide

A20 Type 6269

A40 Types 6568, 6578, 6648

A40p Types 6569, 6579, 6649



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A20 Type 6269

A40 Types 6568, 6578, 6648

A40p Types 6569, 6579, 6649

**Note**

Before using this information and the product it supports, be sure to read “Safety information” on page iii and “Appendix E. Notices and trademarks” on page 121.

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## Safety information

The following statements are important notices that pertain to potentially dangerous components of your computer.

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### Lithium battery notice

**CAUTION:**

**Danger of explosion if battery is incorrectly replaced.**

**When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the 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.**

**ATTENTION**

**Danger d'explosion en cas de remplacement incorrect de la batterie.**

**Remplacer uniquement par une batterie IBM de type ou d'un type équivalent recommandé par le fabricant. La batterie contient du lithium et peut exploser en cas de mauvaise utilisation, de mauvaise manipulation ou de mise au rebut inappropriée.**

***Ne pas :***

- **Lancer ou plonger dans l'eau**
- **Chauffer à plus de 100°C (212°F)**
- **Réparer ou désassembler**

**Mettre au rebut les batteries usagées conformément aux règlements locaux.**

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### Laser compliance statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive or a DVD-ROM drive. CD-ROM drives and DVD-ROM drives are also sold separately as options. CD-ROM drives and DVD-ROM drives are laser products. These drives are certified in the U.S. to conform to the

requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, these drives are certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM drive or a DVD-ROM drive is installed, note the following.

**CAUTION:**

**Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

Removing the covers of the CD-ROM drive or DVD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive or DVD-ROM drive. **Do not remove the drive covers.**

Some CD-ROM drives and DVD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

**DANGER**

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

**DANGER:**

Certains modèles d'ordinateurs personnels sont équipés d'origine d'une unité de CD-ROM ou de DVD-ROM. Mais ces unités sont également vendues séparément en tant qu'options. L'unité de CD-ROM/DVD-ROM est un appareil à laser. Aux États-Unis, l'unité de CD-ROM/DVD-ROM est certifiée conforme aux normes indiquées dans le sous-chapitre J du DHHS 21 CFR relatif aux produits à laser de classe 1. Dans les autres pays, elle est certifiée être un produit à laser de classe 1 conforme aux normes CEI 825 et CENELEC EN 60 825.

Lorsqu'une unité de CD-ROM/DVD-ROM est installée, tenez compte des remarques suivantes:

**ATTENTION: Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites.**

L'ouverture de l'unité de CD-ROM/DVD-ROM peut entraîner un risque d'exposition au rayon laser. Pour toute intervention, faites appel à du personnel qualifié.

Certaines unités de CD-ROM/DVD-ROM peuvent contenir une diode à laser de classe 3A ou 3B. Tenez compte de la consigne qui suit:

**DANGER**

**Rayonnement laser lorsque le carter est ouvert. Évitez toute exposition directe des yeux au rayon laser. Évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques.**



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## About this book

This book will help you become familiar with your IBM® NetVista™ computer and its features. It describes how to set up, operate, maintain, and install options in your computer. In the unlikely event you experience problems, you will find helpful troubleshooting information and instructions for obtaining service in this book.

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## Related information

The following documentation contains additional information about your computer:

- *Quick Reference*  
This publication contains general information to help you to safely set up your computer and access important online publications.
- *About Your Software*  
This online publication (provided only with computers that have IBM-preinstalled software) contains information about the preinstalled software package.
- *Understanding Your Personal Computer*  
This online publication (available on the World Wide Web) includes general information about using personal computers and in-depth information about the specific features of your computer. To access this online publication, see *About Your Software*.

The following publications contain more information about your computer:

- *Hardware Maintenance Manual*  
This publication contains information for trained service technicians. It can be found on the World Wide Web at the following Web site:  
<http://www.ibm.com/pc/support/pc/>  
Type the model number/machine type into the Quick Path field and click **Go**. Click **Online publications** and then click **Hardware Maintenance Manuals**.  
This manual can also be ordered from IBM. To purchase a copy, refer to “Chapter 7. Getting help, service, and information” on page 99.
- *Technical Information Manual*  
This publication contains information for individuals who want to know more about the technical aspects of their computer. It can be found on the World Wide Web at the following Web site:  
<http://www.ibm.com/pc/support/pc/>  
Type the model number/machine type into the Quick Path field and click **Go**. Click **Online publications** and then click **Technical Manuals**.



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## Chapter 1. IBM NetVista computer overview

Thank you for selecting an IBM NetVista computer. Your computer incorporates many of the latest advances in computer technology and can be upgraded as your needs change.

This section provides an overview of the computer features, preinstalled software, and specifications.

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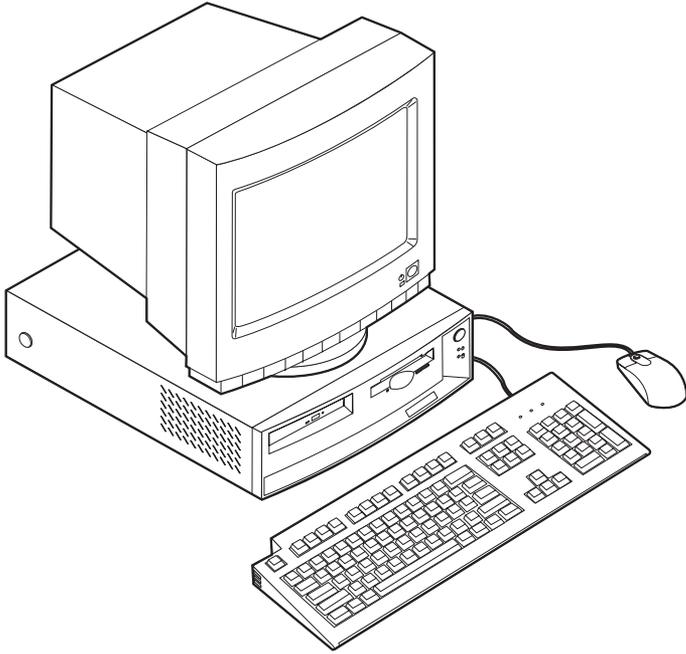
### Identifying your computer

The best way to identify your computer is by the machine type/model number. The machine type/model number indicates the various features of the computer, such as the type of microprocessor or the number of drive bays. You can find this number on the small label on the front of your computer. An example of a machine type/model number is 6568-110.

This book is for all models. When it is necessary to distinguish between models you will see references to the model type. When the model is not specified, the information applies to all. See the following pages for descriptions of the two basic models.

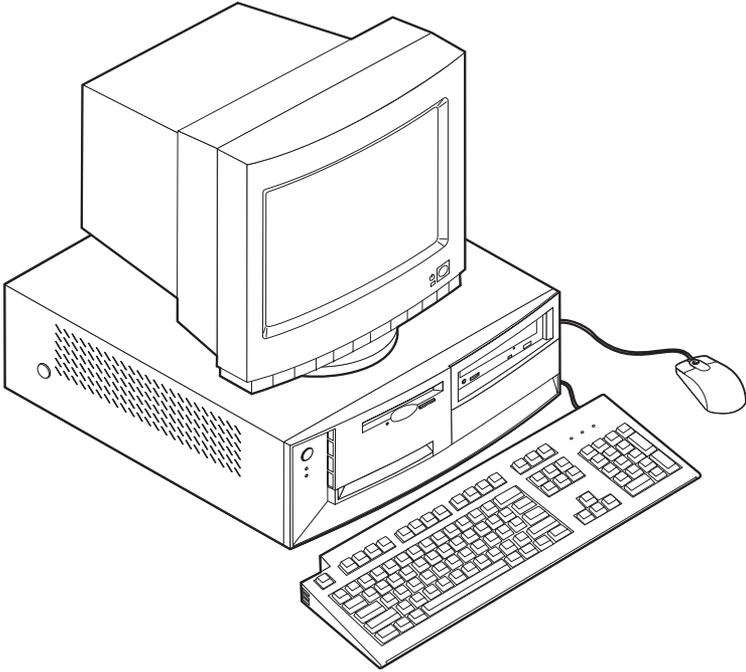
## Small form factor desktop models

Small form factor desktop models have a diskette drive and a hard disk drive. Some models have a slimline CD-ROM drive. The power button is located on the right-hand side of the computer as you are facing it.



## Desktop models

Desktop models come with a diskette drive and a hard disk drive. Some models come with a CD-ROM drive. The power button is located on the left-hand side of the computer as you are facing it.



---

## Features

Not all models come with all features summarized here.

### Microprocessor

Intel® Pentium™ III microprocessor with 256 KB of internal L2 cache memory or an Intel Celeron™ microprocessor with 128 KB of internal L2 cache memory.

### Memory

- Support for:
  - 3.3 V, synchronous, 168-pin, dual inline (DIMM), unbuffered, 133 MHz nonparity SDRAM
  - 64 MB, 128 MB, and 256 MB unbuffered nonparity DIMMs for a maximum of 512 MB
  - DIMM heights up to 38.1 mm (1.5 inches)
- 512 KB flash memory for system programs

### Internal drives

- 3.5-inch, 1.44 MB diskette drive
- Internal hard disk drive
- EIDE CD-ROM drive (some models)

### Video controller

- Dynamic video memory technology
- Accelerated graphics port (AGP) adapter (some models)

### Audio subsystem

16-bit integrated Sound Blaster Pro compatible audio subsystem

**10/100 Mbps Ethernet adapter that supports Wake on LAN®** (some models)

### System management features

- Remote Program Load (RPL) and Dynamic Host Configuration Protocol (DHCP)
- Wake on LAN (requires Wake on LAN-supported network adapter)
- Wake on Ring (in the Configuration/Setup Utility program, this feature is called Serial Port Ring Detect for an external modem and Modem Ring Detect for an internal modem) (some models do not have all of these capabilities)
- Wake on Alarm
- Remote Administration (the ability to update POST and BIOS over the network)
- Automatic power-on startup
- System Management (SM) BIOS and SM software
- Ability to store POST hardware test results

### **Input/output features**

- 25-pin, ECP/EPP parallel port
- One or two 9-pin serial ports
- Two 4-pin, USB ports
- PS/2 mouse port
- PS/2 keyboard port
- 15-pin monitor port
- Three audio connectors (line/headphone out, line in, and microphone)
- Joystick/MIDI connector (some models)

### **Expansion**

- Small form factor desktop models
  - Three drive bays
  - Two peripheral component interconnect (PCI) slots with support for Plug and Play adapters
- Desktop models
  - Four drive bays
  - Three PCI expansion slots with support for Plug and Play adapters
  - One AGP expansion slot (some models; some models with AGP slot come with a preinstalled AGP adapter)

### **Power**

- Small form factor desktop: 110 W power supply with automatic ac voltage sensing
- Desktop: 155 W power supply with manual voltage selection switch
- Automatic 50/60 Hz input frequency switching
- Built-in overload and surge protection
- Advanced Power Management support
- Advance Configuration and Power Interface (ACPI) support

### **Security features**

- Power-on and administrator passwords
- Cover keylock (some models)
- Support for the addition of a U-bolt and lockable cable
- Startup sequence control
- Startup without diskette drive, keyboard, or mouse
- Unattended start mode
- Diskette and hard disk I/O control
- Serial and parallel port I/O control
- Security profile by device

### **IBM preinstalled software**

Your computer might come with preinstalled software. If so, an operating

system, device drivers to support built-in features, and other support programs are included. See *About Your Software* for a detailed description of the preinstalled software.

### **Operating systems (supported)**

- Microsoft® Windows® 2000 Professional
- Microsoft Windows NT® Workstation Version 4.0 with Service Pack 6
- Microsoft Windows 98 SE
- Novell NetWare Versions 3.2, 4.11, 5.0

### **Operating systems (tested for compatibility)**

- Microsoft Windows 95
- DOS 2000
- SCO OpenServer 5.0.2 and later
- IBM OS/2® Warp Connect 3.0
- IBM OS/2 Warp 4.0
- IBM OS/2 LAN Server 3.0 and 4.0
- Linux: Red Hat, Caldera, S.U.S.E., and Pacific High Tech
- Sun Solaris 2.5.1 or later

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1. The operating systems listed here are being tested for compatibility at the time this publication goes to press. Additional operating systems might be identified by IBM as compatible with your computer following the publication of this booklet. Corrections and additions to this list are subject to change. To determine if an operating system has been tested for compatibility, check the Web site of the operating system vendor.

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## Chapter 2. Setting up your computer

This section provides information for connecting cables to your computer and turning on the power.

You will need the following:

- Computer
- Computer power cord
- Keyboard
- Mouse
- Monitor (sold separately with signal cable and power cord)

If you are missing an item, contact your place of purchase.

---

### Selecting a location for your computer

Make sure you have an adequate number of properly grounded electrical outlets for the computer, monitor, and any other devices. Select a location for the computer where it will remain dry. Leave about 50 mm (2 in.) of space around the computer for proper air circulation.

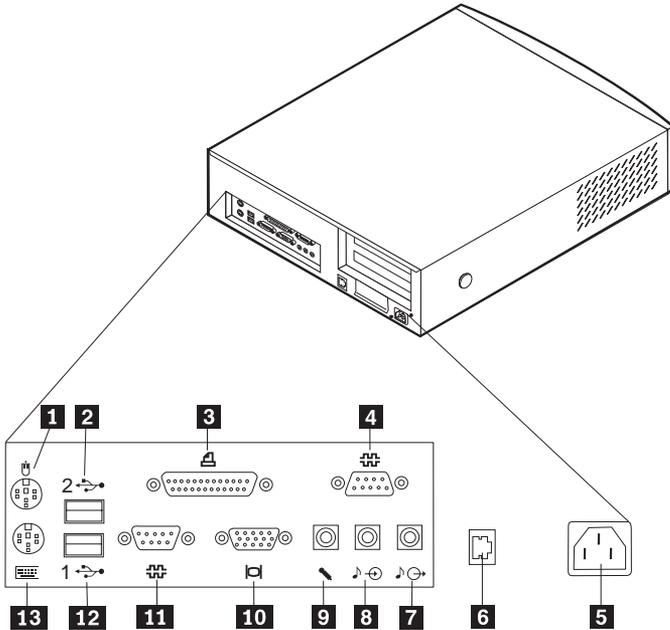
For information about arranging your computer for comfort and ease-of-use, see “Arranging your workspace” on page 13.

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### Connecting computer cables

When you set up your computer, you will need to know where to find the connectors.

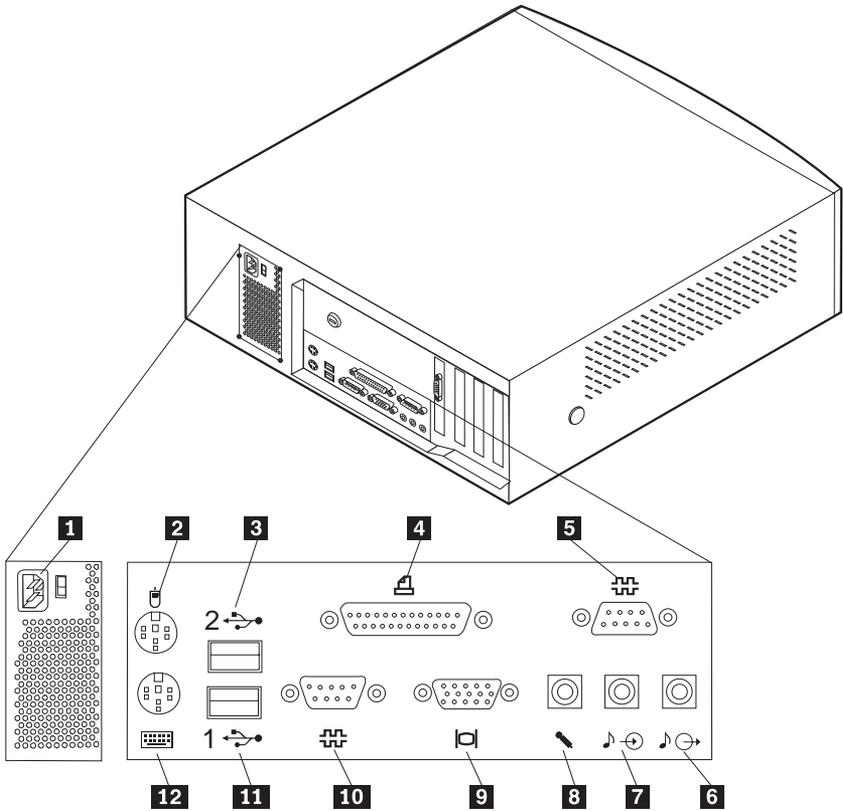
The following illustration shows the location of the connectors on the back of the small form factor desktop model computer. You might not have all of the devices shown here.



- |          |                        |           |                       |
|----------|------------------------|-----------|-----------------------|
| <b>1</b> | Mouse                  | <b>8</b>  | Audio input connector |
| <b>2</b> | USB connector 2        | <b>9</b>  | Microphone connector  |
| <b>3</b> | Parallel connector     | <b>10</b> | Monitor connector     |
| <b>4</b> | Serial connector 2     | <b>11</b> | Serial connector 1    |
| <b>5</b> | Power cord connector   | <b>12</b> | USB connector 1       |
| <b>6</b> | Ethernet connector     | <b>13</b> | Keyboard connector    |
| <b>7</b> | Audio output connector |           |                       |

**Note:** The connectors on the rear of the computer have color-coded icons. Icons will help you to determine where to connect the proper cables to set up your computer.

The following illustration shows the location of the connectors on the back of the desktop model computer. You might not have all of the connectors shown here.

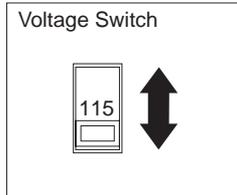


- |  |                               |
|--|-------------------------------|
| <b>1</b> Power connector   | <b>7</b> Audio in connector   |
| <b>2</b> Mouse connector   | <b>8</b> Microphone connector |
| <b>3</b> USB connector 2   | <b>9</b> Monitor connector    |
| <b>4</b> Parallel connector  | <b>10</b> Serial connector 1  |
| <b>5</b> Serial connector 2 (joystick/MIDI connector on some models) | <b>11</b> USB connector 1     |
| <b>6</b> Audio out connector   | <b>12</b> Keyboard connector  |

**Note:** The connectors on the rear of the computer have color-coded icons. Icons will help you to determine where to connect the proper cables on your computer.

To set up your computer, use the previous illustrations and the following steps to connect the cables to your computer.

1. If your computer is the desktop model, check the position of the voltage-selection switch. Use a ballpoint pen to slide the switch, if necessary.
  - If the voltage supply range is 90–137 V ac, set the voltage switch to 115 V.
  - If the voltage supply range is 180–265 V ac, set the voltage switch to 230 V.



2. Connect the monitor cable to the monitor (if it is not already attached), then to the monitor connector and tighten the attachment screws.

**Note:** If your computer comes with an accelerated graphics port (AGP) adapter, the monitor connector on the system board will be disabled. Connect the monitor to the AGP monitor connector.

3. Connect the keyboard cable to the purple keyboard connector. Connect the mouse cable to the green mouse connector.

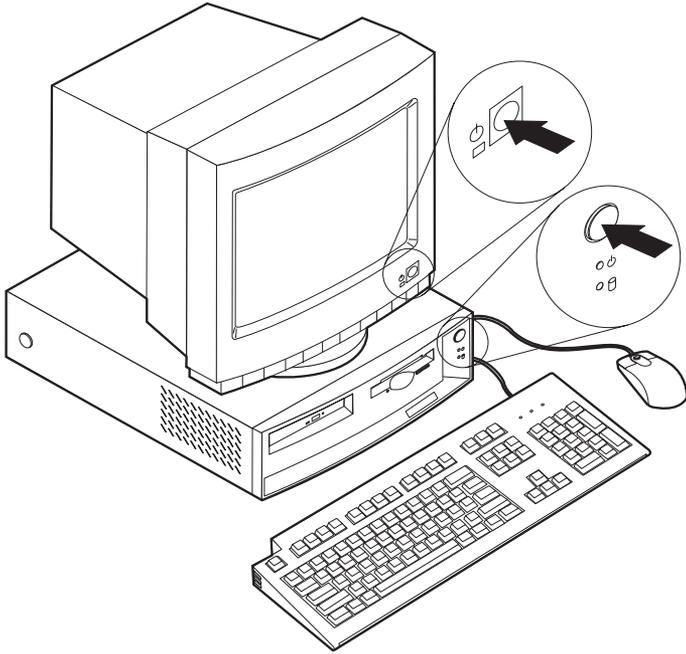
**Note:** If your computer comes with Windows NT and a ScrollPoint™ II mouse, the first time you start up your computer, your mouse will function, but your mouse will not have its ScrollPoint function. You must shut down and restart the computer to enable the ScrollPoint function.

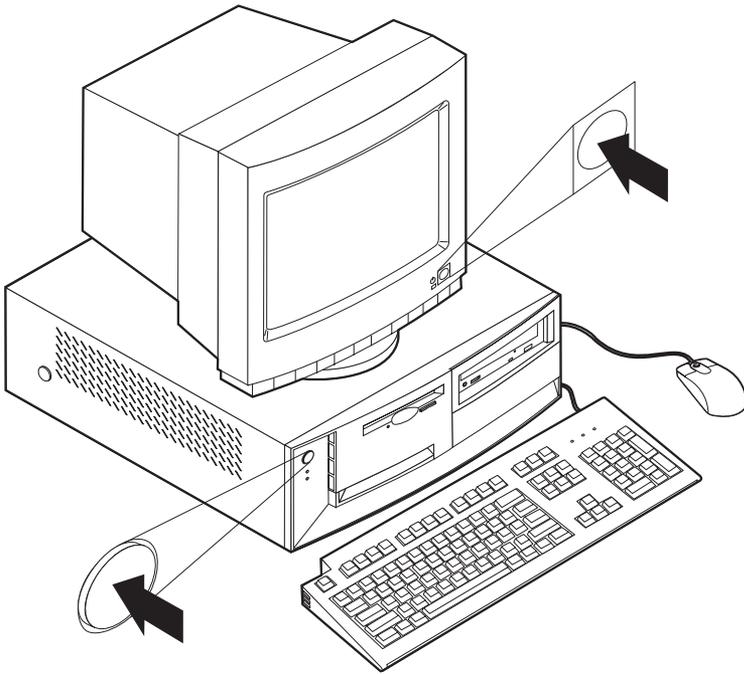
4. Connect any additional devices you have.
  - Any printer or parallel device to the parallel port connector.
  - Any serial device or external modem in the serial connector.
  - Any universal serial bus (USB) devices.
  - Any optional devices, such as speakers, microphones, or headphones, for models with an audio device.
  - If there is a label covering the power connector, remove it. Connect the power cords to the computer, monitor, and other devices first, and then plug the cords into properly grounded electrical outlets.
  - If your computer comes with an Ethernet adapter, connect the Ethernet cable.

---

## Turn on power

Turn on the monitor and other external devices first, and then turn on the computer. See the following illustrations for the location of the power switches for the monitor and the computer.





You see a logo screen while the computer performs a short self-test. When the task completes successfully, the logo screen disappears, the BIOS is loaded, and the software is loaded (in models with preinstalled software).

**Note:** If you suspect a problem, see “Chapter 6. Troubleshooting” on page 69.

---

## Finish the installation

Note the identification numbers (serial and model/type) on the front of the computer and record this information in “Appendix D. Computer records” on page 119. The identification numbers are on the front of the bezel below the CD-ROM drive.

See “Related information” on page vii in the front of this book for sources of other information about your computer. For information about IBM-installed software, see *About Your Software*, one of the online books accessible through Access IBM on your desktop. Additional programs are on the *Software Selections CD* and in some cases on other CDs and diskettes. If you install your own operating system, make sure you install the device drivers after installing your operating system. You can obtain device drivers for operating systems

that are not preinstalled at <http://www.ibm.com/pc/support/> on the World Wide Web. Installation instructions are provided in README files with the device driver files.

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## Arranging your workspace

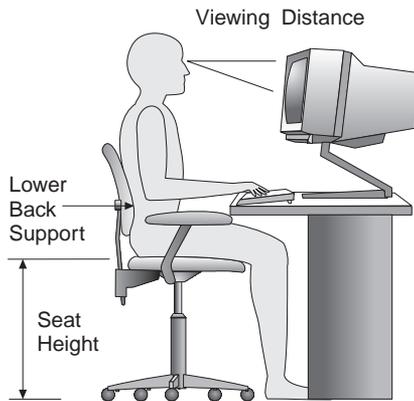
To get the most from your computer, arrange both the equipment you use and your work area to suit your needs and the kind of work you do. Your comfort is of foremost importance, but light sources, air circulation, and the location of electrical outlets also can affect the way you arrange your workspace.

### Comfort

Although no single working position is ideal for everyone, here are a few guidelines to help you find a position that suits you best.

Sitting in the same position for a long time can cause fatigue. A good chair can make a big difference. The backrest and seat should adjust independently and provide good support. The seat should have a curved front to relieve pressure on the thighs. Adjust the seat so that your thighs are parallel to the floor and your feet are either flat on the floor or on a footrest.

When using the keyboard, keep your forearms parallel to the floor and your wrists in a neutral, comfortable position. Try to keep a light touch on the keyboard and your hands and fingers relaxed. You can change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.



Adjust the monitor so the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so you can view it without having to twist your body. Also position other equipment you use regularly, such as the telephone or a mouse, within easy reach.

## Glare and lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Even reflected light from shiny surfaces can cause annoying reflections on your monitor screen. Place the monitor at right angles to windows and other light sources, when possible. Reduce overhead lighting, if necessary, by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight. You might have to adjust the Brightness and Contrast controls on the monitor as the room lighting changes throughout the day.

Where it is impossible to avoid reflections or to adjust the lighting, an antiglare filter placed over the screen might be helpful. However, these filters might affect the clarity of the image on the screen; try them only after you have exhausted other methods of reducing glare.

Dust buildup compounds problems associated with glare. Remember to clean your monitor screen periodically using a soft cloth moistened with a nonabrasive liquid glass cleaner.

## Air circulation

Your computer and monitor produce heat. The computer has a fan that pulls in fresh air and forces out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage. Place the computer and monitor so that nothing blocks the air vents; usually, 51 mm (2 in.) of air space is sufficient. Also, make sure the vented air is not blowing on someone else.

## Electrical outlets and cable lengths

The location of electrical outlets and the length of power cords and cables that connect to the monitor, printer, and other devices might determine the final placement of your computer.

When arranging your workspace:

- Avoid the use of extension cords. When possible, plug the computer power cord directly into an electrical outlet.
- Keep power cords and cables neatly routed away from walkways and other areas where they might get kicked accidentally.

For more information about power cords, see the “Power cord notice” section in this book.

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## Chapter 3. Operating and caring for your computer

This chapter provides information to help you in the day-to-day use and care of your computer.

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### Starting your computer

See “Turn on power” on page 11 for an illustration indicating the location of the power buttons on your computer monitor.

What you see and hear when you start up your computer depends on the settings in the Start Options menu of the Configuration/Setup Utility program. The default settings are **Power On Status**[Disabled] and **Power On Self Test**[Quick].

**Note:** Other selections also might change what is displayed when the computer starts up.

When you turn on your computer, you are prompted with the following options:

Press F1 for Configuration/Setup

**Note:** The option to press F1 to enter the Configuration/Setup Utility program appears when you first turn on your computer and is gone very quickly. For instructions to enter the Configuration/Setup Utility program, see page 29.

To start the IBM Product Recovery Program, press F11

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### Using video features

Your computer has an integrated super video graphics array (SVGA) video controller. This controller is located on the system board. Some models come with an accelerated graphics port (AGP) adapter.

SVGA is a video standard for displaying text and graphic images on a monitor screen. Like other video standards, SVGA supports a variety of *video modes*. Video modes are different combinations of resolution, refresh rate, and color defined by a video standard for displaying text or graphics. For more information on video modes, refer to *Understanding Your Computer* (available at <http://www.ibm.com/pc/support/> on the World Wide Web).

### Video device drivers

To take full advantage of the graphics adapter in your computer, some operating systems and application programs require custom software, known

as video device drivers. These device drivers provide support for greater speed, higher resolution, more available colors, and flicker-free images.

Device drivers for the integrated graphics subsystem and a README file with instructions for installing the device drivers are preinstalled on models with preinstalled operating systems. If your computer has IBM-preinstalled software, video device drivers have already been installed on the hard disk. If your computer did not come with a preinstalled operating system, you can download device drivers from <http://www.ibm.com/pc/support/> on the World Wide Web.

See “Chapter 7. Getting help, service, and information” on page 99 for more information.

## Changing monitor settings

To get the best possible image on your screen and to reduce flicker, you might need to reset the resolution and refresh rate of your monitor. You can view and change monitor settings through your operating system using the instructions provided in the README files on the *Software Selections* CD that comes with your computer. Refer to your operating system documentation for further information on monitor settings.

### Attention

Before you change any monitor settings, be sure to review the information that comes with your monitor. Using a resolution or refresh rate that is not supported by your monitor might cause the screen to become unreadable and could damage the monitor. The information that comes with your monitor usually includes the resolutions and refresh rates that the monitor supports. If you need additional information, contact the manufacturer of the monitor.

To minimize screen flicker and jitter, set your monitor for the highest noninterlaced refresh rate that the monitor supports. If your monitor complies with the VESA Display Data Channel (DDC) standard, it is probably already set to the highest refresh rate that the monitor and video controller can support. If you are not sure if your monitor is DDC-compliant, refer to the documentation provided with the monitor.

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## Using audio features

Your computer comes with an integrated audio controller that supports Sound Blaster applications and is compatible with the Microsoft Windows Sound System. Some models also come with a single internal speaker and three audio connectors. The audio controller provides you with the ability to record and

play sound and music and to enjoy sound with multimedia applications. Optionally, you can connect two stereo speakers to the line out connector to enjoy better sound quality.

Procedures for recording and playing back sound vary by operating system. Refer to your operating system documentation for information and instructions.

The audio connectors in your computer are 3.5 mm (1/8-in.) mini-jacks. A description of the connectors follows. (For the location of the connectors, refer to “Connecting computer cables” on page 7.)

**Line/Headphone Out:**

This jack is used to send audio signals from the computer to external devices, such as stereo-powered speakers with built-in amplifiers, headphones, multimedia keyboards, or the Audio Line-In jack on a stereo system.

**Note:** The internal speaker in your computer is disabled when an external speaker is connected to the headphone port on your computer.

**Audio Line In:**

This jack is used to accept audio signals from external devices, such as line output from a stereo or television system, or a musical instrument, into the computer sound system.

**Microphone:**

This jack is used to connect a microphone to your computer when you want to record voice or other sounds on the hard disk. This port can also be used by speech-recognition software.

**Note:** If you experience interference or speaker feedback while recording, try reducing the microphone recording volume (gain).

**Joystick/MIDI (some models only):**

This port is used to connect a joystick for playing games or a MIDI device to interface with digital musical and sound production equipment.

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## Using diskettes

You can use 3.5-inch diskettes in the diskette drive of your computer.

The information that follows will help you use 3.5-inch diskettes.

## Handling and storing diskettes

Inside the protective diskette case is a flexible disk with a magnetic coating. This disk can be damaged by heat, dust, a magnetic field, or even a fingerprint. Use the following guidelines when handling and storing diskettes:

- Data is stored on the magnetic surface of the diskette. This surface is protected by a plastic cover. If the cover is damaged, *do not* use the diskette. A damaged diskette might damage the diskette drive.
- A protective slide on the top of a 3.5-inch diskette covers part of the magnetic surface. The diskette drive moves this slide to read data from or write data to the diskette. *Do not* move this slide because fingerprints and dust can cause loss of data.
- Never touch the magnetic disk itself.
- Keep diskettes away from magnets or devices that create a strong magnetic field, such as electric motors and generators. Diskettes are sensitive to magnets found in television sets, telephones, stereo speakers, and other such items. A magnetic field can erase the data on your diskettes. *Do not* set diskettes on the monitor or use magnets to attach notes to your computer.
- Do not store diskettes at high temperatures, low temperatures, or in direct sunlight. Temperatures ranging from 4° to 53°C (39° to 127°F) are acceptable for 3.5-inch diskettes. Keep diskettes away from heat. The plastic outer covering might warp, damaging the diskette.

## Inserting and removing diskettes

To insert a 3.5-inch diskette, hold the diskette with the label facing up and insert the end with the protective slide first. Push the diskette into the diskette drive until the diskette clicks into place.

To remove the diskette, press the eject button and slide the diskette out of the drive. Do not remove the diskette while the in-use light is on.

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## Using a CD-ROM drive

Some models have a preinstalled CD-ROM drive. CD-ROM drives can play back or read from a CD, but cannot write information to it. CD-ROM drives use industry standard, 12 cm (4.75-inch) CDs.

Follow these guidelines when using a CD-ROM drive:

- Do not place the drive where there is:
  - High temperature
  - High humidity
  - Excessive dust
  - Excessive vibration or sudden shock
  - An inclined surface
  - Direct sunlight

- Do not insert any object other than a CD into the drive.
- Before moving the computer, remove the CD from the drive.

## Handling a CD

When handling a CD, follow these guidelines:

- Hold the CD by its edges. Do not touch the surface of the side that is not labeled.
- To remove dust or fingerprints, wipe the CD with a clean, soft cloth from the center to the outside. Wiping the CD in a circular direction might cause loss of data.
- Do not write or stick paper on the CD.
- Do not scratch or mark the CD.
- Do not place or store the CD in direct sunlight.
- Do not use benzene, thinners, or other cleaners to clean the disk.
- Do not drop or bend the CD.

## Loading a CD

To load a CD into a CD-ROM drive:

1. Press the Eject/Load button. The tray slides out of the drive. (Do not manually force the tray open.)

**Note:** If you have a small form factor desktop computer, the CD-ROM drive disk tray slides partway out of the drive. Manually pull the tray the rest of the way out.

2. Place the CD in the tray with the label facing up.

**Note:** If you have a small form factor desktop computer, press the disk down until it clicks into place and is held by the spring-loaded holders.

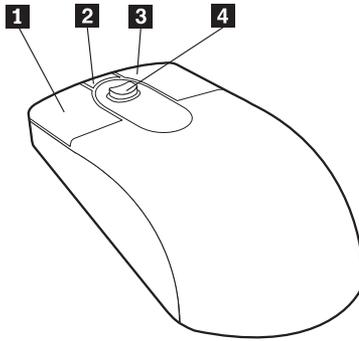
3. Close the tray by pressing the Eject/Load button or by gently pushing the tray forward. When the tray is closed, the indicator light on the front of the drive will activate to indicate that the drive is in use.
4. To eject the CD, press the Eject/Load button. When the tray slides out, carefully remove the disk.
5. Close the tray by pressing the Eject/Load button or by gently pushing the tray forward.

**Note:** If the tray does not slide out of the drive when you press the Eject/Load button, insert the pointed end of a large paper clip into the emergency-eject hole located on the front of the CD-ROM drive.

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## Using the IBM ScrollPoint II mouse

Some models come with an IBM ScrollPoint® II mouse. The ScrollPoint II mouse has the following controls.



**1 Primary mouse button:**

Use this button to select or start a program or menu item.

**2 Quick/Auto scroll button:**

Use this button to put the mouse into *auto-scroll* mode. When the mouse is in auto-scroll mode, the movement of the mouse controls the scrolling direction and speed. To exit from the auto-scroll mode, click any of the mouse buttons.

**3 Context menu button:**

Use this button to display a menu for the active program, icon, or object.

**4 Scroll stick:**

Use this stick to control the scrolling action of the mouse. This stick is pressure sensitive. The direction in which you apply pressure controls the direction of the scrolling action. The amount of pressure you apply controls the scrolling speed.

These buttons are controlled by the IBM ScrollPoint II mouse driver. If your computer came with preinstalled software, this device driver was preinstalled. You can obtain an updated ScrollPoint II mouse driver from <http://www.ibm.com/pc/support/> on the World Wide Web.

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## Updating system programs

*System programs* are the basic layer of software built into your computer. They include the power-on self-test (POST), the basic input/output system (BIOS) code, and the Configuration/Setup Utility program. POST is a set of tests and procedures that is performed each time you turn on your computer. BIOS is a

layer of software that translates instructions from other layers of software into electrical signals that the computer hardware can understand. You can use the Configuration/Setup Utility program to view and change the configuration and setup of your computer.

Your computer system board has a module called *electrically erasable programmable read-only memory* (EEPROM, also referred to as *flash memory*). You can easily update POST, BIOS, and the Configuration/Setup Utility program by starting your computer using a flash update diskette or by using the Remote Administration feature, if it is enabled. See “Setting Remote Administration” on page 34 for more information.

IBM might make changes and enhancements to the system programs. When updates are released, they are available as downloadable files on the World Wide Web (see “Chapter 7. Getting help, service, and information” on page 99). Instructions for using the system programs updates are available in a README file included in the update files.

To update system programs (flash the EEPROM):

1. Insert a system programs update (flash) diskette into the diskette drive (drive A) in your computer. System programs updates are available at <http://www.ibm.com/pc/support/> on the World Wide Web.
2. Turn on the computer. If it is on already, you must turn it off and back on again. The update begins.

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## Using network management tools

This section describes features that a network administrator or file server can use to remotely manage and control your computer. For more information about system management, see *Understanding Your Personal Computer* (available at <http://www.ibm.com/pc/support/> on the World Wide Web).

IBM Universal Manageability tools streamline and automate PC systems management and support tasks, such as asset deployment and tracking. These leading-edge PC tools are available for IBM Personal Computers at no additional charge, helping to reduce total cost of ownership of your networked PCs and allowing you to focus vital company resources on essential business activities.

### Wake on LAN

The Wake on LAN feature requires a Wake on LAN network adapter. A network administrator can use this feature to turn on your computer from a remote location. When Wake on LAN is used in conjunction with network management software (provided on the *Software Selections* CD that comes with your computer), many types of functions, such as data transfers, software

updates, and POST or BIOS updates to your computer can be initiated remotely. For more information, see the documentation that comes with your Ethernet adapter.

**Note:** If the computer power cord is plugged into a surge protector, make sure that when you turn off power you use the computer power switch and not the surge protector switch. Otherwise, the Wake on LAN feature will not work.

## Remote Program Load or Dynamic Host Configuration Protocol

If your computer comes with an Ethernet adapter, a network administrator can use Remote Program Load (RPL) or Dynamic Host Configuration Protocol (DHCP) to control your computer. If you use RPL in conjunction with software such as IBM LANClient Control Manager, you can use a feature called *Hybrid RPL*, which installs hybrid images (or files) on the hard disk. Then, each time the computer starts from the network, LANClient Control Manager recognizes your computer as a Hybrid RPL client and a small *bootstrap* program is downloaded to your computer hard disk. Hybrid RPL avoids the network traffic associated with a standard RPL.

## Remote Administration

A network administrator can use this feature to remotely update the POST and BIOS in your computer. Network management software, such as LANClient Control Manager, is required in order to take advantage of this feature. See “Setting Remote Administration” on page 34 for configuration information.

## LANClient Control Manager (LCCM)

LANClient Control Manager is a graphical, server-based program that aids in system deployment by allowing mass unattended system installation of operating systems, complete software images, device drivers, and BIOS updates. Used with Wake on LAN, LCCM can remotely start up your system from a powered-off state, which means all this can be done while the system is not being used. If you have purchased an IBM PC, LCCM is available for downloading at no additional charge (Internet access fees excepted).

For more information or to download this software go to <http://www.ibm.com/pc/us/desktop/lccm> on the World Wide Web.

## System Migration Assistant (SMA)

System Migration Assistant (SMA) delivers wizard-like functionality to help administrators remotely transfer configurations, profile settings, printer drivers, and files from an IBM or non-IBM PC to supported IBM systems. If you have purchased an IBM computer, SMA is available for downloading at no additional charge (Internet access fees excepted).

For more information or to download this software go to <http://www.ibm.com/pc/us/software/sysmgmt/products/sma> on the World Wide Web.

## Desktop Management Interface

Desktop Management Interface (DMI) is a method for gathering information about the hardware and software in your computer. In a network environment, network administrators can use DMI to remotely monitor and control your computer. For more information about DMI, see *About Your Software* (accessible through Access IBM on computers with preinstalled software).

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## Using security features

To deter unauthorized use of your computer, you can use anti-intrusion features and other security features that are provided with your computer.

### Anti-intrusion features

IBM anti-intrusion features help protect against the theft of computer components, such as the microprocessor, system memory modules, or drives.

A cover lock is built into some models to prevent the cover from being removed. Two identical keys for the cover lock are also supplied. A tag attached to the keys has the key serial number and the address of the key manufacturer.

Some models have a chassis-intrusion detector inside. You can set the chassis-intrusion detector to alert the system administrator each time the computer cover is removed. This detector is enabled after you set an administrator password in the Configuration/Setup Utility program. If a password is set and the cover is removed, a POST error message (176) displays on the computer screen the next time the computer is turned on. You must type the correct administrator password to start up the computer. For information on setting the passwords, see “Using passwords” on page 34.

### Component protection

Your computer has serialized components that can be registered with a third-party security company. (You can also register the entire system.) By registering computer components, you can improve the chances of identifying the components if they are ever stolen and recovered. For more information about component registration, see the IBM support page at <http://www.ibm.com/pc/us/desktop/assetid/> on the World Wide Web.

## Asset ID capability

IBM provides the basis for Asset ID<sup>2</sup> support in some models. Asset ID provides the capability to access information that is stored in an EEPROM module on the system board, using a radio-frequency-enabled portable scanner.

The Asset ID EEPROM contains prerecorded information about the system, including its configuration and serial numbers of key components. The Asset ID EEPROM also includes a number of blank fields you can record with your choice of information. The Asset ID can be scanned from a short distance. The scanning of the Asset ID does not require the computer cover to be removed or even require that the computer be removed from the box in which it is shipped. This type of wireless tracking enables quicker system deployment and improved asset control. Also, Asset ID information is available through UM services.

For the latest information about security features for your computer, go to the IBM support page at <http://www.ibm.com/pc/us/desktop/assetid/> on the World Wide Web.

To determine if your computer comes with Asset ID capability, check the Configuration/Setup Utility program. For instructions to start the Configuration/Setup Utility program, see “Starting and using the Configuration/Setup Utility program” on page 29. If your computer comes with Asset ID capability, see “Using Enhanced Security” on page 31 for information about enabling Asset ID.

## IBM security solutions

IBM security solutions keep electronic business transactions safe. They include the following:

- Integrated security chip that gives you the functionality of a SMART card without the added cost (some models only)
- Enhanced Security support
- User Verification Manager software that helps manage authentication so that you decide who has access to the components of your system

Not all models come with all the features listed here.

## Data protection

You can lose data from the hard disk for a variety of reasons. Security violations, viruses, or hard disk drive failure can all contribute to the

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2. Asset ID enables your personal computer to be scanned by various radio frequency-emitting devices supplied by independent companies. Asset ID is intended for use only with radio frequency equipment that meets ANSI/IEEE C95.1 1991 RF Radiation Limits.

destruction of data files. To protect against the loss of valuable information, IBM has incorporated many data-saving features within your computer.

### **SMART hard disk drive**

Your computer comes with a SMART (Self-Monitoring, Analysis, and Reporting Technology) hard disk drive that is enabled to report potential hard disk failures. If an error is detected, a DMI-compliant warning message is sent to the computer screen and, if the computer is part of a network, to an administrator console. When an error is detected, the data on the hard disk can be backed up and the drive replaced.

### **SMART Reaction**

SMART Reaction software is available to owners of IBM NetVista computers as part of a package called Universal Management Services. SMART Reaction software is a tool that you can use to help back up important data. SMART Reaction is a client/server software application that helps users and administrators respond effectively to a warning issued by the SMART hard disk drive. You can download SMART Reaction software from <http://www.ibm.com/pc/support/> on the World Wide Web.

### **Virus protection**

Your computer has built-in virus protection that can be enabled through the Configuration/Setup Utility program. Norton AntiVirus for IBM is on the IBM *Software Selections CD*.

### **Enhanced Security**

Some models have an enhanced security feature that provides extra protection for your administrator password and your startup sequence settings. With enhanced security, your administrator password and startup sequence are stored in a highly protected, nonvolatile, security EEPROM module that is separate from CMOS memory and the EEPROM module that stores system programs. When your administrator password and security sequence are protected by enhanced security, they remain intact even if the battery in your computer expires or is removed. For more information, see “Using Enhanced Security” on page 31.

### **Locking the keyboard**

You can disable the keyboard so that others are unable to use it. If a power-on password is set, the keyboard is locked when you turn on the computer. You must type the correct password before the keyboard will unlock. You can enable the power-on password feature with the Configuration/Setup Utility program. See “Using a power-on password” on page 34.

**Note:** If you have a USB keyboard, it will function even if a password has been placed on the computer.

Some operating systems have a keyboard and mouse lock-up feature. Check the documentation that comes with your operating system for more information.

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## Shutting down

When you are ready to turn off your computer, follow the shutdown procedure for your operating system to prevent the loss of unsaved data or damage to your software programs. See your operating system documentation for instructions.

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## Taking care of your computer

This section provides guidelines for the proper handling and care of your computer.

### Basics

Here are some basic points about keeping your computer functioning properly:

- Keep your computer in a clean, dry environment. Make sure it rests on a flat, sturdy surface.
- Do not place items on top of the monitor or cover any vents in the monitor or computer. These vents provide air flow to keep your computer from overheating.
- Keep food and drinks away from all parts of your computer. Food particles and spills might make the keyboard and mouse sticky and unusable.
- Do not get the power switches or other controls wet. Moisture can damage these parts and cause an electrical hazard.
- Always disconnect a power cord by grasping the plug, not the cord.

### Cleaning your computer

It is a good practice to clean your computer periodically to protect the surfaces and ensure trouble-free operation.



#### **CAUTION:**

**Be sure to turn off the computer and monitor power switches before cleaning the computer and monitor screen.**

### Computer and keyboard

Use only mild cleaning solutions and a damp cloth to clean the painted surfaces of the computer.

## Monitor screen

Do not use abrasive cleaners when cleaning the surface of the monitor screen. The screen surface is easily scratched, so avoid touching it with pens, pencil points, and erasers.

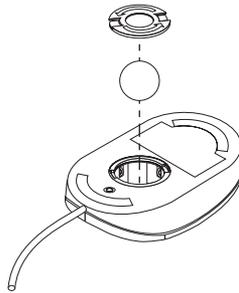
To clean the screen surface, wipe it gently with a soft, dry cloth, or blow on the screen to remove grit and other loose particles. Then use a soft cloth moistened with a nonabrasive liquid glass cleaner.

## Mouse

If the pointer on the screen does not move smoothly with the mouse, you might need to clean the mouse.

To clean your mouse:

1. Turn off the computer.
2. Disconnect the mouse cable from the computer.
3. Turn the mouse upside down. Unlock the retainer on the bottom of the mouse by moving it in the direction indicated by the arrow on the retainer.



4. Turn the mouse right-side up, and the retainer and ball will drop out.
5. Wash the ball in warm, soapy water and dry it well.
6. Using a damp cloth, wipe the outside of the mouse and the retainer. Be sure to wipe the rollers inside the mouse.
7. Insert the ball and retainer. Lock the retainer by moving it in the opposite direction of the arrow.
8. Reconnect the mouse cable to the computer.

## Moving your computer

Take the following precautions before moving your computer.

1. Back up all files and data from the hard disk.  
Operating systems can vary in the way they perform backup procedures. Refer to your operating system documentation for information about software backup.
2. Remove all media (diskettes, compact discs, tapes, and so on) from the drives.
3. Turn off the computer and all attached devices. Your hard disk drive automatically parks the read/write heads in a nondata area. This process prevents damage to the hard disk.
4. Unplug the power cords from electrical outlets.
5. Note where you have attached your cables to the rear of the computer; then remove them.
6. If you saved the original shipping cartons and packing materials, use them to pack the units. If you are using different cartons, cushion the computer components to avoid damage.

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## Chapter 4. Using the Configuration/Setup Utility program

The Configuration/Setup Utility program is stored in the electrically erasable programmable read-only memory (EEPROM) of your computer. You can use the Configuration/Setup Utility program to view and change the configuration settings of your computer, regardless of which operating system you are using. However, the settings you select in your operating system might override any similar settings in the Configuration/Setup Utility program.

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### Starting and using the Configuration/Setup Utility program

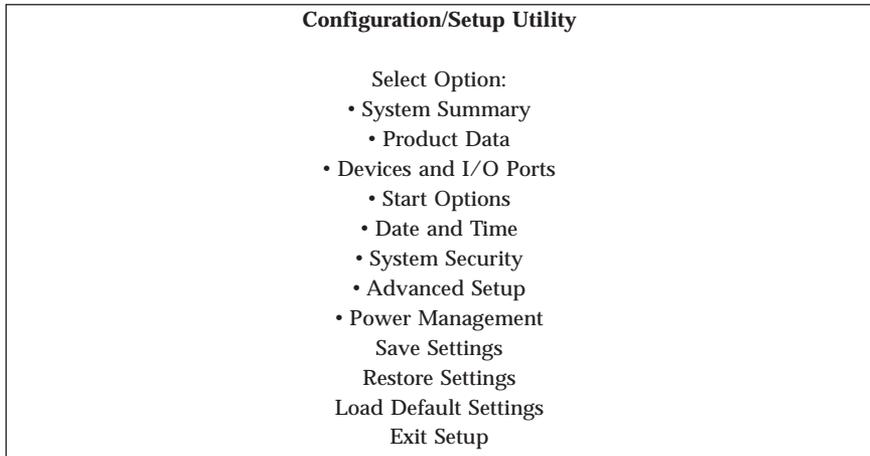
The Configuration/Setup Utility program might start automatically when POST detects that newly installed or removed hardware is not reflected in your current configuration. A 162 POST message is displayed. See “Power-on self-test (POST)” on page 71.

To start the Configuration/Setup Utility program:

1. Press and hold down F1 and turn on the computer. If your computer is already on when you start this procedure, you must shut down the operating system, turn off the computer, wait a few seconds until all in-use lights go off, and restart the computer. (Do not use Ctrl+Alt+Del to restart the computer.)
2. If you have not set a password, the Configuration/Setup Utility program menu appears on the screen. If you have set a password, the Configuration/Setup Utility program menu will not appear until you type your password and press Enter. See “Using passwords” on page 34 for more information.

## Viewing and changing settings

The menu on your computer might look slightly different from the menu shown here, but it will operate the same way.



The Configuration/Setup Utility program menu lists items that identify system configuration topics. You might see symbols next to configuration menu items. See the following table for the meaning of the symbols.

Symbol	Explanation
•	An additional menu or screen is available.
▶	A change to that item has been made in the system configuration or the Configuration/Setup Utility program has detected an error and attempted to correct it. Also, an additional menu might follow a menu item with a ▶ beside it.
*	A system resource conflict was detected. Resolve this conflict before exiting from the Configuration/Setup Utility program so that your computer will function properly.
[ ]	In the Configuration/Setup Utility program menus, the configuration information you can change is enclosed in brackets like these. You cannot change information that is not surrounded by brackets.

When working with the Configuration/Setup Utility program menu, you must use the keyboard. Refer to the following table for the keys used to accomplish various tasks.

<b>Keys</b>	<b>Function</b>
↑ ↓	Use the arrow keys to move among menu items until the item you want is highlighted.
← →	Use these arrow keys to display and toggle among choices for a menu item.
Enter	Press this key to select a highlighted menu item.
Esc	Press this key to exit from a menu after viewing or making changes to the settings in the menu.
+	Use this key in some menus to increase the numerical value of a setting.
-	Use this key (the minus or hyphen key) in some menus to decrease the numerical value of a setting.
0-9	Use the number keys in some menus to change the numerical value of a setting.
F1	Press this key for help on a selected menu item.
F9	Press this key if you changed and saved the setting of a selected menu item and you want to restore the setting that was active before you made the change.
F10	Press this key to return the setting of a selected menu item to a default value.

**Note:** Active keys are displayed at the bottom of each screen; not all of the above keys are active on every menu.

## **Exiting from the Configuration/Setup Utility program**

When you finish viewing or changing settings, press Esc until you return to the Configuration/Setup Utility program menu. You might have to press Esc several times to get back to the Configuration/Setup Utility program menu. If you want to save the changes or settings, select Save Settings before you exit. Otherwise, your changes will not be saved.

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## **Using System Security**

Use the System Security menu to customize the security features of your computer. The features included in the System Security menu are Enhanced Security, Security Profile by Device, Remote Administration, and Power On and Administrator Passwords.

## **Using Enhanced Security**

Some models support Enhanced Security. Enhanced Security can be enabled or disabled only when you update system programs.

If Enhanced Security is enabled and you have not set an administrator password, your computer will operate as though enhanced security is disabled.

If Enhanced Security is enabled and you have set an administrator password, your computer will operate as follows:

- The contents of the security EEPROM (your administrator password and startup sequence) will be protected from failure of the battery and CMOS memory.
- The security EEPROM will be protected from unauthorized access because it locks after your computer is turned on and the system programs have completed their startup routine. Once it is locked, the security EEPROM cannot be read from or written to by any software application or system software until the computer is turned off and back on again. On a network, this might prevent certain functions from being performed remotely on your computer.

Enhanced Security adds a *hard lock* for an extra measure of protection for the system programs in your computer. Normally, the entire contents of the system programs EEPROM is write protected with a *soft lock*. A soft lock enables the Remote Administration program to function in a network environment. With a hard lock, when your computer is turned on and the system programs startup routine is completed, Remote Administration is locked and cannot be unlocked until the computer is restarted and the administrator password is entered. Note that, in a networking environment, this prevents the system programs in your computer from being updated remotely. Someone must be present at your computer to turn it on and off and enter the administrator password.

- Some models have a chassis-intrusion feature that will alert you if the cover of your computer has been opened. This feature will work if your computer is on or off. If the cover has been opened, a prompt for your administrator password will appear on your screen, and your computer will remain in a suspended state until your administrator password is entered.
- Configuration settings cannot be changed in the Configuration/Setup Utility program until you enter the administrator password. This means that any changes to the computer hardware that the system programs detect will generate a configuration error until you enter the administrator password.

To enable or disable Enhanced Security:

1. Update the system programs. See “Updating system programs” on page 20.
2. During the run of the system program update, you are given the option of enabling or disabling Enhanced Security. Your choice is automatically recorded in the System Security menu of the Configuration/Setup Utility program.

## Using Security Profiles by Device

Security Profiles by Device enables you to control the level of security for the following:

- IDE controller (for example, hard disk drives): When the feature is set to Disable, all devices connected to the IDE controller are disabled and will not appear in the system configuration.
- Diskette Drive Access: When the feature is set to Disable, the diskette drive cannot be accessed.
- Diskette Write Protect: When the feature is set to Enable, all diskettes are treated as if write-protected.

Setting Security Profile by Device also enables you to control which devices require a password before they start up. There are three classes of these devices:

- Removable media, such as diskette drives and CD-ROM drives
- Hard disk drives
- Network devices

You can set these devices to request a user password, an administrator password, or not to require a password. This way, if you have a power-on or administrator password set for your system, you can configure your computer to prompt you for a password only when certain devices are accessed at startup. For example, if you set hard disk devices to require a user password, each time you attempt to start up from the hard disk, you will be prompted to type the password before the startup proceeds.

Some operating systems require you to type a password before the operating system will load. Security Profile by Device does not change the way the operating system works. If an operating system password is required, you must still type it when prompted, regardless of the Security Profile by Device settings.

To set Security Profiles by Device:

1. Start the Configuration/Setup Utility program (see “Starting and using the Configuration/Setup Utility program” on page 29).
2. From the Configuration/Setup Utility program menu, select **System Security** and press Enter.
3. Select **Security Profile by Device** and press Enter.
4. Select the desired devices and settings and press Enter.
5. Press Esc twice to return to the Configuration/Setup Utility program menu.
6. Select **Save Settings** from the Configuration/Setup Utility program menu; then press Enter and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

## Setting Remote Administration

You can remotely update the system programs, such as POST and BIOS, from a network server by enabling Remote Administration. If you have set an administrator password for your computer, the password does not have to be entered in order to remotely update programs. Consult your network administrator for information about setting up your network server to perform POST and BIOS updates.

To set Remote Administration, follow these steps:

1. Start the Configuration/Setup Utility program. See “Starting and using the Configuration/Setup Utility program” on page 29.
2. Select **System Security** and press Enter.
3. Select **Remote Administration** and press Enter.
4. To enable Remote Administration, select **Enabled**. To disable, select **Disabled**.
5. Press Esc until you return to the Configuration/Setup Utility program main menu.
6. Select **Save Settings** from the Configuration/Setup Utility program menu; then press Enter and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

## Using passwords

You can use two kinds of passwords to provide security for your computer and data: a power-on password and an administrator password. You do not have to set a password of either type to use your computer. However, if you decide to set one, read the following sections.

### Using a power-on password

The power-on password feature deters unauthorized persons from gaining access to your computer. When you set the power-on password, some models give you the option to choose one of three password prompt modes:

**On** In password prompt On mode, you are prompted for the power-on password when you turn on the computer. Until the correct password is entered, the computer operating system will not start, and you will not be able to use the keyboard or mouse to input any other information.

#### Notes:

1. If you have a mouse connected to a serial port, it will be activated when the computer is started, regardless of whether the password is set.
2. If Remote Administration is enabled, you cannot select On. In this case, select Dual. If you try to set this mode to On when Remote

Administration is enabled, it will automatically be reset to Dual. For more information, see “Setting Remote Administration” on page 34.

3. If you have a USB keyboard connected to your computer, the keyboard will not lock when you have set a password.

**Off** In password prompt Off mode (sometimes referred to as unattended start mode), you are not prompted to enter your power-on password when you turn on the computer. The operating system will start but you must type the password before you can log on or access applications.

**Dual** In the password prompt Dual mode, the startup behavior of the computer depends on whether the computer is started from the computer power switch or by an unattended method, such as remotely over a LAN.

If you start your computer using the power switch, you will be prompted for a password.

If the computer is started by an unattended method, the computer operates the same as it does in password prompt Off mode.

The password does not appear on the screen as you type it. If you type the wrong password, you receive a screen message telling you so. If you type the wrong password three times, you must turn off the computer and start again. When you type the correct password, the computer begins normal operation.

### **Setting, changing, and deleting a power-on password**

A power-on password can be any combination of up to seven characters (A-Z, a-z, and 0-9).

To set, change, or delete a power-on password:

1. Start the Configuration/Setup Utility program (see “Starting and using the Configuration/Setup Utility program” on page 29).
2. From the Configuration/Setup Utility program menu, select **System Security** and press Enter.
3. Select **Power-on Password** and press Enter.
4. To set or change a power-on password, type your new password and press the Down Arrow (↓). Type your new password again and press the Down Arrow (↓).
5. At **Change Power-On Password**, press Enter.
6. If your computer supports password prompt modes want to change the password prompt mode, select **Password Prompt** and then select either **Off**, **On**, or **Dual**. Continue at step 8.

7. To delete a power-on password, select **Delete Power-On Password**. A screen warning you that any existing power-on password will be deleted appears. Press Enter to continue.
8. Press Esc twice to return to the Configuration/Setup Utility program menu.
9. Select **Save Settings** from the Configuration/Setup Utility program menu; then press Enter and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

### Using an administrator password

Setting an administrator password deters unauthorized persons from changing configuration settings. If you are responsible for maintaining the settings of several computers, you might want to set an administrator password.

After you set an administrator password, a password prompt appears each time you try to access the Configuration/Setup Utility program. If you type the wrong password, you receive a message telling you so. If you type the wrong password three times, you must turn the computer off and start again.

If both a power-on and administrator password are set, you can type either password. However, in order to change any settings, you must use your administrator password. If you enter the power-on password, you will only be able to view limited information.

### Setting, deleting, or changing an administrator password

An administrator password can be any combination of up to seven characters (A-Z, a-z, and 0-9).

To set, change, or delete an administrator password:

1. Start the Configuration/Setup Utility program (see “Starting and using the Configuration/Setup Utility program” on page 29).
2. From the Configuration/Setup Utility program menu, select **System Security** and press Enter.
3. Select **Administrator Password** and press Enter.
4. To set or change an administrator password, type your new password and press the Down Arrow (↓). Type your new password again and press the Down Arrow (↓).
5. At **Change Administrator Password**, press Enter.
6. In the **Power-On Password Changeable by User** field, select **Yes** or **No**. (If you select **Yes** and an administrator password is set, the power-on password can be changed without having to enter the administrator password. If you select **No** and an administrator password is set, the power-on password cannot be changed unless the administrator password is entered.)
7. In the **Require Power-On Password on Warm boot** field, select **Yes** or **No**. Continue at step 9 on page 37.

8. To delete an administrator password, select **Delete Administrator Password** and press Enter.
9. Press Esc until you return to the Configuration/Setup Utility program menu.
10. Select **Save Settings** from the Configuration/Setup Utility program menu; then press Enter and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

### **Erasing a lost or forgotten password (clearing CMOS)**

This section applies to lost or forgotten passwords that are not protected by Enhanced Security. For information about lost or forgotten passwords that are protected by Enhanced Security, see “Using Enhanced Security” on page 31.

To erase a forgotten password:

1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Remove the cover. See “Removing the cover” on page 45.
4. Refer to the system board cover label inside the computer to locate the clear CMOS jumper on the system board.
5. Set the jumper from the standard position (pins 1 and 2) to pins 2 and 3.
6. Replace the cover and plug in the power cord. See “Replacing the cover and connecting the cables” on page 65.
7. Restart the computer, leave it on for about ten seconds, and then turn off the computer.
8. Repeat steps 2 through 4.
9. Set the jumper back to the standard position (pins 1 and 2).
10. Replace the cover and plug in the power cord. See “Replacing the cover and connecting the cables” on page 65.

### **Using Adapter ROM security**

Adapter ROM security prevents unauthorized users from altering the setup of vital adapters in your computer. You can set Adapter ROM security to on or off.

### **Using the IBM Embedded Security Chip**

Some models come with the IBM Embedded Security Chip. The Embedded Security Chip is a built-in cryptographic technology that can be used to secure the electronic transmission of information. To use the security features on this chip, you must also install security software that is available at <http://www.ibm.com/pc/support/> on the World Wide Web.

To enable the IBM Embedded Security Chip, do the following:

1. Start the Configuration/Setup Utility program. See “Starting and using the Configuration/Setup Utility program” on page 29.
2. Select **System Security** and press Enter.
3. Select **IBM Embedded Security Chip** and press Enter.
4. Set **IBM Embedded Security Chip** and press Enter.
5. Type the password in the bracketed field and press Enter.

You can clear the IBM Embedded Security Chip by selecting **Clear IBM Security Chip** and pressing Enter. This will delete all IBM Embedded Security Chip passwords and encryption values and disable the IBM Embedded Security Chip feature.

---

## Enabling the Pentium III processor serial number feature

The Pentium III microprocessor features a processor serial number feature. The processor serial number is an electronic number unique to each Pentium III microprocessor. This feature is used primarily to enhance security with Internet transactions. *Your computer is shipped to you with this feature Off (disabled).*

To enable this feature, use the following procedure:

1. Start the Configuration/Setup Utility program. See “Starting and using the Configuration/Setup Utility program” on page 29.
2. Select **Advanced Setup** and press Enter.
3. Select **Processor Control** and press Enter.
4. Change the value for **Processor Serial Number Access** from Disabled to Enabled and press Enter.
5. Save the settings, exit the program, and restart the computer with the computer power switch to activate the new setting.

---

## Other settings in the Configuration/Setup Utility program

The information in this section includes instructions for changing other settings using the Configuration/Setup Utility program, such as the keyboard speed, the startup sequence, and power management.

### Changing keyboard speed

You can change the speed at which the keyboard responds when you hold down a key. This setting can be found under **Start Options** in the Configuration/Setup Utility program. The default *typematic rate* is 30 characters per second (fast rate).

## Changing the primary startup sequence

These settings control the sequence of devices used to start up your computer when it is turned on using the power switch. The default or preset settings for the primary startup sequence are:

First startup device	[Diskette drive]
Second startup device	[Hard disk drive]
Third startup device	[Network]
Fourth startup device	[Disabled]

To view or change the primary or automatic power on startup sequence:

1. Start the Configuration/Setup Utility program (see “Starting and using the Configuration/Setup Utility program” on page 29).
2. Select **Start Options** and press Enter.
3. Select **Startup Sequence** and press Enter.
4. Use the arrow keys to make your selections and press Esc until you return to the Configuration/Setup Utility program menu.
5. Select **Save Settings** from the Configuration/Setup Utility menu and press Enter. Then press Esc and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

## Enabling the Error Startup Sequence

You can set your computer to initiate the Error Startup Sequence when POST detects an error by enabling this feature.

To enable the Error Startup Sequence:

1. Start the Configuration/Setup Utility program (see “Starting and using the Configuration/Setup Utility program” on page 29).
2. Select **Start Options** and press Enter.
3. Select **Startup Sequence** from the Start Options menu and press Enter.
4. Use the arrow keys to select **Error Startup Sequence** and set it to **Primary**, **Automatic**, or **Disabled**.
5. Press Esc until you return to the Configuration/Setup Utility menu and press Enter to save settings. Then press Esc and follow the instruction on the screen to exit from the Configuration/Setup Utility program.

## Power-management features

Your computer comes with built-in energy-saving capabilities. You can view and change energy-saving settings using the power-management menu in the Configuration/Setup Utility program. This section describes the power-management features in your computer and provides instructions for using these features.

## ACPI BIOS IRQ

Automatic Configuration and Power Interface (ACPI) BIOS IRQ enables the operating system to control the power-management features of your computer. You can use the ACPI BIOS IRQ setting to configure the interrupts that this feature uses so that you can free resources for other devices. Not all operating systems support ACPI BIOS IRQ. See your operating system documentation to determine if ACPI is supported.

## ACPI Standby Mode

Some models might allow you to select the power level to which the computer will go when entering standby mode. These models allow you to select standby mode S1 or S3.

When the computer enters S1 mode, power is maintained to all devices, but microprocessor activity is halted.

When the computer enters S3 mode, power is maintained only for main memory. Some computers do not support S3 mode. If the Standby Mode setting in the Configuration/Setup Utility program does not allow you to select S3, your computer only supports Standby Mode S1. If the Standby Mode setting in the Configuration/Setup Utility program allows you to select S3, be sure to read the following important information.

### Important

Some adapters might not wake up properly from Standby Mode S3. If your computer appears to have stopped and will not wake up from standby, press and hold the power switch for 5 seconds. Your computer will exit standby mode and turn off. Press the power switch to turn the computer back on.

If you encounter a problem with Standby Mode S3, set this option to S1 and check to see if updated device drivers that support Standby Mode S3 are available for your adapters.

## Setting power-management features

With power management, the computer and monitor (if the monitor supports DPMS) can be set to go into a reduced power state if they are inactive for a specified length of time.

- **Time to Low Power:** When you enable **Automatic Hardware Power Management**, you can use this option to specify the amount of time that the computer must be inactive before power-management features are activated.
- **System Power:** You can select **ON** if you want the computer to remain on or **OFF** if you want the computer to shut down.
- **Display:** You can use this option to select one of the following reduced-power states:

- **Standby:** In this mode, the screen is blanked, but the screen image is restored *immediately* when any activity is detected.
- **Suspend:** In this mode, the monitor uses less power than in Standby mode. The screen is blanked, but the screen image is restored *within a few seconds* after any activity is detected.
- **Off:** In this mode, the monitor power is turned off. To restore power to the monitor, you must press the monitor power switch. On some monitors, you might have to press the power switch twice.  
If **Off** is selected, you must specify the **Time to Display 'Off.'** You can select 5 minutes to 1 hour.

**Note:** *Time to display off* is the amount of time from when the reduced-power state begins until the display turns off.

- **Disable:** In this mode, the monitor is unaffected by the power management settings.
- **IDE Drives:** You can use this selection to specify whether the IDE drives are enabled or disabled when power-management features are activated.

To set power management features:

1. Start the Configuration/Setup Utility program (see “Starting and using the Configuration/Setup Utility program” on page 29).
2. Select **Power Management** and press Enter.
3. Select **APM** and press Enter.
4. Set **APM BIOS Mode** to Enabled or Disabled.
5. Set **Automatic Hardware Power Management** to Enabled.
6. Select values for power management (time to low power, system power, processor speed, display, and time to display off), as desired.
7. Select **Low Power Entry Activity Monitor** and press Enter.
8. Set to **Enabled** or **Disabled** devices you want to be monitored for power management.

**Note:** If all devices are set to disabled, you must restart the computer to wake the system.

9. Press Esc until you return to the Configuration/Setup Utility program menu; then select **Save Settings** and press Esc and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

**Setting automatic power-on features:** You can use the automatic power-on features on the power-management menu to enable and disable features that automatically turn on your computer. You must also select the startup sequence you want to use for the type of power-on event you select.

- **Wake on LAN:** If you have remote network-management software, you can use the IBM-developed Wake on LAN feature. When you set Wake on LAN

to Enabled, your computer will turn on when it receives a specific signal from another computer on your local area network (LAN).

- **Wake on Alarm:** With this feature, you can specify a date and time at which the computer will be turned on automatically. This can be either a single event, a daily event, or a weekly event.
- **PCI Wake Up:** If this setting is enabled, your computer turns on in response to wake up requests from PCI devices that support this feature.

To set automatic power-on features, follow these steps:

1. Start the Configuration/Setup Utility program (see “Starting and using the Configuration/Setup Utility program” on page 29).
2. Select **Power Management** and press Enter.
3. Select **Automatic Power On** and press Enter.
4. Select the menu item for the feature you want to set. Use Left Arrow (←) or Right Arrow (→) to select either **Enabled** or **Disabled**. Press Enter.
5. Select **Startup Sequence** for the feature. Use Left Arrow (←) or Right Arrow (→) to select either Primary or Automatic. If you select Automatic, make sure **Automatic Power On Startup Sequence** in the Startup Sequence menu is set to **Enabled**. Otherwise, the system will use the Primary startup sequence.
6. Press Esc until you return to the Configuration/Setup Utility program menu.
7. Select **Save Settings** from the Configuration/Setup Utility program menu and press Enter. Then press Esc and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

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## Chapter 5. Installing options

You can expand the capabilities of your computer by adding memory, drives, or adapters. When adding an option, use these instructions along with the instructions that come with the option.

**Important:** Before you install any option, see the safety notices in the *Quick Reference* and read the “Safety information” on page iii. These precautions and guidelines will help you work safely.

---

### Handling static-sensitive devices

Static electricity, although harmless to you, can seriously damage computer components and options.

When you add an option, do *not* open the static-protective package containing the option until you are instructed to do so.

When you handle options and other computer components, take these precautions to avoid static electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters and memory modules by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you install a new option, touch the static-protective package containing the option to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the option and install it directly in the computer without setting the option down. When this is not possible, place the static-protective package that the option came in on a smooth, level surface and place the option on it.
- Do not place the option on the computer cover or other metal surface.

---

## Available options

The following are some available options:

- System memory, called dual in-line memory modules (DIMMs)
- Peripheral component interconnect (PCI) adapters
- Internal drives
  - CD-ROM
  - Hard disk
  - Diskette drives and other removable media drives

For the latest information about available options, see the following World Wide Web pages:

- <http://www.ibm.com/pc/us/options/>
- <http://www.ibm.com/pc/support/>

You can also obtain information by calling the following telephone numbers:

- Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your IBM reseller, or IBM marketing representative.
- Within Canada, call 1-800-565-3344 or 1-800-465-7999.
- Outside the United States and Canada, contact your IBM reseller or IBM marketing representative.

**Important:** Some models come with only one internal fan to cool components in the computer and prevent overheating. Do not install an internal hard disk that is 7200 rpm or more. This might cause your computer to overheat and damage your computer.

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## Tools required

To install some options in your computer, you might need a flat-blade screwdriver. Additional tools might be needed for certain options. See the instructions that come with the option.

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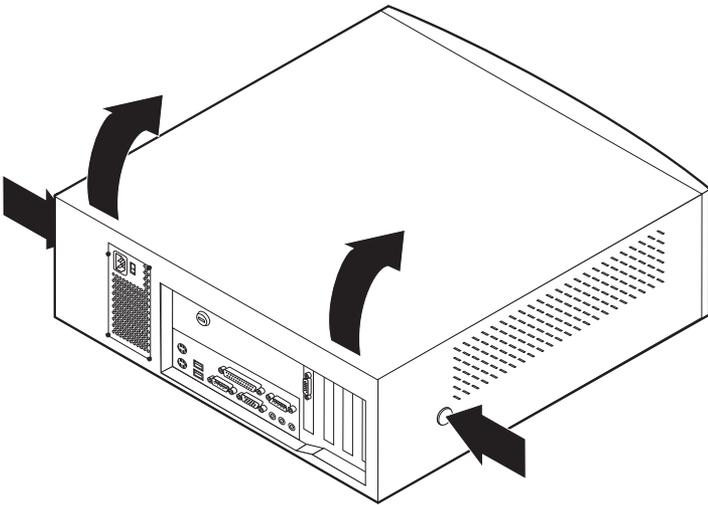
## Removing the cover

**Important:**

Read “Safety information” on page iii and “Handling static-sensitive devices” on page 43 before removing the cover.

To remove the cover:

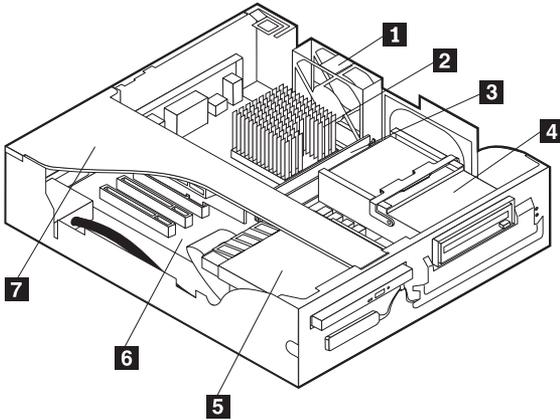
1. Shut down your operating system, remove any media (diskettes, CDs, or tapes) from the drives, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables connected to the computer.
4. Press the buttons on the sides of the computer and pivot the rear end of the cover up toward the front of the computer.



---

## Locating components—small form factor desktop model

The following illustration will help you locate the various components in your computer.

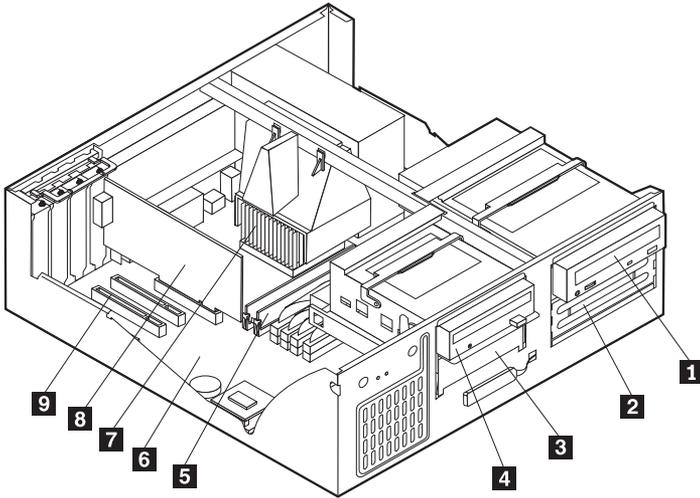


- |          |                |          |                                     |
|----------|----------------|----------|-------------------------------------|
| <b>1</b> | Fan            | <b>5</b> | Slimline CD-ROM drive (some models) |
| <b>2</b> | Microprocessor | <b>6</b> | System board                        |
| <b>3</b> | DIMM           | <b>7</b> | Riser card housing                  |
| <b>4</b> | Diskette drive |          |                                     |

---

## Locating components—desktop model

The following illustration will help you locate the various components in your computer.



- |          |                 |          |                           |
|----------|-----------------|----------|---------------------------|
| <b>1</b> | CD-ROM drive    | <b>6</b> | System board              |
| <b>2</b> | Empty drive bay | <b>7</b> | Microprocessor            |
| <b>3</b> | Hard disk drive | <b>8</b> | AGP adapter (some models) |
| <b>4</b> | Diskette drive  | <b>9</b> | PCI slot                  |
| <b>5</b> | DIMM            |          |                           |

---

## Installing options on the system board and riser card (some models)

This section provides instructions for installing options, such as system memory and adapters, on the system board and the riser card (some models).

### Accessing the system board

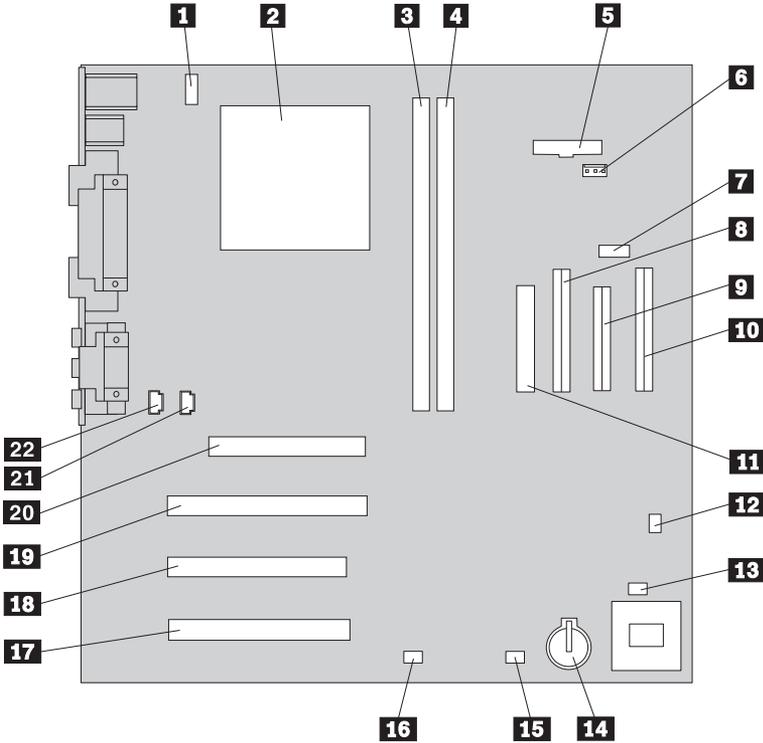
To access the system board, you must remove the computer cover. For information on removing the computer cover, see “Removing the cover” on page 45. You might need to remove adapters in order to access some components of the system board. For information about expansion adapters, see “Installing adapters” on page 52. When disconnecting cables, be sure to note where they attach, so you can correctly reattach them later.

## Identifying parts on the system board

The system board, also called the *planar* or *motherboard*, is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are IBM-installed or that you can install later. Depending on the model, your computer comes with one of the following two system boards.

### Components of the A40 and A40p system board

If your computer is a type A40 or A40p, see the following illustration for the location of parts on the system board.

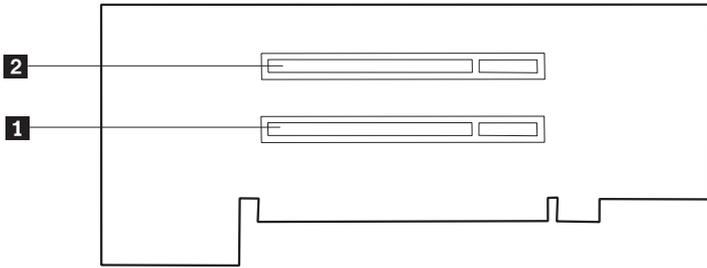


**Note:** An illustration of the system board and additional information is provided on a label located on the inside of the computer chassis.

- |           |                         |           |                            |
|-----------|-------------------------|-----------|----------------------------|
| <b>1</b>  | CPU fan connector       | <b>12</b> | CMOS clear/recovery jumper |
| <b>2</b>  | Microprocessor          | <b>13</b> | Front fan connector        |
| <b>3</b>  | DIMM 1                  | <b>14</b> | Battery                    |
| <b>4</b>  | DIMM 2                  | <b>15</b> | SCSI adapter LED connector |
| <b>5</b>  | Power LED connector     | <b>16</b> | Wake on LAN connector      |
| <b>6</b>  | RFID connector          | <b>17</b> | PCI slot 3                 |
| <b>7</b>  | Front USB connector     | <b>18</b> | PCI slot 2                 |
| <b>8</b>  | Secondary IDE connector | <b>19</b> | PCI slot 1                 |
| <b>9</b>  | Diskette connector      | <b>20</b> | AGP connector              |
| <b>10</b> | Primary IDE connector   | <b>21</b> | CD-ROM audio connector     |
| <b>11</b> | Power connector         | <b>22</b> | Speaker connector          |

### Components of the riser card for small form factor desktop models

The following illustration shows the location of PCI connectors on the riser card for small form factor desktop model computers.

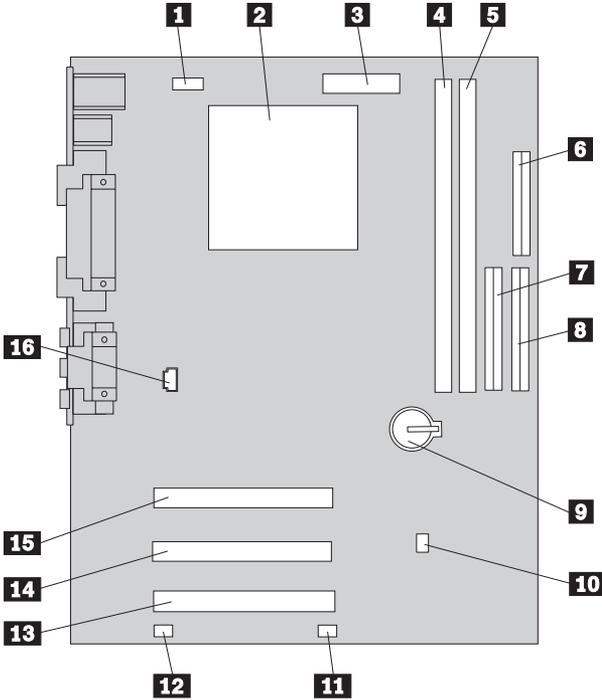


**1** PCI slot 1

**2** PCI slot 2

## Components of the A20 system board

If your computer is a type A20 computer, see the following information for the location of parts on the system board.



**Note:** An illustration of the system board and additional information is provided on a label located on the inside of the computer chassis.

<b>1</b>	CPU fan connector	<b>9</b>	Battery
<b>2</b>	Microprocessor	<b>10</b>	Clear CMOS/Recovery jumper
<b>3</b>	Power connector	<b>11</b>	Front fan connector
<b>4</b>	DIMM 1	<b>12</b>	Wake on LAN connector
<b>5</b>	DIMM 2	<b>13</b>	PCI connector 3
<b>6</b>	Diskette connector	<b>14</b>	PCI connector 2
<b>7</b>	Secondary IDE connector	<b>15</b>	PCI connector 1
<b>8</b>	Primary IDE connector	<b>16</b>	CD-ROM audio connector

## Installing memory

Your computer has two connectors for installing memory modules that provide up to a maximum of 512 MB of system RAM.

Your computer uses dual inline memory modules (DIMMs). The IBM-installed DIMMs that come with your computer are unbuffered, synchronous dynamic random access memory (SDRAM).

When installing DIMMs, the following rules apply:

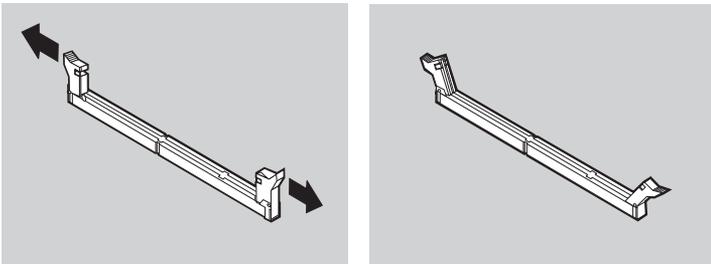
- Fill each system memory connector sequentially, starting at DIMM 1.
- Use 3.3 V, 133 MHz, unbuffered, SDRAM DIMMs.
- Use only 64, 128, or 256 MB DIMMs in any combination.

**Notes:**

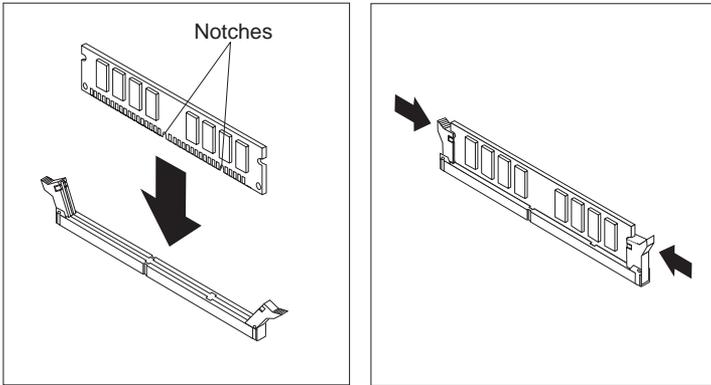
1. To locate the memory connectors on the system board, see “Identifying parts on the system board” on page 48.
2. To open the retaining clips on the DIMM connectors in the desktop model, you will have to remove the AGP adapter first.
  - a. Remove the adapter slot cover latch.
  - b. Remove the AGP adapter.

To install a DIMM:

1. Remove the cover. See “Removing the cover” on page 45.
2. If the retaining clips are not already open, open them.



3. Install the DIMM straight down into the connector until the retaining clips close. Make sure the notches in the DIMM align with the tabs on the connector.



**What to do next:**

- Replace the AGP adapter and adapter slot cover latch.
- To work with another option, go to the appropriate section.
- To complete the installation, go to “Completing the installation” on page 65.

## Installing adapters

This section provides information and instructions for installing and removing adapters.

### Adapter slots

The small form factor desktop model has two expansion slots used to connect adapters to the peripheral component interconnect (PCI) bus. You can install an adapter up to 174.6 mm (6.875 inches) long in the small form factor desktop model.

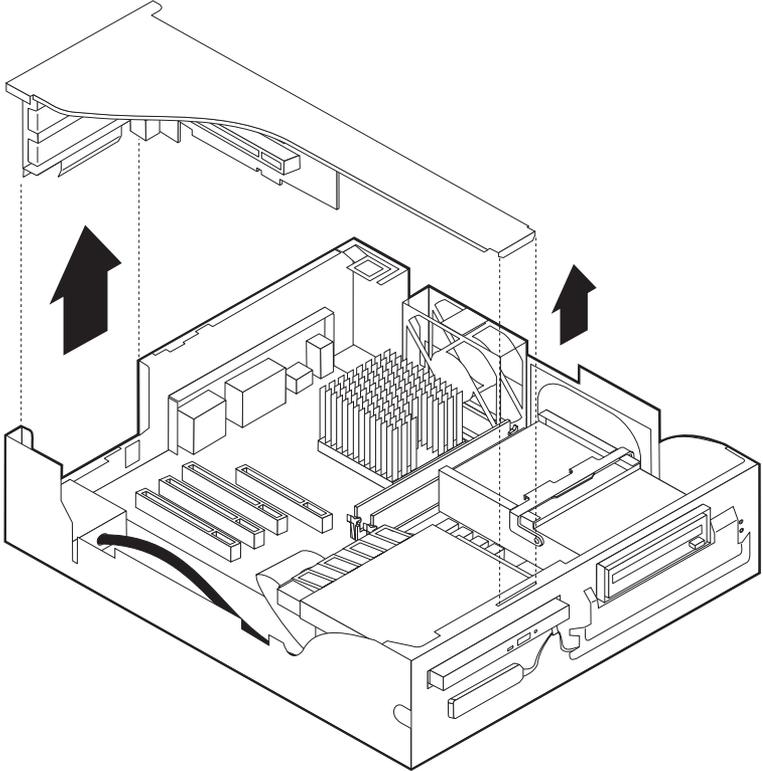
The desktop model has three expansion slots used to connect adapters to the peripheral component interconnect (PCI) bus and one slot used to connect an accelerated graphics port (AGP) adapter. You can install an adapter up to 330 mm (13 inches) long in the desktop model.

All adapters supported by your computer use *Plug and Play* technology that enables the computer to automatically configure the adapter. For more information, see “Updating the computer configuration” on page 66.

## Installing adapters — small form factor desktop model

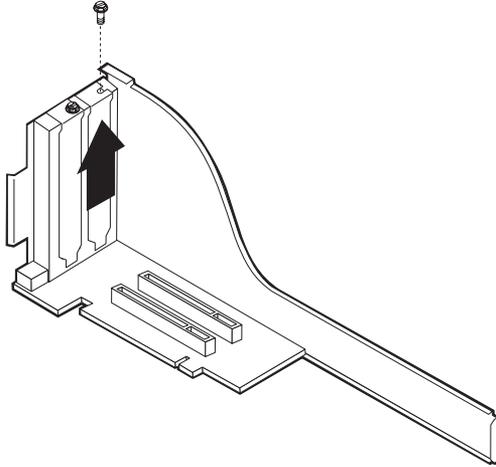
To install an adapter in a PCI expansion slot:

1. Remove the cover and all cables. See “Removing the cover” on page 45.
2. Remove the riser card housing and place the housing on its side with the adapter slots facing up.

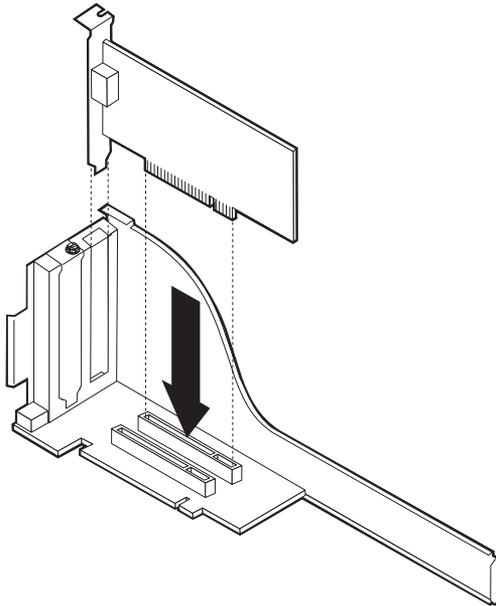


3. Remove the adapter from its static-protective package.

4. Remove the screw and adapter slot cover for the adapter slot into which you are installing the adapter.

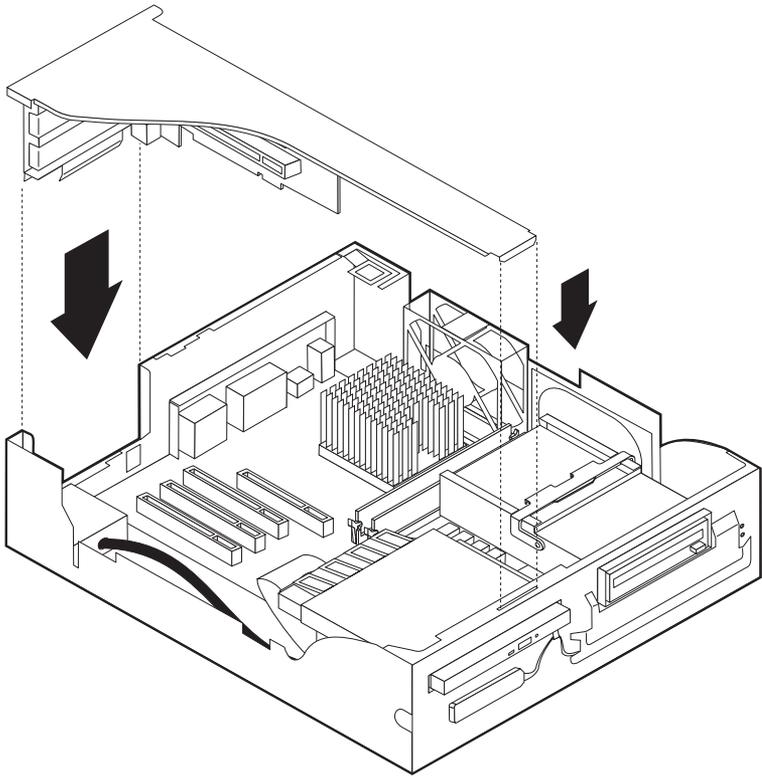


5. Install the adapter and insert the retaining screw.



**Note:** If you are installing a Wake on LAN-supported network adapter, attach the Wake on LAN cable that came with the adapter to the Wake on LAN connector on the system board.

6. Replace the riser card housing.

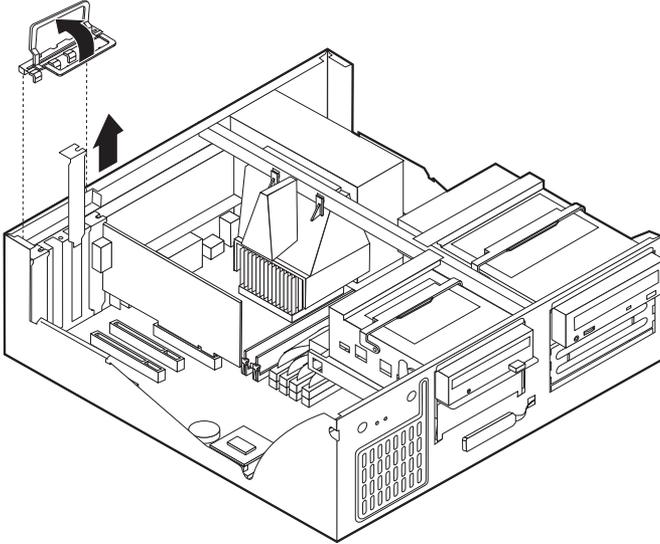


7. Replace the cover and connect the cables (see “Replacing the cover and connecting the cables” on page 65); then continue with “Updating the computer configuration” on page 66.

## Installing adapters — desktop model

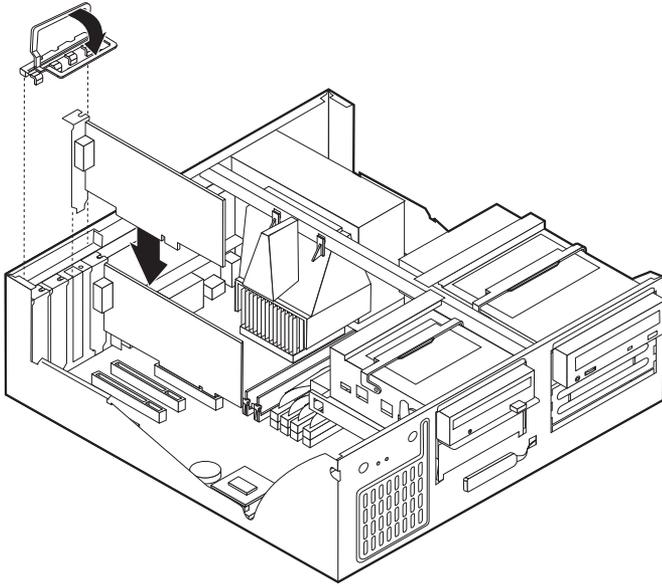
To install an adapter in a PCI or AGP expansion slot:

1. Remove the cover. See “Removing the cover” on page 45.
2. Remove the adapter slot cover latch and the slot cover for the appropriate expansion slot.



3. Remove the adapter from its static-protective package.
4. Install the adapter into the appropriate slot on the system board.

5. Install the adapter slot cover latch.



**Note:** If you are installing a Wake on LAN-supported network adapter, attach the Wake on LAN cable that came with the adapter to the Wake on LAN connector on the system board.

6. Replace the cover and connect the cables (see “Replacing the cover and connecting the cables” on page 65); then continue with “Updating the computer configuration” on page 66.

**What to do next:**

- To work with another option, go to the appropriate section.
- To complete the installation, go to “Completing the installation” on page 65.

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## Installing internal drives

This section provides information and instructions for installing and removing internal drives.

Internal drives are devices that your computer uses to read and store data. You can add drives to your computer to increase storage capacity and to enable your computer to read other types of media. Some of the different drives available for your computer are:

- Hard disk drives
- Tape drives
- CD-ROM drives
- Removable media drives

Internal drives are installed in *bays*. Within this book, the bays are referred to as bay 1, bay 2, and so on.

When you install an internal drive, it is important to note what type and size of drive you can install in each bay. Also, it is important to correctly connect the internal drive cables to the installed drive.

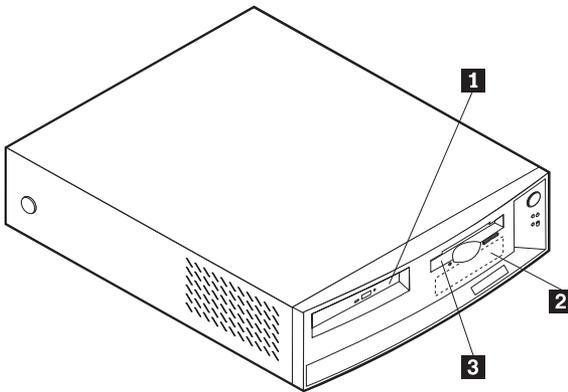
### Drive specifications — small form factor desktop model

Your computer comes with the following IBM-installed drives:

- A CD-ROM drive in bay 1 (some models)
- A 3.5-inch hard disk drive in bay 2
- A 3.5-inch diskette drive in bay 3

Models that do not have drives installed in bay 3 have a static shield and bay panel installed.

The following table describes some of the drives you can install in each bay and their height requirements.



- 1 Bay 1 - Max Height: 25.4 mm (1.0 in.)**  
Slimline CD-ROM drive (standard in some models)
- 2 Bay 2 - Max Height: 25.4 mm (1.0 in.)**  
3.5-inch hard disk drive (preinstalled)
- 3 Bay 3 - Max Height: 12.7 mm (0.5 in.)**  
3.5-inch diskette drive (preinstalled)

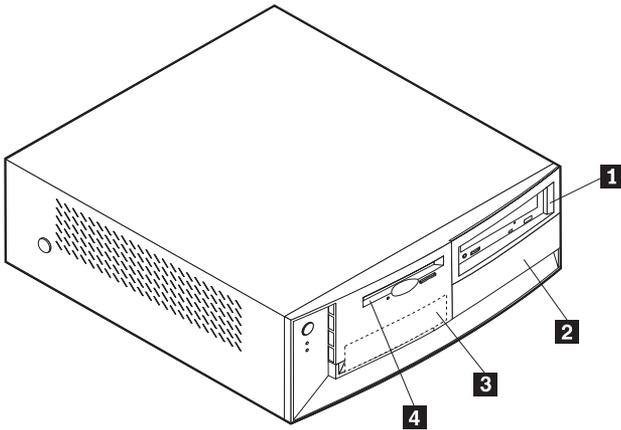
### Drive specifications — desktop model

Your computer comes with the following IBM-installed drives:

- A CD-ROM drive in bay 1 (some models).
- A 3.5-inch hard disk drive in bay 3.
- A 3.5-inch diskette drive in bay 4.

Models that do not have drives installed in bays 1 and 2 have a static shield and bay panel installed.

The following illustration shows the locations of the drive bays in the desktop model.



The following table describes some of the drives you can install in each bay and their height requirements.

- |          |  |
|----------|--|
| <b>1</b> | <b>Bay 1 - Max Height: 41.3 mm (1.6 in.)</b><br>CD-ROM drive (standard in some models)<br>5.25-inch hard disk drive  |
| <b>2</b> | <b>Bay 2 - Max Height: 41.3 mm (1.6 in.)</b><br>5.25-inch hard disk drive<br>3.5-inch hard disk drive (requires a mounting bracket)<br>CD-ROM drive<br>DVD-ROM drive |
| <b>3</b> | <b>Bay 3 - Max Height: 25.4 mm (1.0 in.)</b><br>3.5-inch hard disk drive (preinstalled)  |
| <b>4</b> | <b>Bay 4 - Max Height: 25.4 mm (1.0 in.)</b><br>3.5-inch diskette drive (preinstalled)   |

**Notes:**

1. Drives that are greater than 41.3 mm (1.6 in.) high cannot be installed.
2. Install removable media (tapes or CDs) drives in the accessible bays: bays 1 or 2.

## Power and signal cables for internal drives

Your computer uses cables to connect integrated drive electronics (IDE) drives to the power supply and to the system board. The following cables are provided:

- Four-wire *power cables* connect most drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.
- Flat *signal cables*, also called *ribbon cables*, connect IDE and diskette drives to the system board. There are two sizes of ribbon signal cables that come with your computer:
  - The wider signal cable has two or three connectors.
    - If the cable has three connectors, one of these connectors is attached to the drive, one is a spare, and the third attaches to the primary or secondary IDE connector on the system board.
    - If the cable has two connectors, one of these connectors is attached to the hard disk drive, and the other attaches to the primary or secondary IDE connector on the system board.

**Notes:**

1. If you want to add another device, and your computer does not come with a CD-ROM preinstalled, you will need a second signal cable with three connectors. You will need an 80-conductor ATA 66 signal cable if you are replacing the existing signal cable or adding

a second hard disk. ATA 66 signal cables are color-coded. The blue connector attaches to the system board; the black connector attaches to the master device, and the gray middle connector attaches to the slave device.

If your computer comes with a CD-ROM drive, it will have an ATA 66 signal cable. However, if you installing a hard disk drive, you must change the switch setting on the CD-ROM drive to secondary and change the connector used for the CD-ROM drive to the gray middle connector.

2. If you are installing a slimline CD-ROM drive in the small form factor desktop model, the IDE cable requires a special connector to attach to the slimline CD-ROM drive. This connector can be attached only to an optional slimline CD-ROM drive.
- The narrower signal cable has two connectors for attaching the diskette drive to the diskette-drive connector on the system board.

**Note:** To locate connectors on the system board, see “Identifying parts on the system board” on page 48.

The following are some important points to remember when connecting power and signal cables to internal drives:

- The drives that are preinstalled in your computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive.
- When you install a drive, ensure that the drive connector at the *end* of the signal cable is always connected to a drive; also, ensure that the drive connector at the other end is connected to the system board. This reduces electronic noise from the computer.
- If two IDE devices are used on a single cable, one must be designated as the primary or master device and the other as the secondary or subordinate device; otherwise, some of the IDE devices might not be recognized by the system. The primary or secondary designation is determined by switch or jumper settings on each IDE device.
- If two IDE devices are on a single cable, and only one is a hard disk drive, the hard disk drive must be set as the master device.
- If you have only one IDE device on a cable, it must be set as master.

For help in selecting drives, cables, and other options for your computer, see page 44.

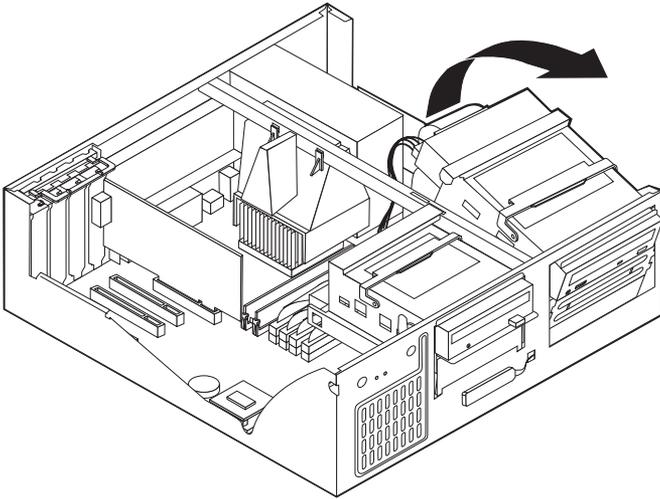
## Installing internal drives in the desktop model computer

To install an internal drive in the desktop model computer: To remove the cover,

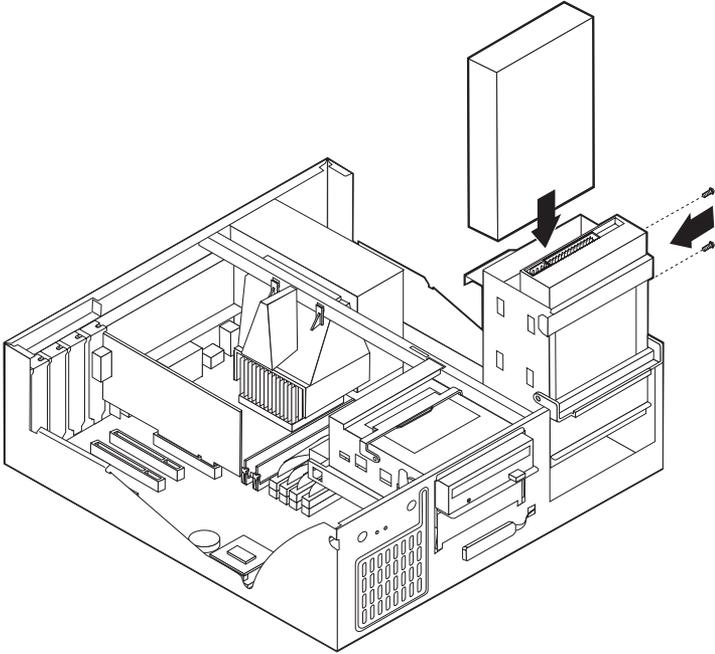
1. See “Removing the cover” on page 45.

**Note:** If your computer has a CD-ROM drive, you might need to remove the signal and power cables from the CD-ROM drive.

2. Pivot the drive bay latch handle toward the front of the computer and pivot the drive bay cage toward the front of the computer until the drive cage latch catches to the chassis.

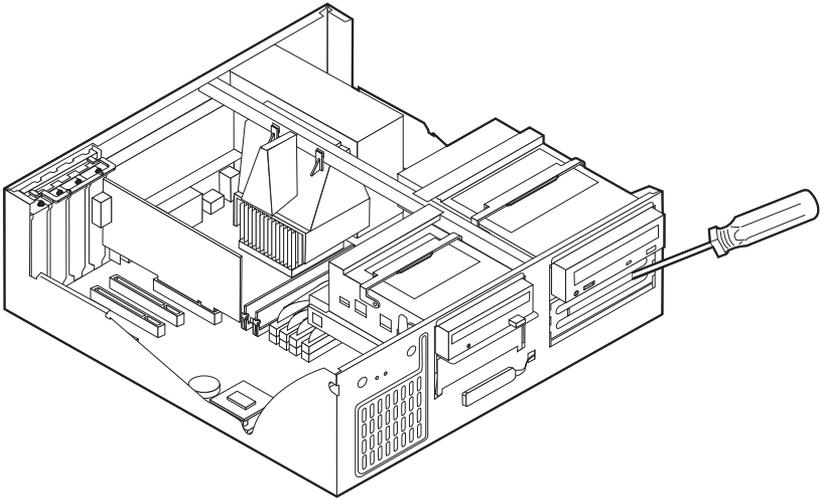


3. Install the drive into the bay. Align the screw holes and insert the two screws.

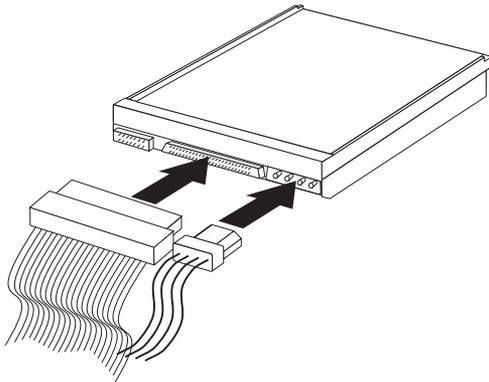


4. Pivot the drive bay cage back into place.

5. If you are installing a drive with removable media, insert a flat-bladed screwdriver into one of the slots on the static shield in the drive bay into which you are installing the drive and gently pry the static shield loose from the drive bay.



6. If the drive you installed is a removable-media drive, remove the bay panel from the front bezel and place the bezel frame that comes with your computer over the drive bay.
7. Connect the power and signal cables to the drive.



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**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to “Completing the installation”.

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**Installing a security U-bolt**

To help prevent hardware theft, you can add a security U-bolt and cable to your computer. After you add the security cable, make sure that it does not interfere with other cables that are connected to the computer.

To install a U-bolt:

1. Use a tool, such as a screwdriver, to remove the two metal knockouts.
2. Insert the U-bolt through the rear panel; then attach and tighten the nuts with an appropriately sized or adjustable wrench.
3. Replace the computer cover. For more information, see “Replacing the cover and connecting the cables”.
4. Thread the cable through the U-bolt and around an object that is not a part of or permanently secured to the building structure or foundation, and from which it cannot be removed; then fasten the cable ends together with a lock.

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**Completing the installation**

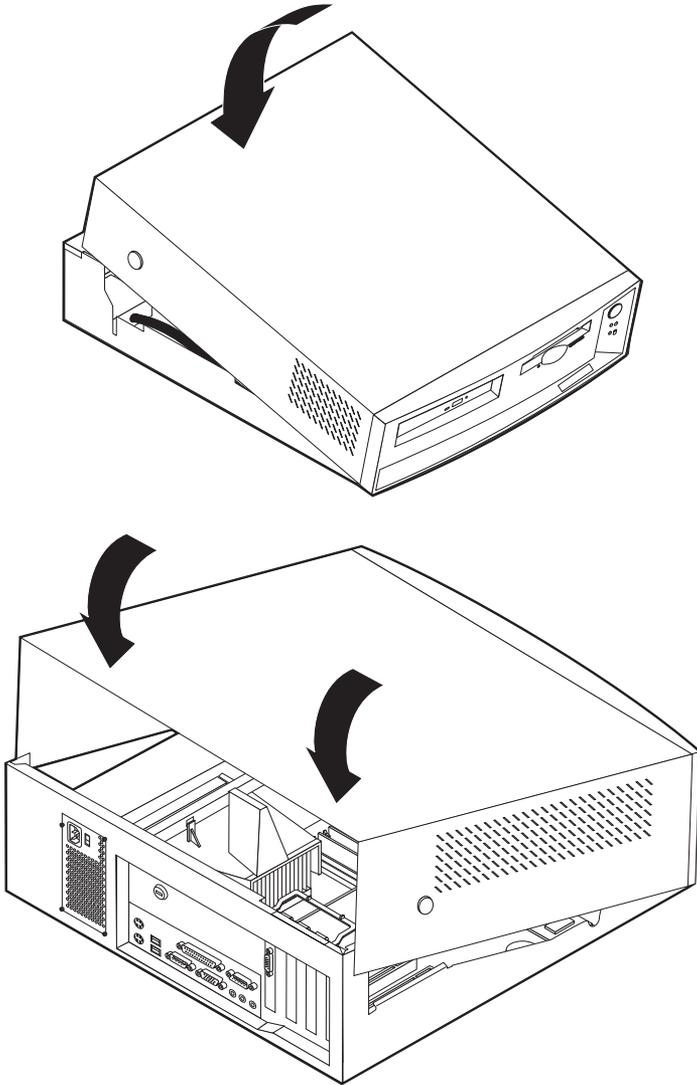
After working with options, you need to install any removed parts, replace the cover, and reconnect any cables, including power cords and telephone lines. Also, depending on the option installed, you might need to confirm the updated information in the Configuration/Setup Utility program.

**Replacing the cover and connecting the cables**

To replace the cover and connect cables to your computer:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
2. Clear any cables that might impede the replacement of the cover.

3. Position the cover over the chassis and pivot the cover down over the computer until the cover snaps into place.



4. Reconnect the external cables and cords to the computer. See “Connecting computer cables” on page 7.

## Updating the computer configuration

You might need to install device drivers after updating the configuration settings. For more information, see the instructions that come with the option

to determine if device drivers are required and how to install them. Some device drivers are included in the service partition of your computer.

You might need to install device drivers after updating the configuration settings. For more information, see the instructions that come with the option to determine if device drivers are required and how to install them. Some device drivers are included in the service partition of your computer.

After adding options, the configuration settings are updated automatically by system programs. If the settings are not updated properly or an error occurs as a result of the installed option, you can use the Configuration/Setup Utility program to reconfigure the appropriate settings. In either case, you must save the settings before exiting from the Configuration/Setup Utility program.

For example, when you start your computer after adding most internal hard disk drives, the settings might be updated. If the settings are not updated properly, use the Configuration/Setup Utility program to make and save those changes.

**Note:** For more information on error messages from configuration conflicts, see “Chapter 6. Troubleshooting” on page 69.

Along with the documentation that comes with your adapter, use the following information to help with adapter configuration.

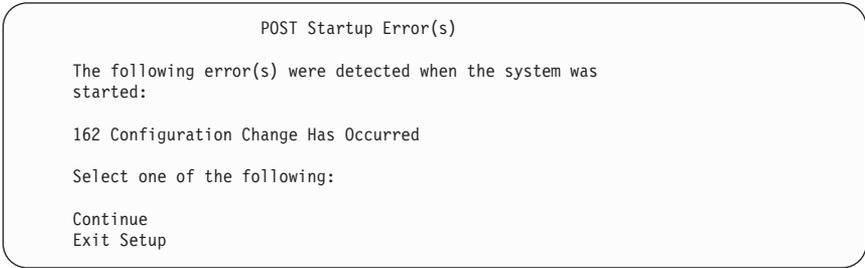
*Plug and Play* is a configuration method that makes expanding your computer easier. The system board of your computer supports operating systems that use Plug and Play technology.

PCI adapters that you can install in your computer are Plug and Play devices. A Plug and Play adapter has no switches or jumpers that must be set. A Plug and Play adapter comes with configuration specifications that provide installation information to the computer during startup. When you install Plug and Play adapters, this information is interpreted by the *basic input/output system (BIOS)*, which supports Plug and Play technology. If the required resources are available, the BIOS software automatically configures the adapter using resources *not* already used by other devices.

### **Starting the Configuration/Setup Utility program**

When you restart the computer for the first time after working with most options, a message might appear indicating that a configuration change has occurred. If such a message appears, you are then prompted to enter the Configuration/Setup Utility program to confirm and save settings that were automatically updated by the system programs.

After you change an option and restart the computer, the following screen might appear.



**Note:** Depending on the configuration changes that occurred, the error message you see might be different from the one shown here. If the preceding screen appears, select **Continue** until you reach the program menu (see “Chapter 4. Using the Configuration/Setup Utility program” on page 29).

If the preceding screen does not appear, use the program to configure your computer. For more information, see “Chapter 4. Using the Configuration/Setup Utility program” on page 29.

### **Configuring startup devices**

When your computer is turned on, it looks for an operating system. The order in which it searches devices for the operating system is the startup sequence. After adding new devices to the computer, you might want to change the startup sequence. You can use the program to configure startup devices. See “Changing the primary startup sequence” on page 39.

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## Chapter 6. Troubleshooting

This chapter describes diagnostic tools that you can use to identify and correct problems that might arise. This chapter also contains information about option diskettes and how to recover from a BIOS update failure.

Computer problems can be caused by hardware, software, or user error (for example, pressing the wrong key). You can use the diagnostic aids discussed in this chapter to help you solve such problems yourself or gather helpful information you can pass on to a service technician.

Computer problems can be caused by hardware, software, or user error (for example, pressing the wrong key). You can use the diagnostic aids discussed in this chapter to help you solve such problems yourself or gather helpful information you can pass on to a service technician.

You can check the hardware by following the procedures in this chapter. You can also use the diagnostic programs provided with your computer (see “IBM Enhanced Diagnostics program” on page 92 for a description of these programs).

If the hardware checks out, and you have not made a user error, you might have a software problem. If you suspect that you have a software problem and your computer comes with IBM-preinstalled software, see “IBM Enhanced Diagnostics program” on page 92 for information about how to run the IBM Enhanced Diagnostics program provided by IBM. Also see the operating system documentation supplied with your computer. If you have installed software applications yourself, see the documentation supplied with the software.

The following tools are available to diagnose hardware-related problems:

- Power-on self-test (POST)
- Troubleshooting procedure
- Error codes and messages
- Troubleshooting charts
- IBM Enhanced Diagnostics program

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## Troubleshooting procedure

Use this procedure as a starting point for problem identification.

1. To begin troubleshooting, perform the following steps:
  - a. Remove all diskettes and CDs from the drives.
  - b. Turn off the computer and wait for a few seconds.
  - c. Turn on any attached devices; then, turn on the computer.
  - d. Wait the normal amount of time for the first window of your application or the operating system to be displayed.

Is either the Windows desktop or the first screen of your application program displayed?

No - continue at step 2.

Yes - The power-on self-test (POST) did not detect a problem. Further diagnostic testing is required. Go to "IBM Enhanced Diagnostics program" on page 92 and run the diagnostic programs. If you are unable to run the diagnostic programs or if the diagnostic programs do not detect an error, go to "Device troubleshooting charts" on page 78.

2. You have an unreadable display, an error message, or the computer is sounding a series of beeps.

Is an error message displayed?

No - continue at step 3.

Yes - See "POST error codes" on page 72 and look for the error message; then, return here.

Is the error message in this table?

No - the message might be from your software. Refer to documentation for your application program.

Yes - continue at step 4.

3. Do you hear a series of beeps?

No - Go to "Device troubleshooting charts" on page 78. Find the symptom that best describes the problem and take the appropriate action. If the problem persists, have the computer serviced.

Yes - Go to "POST beep codes" on page 75.

4. Did the Configuration/Setup Utility program start automatically after the error message was displayed?

No - Follow the action for this error message described in "POST error codes" on page 72.

Yes - continue to step 5.

5. Have you recently added, removed, or changed any hardware?

No - Have the computer serviced.

Yes - Do one of the following:

- If the failure occurred immediately after you installed or removed an option, and you have not yet updated the configuration, see “Chapter 4. Using the Configuration/Setup Utility program” on page 29.
- If the computer was functioning correctly after you installed an option and is now malfunctioning, have the computer serviced.
- If the failure occurred immediately after you made a change to the configuration, verify that you selected the correct settings.
- If the failure occurred immediately after you installed or removed a new option and you get an error message from the Configuration/Setup Utility program, disconnect the new device.

---

## Power-on self-test (POST)

Each time you turn on your computer, it performs a series of tests that check the basic operation of the base computer. This series of tests is called the *power-on self-test (POST)*.

POST does the following:

- Checks basic system board operations
- Checks the memory operation
- Compares the current system configuration with that established by the Configuration/Setup Utility program
- Starts the video operation
- Verifies that the diskette drives are working
- Verifies that the hard disk drive and the CD-ROM drive are working

POST error messages appear when POST finds problems with or changes to the hardware during startup. POST error messages are 3-, 4-, 5-, 8-, or 12-character alphanumeric messages and include brief explanations (except I999XXXX errors).

---

## Diagnostic error codes and messages

Diagnostic codes and messages appear if a hardware problem is detected by one of the IBM Enhanced Diagnostics test programs or if POST detects a problem. Along with error codes, the messages present text information that can be used to identify a failing part.

## POST error codes

Table 1. POST Error Codes

Code	Description	Action
101	Interrupt failure	Have the computer serviced.
102	Timer failure	Have the computer serviced.
106	System board failure	Have the computer serviced.
110	Parity error	Have the computer serviced.
111	I/O parity error 2	Go to “IBM Enhanced Diagnostics program” on page 92 and follow the instruction to run diagnostics.
129	Level 1 cache error	Have the computer serviced.
135	Fan failure	Have the computer serviced.
151	Real time clock failure	Have the computer serviced.
161	Defective CMOS battery	Replace the battery. See “Replacing the battery” on page 95.
162	A change in device configuration occurred	<ol style="list-style-type: none"> <li>1. Verify that all external devices are turned on.</li> <li>2. Verify that all devices are properly installed and securely connected.</li> <li>3. If you added, removed, or changed the location of a device, save the new configuration in the Configuration/Setup Utility program. See “Starting the Configuration/Setup Utility program” on page 67 and “Chapter 4. Using the Configuration/Setup Utility program” on page 29 for more information.</li> </ol>
163	Clock not updating	Have the computer serviced.
164	CMOS RAM memory size does not match	Go to “IBM Enhanced Diagnostics program” on page 92 and follow the instructions to run diagnostics.
166	Boot block check sum error	Have the computer serviced.
167	No processor patch	Update the BIOS. See “Updating system programs” on page 20.

Table 1. POST Error Codes (continued)

Code	Description	Action
168	Alert on LAN is not working correctly.	<ol style="list-style-type: none"> <li>1. Go to “Chapter 4. Using the Configuration/Setup Utility program” on page 29 and follow the instructions to verify that Alert on LAN is enabled.</li> <li>2. If Alert on LAN is enabled and the error persists, have the computer serviced.</li> </ol>
175	System board error	Have the computer serviced.
176	System cover has been removed.	Type in the administrator password. If problem persists, have the computer serviced.
177	An inventory violation occurred, such as a hardware component was removed. This error message is part of the AssetCare and Asset ID features of the computer.	Type in the administrator password. If the problem persists, have the computer serviced.
183	Administrator password required.	Type the administrator password.
184	Asset control antenna not detected.	Have the computer serviced.
186	System board or hardware security error	Have the computer serviced.
187	Administrator password and startup sequence has been cleared.	Go to “Starting the Configuration/Setup Utility program” on page 67 and follow the instructions to set an administrator password and the startup sequence.
190	The computer chassis-intrusion detector was cleared. This is an informational message.	No action is required.
20x	Memory error	Go to “IBM Enhanced Diagnostics program” on page 92 and follow the instructions to run diagnostics.
229	Level 2 cache error	Have the computer serviced.
301 or 303	Keyboard error	<ol style="list-style-type: none"> <li>1. Make sure the keyboard is properly connected.</li> <li>2. If the keyboard is properly connected, have the computer serviced.</li> </ol>

Table 1. POST Error Codes (continued)

Code	Description	Action
601	Diskette drive or controller error	<ol style="list-style-type: none"> <li>1. Go to "IBM Enhanced Diagnostics program" on page 92 and if possible run the IBM Enhanced Diagnostics program.</li> <li>2. If the problem persists, have the computer serviced.</li> </ol>
602	Diskette IPL boot record not valid	<ol style="list-style-type: none"> <li>1. The diskette might be defective. Try another diskette.</li> <li>2. If the problem persists, have the computer serviced.</li> </ol>
604	Unsupported diskette drive installed	<ol style="list-style-type: none"> <li>1. Go to "IBM Enhanced Diagnostics program" on page 92 and if possible run the IBM Enhanced Diagnostics program.</li> <li>2. If the problem persists, have the computer serviced.</li> </ol>
605	Diskette unlocked problem	Have the computer serviced.
662	Diskette drive configuration error	<ol style="list-style-type: none"> <li>1. Go to the configuration procedure and follow the instructions to verify the diskette drive configuration.</li> <li>2. Run diagnostics on the diskette drive. See "IBM Enhanced Diagnostics program" on page 92.</li> <li>3. If the problem persists, have the computer serviced.</li> </ol>
762	Math coprocessor configuration error	Have the computer serviced.
11xx	Serial port error (xx = serial port number)	Have the computer serviced.
1762	Hard disk configuration error	<ol style="list-style-type: none"> <li>1. Go to "Chapter 4. Using the Configuration/Setup Utility program" on page 29 and follow the instructions to verify the hard disk configuration.</li> <li>2. If the problem persists, have the computer serviced.</li> </ol>

Table 1. POST Error Codes (continued)

Code	Description	Action
178x	Hard disk or IDE device failed	<ol style="list-style-type: none"> <li>1. Go to “IBM Enhanced Diagnostics program” on page 92 to run diagnostics on the hard disk and the IDE devices.</li> <li>2. If the problem persists, have the computer serviced.</li> </ol>
18xx	A PCI adapter has requested an unavailable resource.	Go to “Chapter 4. Using the Configuration/Setup Utility program” on page 29 and follow the instructions to reconfigure the PCI devices.
1962	Boot sequence error	<ol style="list-style-type: none"> <li>1. Go to “Changing the primary startup sequence” on page 39 and follow the instructions to verify that the startup sequence is configured.</li> <li>2. If the problem persists, have the computer serviced.</li> </ol>
2400	Display adapter failed; using alternate.	Have the computer serviced.
2462	Video configuration error.	Have the computer serviced.
5962	IDE CD-ROM configuration error	Have the computer serviced.
8601	Pointing device error	Have the computer serviced.
8603	Pointing device or system board error	Have the computer serviced.
I9990301	Hard disk failure	Have the computer serviced.

## POST beep codes

One beep and the appearance of text on the monitor indicate successful completion of POST. More than one beep indicates that POST detected an error. Beep codes are sounded in a series of two or three sets of beeps.

The duration of each beep is constant, but the length of the pause between the beeps varies. For example, a 1–2–4 beep code sounds like one beep, a pause, two consecutive beeps, another pause, and four more consecutive beeps.

For the following beep codes, the numbers indicate the sequence and number of beeps. For example, a “2–3–2” error symptom (a burst of two beeps, three beeps, then two beeps) indicates a memory module problem.

If the following beep codes occur, have the computer serviced.

<b>Beep code</b>	<b>Probable cause</b>
1-1-3	CMOS write/read failure
1-1-4	BIOS ROM checksum failure
1-2-1	Programmable interval timer test failure
1-2-2	DMA initialization failure
1-2-3	DMA page register write/read test failure
1-2-4	RAM refresh verification failure
1-3-1	RAM test failure
1-3-2	RAM parity test failure
1-4-3	Fail-safe timer test in progress
1-4-4	Software NMI port test in progress
2-1-1	Secondary DMA register test in progress or failure
2-1-2	Primary DMA register test in progress or failure
2-1-3	Primary interrupt mask register test failure
2-1-4	Secondary interrupt mask register test failure
2-2-2	Keyboard controller test failure
2-3-2	Screen memory test in progress or failure
2-3-3	Screen retrace tests in progress or failure

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## **Ethernet error messages**

The error messages listed in this section apply only to models with a preinstalled Ethernet adapter or riser card.

If a failure condition occurs after the Ethernet controller is initialized, an error message appears on the screen. The error messages that can occur are shown below. If you experience any error related to the Ethernet adapter, record the error message, and tell your network administrator about the problem.

## **RPL-related error messages**

These error messages are specific to the Ethernet adapter and the RPL environment of your computer.

The two most common error messages are shown below.

RPL-ROM-ERR: 105 The integrated Ethernet failed the loopback test.  
RPL-ROM-ERR: 107 Media test failed; check the cable.

Error 105 indicates that a power-on diagnostic test performed by the Ethernet module did not execute correctly. If this error message appears, you must have the computer serviced. Error 107 indicates that the cable from the LAN is not securely connected to the Ethernet port on your computer. Check the cable to ensure that it is properly connected.

Other error messages that might occur are shown in the following table.

RPL-ROM-ERR: 100 The Ethernet adapter cannot be found.
RPL-ROM-ERR: 101 The Ethernet adapter was unable to initialize.
RPL-ROM-ERR: 102 The Ethernet adapter could not be reset.
RPL-ROM-ERR: 103 There are multiple Ethernet adapters in the system. Specify the correct serial number in NET.CFG.
RPL-ROM-ERR: 104 The Ethernet adapter EEPROM is faulty or not present.
RPL-ROM-ERR: 106 The Ethernet adapter is configured for Plug and Play in a non-Plug and Play system.
RPL-ROM-ERR: 110 The Ethernet adapter RAM failed the memory test.

## DHCP-related error messages

Error messages related to DHCP and the Ethernet adapter are shown in the following table.

E61: Service boot canceled.
E62: Cannot initialize controller.
E63: Cannot initialize controller.
E67: Cannot initialize controller.
E6d: Cannot find BOOTP server.
E6e: Cannot start from downloaded image.
E71: Too many MTFPT packages.
M10: ARP canceled by keystroke.
M11: ARP timeout.
M20: Cannot copy memory.
M21: Cannot write to memory.
M22: Cannot write to memory.
M30: Cannot ARP TFTP address.
M31: TFTP canceled by keystroke.
M32: TFTP open timeout.
M33: Unknown TFTP opcode.
M34: TFTP read canceled by keystroke.

M35: TFTP timeout.
M38: Cannot open TFTP connection.
M39: Cannot read from TFTP connection.
M40: BOOTP canceled by keystroke.
M40: DHCP canceled by keystroke.
M41: BOOTP timeout.
M41: DHCP timeout.
M42: No client or server IP.
M43: No bootfile name.
M44: Cannot ARP redirected BOOTP server.
M6f: System is locked! Press Ctrl+Alt+Del to restart.
M90: Cannot initialize controller for multicast.
M91: MFTFTP canceled by keystroke.
M92: MFTFTP open timeout.
M93: Unknown MFTFTP opcode.
M94: MFTFTP read canceled by keystroke.
M95: MFTFTP timeout.
M96: Cannot ARP MFTFTP address.
M98: Cannot open MFTFTP connection.
M99: Cannot read from MFTFTP connection.
Txx: <message from TFTP error packet>

**Note:** An x value that follows an error code represents any alphanumeric character.

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## Device troubleshooting charts

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

### Important:

If you find it necessary to remove the computer cover, first read “Safety information” on page iii and “Removing the cover” on page 45 for important safety information and instructions.

If you have just added new software or a new computer option and your computer is not working, do the following before using the troubleshooting charts:

1. Remove the software or device you just added.
2. Run the diagnostic programs to determine if your computer is running correctly. (See “IBM Enhanced Diagnostics program” on page 92 for information about diagnostic programs provided with your computer.)
3. Reinstall the new software or new device.

The following directory will help you quickly locate problem categories in the troubleshooting charts.

<b>Problem type</b>	<b>Go to:</b>
Audio problems	“Audio problems” on page 81
CD-ROM drive	“CD-ROM drive problems” on page 82
Diskette drive	“Diskette drive problems” on page 84
General	“General problems”
Intermittent	“Intermittent problems” on page 80
Keyboard, mouse, or pointing-device	“Keyboard, mouse, or pointing device problems” on page 87
Memory	“Memory problems” on page 88
Monitor	“Monitor problems” on page 84
Optional device	“Option problems” on page 89
Parallel Port	“Parallel-port problems” on page 90
Printer	“Printer problems” on page 91
Serial Port 1	“Serial-port problems” on page 90
Serial Port 2	“Serial-port problems” on page 90
Software	“Application problems” on page 91
Universal Serial Bus (USB) device	“Universal Serial Bus (USB) problems” on page 92

## General problems

<b>General problems</b>	<b>Action</b>
The computer does not start when you press the power switch.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. All cables are securely connected to the proper connectors on the computer. For the location of the connectors, see “Connecting computer cables” on page 7.</li> <li>2. The computer cover is properly installed.</li> </ol> <p>If you cannot correct the problem, have the computer serviced.</p>
Problems such as a broken cover lock or indicator lights not working.	Have the computer serviced.

## Intermittent problems

<b>Intermittent problems</b>	<b>Action</b>
A problem occurs only occasionally and is difficult to detect.	Verify that: <ol style="list-style-type: none"><li>1. All cables and cords are securely connected to the rear of the computer and attached devices.</li><li>2. When the computer is turned on, the fan grill is not blocked (there is air flow around the grill), and the fans are working. If airflow is blocked or the fans are not working, the computer might overheat.</li><li>3. If SCSI devices are installed, the last external device in each SCSI chain is terminated correctly. (See your SCSI documentation.)</li></ol> <p>If you cannot correct the problem, have the computer serviced.</p>

## Audio problems

Symptoms	Action
No audio in Windows	<ol style="list-style-type: none"> <li>1. Make sure that headphone and speaker cables are plugged into the correct audio connectors. Plugging a cable into an audio connector disables the built-in speaker.</li> <li>2. Check the Windows Volume Control program to ensure the volume settings are not set too low or that the mute setting is not enabled. To access the Windows Volume Control program, do the following:               <ol style="list-style-type: none"> <li>a. From the windows desktop, click Start.</li> <li>b. Select <b>Programs</b>.</li> <li>c. Select <b>Accessories</b>.</li> <li>d. Select <b>Multimedia</b> (Windows NT Workstation) or <b>Entertainment</b> (Windows 2000).</li> <li>e. Click <b>Volume Control</b>.</li> </ol> </li> <li>3. Make sure the program you are using is designed for use in Windows. If the program is designed to run in DOS, it does not use Windows sound features and must be configured to use Sound Blaster Pro or Sound Blaster emulation.</li> <li>4. Make sure that audio has not been disabled in the Configuration/Setup Utility program. See “Starting and using the Configuration/Setup Utility program” on page 29 for information about how to start the Configuration/Setup Utility program.</li> </ol> <p>If these actions do not correct the problem, run the diagnostic programs (see “IBM Enhanced Diagnostics program” on page 92). If you need technical assistance, see “Chapter 7. Getting help, service, and information” on page 99.</p>
No audio when you play DOS games or use DOS programs	<ol style="list-style-type: none"> <li>1. Make sure the game or program is configured to use Sound Blaster Pro or Sound Blaster emulation. Refer to the documentation that came with your DOS program for instructions on selecting sound card settings.</li> <li>2. Shut down and restart your computer in DOS mode. Then try to run the program again.</li> </ol> <p>If these actions do not correct the problem, run the diagnostic programs (see “IBM Enhanced Diagnostics program” on page 92). If you need technical assistance, see “Chapter 7. Getting help, service, and information” on page 99.</p>

## CD-ROM drive problems

Symptoms	Action
An audio or AutoPlay-enabled disc does not automatically play when inserted into the drive	<p>Make sure you have the Windows AutoPlay feature enabled. To enable the AutoPlay feature, do the following:</p> <ol style="list-style-type: none"><li>1. From the Windows desktop, double-click <b>My Computer</b>.</li><li>2. In the My Computer window, double-click <b>Control Panel</b>.</li><li>3. In the Control Panel window, double-click <b>System</b>.</li><li>4. In the System Properties window, click the <b>Device Manager</b> tab.</li><li>5. Double-click the <b>CD-ROM</b> list item and then double-click the listed <b>CD-ROM</b> option.</li><li>6. In the Properties window, click the <b>Settings</b> tab.</li><li>7. Under Options, select the <b>Auto insert notification check box</b>.</li><li>8. Click <b>OK</b> to exit from the Properties window and save the setting.</li></ol> <p>If this procedure does not correct the problem, run the diagnostic programs (see “IBM Enhanced Diagnostics program” on page 92). If you need technical assistance, see “Chapter 7. Getting help, service, and information” on page 99.</p>

Symptoms	Action
<p>A CD does not work.</p>	<ul style="list-style-type: none"> <li>• Verify that the disk is inserted correctly, with its label up.</li> <li>• Make sure that the disk you are using is clean. To remove dust or fingerprints, wipe the CD with a clean, soft cloth from the center to the outside. Wiping the CD in a circular direction might cause loss of data.</li> <li>• Verify that the disk you are using is good and not scratched or damaged. Try inserting another disk that you know is good. If you cannot read from a known-good disk, you might have a problem with your drive. Check that the power-supply cable and signal cable are securely connected to the drive (see “Removing the cover” on page 45 for cover removal instructions).</li> <li>• Use the Configuration/Setup Utility program to verify that the drive is enabled (see “Chapter 4. Using the Configuration/Setup Utility program” on page 29).</li> </ul> <p>If these actions do not correct the problem, run the diagnostic programs (see “IBM Enhanced Diagnostics program” on page 92). If you need technical assistance, see “Chapter 7. Getting help, service, and information” on page 99.</p>

## Diskette drive problems

Diskette drive problems	Action
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	<p>If there is a diskette in the drive, verify that:</p> <ol style="list-style-type: none"><li>1. The diskette drive is enabled. Use the Configuration/Setup Utility program to check this. For more information, see “Chapter 4. Using the Configuration/Setup Utility program” on page 29.</li><li>2. The computer is checking for the diskette drive in the startup sequence. Use the Configuration/Setup Utility program to verify this.</li><li>3. The diskette you are using is good and not damaged. Try inserting another diskette if you have one.</li><li>4. The diskette is inserted correctly, with its label up and its metal shutter end first in the drive.</li><li>5. The diskette contains the necessary files to start the computer (the diskette must be startable).</li><li>6. The diskette drive cable is properly installed and securely connected.</li><li>7. There is no problem with your software program (see “Application problems” on page 91).</li></ol> <p>If you cannot correct the problem, have the computer serviced.</p>

## Monitor problems

Monitor problems	Action
General monitor problems.	<p>Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the information supplied with the monitor for adjustment and testing instructions.</p> <p>If you cannot find the problem, check the other listings on monitor problems in this table.</p> <p>If you cannot correct the problem, have the computer serviced.</p>

Monitor problems	Action
<p>Wavy, unreadable, rolling, distorted, or jittery screen images.</p>	<p>If the monitor self-tests show that the monitor is working properly, verify that:</p> <ol style="list-style-type: none"> <li>1. The location of the monitor is appropriate. Magnetic fields around other devices, such as transformers, appliances, fluorescent lights, and other monitors might be causing the problem. To determine if the location is causing the problem:               <ol style="list-style-type: none"> <li>a. Turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.)</li> <li>b. Adjust the placement of the monitor and other devices so that they are at least 305 mm (12 in.) apart. Also, when relocating the monitor, be sure it is at least 75 mm (3 in.) from the diskette drives to prevent diskette drive read/write errors.</li> <li>c. Turn on the monitor.</li> </ol> </li> <li>2. An IBM monitor signal cable is properly connected to the monitor and computer, and that the cable is installed securely. Non-IBM monitor signal cables might cause unpredictable problems.</li> <li>3. You are not trying to run your monitor at a higher refresh rate than the monitor supports. See the documentation supplied with your monitor for supported refresh rates.</li> </ol> <p><b>Note:</b> An enhanced monitor signal cable with additional shielding might be available for your monitor. See your IBM reseller or marketing representative for information.</p> <p>If you cannot correct the problem, have the computer serviced.</p>
<p>Screen flickers.</p>	<p>Set the monitor for the highest, noninterlaced refresh rate supported by your monitor and the video controller in your computer.</p> <p><b>Attention:</b> Using a resolution or refresh rate that is not supported by your monitor might damage it.</p> <p>You can reset the refresh rate through your operating system, using the instructions provided in the README files. See your operating system documentation for further information on monitor settings.</p> <p>If this does not correct the problem, have the monitor and computer serviced.</p>

<b>Monitor problems</b>	<b>Action</b>
The monitor works when you turn on the system, but goes blank when you start some application programs.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The monitor signal cable is securely connected to the monitor and the monitor connector on the graphics adapter. For the location of the monitor connector on the graphics adapter installed in your computer, see “Connecting computer cables” on page 7.</li> <li>2. The necessary device drivers for the application programs are installed.</li> </ol> <p>If you cannot correct the problem, have the computer serviced.</p>
The monitor works when you turn on the system, but goes blank after some period of computer inactivity.	<p>The computer is probably set for energy savings with the Advanced Power Management (APM) feature. If the APM feature is enabled, disabling APM or changing APM settings might solve the problem (see “Power-management features” on page 39).</p> <p>If you cannot correct the problem, have the computer serviced.</p>
Blank screen.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The computer power cord is plugged into the computer and a working electrical outlet.</li> <li>2. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly.</li> <li>3. The monitor signal cable is securely connected to the monitor and the monitor connector on the system board. To find the monitor connector on the system board, see “Connecting computer cables” on page 7. If your computer comes with an AGP adapter, verify that the monitor is connected to the monitor connector on the AGP adapter.</li> </ol> <p>If you cannot correct the problem, have the computer serviced.</p>
Only the cursor appears.	Have the computer serviced.
Wrong characters appear on the screen.	Have the computer serviced.

## Keyboard, mouse, or pointing device problems

<b>Keyboard, mouse, or pointing- device problems</b>	<b>Action</b>
All or some keys on the keyboard do not work.	Verify that: <ol style="list-style-type: none"><li>1. The computer and the monitor are turned on.</li><li>2. The keyboard cable is securely connected to the keyboard connector on the computer. For the location of the keyboard connector, see “Connecting computer cables” on page 7.</li></ol> <p>If you cannot correct the problem, have the computer serviced.</p>
The mouse or pointing device does not work.	Verify that: <ol style="list-style-type: none"><li>1. The mouse or pointing-device cable is securely attached to the proper connector on the computer. Depending on the type of mouse you have, the mouse cable will connect to either the mouse or serial connector. To find the mouse and serial connectors, see “Connecting computer cables” on page 7.</li><li>2. The device drivers for the mouse are installed correctly.</li></ol> <p>If you cannot correct the problem, have the computer and the device serviced.</p>

## Memory problems

Memory problems	Action
<p>The amount of memory displayed is less than the amount of memory installed.</p>	<p>The amount of available memory shown might be somewhat less than expected because of basic input/output system (BIOS) shadowing in random access memory (RAM), video takes 1 MB, and ACPI and USB also can take up to 1 MB.</p> <p>Verify that:</p> <ol style="list-style-type: none"><li>1. You have installed the correct type of DIMMs for your computer. See “Installing memory” on page 50 for instructions on adding DIMMs.</li><li>2. The DIMMs are properly installed and securely connected.</li><li>3. If you added or removed memory, you saved the new configuration before exiting from the Configuration/Setup Utility program.</li></ol> <p>If the problem persists, run the memory test from the diagnostic program supplied with your computer. (See “IBM Enhanced Diagnostics program” on page 92 for further information.) The system might have detected a bad DIMM and automatically reallocated memory to enable your computer to continue to operate.</p> <p>If you cannot correct the problem, have the computer serviced.</p>

## Option problems

Option problems	Action
An IBM option that was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"><li>1. The option is designed for your computer.</li><li>2. You followed the installation instructions supplied with the option and in “Chapter 5. Installing options” on page 43.</li><li>3. All option files (if required) are installed correctly. See “Installing files from option diskettes” on page 95 for information about installing option files.</li><li>4. You have not loosened any other installed options or cables.</li><li>5. If the option is an adapter, you have provided enough hardware resources for the adapter to function correctly. See the documentation supplied with the adapter (as well as the documentation for any other installed adapters) to determine the resources required for each adapter.</li><li>6. You updated the configuration information in the program, if necessary, and have no conflicts. For more information, see “Chapter 4. Using the Configuration/Setup Utility program” on page 29.</li></ol> <p>If the problem persists, run the diagnostic programs. (See “IBM Enhanced Diagnostics program” on page 92 for information about diagnostic programs provided with your computer.)</p> <p>If you cannot correct the problem, have the computer and the option serviced.</p>

Option problems	Action
<p>An IBM option that previously worked does not work now.</p>	<p>Verify that all option hardware and cable connections are secure.</p> <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the failing option is a SCSI option, verify that:</p> <ol style="list-style-type: none"> <li>1. The cables for all external SCSI options are connected correctly.</li> <li>2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.</li> <li>3. All external SCSI options are turned on. External SCSI options must be turned on before the system is turned on.</li> </ol> <p>For more information, see your SCSI documentation.</p> <p>If you cannot correct the problem, have the computer serviced.</p>

## Parallel-port problems

Parallel-port problems	Action
<p>Parallel port cannot be accessed.</p>	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. Each port is assigned a unique address.</li> <li>2. The parallel-port adapter, if you added one, is properly installed and firmly seated. See “Chapter 5. Installing options” on page 43 for instructions on adding adapters.</li> </ol> <p>If you cannot correct the problem, have the computer serviced.</p>

## Serial-port problems

Serial-port problems	Action
<p>Serial port cannot be accessed.</p>	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. Each port is assigned a unique address.</li> <li>2. The serial-port adapter, if you added one, is properly installed and firmly seated. See “Installing adapters” on page 52 for instructions on adding adapters.</li> </ol> <p>If you cannot correct the problem, have the computer serviced.</p>

## Printer problems

Printer problems	Action
The printer does not work.	<p>Verify that:</p> <ol style="list-style-type: none"><li>1. The printer is turned on and is online.</li><li>2. The printer signal cable is securely connected to the correct parallel, serial, or USB port on the computer. (See “Connecting computer cables” on page 7 for the location of the parallel, serial, and USB ports.) <b>Note:</b> Non-IBM printer signal cables might cause unpredictable problems.</li><li>3. You have assigned the printer port correctly in your operating system or application program.</li><li>4. You have assigned the printer port correctly in the program. For more information, see “Chapter 4. Using the Configuration/Setup Utility program” on page 29.</li><li>5. If the problem persists, run the tests described in the documentation that comes with your printer.</li></ol> <p>If you cannot correct the problem, have the computer serviced.</p>

## Application problems

Application problem	Action
Software program does not function properly or does not start	<p>To determine if problems are caused by installed software, verify that:</p> <ol style="list-style-type: none"><li>1. Your computer has the minimum memory requirements needed to use the software. See the information supplied with the software to verify memory requirements. <b>Note:</b> If you have just installed an adapter or memory, you might have a memory address conflict.</li><li>2. The software is designed to operate on your computer.</li><li>3. Other software works on your computer.</li><li>4. The software you are using works on another computer.</li></ol> <p>If you received any error messages while using the software program, see the information supplied with the software for a description of the messages and solutions to the problem.</p> <p>If you cannot correct the problem, have the computer serviced.</p>

## Universal Serial Bus (USB) problems

Universal Serial Bus port problems	Action
The Universal Serial Bus ports cannot be accessed.	Verify that the USB device is properly installed and firmly seated. If you cannot correct the problem, have the computer serviced.

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## Software-generated error messages

These messages appear if a problem or conflict is detected by the application program, the operating system, or both. Error messages for operating-system and other software problems are generally text messages, but they also can be numeric messages. For information about these software error messages, see the information supplied with the operating system and application program.

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## IBM Enhanced Diagnostics program

The IBM Enhanced Diagnostics program runs independently of the operating system. You can run the IBM Enhanced Diagnostics program from a hidden partition of your hard disk where a copy of your preinstalled programs and diagnostics programs is kept. You can also create an IBM *Enhanced Diagnostics* diskette image from the service partition if your computer comes with a preinstalled operating system or download the image from the World Wide Web. The user interface for running the diagnostics utility programs is provided by WaterGate Software PC-Doctor.

The IBM Enhanced Diagnostics program will isolate your computer hardware from software that was preinstalled (or that you have installed) on your hard disk. The programs run independently of the operating system, and must be run either from CD or diskette.

You can use this program to test the hardware components of your computer. This method of testing is generally used when other methods are not accessible or have not been successful in isolating a problem suspected to be hardware related.

To start the IBM Enhanced Diagnostics program from the hidden partition, do the following:

1. Turn off your computer and any attached devices.
2. Turn on all attached devices; then turn on your computer.
3. When you see To start the IBM Product Recovery Program, press F11, press the F11 key. The Product Recovery Program will load.
4. Select **System Utilities** and press Enter.

5. A new menu opens with the options for viewing system utilities:
  - Run Diagnostics
  - Create a diagnostic diskette
  - System Information
  - Create a Recovery Repair diskette
6. Select **Run Diagnostics** to open the IBM Enhanced Diagnostics program to try to track down a problem. Select **System Information** to display the current computer configuration.
7. When you finish running the diagnostic program, press Esc and turn off the computer.

To create an IBM Enhanced Diagnostics diskette from the image on the hidden partition:

1. Turn off your computer and any attached devices.
2. Turn on all attached devices; then turn on your computer.
3. When you see To start the IBM Product Recovery Program, press F11, press the F11 key. The Product Recovery Program will load.
4. Select **System Utilities** and press Enter.
5. A new menu opens with the options for viewing system utilities:
  - Run Diagnostics
  - Create a diagnostic diskette
  - System information
  - Create a Recovery Repair diskette
6. Select **Create a diagnostic diskette** and press Enter. Then follow the instructions on the screen.

To download the latest image of the IBM Enhanced Diagnostics from the Web site and create a startable Enhanced Diagnostics Diskette:

1. Go to the IBM support Web site (<http://www.ibm.com/pc/support/>).
2. In the **Quick Path** field, type the model number of your computer and click **Go**.
3. Click the **Downloadable files** link.
4. Click the **Diagnostics** link.
5. Click the link to the file under **Downloadable files - Diagnostics** at the bottom of the page.
6. Click the executable file link under **File Details** to download the file to your hard disk.
7. Go to a DOS prompt and change the directory to where the file was downloaded.
8. Insert a blank high-capacity diskette in diskette drive A.
9. Type the following and press Enter: *filename* a: Where *filename* is the name of the file you downloaded from the Web.

The downloaded file is self-extracting and will be copied to the diskette. When the copy completes, you have a startable *IBM Enhanced Diagnostics* program diskette.

To start the IBM Enhanced Diagnostic program using the diskette:

1. Shut down Windows and turn off the computer.
2. Turn off any attached devices.
3. Insert the *IBM Enhanced Diagnostic* diskette into drive A.
4. Turn on all attached devices; then turn on your computer.
5. Follow the instructions that appear on the screen. For help, press F1.

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## Other diagnostic programs on the Software Selections CD

The *Software Selections CD* supplied with your computer also contains diagnostic programs designed specifically for certain operating environments (Windows 2000 Professional, Windows 98 SE, and Windows NT). Because these versions work with the operating system, they not only test the hardware, but also analyze certain software components of your computer. These diagnostic programs are especially useful in isolating problems related to the operating system and device drivers.

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## Recovering from a POST/BIOS update failure

If power to your computer is interrupted while POST/BIOS is being updated (flash update), your computer might not restart correctly. If this happens, perform the following procedure to recover:

1. Turn off the computer and any attached devices, such as printers, monitors, and external drives.

**CAUTION:**

**Do not touch internal components of the computer while the power is on.**

2. Unplug all power cords from electrical outlets and remove the cover. See “Removing the cover” on page 45.
3. Locate the Clear CMOS/recovery jumper on the system board, removing any adapters that impede access to the jumper. See the system board label inside your computer for the location of the jumper. See also “Installing options on the system board and riser card (some models)” on page 47.
4. Move the jumper to the adjacent pair of jumper pins.
5. Replace any adapters that were removed and replace the cover. See “Replacing the cover and connecting the cables” on page 65.
6. Reconnect the power cords for the computer and monitor to electrical outlets.

7. Insert the POST/BIOS update (flash) diskette into drive A: and turn on the computer and the monitor.
8. After the update session completes, remove the diskette from the diskette drive and turn off the computer and monitor.
9. Unplug the power cords from electrical outlets.
10. Remove the cover. See “Removing the cover” on page 45.
11. Remove any adapters that impede access to the BIOS Configuration jumper.
12. Move the Clear CMOS/recovery jumper to its original position.
13. Replace any adapters that were removed.
14. Install the cover and reconnect any cables that were disconnected.
15. Turn on the computer to restart the operating system.

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## Installing files from option diskettes

An optional device or adapter might come with a diskette. Diskettes that are included in option packages usually contain files that the system needs for recognizing and activating the options. Until you install the necessary files, the new device or adapter might cause error messages.

If your optional device or adapter comes with a diskette, you might need to install some configuration (.CFG) files or diagnostic files (.EXE or .COM) from the diskette to your hard disk. See the documentation that comes with the option to determine if you need to install files.

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## Replacing the battery

Your computer has a special type of memory that maintains the date, time, and settings for built-in features, such as serial- and parallel-port assignments (configuration). A battery keeps this information active when you turn off the computer.

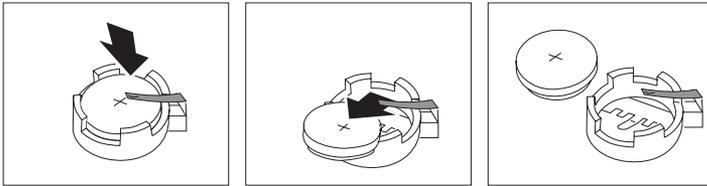
The battery requires no charging or maintenance throughout its life; however, no battery lasts forever. If the battery fails, the date, time, and configuration information (including passwords) are lost. An error message is displayed when you turn on the computer.

Refer to “Lithium battery notice” on page iii for information about replacing and disposing of the battery. If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, representative, to be recycled or disposed of in a proper manner.

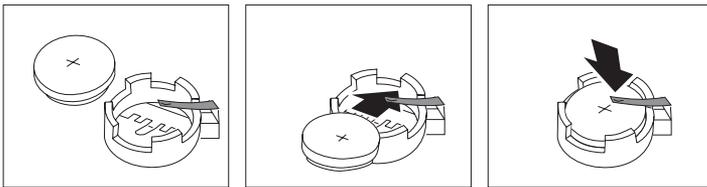
For further information on battery disposal, call IBM at 1-800-IBM-4333 (1-800-426-4333) in the U.S. For information outside of the U.S., contact your IBM reseller or marketing representative.

To change the battery:

1. Turn off the computer and all attached devices.
2. Unplug the power cord and remove the cover. See “Removing the cover” on page 45.
3. Locate the battery. Refer to the system board label inside your computer or see “Identifying parts on the system board” on page 48.
4. If necessary, remove any adapters that impede access to the battery. See “Installing adapters — small form factor desktop model” on page 53 or “Installing adapters — desktop model” on page 56 for more information.
5. Remove the old battery.



6. Install the new battery.



7. Replace any adapters that were removed to gain access to the battery. See “Installing adapters — small form factor desktop model” on page 53 or “Installing adapters — desktop model” on page 56 for instructions for replacing adapters.
8. Replace the cover and plug in the power cord. See “Connecting computer cables” on page 7.

**Note:** When the computer is turned on for the first time after battery replacement, an error message might be displayed. This is normal after replacing the battery.

9. Turn on the computer and all attached devices.

10. Use the Configuration/Setup Utility program to set the date and time and any passwords.
11. Dispose of the old battery as required by local ordinances or regulations.



---

## Chapter 7. Getting help, service, and information

If you need help, service, technical assistance, or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you.

For example, IBM maintains pages on the World Wide Web where you can get information about IBM products and services, find the latest technical information, and download device drivers and updates. Some of these pages are:

<b><a href="http://www.ibm.com">http://www.ibm.com</a></b>	Main IBM home page
<b><a href="http://www.ibm.com/pc">http://www.ibm.com/pc</a></b>	IBM Personal Computing
<b><a href="http://www.ibm.com/pc/support">http://www.ibm.com/pc/support</a></b>	IBM Personal Computing Support
<b><a href="http://www.ibm.com/pc/us/ibmpc">http://www.ibm.com/pc/us/ibmpc</a></b>	IBM Commercial Desktop PCs (U.S.)
<b><a href="http://www.ibm.com/pc/us/intellistation">http://www.ibm.com/pc/us/intellistation</a></b>	IBM IntelliStation Workstations (U.S.)
<b><a href="http://www.ibm.com/pc/us/accessories">http://www.ibm.com/pc/us/accessories</a></b>	Options by IBM (U.S.)
<b><a href="http://www.ibm.com/pc/us/netfinity">http://www.ibm.com/pc/us/netfinity</a></b>	IBM Netfinity Servers (U.S.)

You can select a country-specific Web site from these pages.

Help is also available from bulletin boards and online services, as well as by fax and telephone. This section provides information about these sources.

Services available and telephone numbers listed are subject to change without notice.

You can select a country-specific Web site from these pages.

Help is also available from bulletin boards and online services, as well as by fax and telephone. This section provides information about these sources.

Services available and telephone numbers listed are subject to change without notice.

---

## Service support

With the original purchase of an IBM hardware product, you have access to extensive support coverage. During the IBM hardware product warranty period, you may call the IBM Personal Computer HelpCenter (1-800-772-2227 in the U.S.) for hardware product assistance covered under the terms of the IBM hardware warranty. See “Getting help by telephone” in this chapter for HelpCenter telephone numbers in other countries.

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 Engineering Changes (ECs) available that apply to your hardware.

Be sure to retain your proof of purchase to obtain warranty service.

Please have the following information ready when you call:

- 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

If possible, be at your computer when you call.

A compatible monitor, keyboard, and mouse are required for many service activities. Before you have the computer serviced, be sure to have these components attached to your computer, either directly or through a console switch.

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts

**Note:** 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's warranty terms.

---

## **Before you call for service**

Many computer problems can be solved without outside assistance, by using the online help or by looking in the online or printed documentation that comes with your computer or software. Also, be sure to read the information in any README files that come with your software.

Most computers, operating systems, and application programs come with documentation that contains troubleshooting procedures and explanations of error messages. The documentation that comes with your computer also contains information about the diagnostic tests you can perform.

If you receive a POST error code when you turn on your computer, refer to the POST error-message charts in your hardware documentation. If you do not receive a POST error code, but suspect a hardware problem, refer to the troubleshooting information in your hardware documentation or run the diagnostic tests.

If you suspect a software problem, consult the documentation (including README files) for the operating system or application program.

---

## **Getting customer support and service**

Purchasing an IBM PC hardware product entitles you to standard help and support during the warranty period. If you need additional support and services, a wide variety of extended services are available for purchase that address almost any need.

### **Using the World Wide Web**

On the World Wide Web, the IBM Personal Computing 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, on the IBM Personal Computing Support page at: <http://www.ibm.com/pc/support>

If you select 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. You will have the information you need, all in one place. In addition, you can choose to receive e-mail notifications whenever new information becomes available about your registered products. You also can access online support forums, which are community sites monitored by IBM support staff.

For information about specific Personal Computer products, visit the following pages: <http://www.ibm.com/pc/us/intellistation>

<http://www.ibm.com/pc/us/ibmpc>

<http://www.ibm.com/pc/us/netfinity>

<http://www.ibm.com/pc/us/thinkpad>

<http://www.ibm.com/pc/us/accessories>

[http://www.direct.ibm.com/content/home/en\\_US/aptiva](http://www.direct.ibm.com/content/home/en_US/aptiva)

You can select a country-specific Web site from these pages.

## 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 by telephone

During the warranty period, you can get help and information by telephone through the IBM PC HelpCenter. Expert technical-support representatives are available to assist you with questions you might have on the following:

- Setting up your computer and IBM monitor
- Installing and setting up IBM options purchased from IBM or an IBM reseller
- 30-day, preinstalled-operating-system support
- Arranging for service (on-site or carry-in)
- Arranging for overnight shipment of customer-replaceable parts

In addition, if you purchased an IBM PC Server or IBM Netfinity Server, you are eligible for IBM Start Up Support for 90 days after installation. This service provides assistance for:

- Setting up your network operating system
- Installing and configuring interface cards
- Installing and configuring network adapters

Please have the following information ready when you call:

- Machine Type and Model
- Serial numbers of your computer, monitor, and other components, or your proof of purchase
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information for your system

If possible, be at your computer when you call.

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. <sup>3</sup>

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

Country		Telephone number
Austria	Österreich	01-54658 5060
Belgium - Dutch	Belgie	02-714 35 70
Belgium - French	Belgique	02-714 35 15
Canada	Toronto only	416-383-3344
Canada	Canada - all other	1-800-565-3344
Denmark	Danmark	35 25 02 91
Finland	Suomi	09-22 931 840
France	France	01 69 32 40 40
Germany	Deutschland	069-6654 9040
Ireland	Ireland	01-815 9202
Italy	Italia	02-4827 9202
Luxembourg	Luxembourg	298-977 5063
Netherlands	Nederland	020-504 0501
Norway	Norge	23 05 32 40
Portugal	Portugal	21-791 51 47
Spain	España	91-662 49 16
Sweden	Sverige	08-751 52 27
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.

## Getting help around the world

If you travel with your computer or need to move it to another country, you can register for International Warranty Service. When you register with the International Warranty Service Office, you will receive an International Warranty Service Certificate that is honored virtually worldwide, wherever IBM or IBM resellers sell and service IBM PC 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.

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## 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 name might vary by country.

### Enhanced PC support line

Enhanced PC Support is available for desktop and mobile IBM computers that are not connected to a network. Technical support is provided for IBM computers and IBM or non-IBM options, operating systems, and application programs on the Supported Products list.

This service includes technical support for:

- Installing and configuring your out-of-warranty IBM computer
- Installing and configuring non-IBM options in IBM computers
- Using IBM operating systems in IBM and non-IBM computers
- Using application programs and games
- Tuning performance
- Installing device drivers remotely
- Setting up and using multimedia devices
- Identifying system problems
- Interpreting documentation

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about purchasing Enhanced PC Support, see “Ordering support line services” on page 106.

### 900-number operating system and hardware support line

In the U.S., if you prefer to obtain technical support on a pay-as-you-go basis, you can use the 900-number support line. The 900-number support line provides support for IBM PC products that are out of the warranty period.

To access this support, call 1-900-555-CLUB (2582). You will be notified of the charge per minute.

### Network and server support line

Network and Server Support is available for simple or complex networks made up of IBM servers and workstations using major network operating systems. In addition, many popular non-IBM adapters and network interface cards are supported.

This service includes all of the features of the Enhanced PC Support Line, plus:

- Installing and configuring client workstations and servers
- Identifying system problems and correcting problems on the client or the server
- Using IBM and non-IBM network operating systems
- Interpreting documentation

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about purchasing Network and Server Support, see “Ordering support line services”.

## Ordering support line services

Enhanced PC Support Line and Network and Server Support Line services are available for products on the Supported Products list. To receive a Supported Products list:

- In the U.S.:
  1. Call 1-800-426-3395.
  2. Select document number 11683 for Network and Server support.
  3. Select document number 11682 for Enhanced PC support.
- In Canada, contact IBM Direct at 1-800-465-7999, or:
  1. Call 1-800-465-3299.
  2. Select the HelpWare catalog.
- In all other countries, contact your IBM reseller or IBM marketing representative.

For more information or to purchase these services:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your HelpCenter.

## Warranty and repair services

You can upgrade your standard hardware warranty service or extend the service beyond the warranty period.

Warranty upgrades in the U.S. include:

- Carry-in service to on-site service  
 If your warranty provides carry-in repair service, you can upgrade to on-site repair service, either standard or premium. The standard upgrade provides a trained servicer within the next business day (9 a.m. to 5 p.m., local time, Monday through Friday). The premium upgrade provides 4-hour average response, 24 hours a day, 7 days a week.
- On-site service to premium on-site service

If your warranty provides for on-site service, you can upgrade to premium on-site service (4-hour average on-site response, 24 hours a day, 7 days a week).

You also can extend your warranty. Warranty and Repair Services offers a variety of post-warranty maintenance options, including ThinkPad EasyServ Maintenance Agreements. Availability of the services varies by product.

For more information about warranty upgrades and extensions:

- In the U.S., call 1-800-426-4968.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your IBM reseller or IBM marketing representative.

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## Ordering publications

Additional publications are available for purchase from IBM. For a list of publications available in your country:

- In the U.S., Canada, and Puerto Rico, call 1-800-879-2755.
- In other countries, contact your IBM reseller or IBM marketing representative.



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## Appendix A. Using the *Software Selections CD*

Use the information in this chapter if you want to install software from the *IBM Software Selections CD*.

**Important:** You must have Microsoft Internet Explorer 4.0 or higher installed to run the *IBM Software Selections CD*.

---

### Features of the *Software Selections CD*

The *IBM Software Selections CD* contains diagnostic programs and other support software for Windows 98, Windows NT Workstation 4.0, and Windows 2000.

**Note:** Not all software is available for all operating systems. See the *IBM Software Selections CD* to find out which programs are for your operating system.

#### **Important**

The *IBM CD* does not contain operating systems. Before you can use the *Software Selections CD*, your operating system must be installed in your computer.

You can use the *Software Selections CD* to:

- Install some software products directly from the CD on models equipped with a CD-ROM drive.
- Create an image of the *Software Selections CD* on your hard disk or on a local area network (LAN) disk and install the software products from that image.
- Create diskettes for software products that cannot be installed from the CD and install the products from diskette.

The *IBM Software Selections CD* has an easy-to-use, graphical interface and automated installation procedures for most products. It also has a help system that describes the features of the CD.

The products on the *IBM Software Selections CD* are licensed according to the terms and conditions of the IBM International License Agreement for Non-Warranted Programs, which is available through Access IBM. (See Appendix A of *About Your Software* for more information about viewing the license agreement.)

---

## Starting the *Software Selections CD*

To use the *Software Selections CD*, insert the CD into your CD-ROM drive. The Software Selections program starts automatically.

If the auto-run feature is disabled in your computer:

1. Click the Windows **Start** button; then click **Run**
2. Type  
e:\swselect.exe

where *e* is the CD-ROM drive letter.

3. Press Enter. The Software Selections menu appears.
4. Select the desired option; then follow the instructions on the screen.

or

1. In Access IBM, click **Customize**. (For information about opening Access IBM, see *About Your Software*.)
2. In the Customize menu, click **Install Software**.
3. When prompted, insert the *Software Selections CD* into the CD-ROM drive.

After a program is installed, you can access it through the Programs choice on the Windows Start menu. For most programs, support documentation is built into the online Help system; for some, online documentation is also provided.

---

## Using the *Software Selections* program

A Software Selections program is provided on your *Software SelectionsCD*. Information about using the *Software SelectionsCD* is in *About Your Software*.

To use the Software Selections program:

1. In the Software Selections menu, click the check box next to the software you want to install.
2. After selecting the software, click **Install**. A window opens showing the software programs that will be installed. Click **OK** to continue with the installation process or click **Cancel** to reset your options.
3. To complete a task, make the applicable selections and follow the instructions on the screen.

After a program is installed, you can access it through the Programs choice on the Windows Start menu. For most programs, support documentation is built into the online Help system; for some, online documentation is also provided.

---

## Appendix B. Specifications

The following specifications will help you to set up your computer and install options.

---

### Specifications — small form factor desktop model

#### Dimensions

**Height:** 87 mm (3.43 in.)

**Width:** 345 mm (13.6 in.)

**Depth:** 360 mm (14.2 in.)

**Weight:** Minimum configuration as shipped: 8.2 kg (18 lb.)

Maximum configuration: 8.6 kg (19 lb.)

#### Environment

**Air temperature:** System on: 10° to 35°C (50° to 95°F)

System off: 10° to 43°C (50° to 110°F)

**Humidity:** System on: 8% to 80%

System off: 8% to 80%

**Maximum altitude:** 2134 m (7000 ft.)

#### Electrical input

##### Input voltage:

Minimum: 90 V ac

Input frequency range: 47-63 Hz

Maximum: 265 V ac

**Input kilovolt-amperes (kVA)** (approximately):

Minimum configuration as shipped: 0.08 kVA

Maximum configuration: 0.16 kVA

**Note:** Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

#### Heat output

Approximate heat output in British thermal units (Btu) per hour:

Minimum configuration: 205 Btu/hr. (60 watts)

Maximum configuration: 375 Btu/hr. (110 watts)

## Airflow

Approximately 0.25 cubic meters per minute (9 cubic feet per minute)

## Acoustical noise-emission values

Average sound-pressure levels:

At operator position: Idle: 38 dBA Operating: 43 dBA

At bystander position—1 meter (3.3 ft.): Idle: 33 dBA Operating: 37 dBA

Declared (upper limit) sound power levels: Idle: 4.8 bels Operating: 5.1 bels

**Note:** These levels were measured in controlled acoustical environments according to procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779, and are reported in accordance with ISO 9296. Actual sound-pressure levels in your location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound power levels indicate an upper limit, below which a large number of computers will operate.

---

## Specifications — desktop model (A40 and A40p)

### Dimensions

**Height:** 140 mm (5.5 in.)

**Width:** 425 mm (16.7 in.)

**Depth:** 425 mm (16.7 in.)

**Weight:** Minimum configuration as shipped: 9.4 kg (20 lb.)

Maximum configuration: 11.3 kg (25.0 lb.)

### Environment

**Air temperature:** System on: 10° to 35°C (50° to 95°F)

System off: 10° to 43°C (50° to 110°F)

**Humidity:** System on: 8% to 80%

System off: 8% to 80%

**Maximum altitude:** 2134 m (7000 ft.)

### Electrical input

**Input voltage:**

**Low range:** Minimum: 90 V ac Maximum: 137 V ac

Input frequency range: 57-63 Hz

Voltage switch setting: 115 V

**High range:** Minimum: 180 V ac Maximum: 265 V ac

Input frequency range: 47-53 Hz

Voltage switch setting: 230 V

**Input kilovolt-amperes (kVA)** (approximately):  
Minimum configuration as shipped: 0.08 kVA  
Maximum configuration: 0.30 kVA

**Note:** Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

### **Heat output**

Approximate heat output in British thermal units (Btu) per hour:  
Minimum configuration: 240 Btu/hr. (75 watts)  
Maximum configuration: 705 Btu/hr. (207 watts)

### **Airflow**

Approximately 0.5 cubic meters per minute (18 cubic feet per minute)

### **Acoustical noise-emission values**

#### **Average sound-pressure levels:**

At operator position: Idle: 38 dBA Operating: 43 dBA  
At bystander position—1 meter (3.3 ft.): Idle: 33 dBA Operating: 37 dBA  
Declared (upper limit) sound power levels: Idle: 4.8 bels Operating: 5.1 bels

**Note:** These levels were measured in controlled acoustical environments according to procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779, and are reported in accordance with ISO 9296. Actual sound-pressure levels in your location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound power levels indicate an upper limit, below which a large number of computers will operate.

---

## **Specifications — desktop model (A20)**

### **Dimensions**

**Height:** 140 mm (5.5 in.)  
**Width:** 425 mm (16.7 in.)  
**Depth:** 425 mm (16.7 in.)  
**Weight:** Minimum configuration as shipped: 9.4 kg (20 lb.)  
Maximum configuration: 11.3 kg (25.0 lb.)

### **Environment**

**Air temperature:** System on: 10° to 35°C (50° to 95°F)

System off: 10° to 43°C (50° to 110°F)

**Humidity:** System on: 8% to 80%

System off: 8% to 80%

**Maximum altitude:** 2134 m (7000 ft.)

## Electrical input

### Input voltage:

**Low range:** Minimum: 90 V ac Maximum: 137 V ac

Input frequency range: 57-63 Hz

Voltage switch setting: 115 V

**High range:** Minimum: 180 V ac Maximum: 265 V ac

Input frequency range: 47-53 Hz

Voltage switch setting: 230 V

**Input kilovolt-amperes (kVA)** (approximately):

Minimum configuration as shipped: 0.08 kVA

Maximum configuration: 0.30 kVA

**Note:** Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

## Heat output

Approximate heat output in British thermal units (Btu) per hour:

Minimum configuration: 240 Btu/hr. (75 watts)

Maximum configuration: 705 Btu/hr. (207 watts)

## Airflow

Approximately 0.5 cubic meters per minute (18 cubic feet per minute)

## Acoustical noise-emission values

### Average sound-pressure levels:

At operator position: Idle: 38 dBA Operating: 43 dBA

At bystander position-1 meter (3.3 ft.): Idle: 33 dBA Operating: 37 dBA

Declared (upper limit) sound power levels: Idle: 4.8 bels Operating: 5.1 bels

**Note:** These levels were measured in controlled acoustical environments according to procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779, and are reported in accordance with ISO 9296. Actual sound-pressure levels in your location might exceed the average values stated because of room reflections and other

nearby noise sources. The declared sound power levels indicate an upper limit, below which a large number of computers will operate.



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## Appendix C. Placing the computer on its side

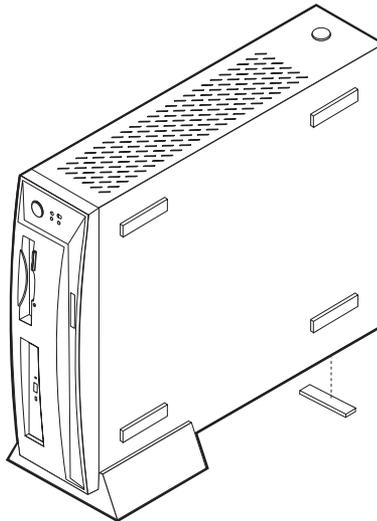
Although your computer was designed to be placed on a desktop, you can place your computer on its side by using a special desktop stand. Use the instructions in the following sections if you choose to place your computer on its side.

---

### Placing the small form factor desktop computer on its side

The following procedure applies to the small form factor desktop model computer.

1. The stand comes with an extra adhesive foot like the ones shown on the bottom of the computer in the illustration below. Apply this adhesive foot to the side of the computer at the rear of the computer cover.
2. Place the computer onto the stand as illustrated below, with the power button and vent oriented at the top of the computer.

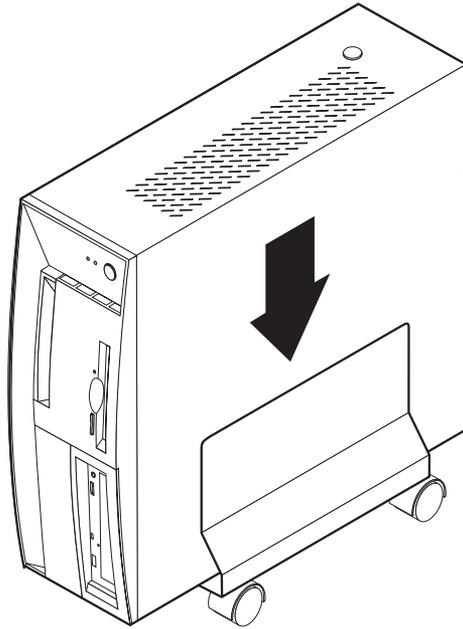


---

## Placing the desktop computer on its side

The following procedure applies to the desktop model computer.

1. Assemble the computer stand. See the instructions provided with the stand.
2. Place the computer on the stand as illustrated below, with the power button and vent oriented at the top of the computer.



---

## Appendix D. Computer records

This appendix contains forms for recording information about your computer, which can be helpful if you decide to install additional hardware, or if you ever need to have your computer serviced.

Record and retain the following information.

Product name	NetVista A20/A40/A40p
Model/Type (M/T)	_____
Serial number (S/N)	_____
Date of purchase	_____
Registration number	_____

The registration number is required for service or support. You can register your computer by telephone when you call for service or support. See *About Your Software* for more information about registering your computer.

The model and type (M/T) numbers and the serial number (S/N) for your computer are located on a label on the rear of the computer and also on a label on the front of the computer.



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## Appendix E. Notices and trademarks

This appendix includes trademark information and notices.

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### Notices

This publication was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

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North Castle Drive  
Armonk, NY 10504-1785  
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## Electronic emissions notices

This computer is classified as a Class B digital device. However, this computer includes a built-in network interface controller (NIC) and is considered a Class A digital device when the NIC is in use. Additionally, NetVista A20 Type 6269 computers are considered Class A digital devices when a second dual inline memory module (DIMM) is installed. The Class A digital device rating and compliance notice are primarily because the inclusion of certain Class A options or Class A NIC cables changes the overall rating of the computer to Class A.

Cet ordinateur est enregistré comme un appareil numérique de classe B. Toutefois, lorsque la carte réseau qu'il contient est utilisée, il est considéré comme un appareil de classe A. Il a été déclaré de classe A dans l'avis de conformité car la présence de certaines options de classe A ou de câbles de carte réseau de classe A modifie ses caractéristiques et le rend conforme aux normes de la classe A.

### Class B notices

NetVista A20 Type 6269, NetVista A40 Types 6568, 6578, and 6648, NetVista A40p Types 6569, 6579, and 6649

### Federal Communications Commission (FCC) statement

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or

by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Responsible party:

International Business Machines Corporation  
New Orchard Road  
Armonk, NY 10504  
Telephone: 1-919-543-2193



Tested To Comply  
With FCC Standards

FOR HOME OR OFFICE USE

### **Industry Canada Class B emission compliance statement**

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

### **Avis de conformité à la réglementation d'Industrie Canada**

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

### **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 B Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

## **Class A notices**

NetVista A20 Types 6269, NetVista Types 6568, 6578, and 6648, NetVista A40p Types 6569, 6579, and 6649

### **Federal Communications Commission (FCC) statement**

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

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

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

### **Industry Canada Class A emission compliance statement**

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

### **Avis de conformité à la réglementation d'Industrie Canada**

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

### **Australia and New Zealand Class A statement**

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

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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.

## **Federal Communications Commission (FCC) and telephone company requirements**

1. This device complies with Part 68 of the FCC rules. A label is affixed to the device that contains, among other things, the FCC registration number, USOC, and Ringer Equivalency Number (REN) for this equipment. If these numbers are requested, provide this information to your telephone company.

**Note:** If the device is an internal modem, a second FCC registration label is also provided. You may attach the label to the exterior of the computer in which you install the IBM modem, or you may attach the label to the external DAA, if you have one. Place the label in a location that is easily accessible, should you need to provide the label information to the telephone company.

2. The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed five (5). To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.
3. If the device causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance; if advance notice is not practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your

equipment. If they do, you will be given advance notice to give you an opportunity to maintain uninterrupted service.

5. If you experience trouble with this product, contact your authorized reseller, or call IBM. In the United States, call IBM at **1-800-772-2227**. In Canada, call IBM at **1-800-565-3344**. You may be required to present proof of purchase.

The telephone company may ask you to disconnect the device from the network until the problem has been corrected, or until you are sure the device is not malfunctioning.

6. No customer repairs are possible to the device. If you experience trouble with the device, contact your Authorized Reseller or see the Diagnostics section of this manual for information.
7. This device may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.
8. When ordering network interface (NI) service from the local Exchange Carrier, specify service arrangement USOC RJ11C.

### **Canadian Department of Communications certification label**

**NOTICE:** The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements documents. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**Caution:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

**NOTICE:** The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

### **Étiquette d'homologation du ministère des Communications du Canada**

**AVIS :** L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurité des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunications. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

**Avertissement :** L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir recours à un service d'inspection des installations électriques ou à un électricien, selon le cas.

**AVIS :** L'indice d'équivalence de la sonnerie (IES) assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent être raccordés à une interface. La terminaison d'une interface téléphonique peut consister en une combinaison de quelques dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5.

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## Power cord notice

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, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka

<b>IBM power cord part number</b>	<b>Used in these countries and regions</b>
14F0033	Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
62X1045	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

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