PC 300PL User Guide

Types 6584 and 6594

PC 300PL User Guide

Types 6584 and 6594

IBM

┌─ **Note** ───┐

Before using this information and the product it supports, be sure to read the
general information under Appendix C, "Product warranties and notices" on
page 151.

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First Edition (September 1999)

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Contents

Safety information

⚠️ **DANGER:**

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.

To Connect	To Disconnect
Turn everything OFF.	Turn everything OFF.
First, attach all cables to devices.	First, remove power cord from outlet.
Attach signal cables to receptacles.	Remove signal cables from receptacles.
Attach power cord to outlet.	Remove all cables from devices.
Turn device ON.	

⚠
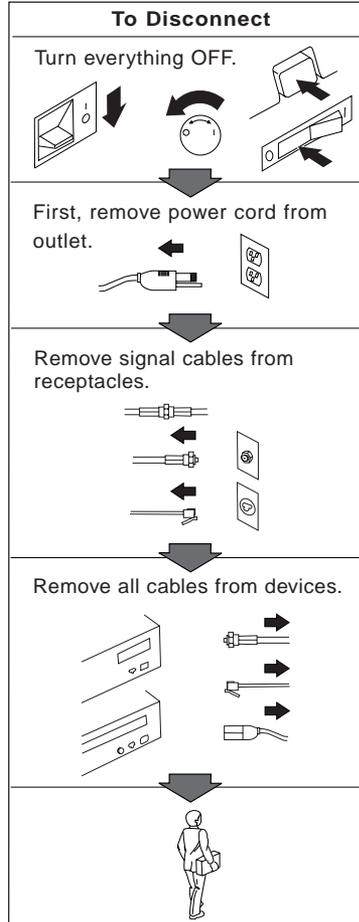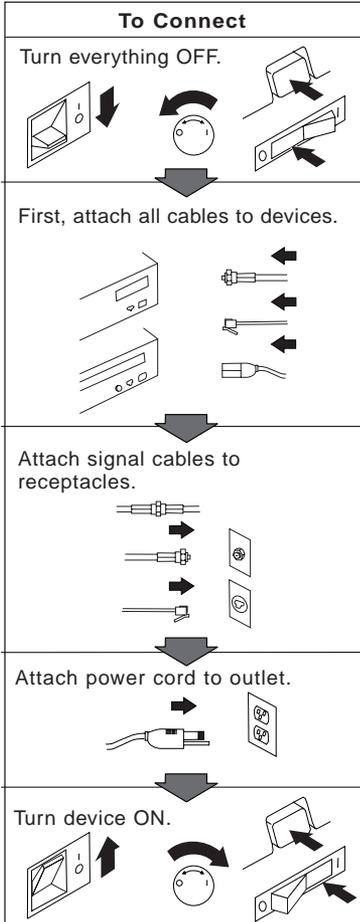
DANGER

> **To avoid a shock hazard, do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**

DANGER

> **Pour éviter tout risque de choc électrique, ne manipulez pas de câbles ni de cordons et n'effectuez pas d'opération d'installation, de maintenance ou de reconfiguration pendant un orage.**

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.**

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 État-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.**

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 33F8354 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.

About this book

This book will help you become familiar with your IBM® Personal 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.

Related information

The following documentation contains additional information about your computer:

- *About Your Software*
  This publication (provided only with computers that have IBM-preinstalled software) contains information about the preinstalled software package.

- *Understanding Your Personal Computer*
  This online publication (preinstalled on your computer and provided on the *Software Selections CD* that comes with your computer) includes general information about using personal computers and in-depth information about the specific features of your computer. For information on how to access this online publication, see *About Your Software*.

- *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/us/
  Type the machine type/model number 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 133.

- *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/us/
  Type the machine type/model number into the Quick Path field and click **Go**. Click **Online publications** and then click **Technical Manuals**.

Chapter 1. IBM PC 300PL overview

Thank you for selecting an IBM PC 300®PL. 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.

Identifying your computer

In most instances, 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 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 6584-110.

This book describes PC 300PL models in desktop and tower versions. These naming conventions are used only where it is appropriate. Instructions without these naming conventions apply to both the computer models.

Desktop model

The desktop model comes with four drive bays, one AGP slot with a preinstalled video adapter, and either four PCI expansion slots or, optionally, two PCI slots, one shared PCI and ISA slot, and one ISA slot. If your computer comes with a CD-ROM drive, it is next to the diskette drive. When the desktop model is in its normal position (drives horizontal), you can place the monitor on top of it.
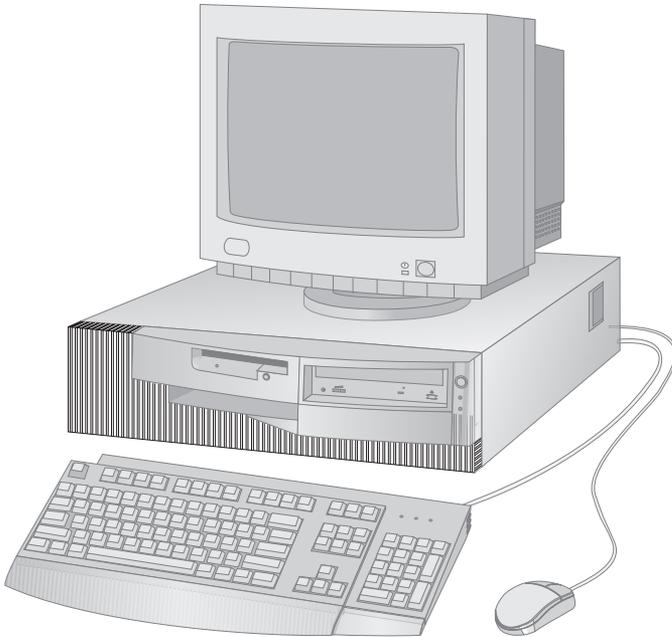
Tower model

The tower model comes with six drive bays, six PCI expansion slots, and one AGP slot with a preinstalled video adapter. The drive bays in the tower model are aligned on top of one another. If your computer has a CD-ROM drive, it is installed in the bay at the top of the computer. When the tower model is in its normal position, the drives in the tower are horizontal with the handle at the top of the computer.
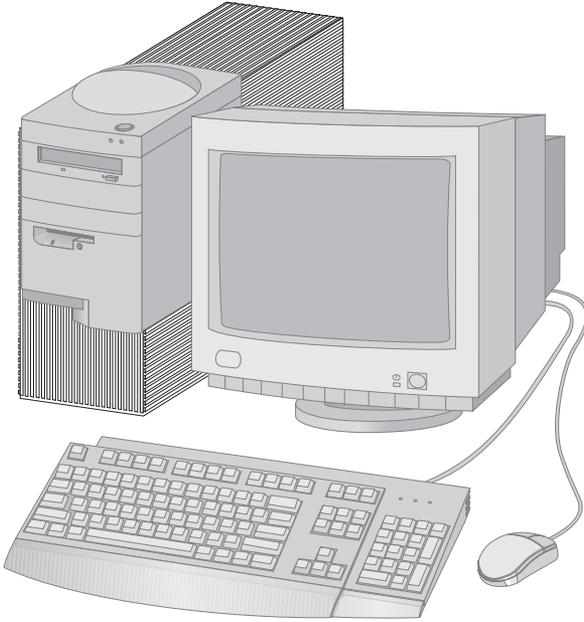
Features

Microprocessor

Your PC 300PL includes an Intel® Pentium® III microprocessor with up to
512 KB of L2 cache memory.

Memory
- Support for:
  - 2.5 V, 184-pin, Rambus inline memory module (RIMM) that
    contains error correcting code (ECC) or non-ECC Rambus dynamic
    random access memory (RDRAM)
  - 64 MB, 128 MB, 256, and 512 MB (when available) RIMMs for a
    maximum of 1 GB
  - RIMM heights up to 63.5 mm (2.5 inches)
- 512 KB flash memory for system programs

Internal drives
- Standard:
  - One 3.5-inch, 1.44 MB diskette drive
  - One internal hard disk drive
- Some models: One EIDE CD-ROM drive

Graphics subsystem

High-performance accelerated graphics port (AGP) graphics adapter with
up to 16 MB synchronous graphics RAM (SGRAM) video memory

Audio subsystem:
- Integrated audio controller compatible with Microsoft Windows Sound
  System
- Supports most Sound Blaster applications

10/100 Megabits per second Ethernet adapter that supports:
- Wake on LAN® (some models)
- Alert 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 Alarm
- Remote Administration (ability to update POST and BIOS over the network)
- Automatic power-on startup
- System Management (SM) BIOS and software
- Ability to store POST hardware test results
- Built-in system management hardware (temperature sensors, fan-speed monitor, chassis-intrusion detector, power supply and processor voltage monitor, and power-switch bypass)

Input/output features

- 25-pin, Extended Capabilities Port (ECP)/Extended Parallel Port (EPP) parallel port
- Two 9-pin, 16550 UART serial ports
- Two 4-pin, Universal Serial Bus (USB) ports
- Mouse port
- Keyboard port
- Monitor port (on graphics adapter)
- Three audio connectors (line out, line in, and microphone)

Expansion

- Drive bays
  - Desktop model: four drive bays
  - Tower model: six drive bays
- Adapter slots with support for Plug and Play adapters
  - Desktop:
    - Four PCI expansion slots (some models)
    - Two PCI, one ISA, and one shared PCI/ISA expansion slots (some models)
  - Tower: six PCI expansion slots

  PCI slot 1 supports the Alert on LAN feature for use with Alert on LAN-supported network adapters

Power

- Manual switch between ranges, 90–137/180–265 V ac
- Automatic switching, 57–63/47–53 Hz input frequency range
- Built-in overload and surge protection
- Advanced Power Management support
- Advanced Configuration and Power Interface (ACPI) support

Security features

- Cover lock and keys
- Support for the addition of a U-bolt and lockable cable
- Power-on and administrator passwords
- 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
- Alert on LAN (requires Alert on LAN supported network adapter)
- Security profile by device
- IBM Security Solutions

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 NT® Workstation Versions 3.51 and 4.0
- Microsoft Windows® 95 and Windows 98

Operating systems (tested for compatibility)[1]

- Novell NetWare Versions 3.2, 4.11, 5.0
- SCO OpenServer 5.0.4
- OS/2®
- MS-DOS® 6.22
- IBM PC DOS 7.0
- 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 the list are available in the IBM online compatibility report, which can be found on the World Wide Web. For World Wide Web pages, see Chapter 7, "Getting help, service, and information" on page 133.

Specifications

System specifications provide information to help you in the setup of your computer.

Desktop model

Dimensions

- Height: 134 mm (5.3 in.)
- Width: 447 mm (17.6 in.)
- Depth: 450 mm (17.7 in.)

Weight

- Minimum configuration as shipped: 9.9 kg (22 lb)
- Maximum configuration: 11.3 kg (25 lb)

Environment

- Air temperature:
  - System on: 10° to 32°C (50° to 90°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 ac
  - High range:
    - Minimum: 180 V ac
    - Maximum: 265 V ac
    - Input frequency range: 47–53 Hz
    - Voltage switch setting: 230 V ac
  - Input kilovolt-amperes (kVA) (approximately):
    - Minimum configuration as shipped: 0.05 kVA
    - Maximum configuration: 0.52 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: 245 Btu/hr (70 watts)
  - Maximum configuration: 700 Btu/hr (204 watts)

Airflow

- Approximately 0.56 cubic meters per minute (20 cubic feet per minute)

Acoustical noise-emission values

- Average sound-pressure levels:
  - At operator position:
    - Idle: 34 dBA
    - Operating: 41 dBA
  - At bystander position–1 meter (3.3 ft):
    - Idle: 29 dBA
    - Operating: 34 dBA
- Declared (upper limit) sound power levels:
  - Idle: 4.5 bels
  - Operating: 5.0 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.

Tower model

Dimensions

- Height: 492 mm (19.4 in.)
- Width: 200 mm (7.9 in.)
- Depth: 445 mm (17.5 in.)

Weight

- Minimum configuration as shipped: 15 kg (33 lb)
- Maximum configuration: 17.3 kg (38 lb)

Environment

- Air temperature:
  - System on: 10° to 32°C (50° to 90°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: 0.51 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: 245 Btu/hr (70 watts)
  - Maximum configuration: 969 Btu/hr (285 watts)

Airflow

- Approximately 0.56 cubic meters per minute (20 cubic feet per minute)

Acoustical noise-emission values

- Average sound-pressure levels:
  - At operator position:
    - Idle: 33 dBA
    - Operating: 35 dBA
  - At bystander position–1 meter (3.3 ft):
    - Idle: 29 dBA
    - Operating: 32 dBA
  - Declared (upper limit) sound power levels:
    - Idle: 4.5 bels
    - Operating: 4.8 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.

Chapter 2. Setting up your computer

This section provides information for connecting cables to your computer.

> **Before you begin**
>
> Read "Safety information" on page vii before setting up your computer.

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 15.

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 desktop model computer. You might not have all of the devices shown here.
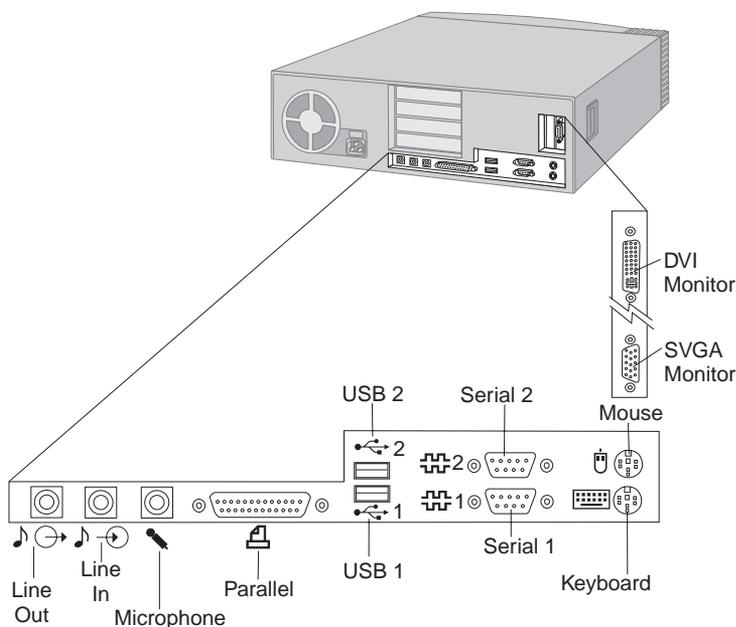
Notes:

1. The connectors on the rear of the computer have color-coded icons. You can use the icons to determine where to connect cables on your computer.

2. Some models might come with a digital visual interface (DVI) connector instead of a super video graphics array (VGA) connector. See page 12.

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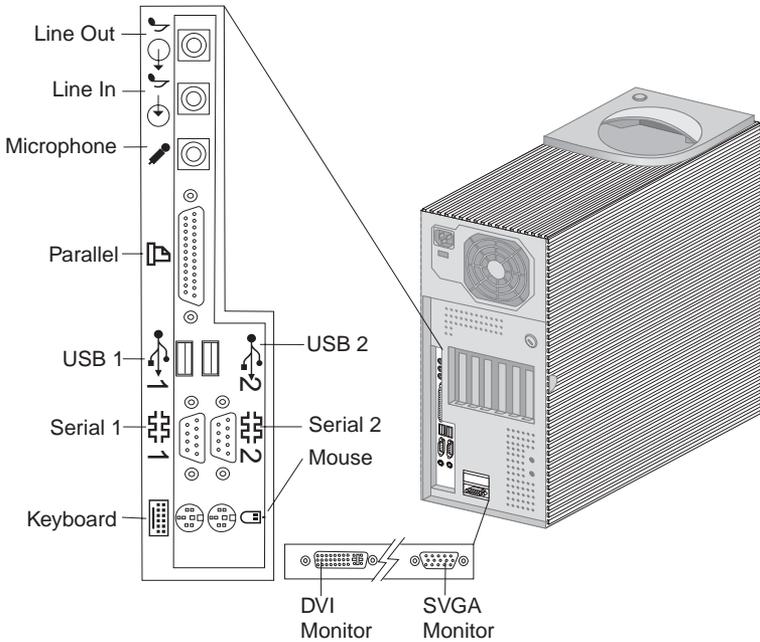
Notes:

1. The connectors on the rear of the computer have color-coded icons. You can use the icons will help you to determine where to connect cables on your computer.

2. Some models might come with a digital visual interface (DVI) connector instead of a super video graphics array (VGA) connector. See page 12.

Use the following steps to set up your computer:

1. 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.
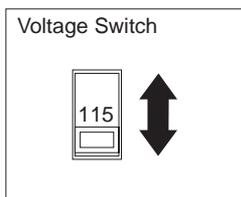
2. Connect the monitor cable to the monitor (if it is not already attached) and then to the monitor connector; tighten the attachment screws.
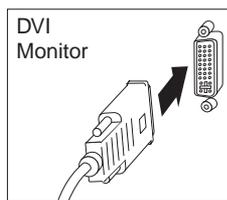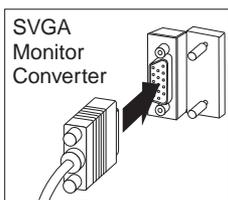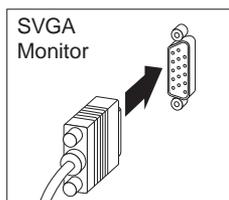
Desktop
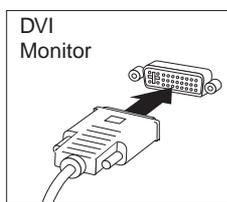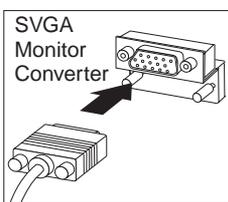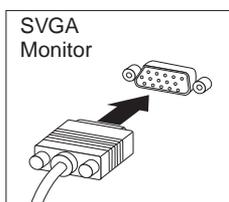
Tower

Note: If your computer has an SVGA monitor converter, it might already be connected and it might look different than the one shown here.

3. Connect the keyboard cable to the gray keyboard connector. Connect the mouse cable to the green mouse connector.
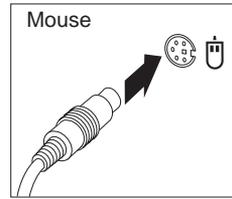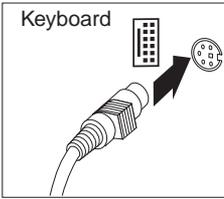
Desktop
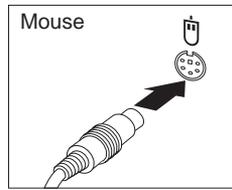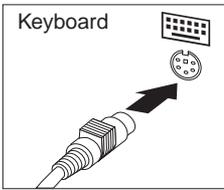
Tower

Note: If your computer comes with Windows NT Workstation and a ScrollPoint™ mouse, the first time you start up your computer, 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.
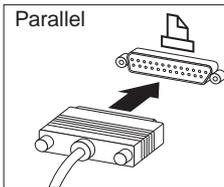
Desktop
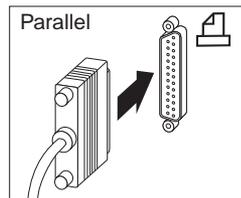
Tower

- Any serial device or external modem in the serial connector.
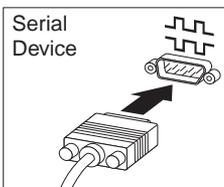
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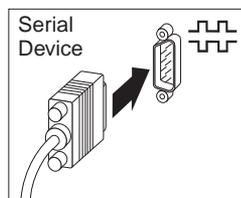
Tower

- Any Universal Serial Bus (USB) devices.
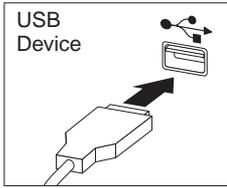
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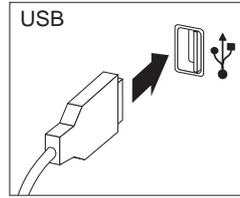
Tower

- Any optional devices, such as speakers, microphones, or headphones, for models with an audio device.
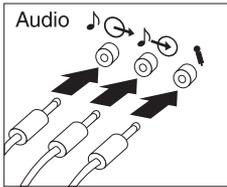
Desktop
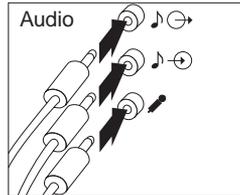
Tower

- Connect the power cord to the power connector. 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.
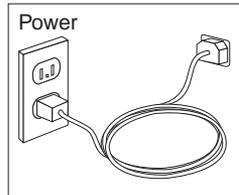
Important:

- When you first plug in the power cord, the computer turns on for a few seconds, then turns off. This is normal operation.

- In some circumstances, the computer might not turn off immediately when you press the power switch. In this case, hold the power switch down until the computer turns off.

- Connect the Ethernet cable (for models with an Ethernet adapter).
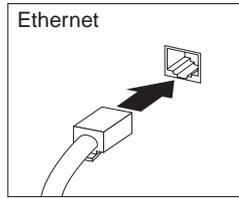
Finish the installation

Locate identification numbers (serial and model/type) and record this information in Appendix B, "Computer records" on page 147.

See "Related information" on page xi for sources of other information about your computer. For information about IBM-installed software, see *About Your Software* in your applications package. 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. Device drivers are provided on the *Product Recovery CD* or at http://www.ibm.com/pc/us/ on the Word Wide Web. Installation instructions are provided with the media or in README files on the diskettes or CDs.

Arranging your workspace

To get the most from your computer, arrange 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, the following guidelines will help you find a position that suits you best.

Choose a good chair to reduce the frequency of fatigue from sitting in the same position for a long time. 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.

Viewing Distance

Lower Back Support

Seat Height
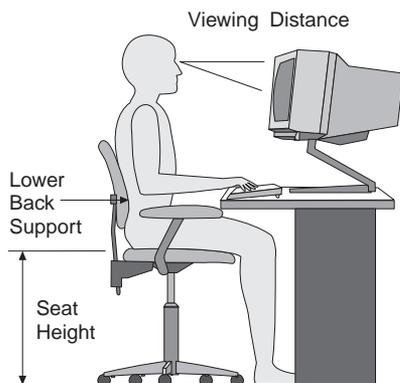
Adjust the monitor so that the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so that you can view it without having to twist your body.

Glare and lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Place the monitor at right angles to windows and other light sources whenever 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, place an antiglare filter over the screen. 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. Whenever 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 be kicked accidentally.

For more information about power cords, see "Power cord notice" on page 169.

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.

Controls and status indicators

The buttons at the front of your computer are controls that enable you to perform specific functions, such as turning on the computer. The lights are status indicators that tell you when certain devices, such as the diskette drive, are in use.

The following illustrations show the controls and status indicators for the desktop and tower models.
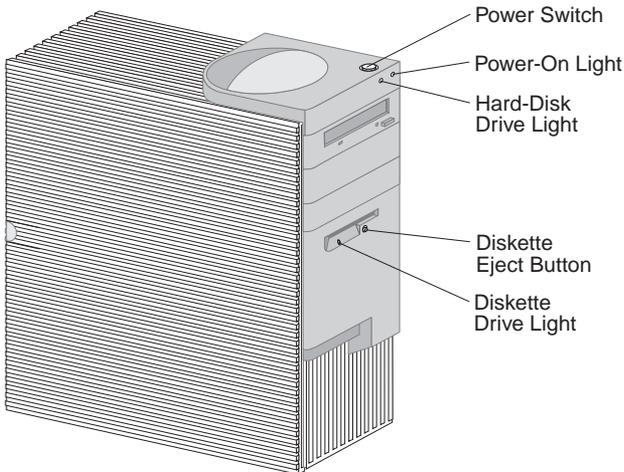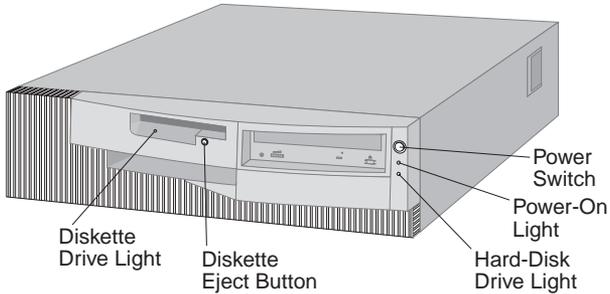
The following list describes the controls and status indicators for your computer.

- **Power switch:** Press this switch to turn your computer on or off. Do not turn off your computer if the in-use light for the hard disk drive or diskette drive is on.

   Note: The power switch normally operates with a single touch. However, in some circumstances the computer might not immediately turn off. If this happens, hold the power switch down for approximately 5 seconds, and the computer will then turn off.

- **Power-on light:** This status indicator lights when you turn on your computer.

- **Hard disk drive light:** When this light is on, it indicates that the hard disk drive heads are being positioned or that your computer is reading from or writing to the hard disk.

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

- **Diskette drive light:** When this light is on, it indicates that the diskette drive heads are being positioned or that your computer is reading from or writing to a diskette.

Note: If your computer has a preinstalled CD-ROM drive, see "Using a CD-ROM drive" on page 24.

Starting your computer

To start your computer:

1. Turn on all devices connected to the computer.

2. Press and release the power switch on your computer.
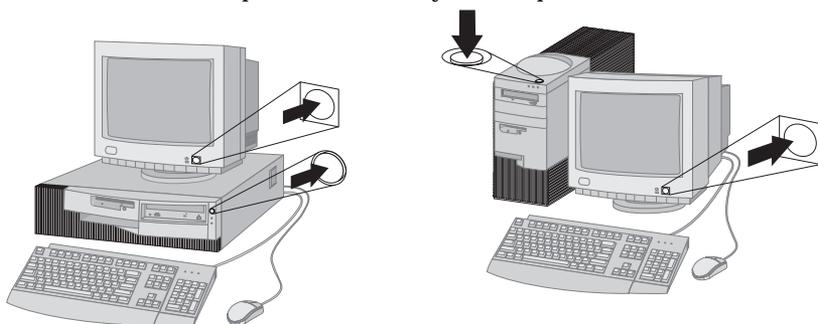
   Note: If you suspect a problem, see Chapter 6, "Troubleshooting" on page 105.

If you have not changed any settings in the Configuration/Setup Utility program, the following events occur:[2]

1. The video BIOS is installed.

2. The IBM logo appears on the screen.

3. The amount of system memory and extended memory appears in the top-left corner of the screen.

4. The following messages appear:
   ```
   Press F1 for Configuration/Setup
   Press ESC for fast POST
   Press F12 for Network Boot
   ```

5. The power-on self-test (POST) is performed. If POST detects a problem, you hear multiple beeps (or no beep) and an error message appears on the screen. Write down any error code numbers and descriptions. For further information about error messages, see Chapter 6, "Troubleshooting" on page 105.

6. You can start the Configuration/Setup Utility program (by pressing F1) or run a fast POST (by pressing Esc).

7. If your computer has a SCSI adapter installed, the SCSI BIOS is installed.

8. If you have set a power-on password, a prompt appears on the screen. If you have set both power-on and administrator passwords, you can type either password at the password prompt. When you type your password at the prompt and press Enter, the first screen of your operating system or application program appears.

9. If the system hardware configuration has changed or an error is detected, the Configuration/Setup Utility program menu might be displayed when you press Enter.

   For more information, see "Power-on self-test (POST)" on page 106.

10. A Dynamic Host Configuration Protocol (DHCP) request is sent to the network, and one of the following events occurs:

    - If you are properly connected to a network, a DHCP server dynamically assigns an Internet Protocol (IP) address to your computer and then loads a startup image onto your computer.

    - If the DHCP request is unsuccessful, the following message appears:

---

[2] If you have changed settings for features (such as passwords or the startup sequence) in the Configuration/Setup Utility program, see "Settings that affect the startup procedure" on page 49 for important information.

```
No IP address found for DHCP or BOOTP
```

The operating system and application programs are loaded from the hard disk drive.

- If you have not plugged an Ethernet cable into the Ethernet connection on your computer, the following message appears:

```
Media test failed; check cable
```

and the operating system and application programs are loaded from the hard disk drive.

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*].

Notes:

1. Other selections also might change what is displayed when the computer starts up.

2. If you have preinstalled software, a preinstalled application called ConfigSafe automatically takes a snapshot of your initial system settings when you first start up your computer. With this information, you can reset these settings if a configuration update fails in the future. For further information about ConfigSafe and other software provided with your computer, see *About Your Software*.

Your computer can "wake up" and be started remotely over a network if it has a properly configured network connection to a network adapter with Wake on LAN support. For more information, see "Wake on LAN" on page 28 and "Setting the startup sequence" on page 48.

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.

Using diskettes

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

Handling and storing diskettes

Inside the protective diskette case is a flexible disk with a magnetic-sensitive coating on which data is stored. A plastic cover protects this disk from damage by heat, dust, magnetic fields, and fingerprints.

Use the following guidelines when handling and storing diskettes:

- If the plastic cover that protects the disk 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.

Write-protecting diskettes

It is possible to accidentally format a diskette or unintentionally write data to it. Important information can be written over or lost. For this reason, it is a good idea to write protect important diskettes. You can read data from a write-protected diskette, but you cannot erase or change the data.

The write-protect switch is located on the back of a 3.5-inch diskette. The write-protect switch can be used to prevent data from being written to or erased from the diskette. If a 3.5-inch diskette does not have a write-protect switch, it is permanently write-protected.

Write-Protect Switch
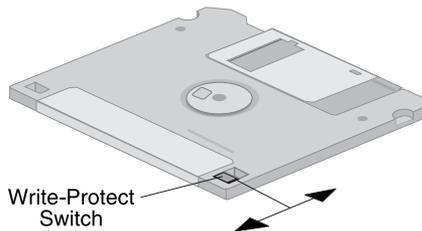
- To allow writing to the diskette, slide the switch so the write-protect window is covered.

- To prevent writing to the diskette, slide the switch so the write-protect window is open.

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

Using video features

Your computer has an accelerated graphics port (AGP) adapter with SGRAM video memory that 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, see *Understanding Your Personal Computer* (provided on the *Software Selections CD* that comes with your computer).

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 graphics adapter and a README file with instructions for installing the device drivers are provided on the *Product Recovery CD* that comes with your computer. If your computer has IBM-preinstalled software, video device drivers have already been installed on the hard disk. However, you can use the device driver installation instructions if you need to reinstall the device drivers or if you need information about obtaining and installing updated device drivers.

See Chapter 7, "Getting help, service, and information" on page 133 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 *Product Recovery CD* that comes with your computer. See your operating system documentation for more 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, see the documentation provided with the monitor.

Using audio features

Your computer has an integrated audio controller that supports most Sound Blaster applications and is compatible with the Microsoft Windows Sound System. Your computer also has a single internal speaker and three audio connectors. Using the audio controller, you can record and play back sound and music and enjoy sound with multimedia applications. Optionally, you can connect two stereo speakers to the line-out connector to enjoy better sound with multimedia applications.

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, see "Connecting computer cables" on page 10.)

Line 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 connector on your computer.

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

Microphone in: 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 jack 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).

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

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 firmware hub 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 49 for more information.

As part of the continuing work to improve quality, 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 or through the bulletin board Service (see Chapter 7, "Getting help, service, and information" on page 133). Instructions for using the system programs updates are available in a README file included in the update files.

Managing your computer

Your computer comes with 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* (provided on the *Software Selections CD* comes with your computer).

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

Wake on LAN

A network administrator can use the Wake on LAN feature to turn on your computer from a remote location if your computer has a Wake on LAN network adapter. When Wake on LAN is used in conjunction with network management software, 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.

Alert on LAN

Your computer supports Alert on LAN technology. Alert on LAN technology provides notification of changes in the computer system even if the computer is turned off. Working with Desktop Management Interface (DMI) and Wake on LAN technologies, Alert on LAN helps to manage and monitor the hardware and software features of your computer.

Alert on LAN generates notifications when the internal computer components have been removed, POST fails during a Wake on LAN attempt, or the computer is disconnected from the network or unplugged from the electrical outlet. Alert on LAN can be integrated with network-management software such as LANClient Control Manager™ and IBM Netfinity Manager.

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 the remote administration feature to update remotely 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. Refer to "Setting Remote Administration" on page 49 for configuration information.

LANClient Control Manager

LANClient Control Manager (LCCM) is a graphical, server-based program that aids in system deployment by enabling unattended installation of operating systems, complete software images, device drivers, and BIOS updates to remote systems. Used with Wake on LAN, LCCM can remotely start up your system from a powered-off state, which means that installation can be done while the system is not being used. When you

purchase an IBM PC, you can download LCCM at no additional charge (Internet access fees excepted).

For more information or to download this software, visit 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, device drivers, and files from an IBM or non-IBM PC to supported IBM systems. If you have purchased an IBM PC, You can download SMA at no additional charge (Internet access fees excepted).

For more information or to download this software, visit 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 *Understanding Your Personal Computer* (provided on the *Software Selections CD* that comes with your computer).

Using security features

To deter unauthorized use of your computer, you can use anti-intrusion features and other security features 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 the chassis of your computer 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.

> **Important**
>
> Record the key code number and the manufacturer address and phone number in the space provided in Appendix B, "Computer records" on page 147. Because locksmiths are not authorized to duplicate the cover lock keys, you must order replacement keys from the key manufacturer. When ordering replacement keys, you will need the key code number.

You can set a chassis-intrusion detector inside your computer 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. After the password is set, and after the computer cover is removed, a POST error message (176) displays on the computer screen the next time the computer is plugged in and turned on. You must enter the correct administrator password in order to start up the computer. For information on setting passwords, see Chapter 4, "Using the Configuration/Setup Utility program" on page 37.

If your computer uses Alert on LAN, and you are connected to a network that uses Intel LANDesk® Desktop Manager or Intel LANDesk Client Manager, a message that the computer cover has been removed is also sent to the network administrator console. For more information, see "Alert on LAN" on page 29 and contact your network administrator.

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.pc.ibm.com/us/desktop/ on the World Wide Web.

Asset ID capability

IBM provides the basis for Asset ID™ support[3] in your computer. Asset ID provides the capability to access information about your computer that is stored in an EEPROM module on the system board, using a radio-frequency-enabled portable scanner.

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[3] 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.

The Asset ID EEPROM contains prerecorded information about the system, including its configuration and the 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.

For the latest information on personal computer security features, visit the IBM support page at http://www.pc.ibm.com/security/ on the World Wide Web.

IBM security solutions

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

- Integrated security chip called the *signature generation chip* that gives you the functionality of a SMART card without the added cost
- Enhanced security support
- User Verification Manager software that helps manage authentication so you decide who has access to the components of your system

Data protection

You can lose data from the hard disk drive for a variety of reasons. Security violations, viruses, or hard disk drive failure can all contribute to the 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. Once an error is detected, the data on the hard disk can be backed up and the drive replaced.

Virus protection

Your computer has built-in virus protection that can be enabled through the Configuration/Setup Utility program. In addition, Norton AntiVirus for IBM is available on the IBM *Software Selections CD*. For further information about Norton AntiVirus for IBM or other software, see *About Your Software*.

Enhanced security

Your computer has 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 by someone. For more information, see "Using Enhanced Security" on page 46.

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 Chapter 4, "Using the Configuration/Setup Utility program" on page 37.

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

Taking care of your computer

Use these 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 of the 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.
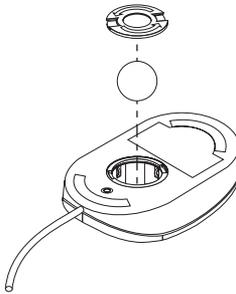
4. Turn the mouse right-side up, and the retainer and ball will drop out.

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. See 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 units to avoid damage.

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.

Starting and using the Configuration/Setup Utility program

The Configuration/Setup Utility program is started automatically when POST detects that hardware installed in your computer has resulted in a downgraded configuration. A 162 POST message is displayed. See "Power-on self-test (POST)" on page 106.

To start the Configuration/Setup Utility program:

1. Turn on your 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. When the Configuration/Setup Utility prompt appears in the lower-left corner of the screen during startup, press F1. (This prompt appears on the screen for only a few seconds. You must press F1 quickly.)

3. 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 40 for more information.

   Note: If new system hardware has been added *and* one or more of the following statements are true, the Configuration/Setup Utility program menu will display before control is passed to the operating system.

   - Enhanced POST is in effect.
   - Power-on password is enabled.
   - Administrator password is enabled.

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

```
┌─────────────────────────────────────────────────────────┐
│                Configuration/Setup Utility                │
├─────────────────────────────────────────────────────────┤
│                                                           │
│         Select Option:                                    │
│                                                           │
│         • System Summary                                  │
│         • Product Data                                    │
│         • Devices and I/O Ports                           │
│         • Start Options                                   │
│         • Date and Time                                   │
│         • System Security                                 │
│         • Advanced Setup                                  │
│         • ISA Legacy Resources                            │
│         • Power Management                                │
│                                                           │
│           Save Settings                                   │
│           Restore Settings                                │
│           Load Default Settings                           │
│                                                           │
│           Exit Setup                                      │
│                                                           │
└─────────────────────────────────────────────────────────┘
```
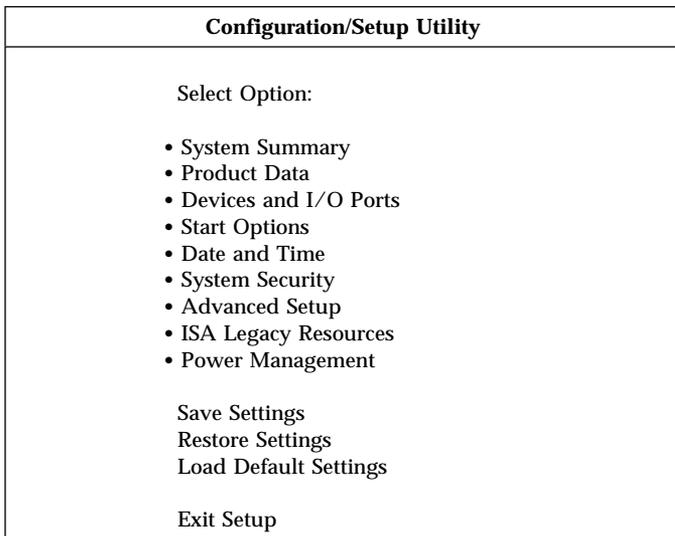
Viewing and changing settings

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. The following table shows the keys used to accomplish various tasks.

Keys	Function
↑ ↓	Use these 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 these 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 to return to the Configuration/Setup Utility program menu (you might have to press Esc several times). If you want to save the new settings, select Save Settings before you exit. Otherwise, your changes will not be saved.

Using passwords

You can use passwords to provide security for your computer and data. You can set two kinds of passwords: 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 before you do so.

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, you can 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 to input any other information. If you have a mouse connected to the mouse connector, it will remain locked. If you have a mouse connected to a serial port, it will be activated when the computer is started, regardless of whether a password is set.

> **Note:** If **Remote Administration** is enabled, you cannot select **On**. In this case, select **Dual**. If you 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 49.

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 computer will start the operating system. However, if you have a mouse connected to the mouse connector, see the following information.

```
┌─ Important information for mouse users ─────────────┐
│                                                      │
│  This information applies only to computers with a   │
│  mouse connected to the mouse port;  a serial mouse  │
│  is not affected by the password prompt Off mode.    │
│                                                      │
│  The password prompt Off mode prevents the computer  │
│  from detecting that a mouse is attached.  In this   │
│  mode, the mouse device driver does not load         │
│  automatically.  Instead, the operating system       │
│  displays an error message informing you that the    │
│  mouse connector is disabled.  To enable the         │
│  operating system to load without displaying this    │
│  error message on future restarts, type either your  │
│  power-on or administrator password and press Enter. │
│  Then use the tab key and spacebar on the keyboard   │
│  to put a check mark in the Do not display this      │
│  message in the future check box.                    │
│                                                      │
│  Once the operating system starts in password prompt │
│  Off mode, the computer will remain locked until you │
│  type your password.  However, the mouse connected   │
│  to the mouse port remains locked.                   │
│                                                      │
└──────────────────────────────────────────────────────┘
```

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 a modem or timer.

If you start the computer by using the power switch, the computer operates the same as it does in password prompt On mode. See page 40 for more information.

If the computer is started by an unattended method, such as remotely over a LAN, the computer operates the same as it does in password prompt Off mode. See page 40 for more information.

Once you enter your power-on password, you will be able to view limited information in the Configuration/Setup Utility program, but you will not be able to change any settings.

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).

Attention

Keep a record of your power-on password in a secure place. If you lose
or forget your password, you cannot change or delete it without
removing the computer cover and moving a jumper on the system
board. See "Erasing a lost or forgotten password" on page 44 for more
information.

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 37).

2. From the Configuration/Setup Utility program menu, select **System
   Security** and press Enter.

3. Select **Power-On Password** and press Enter.

4. 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. Then go to step 9.

5. To change a power-on password, select **Change Power-On Password**
   and follow the instructions on the screen.

6. To set a new password, type your new password and press Down
   Arrow (↓).

7. Type your new password again.

8. At **Password Prompt**, select **Off**, **On**, or **Dual**. Press Left Arrow (←) or
   Right Arrow (→) to toggle among selections.

   Note: If **Remote Administration** is enabled, you cannot select **On**. In
   this case, select **Dual**. If you set this mode to **On**, when **Remote
   Administration** is enabled, the mode will automatically be reset
   to **Dual**.

9. Press Esc twice to return to the Configuration/Setup Utility program
   menu.

10. Select **Save Settings** from the Configuration/Setup Utility menu: then
    press Esc and follow the instructions on the screen to exit from the
    Configuration/Setup Utility program.

Using an administrator password

> **Important**
>
> If enhanced security is enabled, keep a record of your administrator password in a secure place. If you forget or lose the administrator password, you must replace the system board in order to recover.

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. If you type the wrong password three times in succession, 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 37).

2. From the Configuration/Setup Utility program menu, select **System Security** and press Enter.

3. Select **Administrator Password** and press Enter. You will be warned that if you forget your administrator password, you will have to replace your system board. Press Enter to continue.

4. To delete an administrator password, select **Delete Administrator Password** and go to step 9 on page 44.

5. To set an administrator password, type your password, press Down Arrow (↓), and type your password again.

6. At **Power-On Password Changeable by User**, select **Yes** or **No**. Press Left Arrow (←) or Right Arrow (→) to toggle between selections. (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 you enter the administrator password.)

7. At **Require Power-On Password on Warm boot**, select Yes or No.

8. Select **Change Administrator Password** and follow the instructions on the screen.

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 Esc and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

Erasing a lost or forgotten password

This section applies to lost or forgotten passwords that are *not* protected by enhanced security. For information on lost or forgotten passwords that *are* protected by enhanced security, see "Using Enhanced Security" on page 46.

Important

If possible, record the configuration information of your computer *before* setting the fail safe jumper.

To erase a lost or 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 61 (desktop) or "Removing the cover" on page 77 (tower).

4. Refer to the system board cover label inside the computer to locate the fail safe jumper on the system board.

5. Move the fail safe jumper from the normal position to the clear position.

6. Replace the cover.

7. Plug in the power cord.

8. Restart the computer, leave it on for about 10 seconds, and then turn off the computer.

9. Unplug the power cord and remove the cover. See "Removing the cover" on page 61 (desktop) or "Removing the cover" on page 77 (tower).

10. Move the fail safe jumper from the clear position to the normal position.

11. Replace the computer cover. See "Replacing the cover and connecting the cables" on page 76 or "Replacing the cover and connecting the cables" on page 92.

12. Plug in the power cord.

Using Security Profile by Device

Security Profile 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 Profile by Device:

1. Start the Configuration/Setup Utility program (see "Starting and using the Configuration/Setup Utility program" on page 37).

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 menu: then press Esc and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

Using 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 if 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. In a networking environment, 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 turned off and back on again 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.

- A chassis-intrusion feature will alert you if the cover of your computer has been removed. This feature will work if your computer is on or off. If the cover has been removed, a prompt for your administrator password will appear on the screen, and your computer will remain in a suspended state until you enter your administrator password.

- You cannot be change your configuration settings in the Configuration/Setup Utility program until you enter the administrator password. This means that any changes in computer hardware that the system programs in your computer detect will generate a configuration error until you enter the administrator password.

To enable or disable Enhanced Security:

1. Insert a system programs update diskette into the diskette drive (drive A) in your computer. System programs updates are available on the World Wide Web.

2. Turn on the computer. If it is on already, you must turn it off and back on again.

3. The update begins, your computer halts, and you are prompted for your administrator password (if you have set an administrator password). The computer remains in a halted state until you enter the administrator password.

4. When you enter the administrator password, or if no administrator password has been set, the update diskette will continue to run, and 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.

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, remote administration, 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).

Setting the startup sequence

Your computer can be started from several devices including the hard disk drive, diskette drive, CD-ROM drive, or from the network. The startup program looks for these devices in a selected sequence. You can use the Configuration/Setup Utility to select the startup sequence.

The startup sequence of your computer has been preset to automatically send a Dynamic Host Configuration Protocol (DHCP) request when your computer starts. This feature makes it easier for a network administrator to set up and manage computers using network management software such as IBM LANClient Control Manager (see "LANClient Control Manager" on page 29).

With the preset startup sequence, when you start your computer with the Ethernet cable attached and no startup diskette in the diskette drive, your computer sends a DHCP request over the network. If the DHCP request is successful, an IP address is assigned to your computer, and the operating system and other software are loaded.

Your computer has the following preset startup sequence:

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

Note: The preceding startup sequence is not the *default* startup sequence for your computer. If you change the settings in the Configuration/Setup Utility program to default, the preceding settings will change. If you load the Default settings or if you move the fail safe jumper, the default settings for the startup sequence are the following:

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

Important

Be sure to write down your correct sequence so you can restore it if you need to do so.

To set the startup sequence:

1. Start the Configuration/Setup Utility program (see "Starting and using the Configuration/Setup Utility program" on page 37).

2. Select **Start Options** and press Enter.

3. Select **Startup Sequence** from the Start Options menu and press Enter.

4. Select **First Startup Device** and press Enter.

5. Use the arrow keys to make your selection and press Enter.

6. If necessary, repeat the above steps for **Second Startup Device**, **Third Startup Device**, and **Fourth Startup Device**.

7. If **Automatic Power On Startup Sequence** is Enabled, select the sequence and devices from the choices provided.

8. Press Esc until you return to the Configuration/Setup Utility program menu.

9. 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.

Settings that affect the startup procedure

Settings for the following features in the Configuration/Setup Utility program can affect the startup procedure for your computer:

- Start Options, including the startup sequence, power-on status, and power-on self-test.

- Security options, including administrator and power-on passwords. For more information, see "Using passwords" on page 40, "Using a power-on password" on page 40, and "Using an administrator password" on page 43.

- Security Profile by Device. For more information, see "Using Security Profile by Device" on page 45.

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 on 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 37.

2. Select **System Security** and press Enter.

3. Select **Remote Administration** and press Enter.

4. To enable update 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 Esc and follow the instructions on the screen to exit from the Configuration/Setup Utility program.

Interrupt and DMA resources

This section lists the settings for the default interrupt and direct memory access (DMA) resources for your computer. The interrupt and DMA settings might change if your computer is reconfigured.

Interrupt request	System resource
0	Timer
1	Keyboard
2	Interrupt controller
3	Serial port B
4	Serial port A
5	Available
6	Diskette
7	Parallel port
8	Real Time Clock
9	ACPI
10	Available
11	Available
12	Mouse
13	Coprocessor
14	Available
15	IDE drives

Note: IRQs 4 and 7 can be modified to alternative settings or disabled.

DMA request	System resource
0	Available
1	Available
2	Diskette
3	Parallel port
4	System resource
5	Available
6	Available
7	Available

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.

Attention

If a device, such as a monitor, does not have power-management capabilities, it can be damaged when exposed to a reduced power state. Before you make energy-saving selections for your monitor, check the documentation that comes with your monitor to see if it supports Display Power Management Signaling (DPMS).

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 allow you to select which power level your system goes to when it enters standby mode.

Standby Mode S1 Standby Mode S1 is supported on all models. When the computer enters S1 mode, power is maintained to all devices but microprocessor activity is halted.

Standby Mode S3 Standby Mode S3 is supported on some models. If the Standby Mode setting in your computer does not allow you to select S3, only Standby Mode S1 is supported. When the computer enters S3 mode, power is maintained only for main memory. To wake up from Standby Mode S3, press and release the power switch on the computer.

Note: If the Standby Mode setting in your computer allows you to select S3, be sure to read the following important text box.

Important

Some optional adapters might not wake up properly from standby mode S3. If your computer appears to be hung in 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 find out if updated device drivers that support Standby Mode S3 are available for your optional adapters.

Setting power-management features

Important

If your computer has only USB devices connected, you might not be able to wake the system once it has gone to a low-power state.

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 37).
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 three times to return to the Configuration/Setup Utility program menu.
10. Select **Save Settings** from the Configuration/Setup Utility program menu; then 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 and a Wake on LAN-supported network adapter, 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). For more information, see the documentation that comes with your network adapter.

- **Wake Up 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 37).

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.

Quick reference for network-related settings

Some models come with a network adapter. The following tables provide a quick reference to help you if your computer is connected to other computers on a network. This information is intended to help you quickly find specific network settings. You can view the current setting or select a different setting. When finished, you can either save the settings and exit the utility program or exit without saving the settings.

The steps in the following table always start at the Configuration/Setup Utility main menu.

To enable:	Select:	Comments:
Remote Administration	1. System Security 2. Remote Administration 3. Enabled	Enable Remote Administration to allow POST/BIOS updates over the LAN.
Bypass of normal boot and use network	1. Start options 2. Network boot F12 option 3. Enabled	
Wake on LAN	1. Power Management 2. Automatic Power On 3. Wake on LAN 4. Enabled 5. Startup Sequence 6. Automatic Press Esc to go back to the main menu. 7. Start Options 8. Startup Sequence 9. Automatic Power On Startup Sequence 10. Enabled 11. First, second, third, and fourth startup devices	• You might not be able to select four startup devices for your model. • If your LAN adapter does not have a connection to the Wake on LAN connector on the system board, you must enable Wake on PCI also.
Wake on PCI	1. Power Management 2. Automatic Power On 3. Wake on PCI 4. Enabled 5. Startup Sequence 6. Automatic Press Esc to go back to the main menu. 7. Start Options 8. Startup Sequence 9. Automatic Power On Startup Sequence 10. Enabled 11. First, second, third, and fourth startup devices	You might not be able to select four startup devices for your model.

To enable:	Select:	Comments:
Wake on Alarm	1. Power Management 2. Automatic Power On 3. Wake on Alarm 4. Single Event, Daily Event, or Weekly Event 5. Alarm settings 6. Startup Sequence 7. Automatic Press Esc to go back to the main menu. 8. Start Options 9. Startup Sequence 10. Automatic Power On Startup Sequence 11. Enabled 12. First, second, third, and fourth startup devices	You might not be able to select four startup devices on your model.
Serial Port Ring Detect	1. Power Management 2. Automatic Power On 3. Serial Port A Ring Detect 4. Enabled 5. Startup Sequence 6. Automatic Press Esc to go back to the main menu. 7. Start Options 8. Startup Sequence 9. Automatic Power On Startup Sequence 10. Enabled 11. First, second, third, and fourth startup devices	You might not be able to select four startup devices for your model. Wake on Ring is enabled for communications port COM1 only.

To enable:	Select:	Comments:
Modem Ring Detect	1. Power Management 2. Automatic Power On 3. MODEM Ring Detect 4. Enabled 5. Startup Sequence 6. Automatic Press Esc to go back to the main menu. 7. Start Options 8. Startup Sequence 9. Automatic Power On Startup Sequence 10. Enabled 11. First, second, third, and fourth startup devices	• You might not be able to select four startup devices for your model. • For this setting to work, you must also enable Wake on PCI.

Enabling the Pentium III processor serial number feature

Some models come with a Pentium III microprocessor that features a processor serial number. 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. *Models equipped with the Pentium III microprocessor are 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 37 if you need instructions for starting the program.

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 your computer with the computer power switch to activate the new setting.

Chapter 5. Installing options

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

Preparing to install options

> **Important**
>
> The presence of 5 V standby power might result in damage to your hardware unless you disconnect the power cord from the wall before opening the computer cover. Before you install any option, read the "Safety information" on page vii and "Handling static-sensitive devices." These precautions and guidelines will help you work safely.
>
> Be careful when working near the microprocessor. Under normal use, the microprocessor can become very hot.

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, memory modules, and continuity RIMMs 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 into 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:

- Adapters
  - Peripheral component interconnect (PCI) adapters
  - Industry standard architecture (ISA) adapters (some models)
- Internal drives
  - CD-ROM
  - Hard disk
  - Diskette drives and other removable media drives.
- System memory, called Rambus in-line memory modules (RIMMs)

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.

Tools required

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

> **Important**
>
> Run ConfigSafe (or a similar application) to take a *snapshot* of your
> computer configuration before installing an optional device. Using this
> snapshot, you can view and compare the changes in the computer
> configuration after you install an option. Also, if you have problems
> configuring the option after it is installed, ConfigSafe allows you to
> restore the configuration to the previous settings.
>
> If you have preinstalled software, ConfigSafe took a snapshot of the
> initial configuration of your computer when you started your computer
> for the first time. You might be able to use this snapshot to restore the
> configuration to the initial settings.
>
> ConfigSafe is a part of the preinstalled software in your computer. For
> more information, see *About Your Software*.

If you have a desktop model, continue with "Installing options in the
desktop model." If you have a tower model, go to "Installing options in the
tower model" on page 76.

Installing options in the desktop model

The instructions in this section will help you to install options in your
desktop model computer. You can use the information in this section to
install optional drives and adapters.

Removing the cover

You must remove the computer cover to access the internal components,
such as the system board, riser card, and drive bays. When disconnecting
cables, be sure to note where they attach, so you can correctly reattach them
later.

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
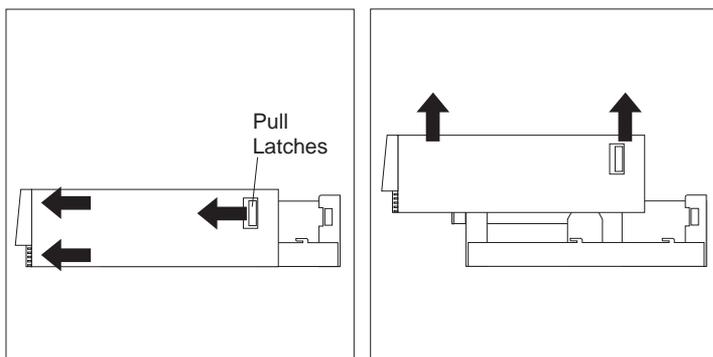   computer.

Note: For more information on connectors, see "Connecting computer cables" on page 10.

4. If a cover lock is present, unlock the computer cover. (The cover lock is located on the rear of the computer in some models.)

Attention

If you have set an administrator password, before removing the computer cover, read the important information in "Using an administrator password" on page 43.

---

5. Pull the latch handles on the sides of the computer; then gently pull the cover forward until the cover is released.

6. Lift the cover from the computer.

Pull
Latches

Attention

Proper cooling is required for the reliable performance of internal components. Do not operate your computer with the cover removed.

Locating components

Once you have removed the cover (see "Removing the cover" on page 61), you will need to locate and recognize components inside your computer. The following illustration will help you locate the various components in your computer.

1	CD-ROM drive	7	Diskette drive
2	Power switch	8	Air duct
3	Power-on light	9	System board
4	Hard disk drive light	10	AGP adapter
5	. Bay 2 (3.5-in. bay)	11	Riser card
6	Hard disk drive		

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. See the following illustration for the location of parts on the system board.

**Note:** An illustration of the system board with additional information is provided on a label located on the inside of the computer chassis.
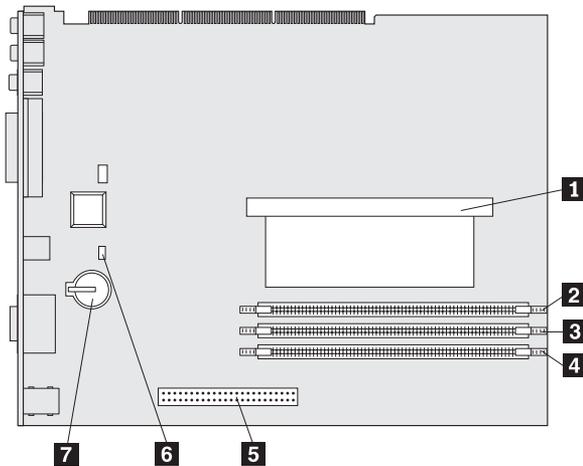
1	Microprocessor
2	RIMM 1
3	RIMM 2
4	RIMM 3
5	AGP slot
6	Fail safe jumper
7	Battery

Locating components on the riser card

Your computer uses a riser card for expansion. The riser card contains expansion slots that connect adapters to the peripheral component interconnect (PCI) and industry standard architecture (ISA) buses and connectors for the integrated drive electronics (IDE) and diskette drives. The following illustrations show the expansion slots and connectors on the riser card. The PCI slots are on the front of the riser card, and the power and IDE drive connectors are on the back side of the riser card.
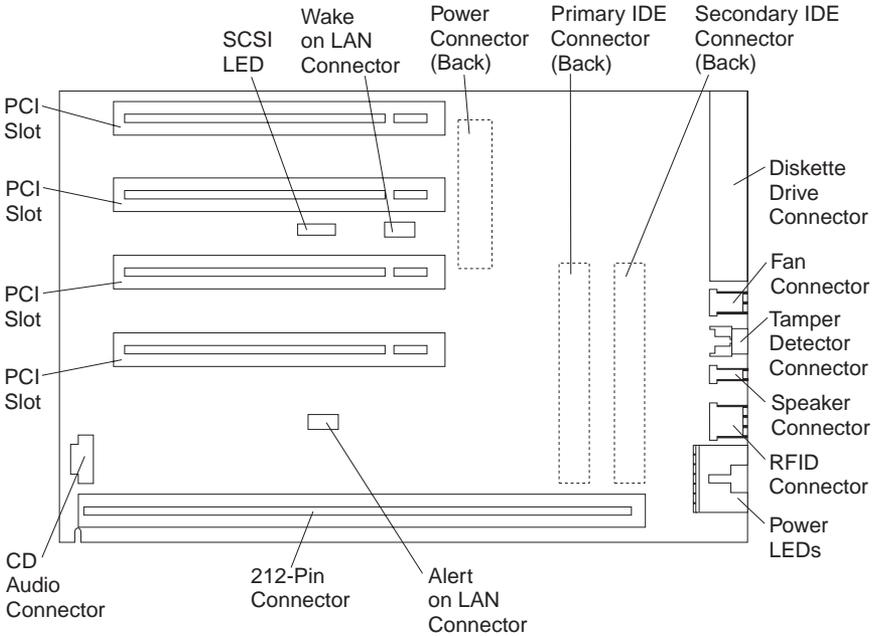
Some models have a riser card with two PCI slots, one ISA slot, and one shared PCI/ISA slot. The following illustration shows the location of the connectors on the PCI/ISA riser card.
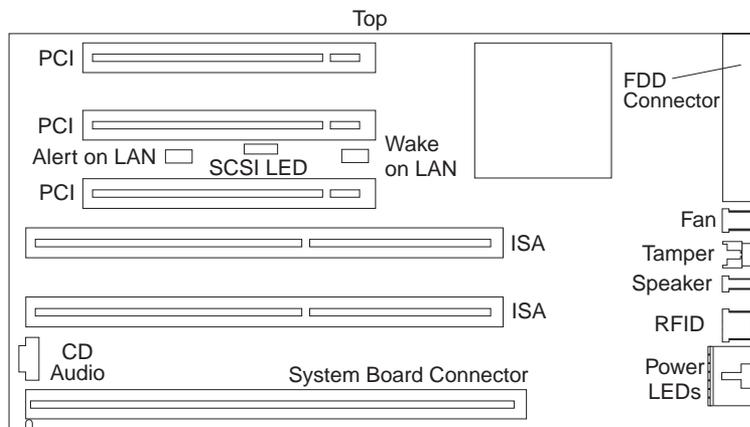
Installing adapters

You can install a variety of adapters in the expansion slots on the riser card. For information on locating the riser card, see "Locating components" on page 63.

The riser card in the desktop model has four dedicated PCI slots. Some models have two PCI slots, one ISA slot, and one shared PCI/ISA slot. This section provides information and instructions for installing adapters.


Before you begin:

- Read the instructions that come with the new adapter.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Removing the cover" on page 61).
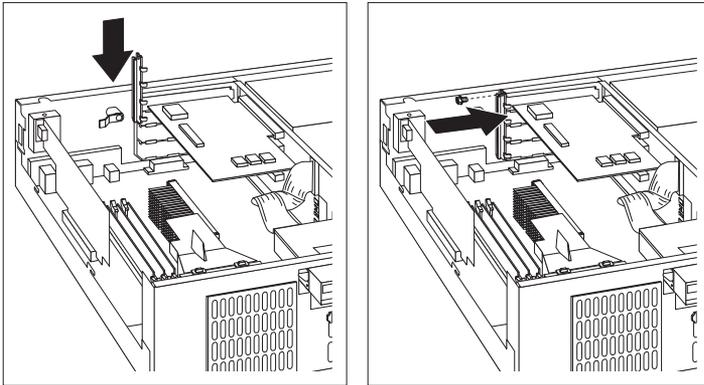

To install an adapter in the riser card:

1. Remove the screw and bracket.
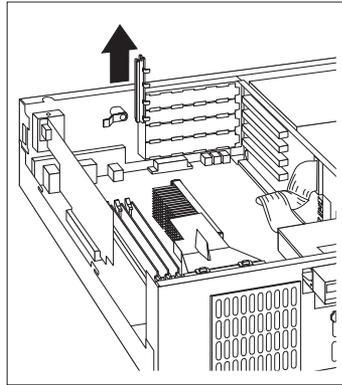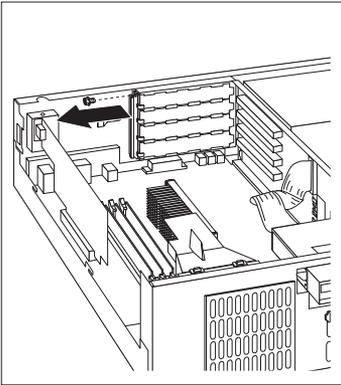
2. Remove the appropriate expansion slot cover.

3. Touch the static-protective package containing the adapter to any *unpainted* metal surface in the computer; then, remove the adapter from the package.

4. Install the adapter.
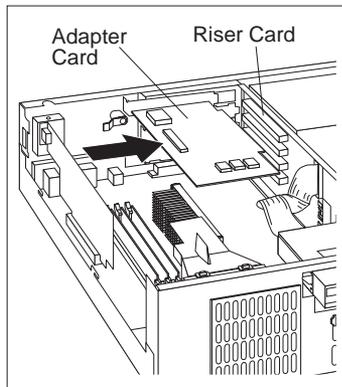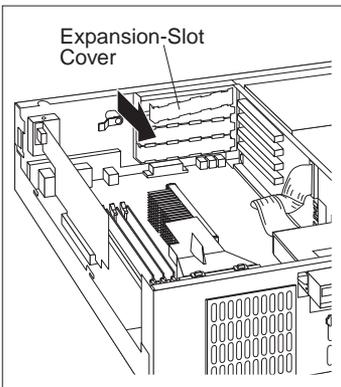
5. Install the bracket and the screw.

Notes:

1. If you need to attach a cable from the adapter to a drive in bay 1, 2, or 3, see step 8 on page 74 for instructions on how to rotate the drive cage to access the drive connector.

2. If you are installing an internal modem and plan to use the modem wake-up feature, ensure that the unused positions are *next to the bottom of the riser card.* If this cable is incorrectly attached, the computer might automatically restart each time you turn it off.

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 102.

What to do next

- Go to the device-record form in Appendix B, "Computer records" on page 147 and write the adapter name next to the slot into which you installed it.
- To work with another option, go to the appropriate section.
- To replace the cover, go to "Replacing the cover and connecting the cables" on page 76.

Working with internal drives

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

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 drives available for your computer are:
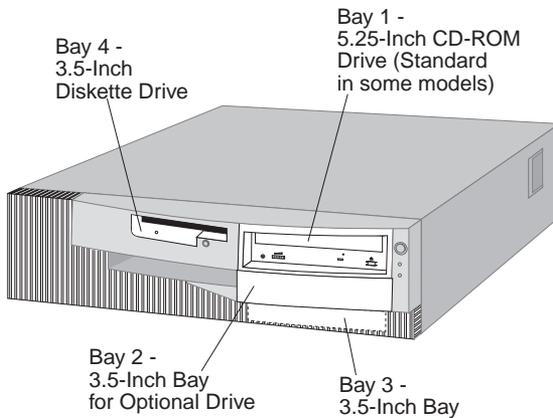
- Hard disk drives
- Tape drives
- CD-ROM drives
- Removable media drives

Internal drives are installed in *bays*. 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.

The desktop model 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.

Drive specifications

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

Bay 1 - **Maximum height: 41.3 mm (1.6 in.)**   CD-ROM drive (standard in some models)
5.25-inch hard disk drive

Bay 2 - **Maximum height: 25.4 mm (1.0 in.)**   3.5-inch hard disk drive
3.5-inch tape drive

Bay 3 - **Maximum height: 25.4 mm (1.0 in.)**   3.5-inch hard disk drive (preinstalled)

Bay 4 - **Maximum height: 25.4 mm (1.0 in.)**   3.5-inch diskette drive (preinstalled)

Notes:

1. You cannot install drives that are greater than 41.3 mm (1.6 in.) high.

2. You must install drives that require removable media (diskettes, tapes, or CDs) in the accessible bays: bays 1 and 2.

3. Only one diskette drive is supported for this computer.

4. To properly mount a 3.5-inch drive into bay 1, you must use a 3.5-inch conversion kit for a 5.25-inch bay.

Power and signal cables for internal drives

Your computer uses cables to connect integrated drive electronics (IDE) drives to the power supply and riser card. 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 riser card. There are two sizes of 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 attaches to the drive, one is a spare, and the third attaches to the IDE connector on the riser card.

    - If the cable has two connectors, one of these connectors attaches to the drive, and the other attaches to the IDE connector on the riser card.

> **Important**
>
> 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 riser card; the black connector attaches to
> the primary device (also known as the master device), and
> the gray middle connector attaches to the secondary device
> (also known as the slave device).
>
> If your computer comes with a CD-ROM drive, it will
> have an ATA 33 signal cable. However, if you are
> installing an ATA 66 hard disk and want to take
> advantage of the faster rates, you must obtain an ATA 66
> signal cable, 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. The hard
> disk will operate at the faster 66 MHz rate, but the
> CD-ROM drive will still operate at the slower ATA 33 rate.

 – The narrower signal cable has two connectors for attaching the
   diskette drive to the diskette-drive connector on the riser card.

Note: To locate connectors on the riser card, see "Locating components on
the riser card" on page 65.

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,
  subordinate, or slave device; otherwise, the system might not recognize
  some of the IDE devices. 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 your computer has only one IDE device on a cable, it must be set as master.

For help selecting drives, cables, and other options for your computer, do one of the following:

- Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your IBM reseller, or your 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.

Installing a drive

Your computer comes with drives preinstalled in bays 3 and 4. Your computer might also come with drives preinstalled in bays 1 or 2. Any drive bay that does not contain a preinstalled drive has a metal shield mounted on the computer frame and a bay panel mounted in the cover of the computer. Before installing any drive, you must remove the bay panel and metal shield. You must also rotate the drive cage.

Before you begin

- Read the instructions that come with the drive you want to install.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Removing the cover" on page 61).
---

Notes:

- To install a 3.5-inch drive into drive bay 1, you must install a conversion kit (IBM Part Number 70G8165). You will also need a cable to connect to the hard disk drive.

To install a drive in bays 1 or 2:

1. Locate the appropriate bay panel in the computer cover.

2. Use the tip of a screwdriver if necessary to pry the bay panel from the cover until the plastic tab on the left side of the bay panel (as you are facing the computer) is released.

3. Slide the bay panel toward the diskette drive bay and remove the bay panel.
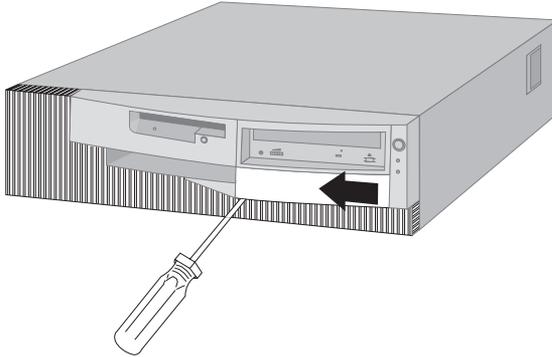
   **Note:** Save the removed bay panel for possible future use.

4. With the front of the computer facing you, push in the tabs on the sides of the metal shield until it flexes.

5. Lift off one side, then the other.
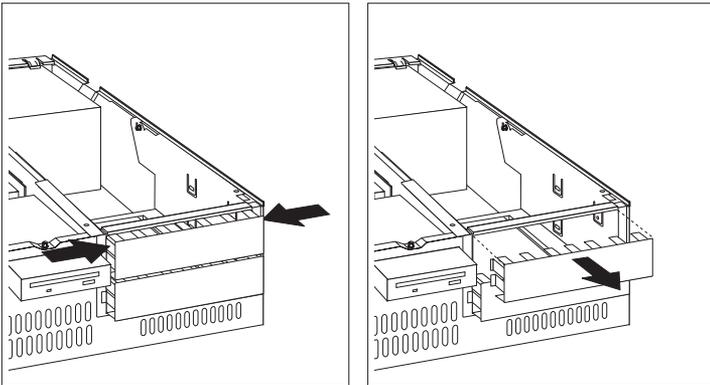
   **Note:** You might need to remove the shield from bay 1 to get to the shield covering bay 2.

6. Touch the static-protective package containing the new drive to any *unpainted* metal surface and then remove the drive.

7. Slide the plastic latch that secures the drive cage to the computer frame.

8. Carefully rotate the cage out of the computer toward the power supply. The cage will pivot back until it rests on top of the computer frame.
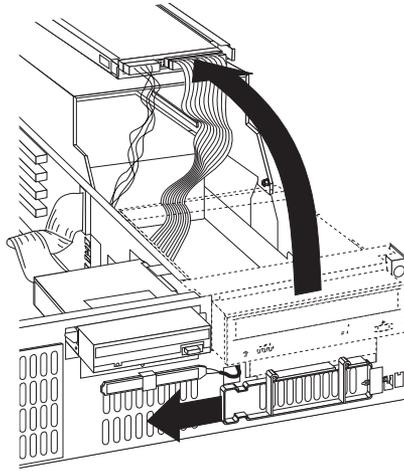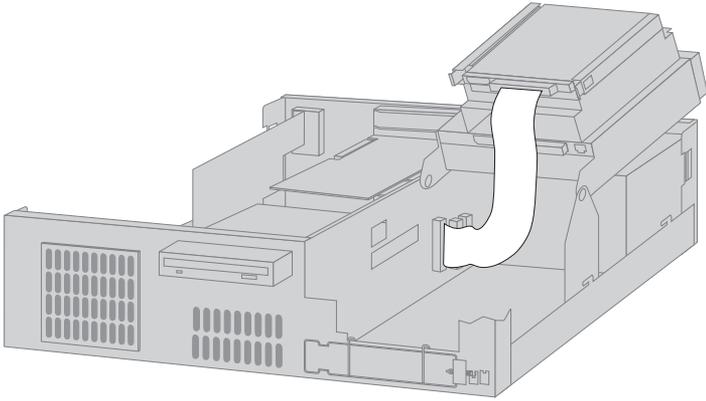
Note: Leave the cables attached.

9. Insert the drive into the desired unoccupied drive bay. Note that the cage is upside down, so you must also put the drive in upside down. Then insert and tighten the screws to hold it in place.
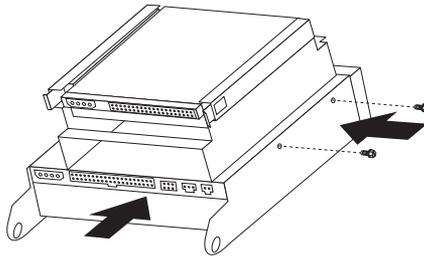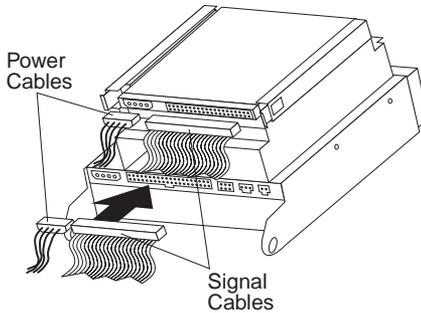
10. Attach the signal cable connector to the IDE connector on the riser card.

> **Note:** See "Locating components on the riser card" on page 65 for an illustration showing the locations of the connectors on the riser card.

11. Attach all cables to the drive.

> **Note:** If you install more than one drive, attach cables to the lowest drive first and work your way up.


12. Rotate the drive cage back.

What to do next:

- Go to the device-record form in Appendix B, "Computer records" on page 147 and record the new installation.
- To work with another option, go to the appropriate section.
- To replace the cover, go to "Replacing the cover and connecting the cables" on page 76.

Replacing the cover and connecting the cables

To replace the cover and connect the cables:

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. With a hand on either side of the top cover, place the cover over the computer and slide the cover straight back until it snaps into place.
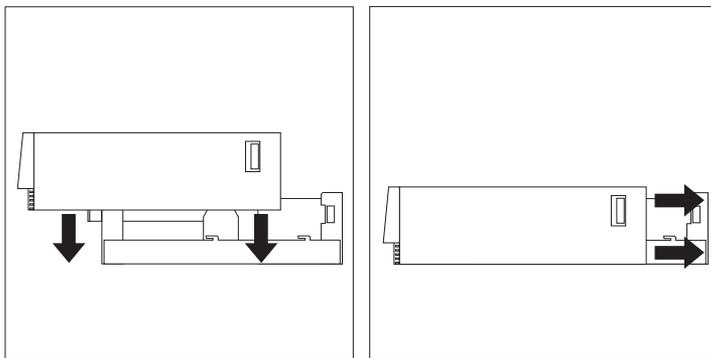
4. If a lock is present at the back of the computer, lock the cover.

5. Reconnect the external cables and cords to the computer.

6. Plug the power cords into properly grounded electrical outlets.

7. Update the computer configuration. See "Updating the computer configuration" on page 102.

Note: If an error message related to the chassis-intrusion detector appears after you restart your computer, you must enter the administrator password. For more information, see "Using passwords" on page 40.

What to do next

To complete the installation, go to "Completing the installation" on page 101.


Installing options in the tower model

You can use the information and instructions in this section to install optional drives and adapters in your tower model computer.

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. If a cover lock is present, unlock the computer cover. (The cover lock is located at the rear of the computer on some models.)

5. Locate the cover-release tab on the rear of the side cover and slide the cover toward the front of the computer. Lift off the cover.
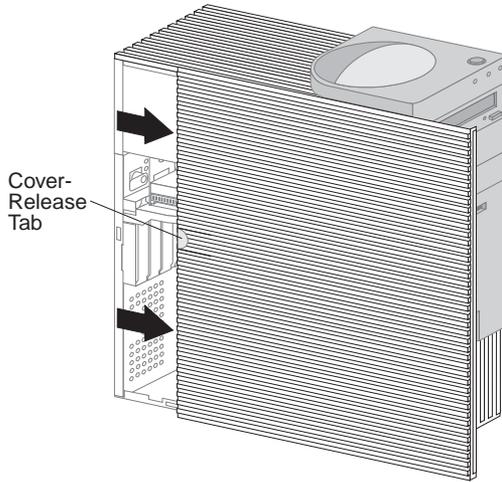
Cover-
Release
Tab

Note: You might find it easier to access the inside of the computer if you place the computer on its side.

Attention

Proper cooling is required for the reliable performance of internal components. Do not operate your computer with the cover removed.

Locating components

Once you have removed the cover (see "Removing the cover"), you will need to locate and recognize components inside your computer. The following illustration will help you locate the various components in your computer. Your computer might differ from the one shown.
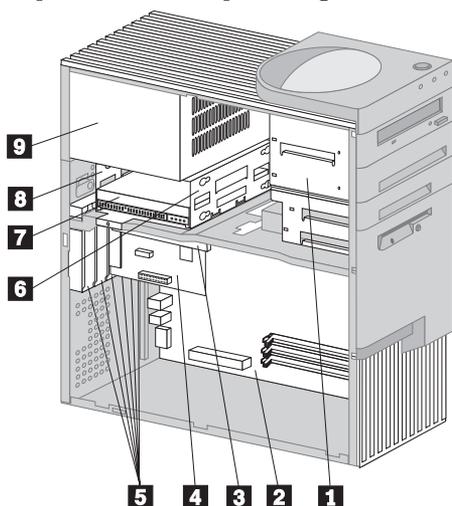

1	Drive cage for bays 1 through 4
2	System board
3	Riser card
4	Adapter
5	Expansion slots
6	Drive cage for bays 5 and 6
7	Hard disk drive in bay 6
8	Bay 5
9	Power supply

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. The following illustration shows the location of parts on the system board.

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

.
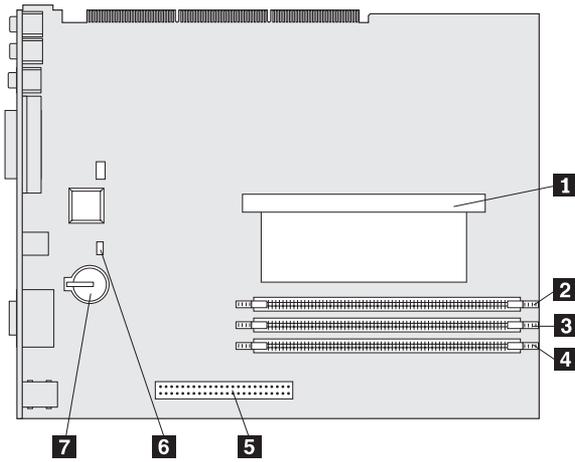
1	Microprocessor
2	RIMM 1
3	RIMM 2
4	RIMM 3
5	AGP connector
6	Fail safe jumper
7	Battery

Locating components on the riser card

Your computer uses a riser card for expansion. The riser card contains expansion slots that connect adapters to the peripheral component interconnect (PCI) buses and connectors for the Integrated Drive Electronics (IDE) and diskette drives.

The following illustration shows the expansion slots and connectors on the riser card. The diskette and IDE drive connectors are on the back side of the riser card. When installing optional drives, refer to the following illustration for the location of the appropriate connectors.
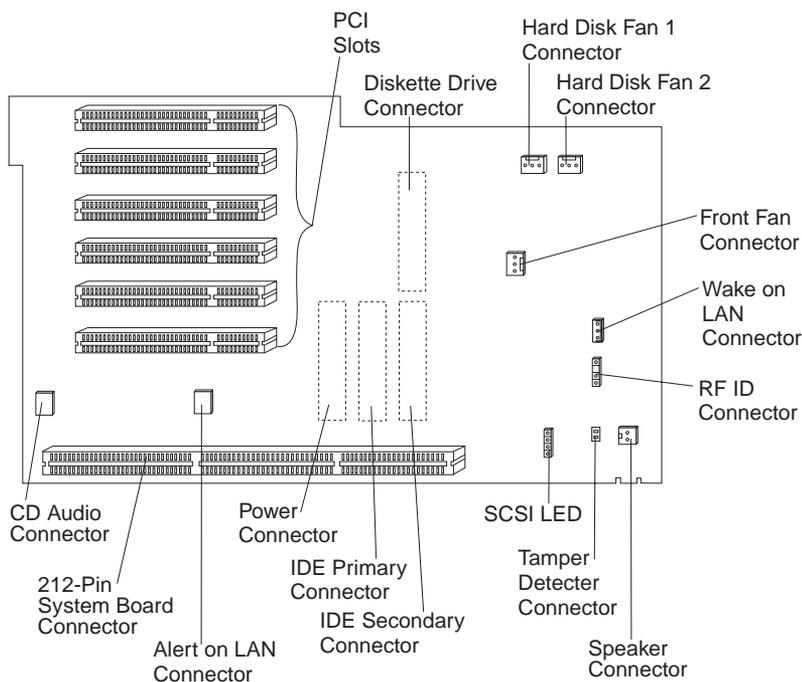
Installing adapters

You can install a variety of adapters in the expansion slots on the riser card. For information on locating the riser card, see "Locating components" on page 78.

The riser card in the tower model has six dedicated PCI slots.

Note: If you are installing a Wake on LAN-supported network adapter, attach the Wake on LAN cable that comes with the adapter to the Wake on LAN connector on the system board. If you also want to take advantage of the Alert on LAN feature of your computer, you must install your network adapter in the PCI slot closest to the system board.

> **Before you begin:**
>
> - Read the instructions that come with the new adapter.
> - Turn off the computer and all other connected devices.
> - Disconnect all cables attached to the computer and remove the computer cover (see "Removing the cover" on page 77).

To install an adapter in your computer:

The following illustrations show the computer on its side. To install an adapter in the riser card:

1. Remove the screw and bracket.
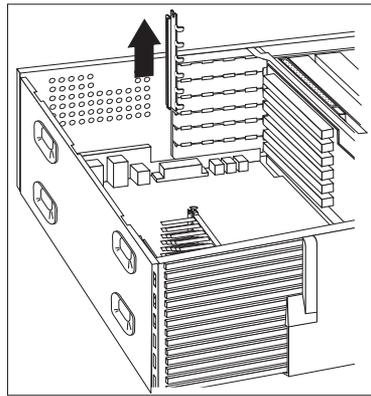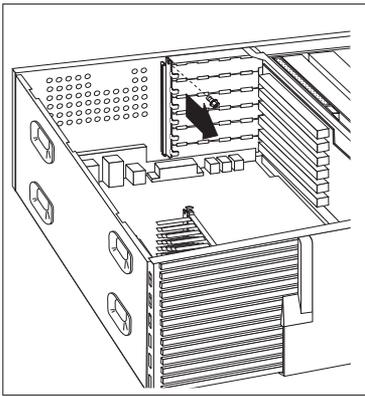
2. Remove the appropriate expansion slot cover.

   Next, touch the static-protective package containing the adapter to any *unpainted* metal surface in the computer; then, remove the adapter from the package. Install the adapter.
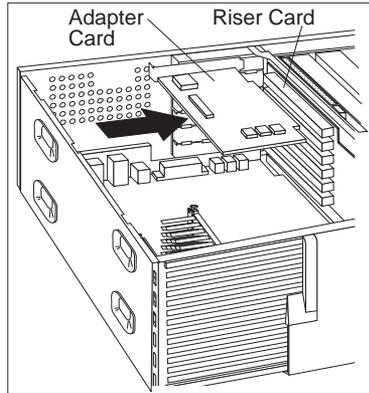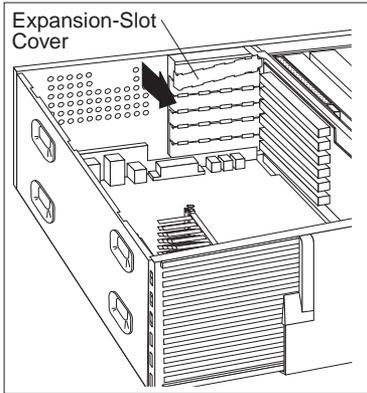
3. Install the bracket and the screw.
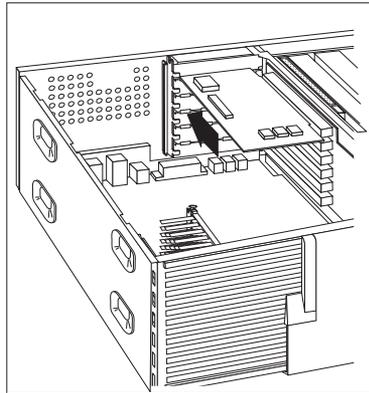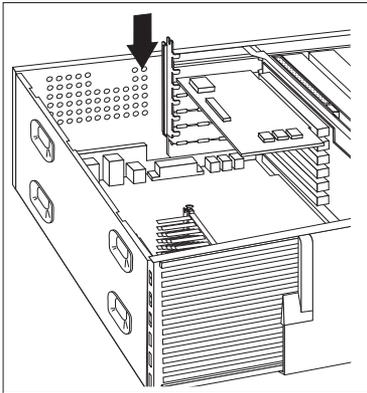
4. If you installed a network adapter that uses Wake on LAN or Alert on LAN, attach the cable from the riser card to the adapter. See page 80 to locate the Wake on LAN or Alert on LAN connectors.

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 102.

> **What to do next**
>
> - Go to the device record form in Appendix B, "Computer records" on page 147 and write the adapter name next to the slot into which you installed it.
> - To work with another option, go to the appropriate section.
> - To replace the cover, go to "Replacing the cover and connecting the cables" on page 92.

Working with internal drives

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

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 drives available for your computer are:

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

Internal drives are installed in *bays*. 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.

The tower model computer comes with the following IBM-installed drives:

- A CD-ROM drive in bay 1 (some models)
- A 3.5-inch diskette drive in bay 4
- A 3.5-inch hard disk drive in bay 6

Drive Bay 1 (5.25-inch)
Drive Bay 2 (5.25-inch)
Drive Bay 3 (3.5-inch)
Diskette Drive
Drive Bay 5 (3.5-inch)
Drive Bay 6 (3.5-inch)
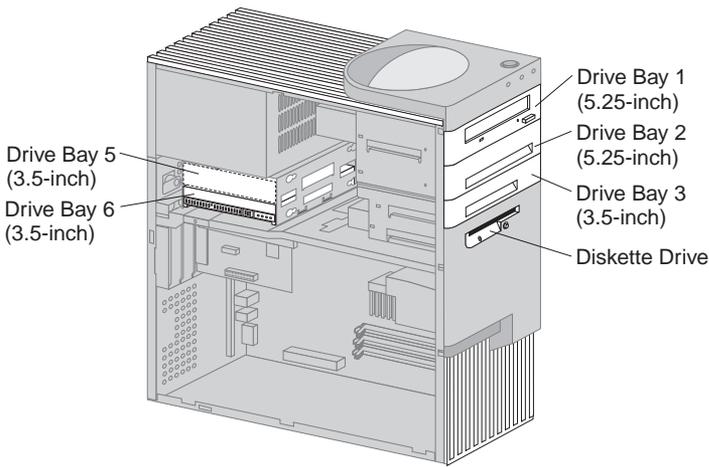
Drive specifications

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

Bay 1 - **Maximum height: 41.3 mm (1.6 in.)**   CD-ROM drive (standard in some models)
5.25-inch hard disk drive

Bay 2 - **Maximum height: 41.3 mm (1.6 in.)**   5.25-inch hard disk drive
3.5-inch hard disk drive (requires a mounting bracket)

Bay 3 - **Maximum height: 25.4 mm (1.0 in.)**   3.5-inch hard disk drive

Bay 4 - **Maximum height: 25.4 mm (1.0 in.)**   3.5-inch diskette drive (preinstalled)

Bay 5 - **Maximum height: 25.4 mm (1.0 in.)**   Hard disk drive

Bay 6 - **Maximum height: 25.4 mm (1.0 in.)**   Hard disk drive

Notes:

Notes:

1. You cannot install drives that are greater than 41.3 mm (1.6 in.) high.

2. You must install drives that require removable media (diskettes, tapes, or CDs) in the accessible bays: bay 1, 2, 3, or 4.

3. You can install one diskette drive only.

4. To properly mount a 3.5-inch drive into bay 1 or 2, you must use a 3.5-inch conversion kit for a 5.25-inch bay (IBM Part Number 70G8165).

Power and signal cables for internal drives

Your computer uses cables to connect integrated drive electronics (IDE) drives to the power supply and riser card. 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 riser card. There are two sizes of 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 attaches to the drive, one is a spare, and the third attaches to the IDE connector on the riser card.

    - If the cable has two connectors, one of these connectors attaches to the drive, and the other attaches to the IDE connector on the riser card.

      ┌─── **Important** ─────────────────────────────┐

      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 riser card; the black connector attaches to the primary device (also known as the master device), and the gray middle connector attaches to the secondary device (also known as the slave device).

      If your computer comes with a CD-ROM drive, it will have an ATA 33 signal cable. However, if you are installing an ATA 66 hard disk and want to take advantage of the faster rates, you must obtain an ATA 66 signal cable, 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. The hard disk will operate at the faster 66 MHz rate, but the CD-ROM drive will still operate at the slower ATA 33 rate.

      └──┘

  - The narrower signal cable has two connectors for attaching the diskette drive to the diskette-drive connector on the riser card.

Note: To locate connectors on the riser card, see "Locating components on the riser card" on page 79.

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 riser card. 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, subordinate, or slave device; otherwise, the system might not recognize some of the IDE devices. 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, do one of the following:

- Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your IBM reseller, or your 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.

Installing drives in bays 1, 2, or 3

Use the instructions in this section to help you to install drives in bays 1 through 3.

┌─ **Before you begin** ───┐

- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer.

  Attention: The presence of 5 V standby power might result in damage to your hardware unless you disconnect the power cord from the wall before opening the computer.

- Remove the computer cover (see "Removing the cover" on page 77).

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To install a drive in bay 1, 2, or 3:

1. Use the tip of a screwdriver to remove the bay panel for the appropriate drive bay.
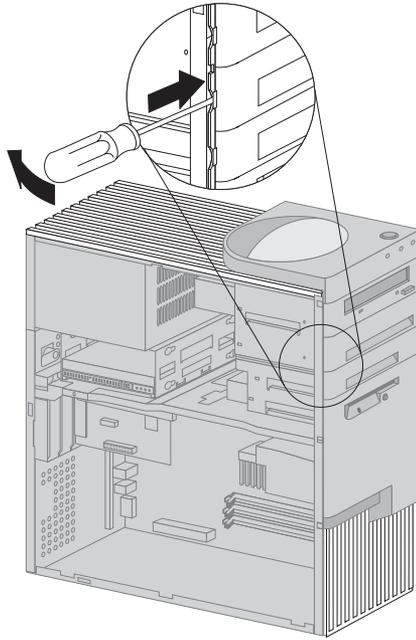
2. If knockouts are present in the drive bay opening, twist them with a screwdriver or pliers to remove.

   The following illustration shows the type of knockouts that might be present in bay 1.
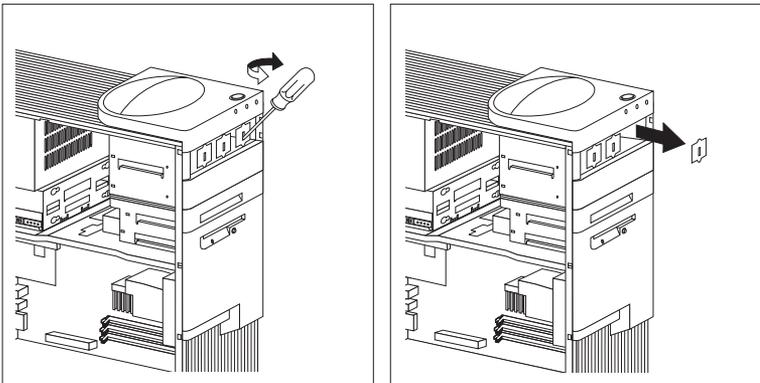
The following illustration shows the type of knockout that might be present in bays 2 and 3.

3. Install the drive in the bay opening and secure the drive by inserting screws.
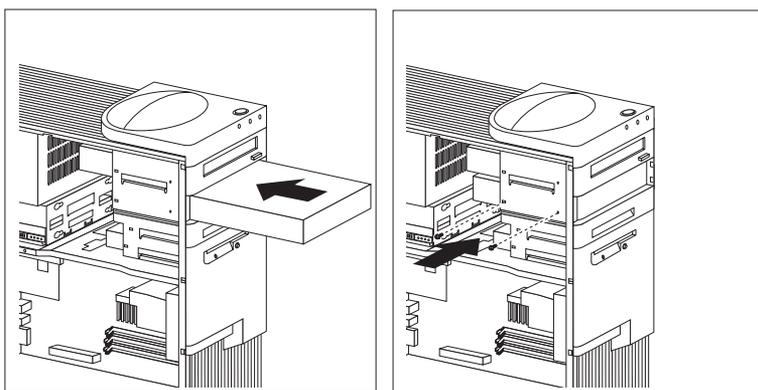
4. Attach the cables to the drives. If necessary, see page 80 for an illustration showing the locations of the drive connectors on the riser card.

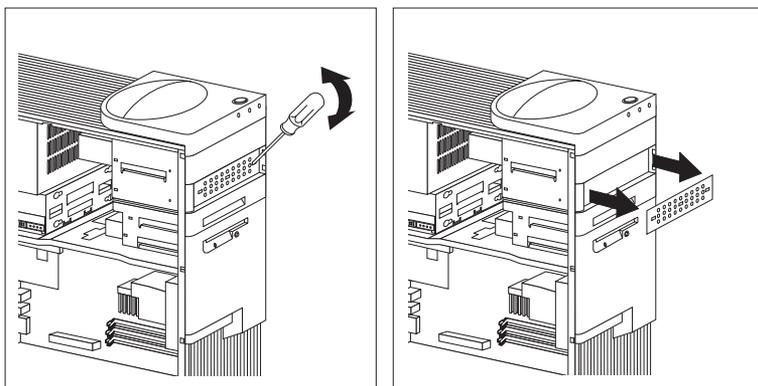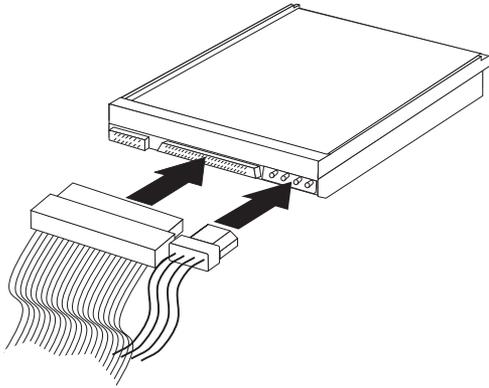5. If the installed drive has nonremovable media, replace the bay panel.
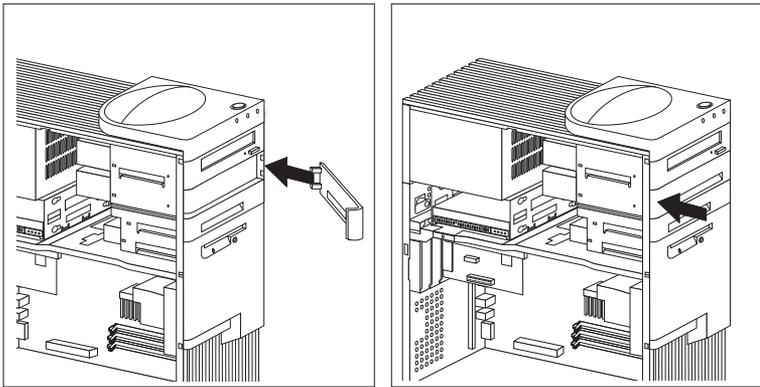
6. If you installed a CD-ROM drive and want to connect the drive to the CD-ROM audio connector, see page 80 to locate the CD-ROM audio connector on the riser card.

What to do next

- Go to the device record form in Appendix B, "Computer records" on page 147 and record the installation of the drive.
- To work with another option, go to the appropriate section.
- To replace the cover, go to "Replacing the cover and connecting the cables" on page 92.

Installing a drive in bay 5

Any drive installed in bay 5 must be a device with nonremovable media, such as a hard disk drive. (Your computer comes with a hard disk drive in bay 6.) To install a drive in this bay, you must remove the drive cage.

```
┌─ Before you begin ──────────────────────────────────────┐

  • Read the instructions that come with the optional device.
  • Turn off the computer and all other connected devices.
  • Disconnect all cables attached to the computer.

    Attention: The presence of 5 V standby power might result in
    damage to your hardware unless you disconnect the power cord
    from the wall before opening the computer cover.

  • Remove the computer cover (see "Removing the cover" on
    page 77).
└─────────────────────────────────────────────────────────┘
```

To install a drive in bay 5:

1. Disconnect all cables attached to the hard disk drive in bay 6.
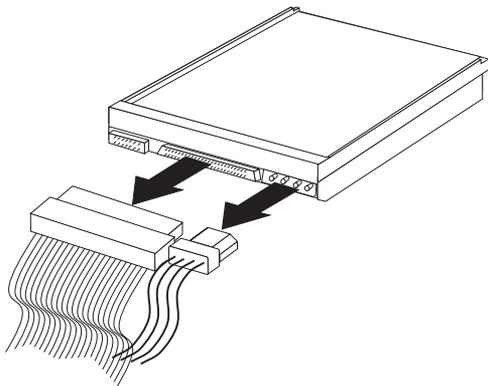
2. Remove the screw holding the drive cage and carefully slide the drive cage away from the computer.
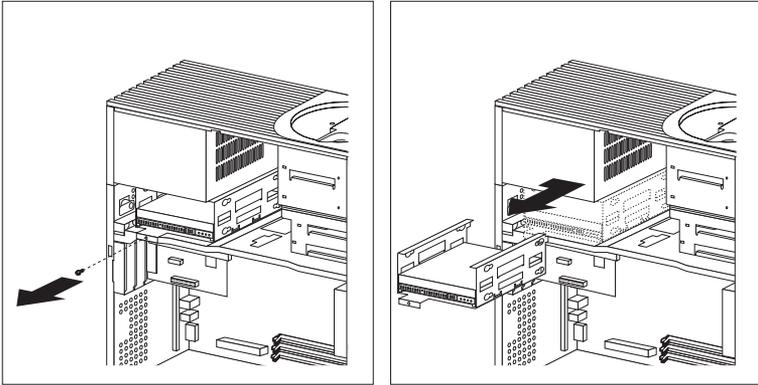
3. Slide the drive into the bay and secure it with rubber grommets and screws.
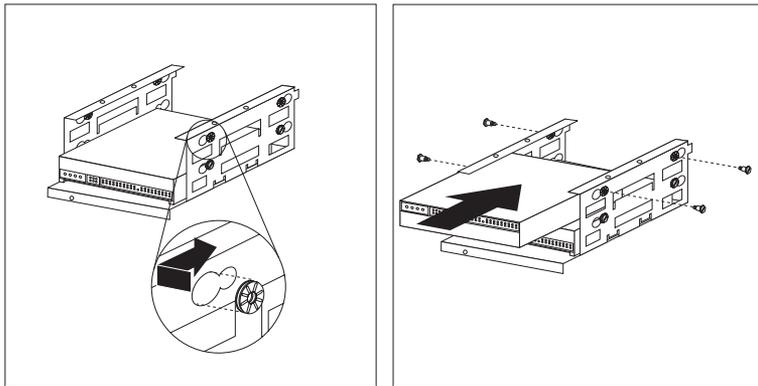
4. Reinstall the drive cage and secure it with the screw you removed in step 2.

5. Connect the cables to the drive.
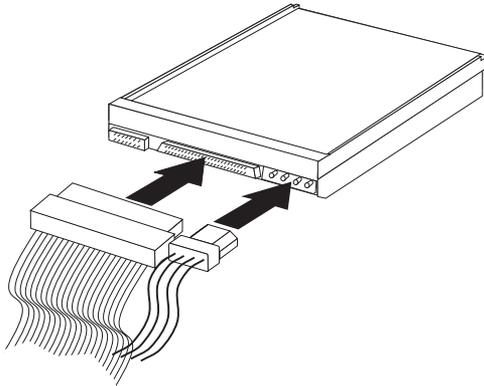
> **What to do next**
>
> - Go to the device record form in Appendix B, "Computer records" on page 147 and record the installation of the drive.
> - To work with another option, go to the appropriate section.
> - To replace the cover, go to "Replacing the cover and connecting the cables."

Replacing the cover and connecting the cables

To replace the cover and connect the cables:

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. Make sure the cover lock (if present) is in the unlocked position.

4. Place the cover on the computer frame. Secure the cover by sliding it until the cover aligns with the rear of the computer.
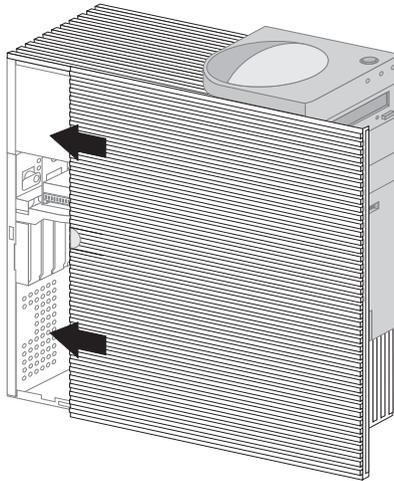
5. If a cover lock is present, go to the back of the computer and lock the cover.

6. Reconnect the external cables and cords to the computer.

7. Plug the power cords into properly grounded electrical outlets.

8. Update the computer configuration. See "Updating the computer configuration" on page 102.

   Note: If an error message related to the chassis-intrusion detector appears after you restart your computer, you must enter the administrator password. For more information, see "Using passwords" on page 40.

What to do next

To complete the installation, go to "Completing the installation" on page 101.

Working with memory

You can add memory to your computer to increase system performance.

Your computer has three connectors (RIMM 1, RIMM 2, and RIMM 3) for installing system memory modules. The maximum amount of system memory your computer supports is 1 GB.

Note: To locate the memory connectors inside your computer, see "Identifying parts on the system board" on page 64 (desktop) or "Identifying parts on the system board" on page 78 (tower).

Your computer uses *Rambus inline memory modules (RIMMs)*.

The IBM-installed RIMMs that come with your computer are non-ECC or ECC (error checking and correction) RDRAM (Rambus dynamic random access memory) modules.

When installing or replacing RIMMs, take the following information into consideration:

- Each memory connector supports a maximum of 512 MB of memory.

- Install only ECC RIMMS to enable ECC. If you use ECC and non-ECC memory together, it will function as non-ECC memory.

- RIMM connectors do not support dual inline memory modules (DIMMs)

- Any connector that does not have a RIMM installed must have a *continuity RIMM*, a module that looks like a RIMM but has no memory on it. A continuity RIMM is used to continue the connection on a RIMM connector that does not have memory installed in it.

- The three connectors on your computer can accommodate up to a total of 32 devices. Devices are the memory modules on the RIMMs. Do not exceed the 32 device maximum. Refer to the label on the RIMMs to find out how many devices are on the RIMMs. You can also use IBM Enhanced Diagnostics program to find out how many devices are on each RIMM. For more information about IBM Enhanced Diagnostics, see *About Your Software* or the *Device Driver and IBM Enhanced Diagnostics CD*. To start the IBM Enhanced Diagnostics program, do the following:

  1. Run the IBM Enhanced Diagnostics program. See "IBM Enhanced Diagnostics program" on page 126 for instructions.

  2. Once in the IBM Enhanced Diagnostics program main menu, select **Hardware Info** and press Enter.

  3. Select **DIMM/RIMM Info** and press Enter.

  4. Scroll to **Number of Rambus Devices** for each RIMM and add the total number of Rambus devices.

  5. Scroll to **Number of Disabled Devices** for each RIMM and add the total number of disabled Rambus devices to the total number of Rambus devices.

  6. Make sure that the total number of devices on the new RIMM does not cause the total number of devices on all RIMMs to exceed 32.

- Use PC600 (300 MHz), PC700 (356 MHz), or PC800 (400 MHz) RIMMs.

- You must use RIMMs that are compatible with the speed of the Front Side Bus (FSB) on your microprocessor. To find the speed of the FSB on your microprocessor, do the following:

  1. Run the IBM Enhanced Diagnostics program. See "IBM Enhanced Diagnostics program" on page 126 for instructions.

  2. Once in the IBM Enhanced Diagnostics program main menu, select **Hardware Info** and press Enter.

  3. Select **SMBIOS Info** and press Enter.

  4. Scroll to **Processor Information** and find **External Clock**. This entry tells you the FSB of your microprocessor.

- If the microprocessor in your computer has a 133 MHz FSB, do not install PC600 RIMMs in your computer. If your computer has a 133 MHz FSB and runs with only PC600 RIMMs, your computer will not work. If your computer has a 133 MHz FSB with a PC600 RIMM and either a PC700 or PC800 RIMM, the PC 600 RIMM will be disabled.

The following tables show the configuration of RIMMs and continuity RIMMs installed on computers with 100 MHz and 133 MHz FSB.

Table 1. Memory configurations for 100 MHz FSB			
RIMM 1	**RIMM 2**	**RIMM 3**	**Functions as**
PC600	PC600	PC600	PC600
PC700	PC700	PC700	PC700
PC800	PC800	PC800	PC800
PC600	PC700	PC700	PC600
PC600	PC700	PC800	PC600
PC600	PC800	PC800	PC600
PC700	PC700	PC800	PC600
PC700	PC800	PC800	PC600
PC800	PC800	PC800	PC800
PC600	Continuity RIMM	PC600	PC600
PC600	Continuity RIMM	PC700	PC600
PC600	Continuity RIMM	PC800	PC600
PC700	Continuity RIMM	PC700	PC600
PC700	Continuity RIMM	PC800	PC600
PC800	Continuity RIMM	PC800	PC800
PC600	Continuity RIMM	Continuity RIMM	PC600
PC700	Continuity RIMM	Continuity RIMM	PC600
PC800	Continuity RIMM	Continuity RIMM	PC800
Any device	Any device	No device	Invalid
Continuity RIMM	Continuity RIMM	Continuity RIMM	Invalid

Notes:

- PC600=300 MHz RIMM
- PC700=356 MHz RIMM
- PC800=400 MHz RIMM

Table 2. Memory configurations for 133 MHz FSB			
RIMM 1	**RIMM 2**	**RIMM 3**	**Functions as**
PC700	PC700	PC700	PC700
PC800	PC800	PC800	PC800
PC600	PC700	PC700	PC700
PC600	PC700	PC800	PC700
PC600	PC800	PC800	PC800
PC700	PC700	PC800	PC700
PC700	PC800	PC800	PC700
PC800	PC800	PC800	PC800
PC600	Continuity RIMM	PC700	PC700
PC600	Continuity RIMM	PC800	PC800
PC700	Continuity RIMM	PC700	PC700
PC700	Continuity RIMM	PC800	PC700
PC800	Continuity RIMM	PC800	PC800
PC700	Continuity RIMM	Continuity RIMM	PC700
PC800	Continuity RIMM	Continuity RIMM	PC800
Any device	Any device	No device	Invalid
PC600	Continuity RIMM	PC600	Invalid
PC600	PC600	PC600	Invalid
PC600	Continuity RIMM	Continuity RIMM	Invalid

Notes:

- PC600=300 MHz RIMM
- PC700=356 MHz RIMM
- PC800=400 MHz RIMM

Removing a memory module or continuity RIMM

In order to install a RIMM, you must first remove the continuity RIMM or RIMM occupying the connector into which you are installing memory. Use the following instructions to help you to remove a continuity RIMM or RIMM.
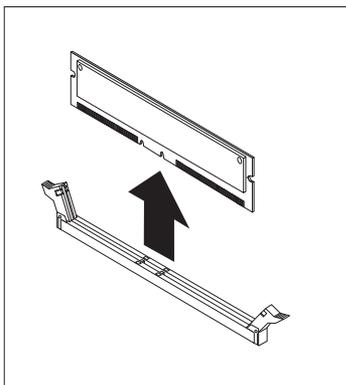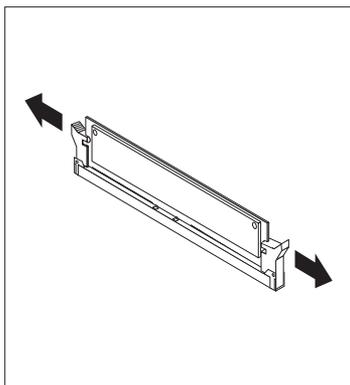

Before you begin

- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Removing the cover" on page 61 or "Removing the cover" on page 77).

  Attention: The presence of 5 V standby power might result in damage to your hardware unless you disconnect the power cord from the wall before opening the computer cover.

---

1. To locate the memory connectors inside your computer, see "Identifying parts on the system board" on page 64 (desktop) or "Identifying parts on the system board" on page 78 (tower).

2. At both ends of the memory module connector, push outward on the retaining clips until the module is loosened. Lift the memory module or continuity RIMM out of the connector.

   Note: Be careful not to push too hard on the retaining clips because the memory or continuity RIMM may abruptly eject from the connector.

3. Store the memory or continuity RIMM in a static-protective package.

Installing a memory module or continuity RIMM

Before you begin ─────────────────────────────────

- Read the instructions that come with the new system memory.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Removing the cover" on page 61 or "Removing the cover" on page 77).

To install a RIMM or continuity RIMM:

1. To locate the memory connectors inside your computer, see "Identifying parts on the system board" on page 64 (desktop) or "Identifying parts on the system board" on page 78 (tower).

2. Remove the continuity RIMM occupying the RIMM connector. See "Removing a memory module or continuity RIMM" on page 98 for instructions on removing a continuity RIMM. Do not discard or lose the continuity RIMM. It might be needed later if you change your memory configuration.
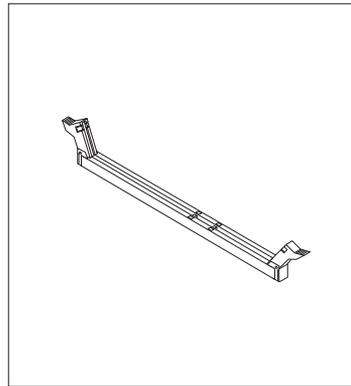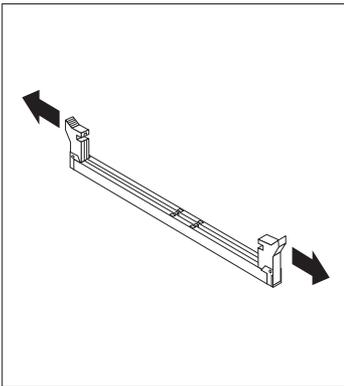
3. Touch the static-protective package containing the memory module to any *unpainted* metal surface in the computer, and then remove the module.

4. Position the module above the connector so that the two notches on the bottom edge of the module align properly with the connector.

5. Firmly push the module straight down into the connector until the retaining clips pop up and snugly fit around both ends of the module.
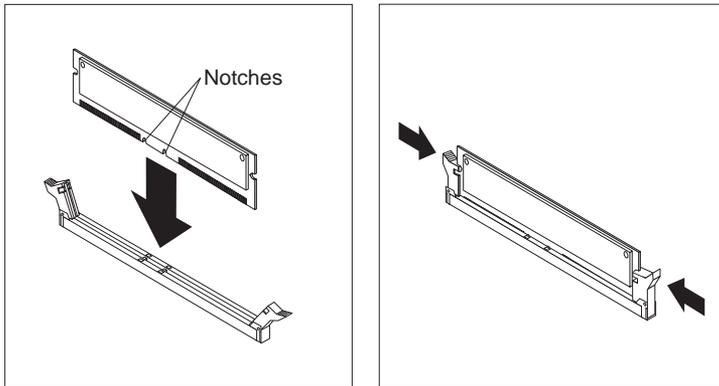
6. To install another memory module, repeat steps 1–4.

7. Go to the device-record form in Appendix B, "Computer records" on page 147 and record this installation.

What to do next

- To work with another option, go to the appropriate section.
- To replace the cover, go to "Replacing the cover and connecting the cables" on page 76 or "Replacing the cover and connecting the cables" on page 92, depending on your model.

Installing a security U-bolt

To help prevent hardware theft, you can use the cover lock and 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.

> **Before you begin:**
>
> - Obtain the following:
>   - A 19-mm (3⁄4 in.) U-bolt and threaded nuts that fit the U-bolt
>   - A security cable
>   - A lock, such as a combination lock or padlock
>   - An appropriately sized or adjustable wrench
>   - A small, flat-blade screwdriver
> - Turn off the computer and all other connected devices.
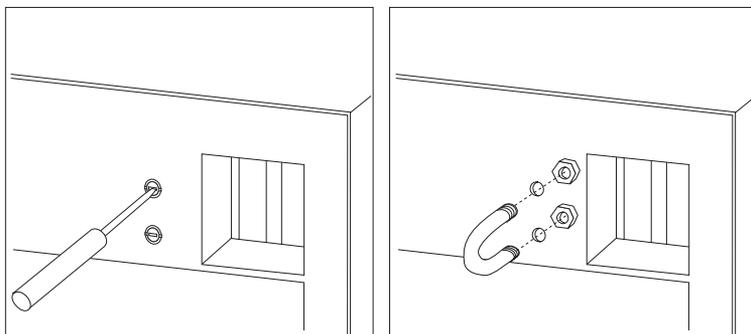> - Disconnect all external cables and power cords and remove the computer cover (see "Removing the cover" on page 61 or "Removing the cover" on page 77).

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" on page 76 (desktop) or "Replacing the cover and connecting the cables" on page 92 (tower).

4. Thread the cable through the U-bolt and around an object that is 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.

Completing the installation

After working with options, you need to reinstall 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 update information in the Configuration/Setup Utility program.

Updating the computer configuration

> **Important:**
>
> The configuration information in this section applies to installing options. For more information on using the Configuration/Setup Utility program, see the Chapter 4, "Using the Configuration/Setup Utility program" on page 37.

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 on the IBM *Product Recovery CD* that comes with your computer.

After adding options, you must update the configuration settings. In most cases, system programs perform this configuration automatically. If the settings are not updated automatically, you can use the Configuration/Setup Utility program to reconfigure the appropriate settings. In either case, you must save the settings before exiting 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, use the Configuration/Setup Utility program to make and save those changes. See Chapter 4, "Using the Configuration/Setup Utility program" on page 37.

Note: For more information on error messages from resource conflicts, see Chapter 6, "Troubleshooting" on page 105.

Configuring Plug and Play adapters

Adapters designed for PCI slots are Plug and Play devices. *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.

A Plug and Play adapter has no switches or jumpers that must be set. A Plug and Play adapter comes with configuration specifications set in the operating system. These specifications provide installation information to the computer during startup. When you install or remove 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.

Note: See Chapter 6, "Troubleshooting" on page 105 for information on error messages resulting from resource conflicts.

Configuring ISA legacy adapters

To configure an installed ISA legacy adapter, you might need to alter switch or jumper settings on the adapter. If there is a conflict, you must use the Configuration/Setup Utility program to set the ISA legacy resource information, such as memory locations, I/O assignments, and DMA and interrupt assignments.

Note: For more information about required resources and switch settings, refer to the documentation that comes with the adapter.

To set the legacy resource information for an installed adapter:

1. Start the Configuration/Setup Utility program (see Chapter 4, "Using the Configuration/Setup Utility program" on page 37).

2. Select **ISA Legacy Resources** from the Configuration/Setup Utility menu.

3. As needed, select **Memory Resources, I/O Port Resources, DMA Resources,** or **Interrupt Resources**.

4. Set the appropriate resource to **ISA Resource**.

5. Press Esc to return to the main menu.

6. Select **Save Settings** and press Enter.

If you remove an ISA legacy adapter, you must reset to **Available** the system resources that are no longer being used. To do this, follow the above procedures and select **Available** at step 4.

Note: For more information on adapters and resolving conflicts, see Chapter 6, "Troubleshooting" on page 105 and "Interrupt and DMA resources" on page 50.

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.

```
                        POST Startup Error(s)

    The following error(s) were detected when the system was
    started:

    162 Configuration Change Has Occurred

    Select one of the following:

    Continue
    Exit Setup
```

If such a message appears, you are then prompted to enter the
Configuration/Setup Utility program to manually update the configuration
settings or to confirm and save the settings that were automatically updated
by the system programs.

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
Configuration/Setup Utility program menu (see Chapter 4, "Using
the Configuration/Setup Utility program" on page 37).

If the preceding screen does not appear, use the Configuration/Setup Utility
program to configure your computer. For more information, see Chapter 4,
"Using the Configuration/Setup Utility program" on page 37.

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 using the Configuration/Setup Utility program.
See "Setting the startup sequence" on page 48.

Chapter 6. Troubleshooting

This chapter describes diagnostic tools that you can use to identify and correct problems that might come up as you use your computer. This chapter also contains information about Option Diskettes and how to recover from a BIOS update failure.

> --- **Note** ---
>
> If your computer does not start when you press the power switch, do the following:
>
> - Make sure your computer and monitor are connected to working electrical outlets.
> - Make sure all cables are securely connected to the correct locations. If this does not correct the problem, have the computer serviced.

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 126 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 126 for information about how to run the IBM Enhanced Diagnostics program provided by IBM. Also see the operating system documentation that comes 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 MAP
- Error codes and messages
- Troubleshooting charts
- IBM Enhanced Diagnostics program

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

If **Power-On Self-Test** is set to *Enhanced,* numbers showing the amount of memory being tested appear in the top-left corner of the screen until the total amount of memory in the system is reached. Prompts for running a fast POST or accessing the Configuration/Setup Utility program appear in the lower-left corner of the screen. Quick mode is the default mode of operation.

Note: 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).

If POST finishes without detecting any problems, the first screen of your operating system or application program appears if you have not set a power-on password. If you have set a power-on password, a password prompt appears. You must enter your password before the first screen of your operating system or application program will appear. (For more information about using passwords, see "Using a power-on password" on page 40.)

If **Power-On Status** is *Enabled* and POST detects no problems, you will hear a single beep. If POST detects a problem, you will hear multiple beeps or no beep. In most cases, an error code appears in the top-left corner of the screen, and in some cases a description of the error is displayed beside the code. (Note that the screen will sometimes display multiple error codes and descriptions.) Write down all error code numbers and descriptions. For more information about what caused an error message to appear and what action to take, see "POST error messages" on page 110 and "Troubleshooting MAP" on page 107.

If you hear no beep at all during POST, see "Device troubleshooting charts" on page 115. You might need to have your computer serviced.

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).

Troubleshooting MAP

Use this procedure as a starting point for problem isolation.

| 001 |

– Turn off the computer and wait a few seconds.
– Turn on the computer, monitor, and any other attached devices.
– Wait the normal amount of time for the first screen of your application or the operating system to display.

Is the first screen of your application or operating system displayed?
Yes No

> | 002 |
>
> Continue at Step 004.

| 003 |

You might have an I/O device that is failing, or an intermittent problem with your computer.
Go to "IBM Enhanced Diagnostics program" on page 126 and run the IBM Enhanced Diagnostics program.

| 004 |

You have an unreadable display, an error message, or the computer is sounding a series of beeps.
Is an error message displayed?
Yes No

> | 005 |
>
> **Do you hear a series of beeps?**
> **Yes No**
>
> > | 006 |
> >
> > – Make sure that the monitor is turned on and the Brightness and Contrast controls are adjusted correctly.
> > – Make sure that the monitor signal cable is securely connected to the monitor and to the monitor connector on the graphics adapter. To find the monitor connector on your computer, see

"Connecting computer cables" on page 10.
If the problem persists, have the computer serviced.

007

Go to "POST beep codes" on page 114.

008

– Refer to "POST error messages" on page 110 and look for the error
  message; then return here.
Is the error message in this table?
Yes No

> **009**
>
> A SCSI error message might be displayed. Refer to the SCSI
> documentation that comes with your computer.
> – or –
> An application message might be displayed. Refer to documentation
> for your application program.

010

**Did the Configuration/Setup Utility start automatically after the error
message displayed?**
Yes No

> **011**
>
> – Follow the action for this error message described in "POST error
>   messages" on page 110.

012

Have you recently added, removed, or changed any hardware?
Yes No

> **013**
>
> Have the computer serviced.

014

– At the POST Startup Errors screen, select **Continue** if you want to access
  the Configuration/Setup Utility program menu. Select **Exit Setup** if you
  want to exit the Configuration/Setup Utility program.

  To select an item, press Up Arrow (↑) or Down Arrow (↓) to highlight
  the item, and then press Enter. If you select **Continue**, the
  Configuration/Setup Utility program menu appears on the screen. You

will see a pointer next to any menu items that are malfunctioning or that have been changed since the last time you turned on your computer. If you did not knowingly make a change to a flagged menu item, there is probably a malfunction in that item. If you made a change, continue here. If you did not make a change, have the computer serviced.

To use the Configuration/Setup Utility program:

1. Select the menu item that is flagged (or that you wish to view) by pressing Up Arrow (↑) or Down Arrow (↓), and then press Enter.

2. A new menu specific to the item that you selected appears. Press Left Arrow (←) or Right Arrow (→) to toggle between choices for a menu item. (Note that each menu item has a Help screen. To view the Help screen, select the menu item, and then press F1.)

3. When you have finished viewing and changing settings, press Esc to return to the Configuration/Setup Utility program menu.

4. Before you exit from the program, select **Save Settings**. When you exit from the Configuration/Setup Utility program menu, your operating system will start automatically (unless there is an unresolved problem with the startup device).

Important

If you did *not* change any settings in the Configuration/Setup Utility program, note the following:

- You will get an error message if you exit from the Configuration/Setup Utility program without selecting **Save Settings**. Your operating system will not start, but the computer will automatically restart. When the computer restarts, you will get a POST error message, and then the Configuration/Setup Utility program will again start automatically.

- You will *not* get an error message if you select **Save Settings**, and then exit the Configuration/Setup Utility program. Your system will save all settings as they currently appear in the Configuration/Setup Utility program and your operating system will start (unless there is an unresolved problem with the startup device).

To exit from the Configuration/Setup Utility program, press Esc and follow the instructions on the screen.

For more information about what caused an error message to appear and what action to take, see "POST error messages" on page 110.

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 messages

The computer might display more than one error message. Often, the first error to occur causes subsequent errors. When using the POST message charts in this section, always begin by following the suggested action for the first error message that appears on your computer screen. Note that, in these charts, "X" can be any alphanumeric character.

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 126 for instructions on running diagnostics.
114	External ROM checksum error	Have the computer serviced.
121	Hardware error	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 131.

Code	Description	Action
162	A change in device configuration occurred.	1. Verify that all external devices are turned on. 2. Verify that all devices are properly installed and securely connected. 3. If you added, removed, or changed the location of a device, you must save the new configuration in the Configuration/Setup Utility program. See "Starting the Configuration/Setup Utility program" on page 103 and Chapter 4, "Using the Configuration/Setup Utility program" on page 37 for more information.
163	Clock not updating	Have the computer serviced.
164	CMOS RAM memory size does not match	Go to "IBM Enhanced Diagnostics program" on page 126 for instructions on running diagnostics.
167	Clock not updating	Update the BIOS. See "Updating system programs" on page 27.
168	Alert on LAN is not working correctly.	1. Go to Chapter 4, "Using the Configuration/Setup Utility program" on page 37 and follow the instructions to verify that Alert on LAN is enabled. 2. If Alert on LAN is enabled and you still get this error code, have the computer serviced.
175	System board error	Have the computer serviced.
176	The system cover has been removed.	Type in the administrator password. If the problem persists, have the computer serviced.

Code	Description	Action
177	An inventory violation occurred, such as a hardware component was removed. This error message is part of the Asset ID feature of the computer.	Type in the administrator password. If the problem persists, have the computer serviced.
184	Asset control antenna not detected.	Have the computer serviced.
186	System board or hardware security error	Have the computer serviced.
187	The administrator password and startup sequence has been cleared.	Go to Chapter 4, "Using the Configuration/Setup Utility program" on page 37 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 126 for instructions about running diagnostics.
301 or 303	Keyboard error	1. Make sure the keyboard is properly connected. 2. If the keyboard is properly connected, have the computer serviced.
601	Diskette drive or controller error	1. Go to "IBM Enhanced Diagnostics program" on page 126 and if possible follow the instructions to run the IBM Enhanced Diagnostics program. 2. If the problem persists, have the computer serviced.
602	Diskette IPL startup (boot) record not valid	1. The diskette might be defective. Try another diskette. 2. If the problem persists, have the computer serviced.

Code	Description	Action
604	Unsupported diskette drive installed	1. Go to "IBM Enhanced Diagnostics program" on page 126 and if possible follow the instructions to run the IBM Enhanced Diagnostics program. 2. If the problem persists, have the computer serviced.
662	Diskette drive configuration error	1. Go to the configuration procedure and follow the instructions to verify the diskette drive configuration. 2. Run the diagnostics program for the diskette drive. See "IBM Enhanced Diagnostics program" on page 126. 3. If the problem persists, have the computer serviced.
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	1. Go to Chapter 4, "Using the Configuration/Setup Utility program" on page 37 and follow the instructions to verify the hard disk configuration. 2. If the problem persists, have the computer serviced.
178x	Hard disk or IDE device failed	1. Go to "IBM Enhanced Diagnostics program" on page 126 and follow the instructions to run the diagnostics program for the hard disk drive and the IDE devices. 2. If the problem persists, have the computer serviced.

Code	Description	Action
18xx	A PCI adapter has requested an unavailable resource.	Go to Chapter 4, "Using the Configuration/Setup Utility program" on page 37 and follow the instructions to reconfigure the PCI devices.
1962	Startup (Boot) sequence error	1. Go to Chapter 4, "Using the Configuration/Setup Utility program" on page 37 and follow the instructions to verify that the startup sequence is configured. 2. If the problem persists, 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.

It is possible to misinterpret beep codes if you do not understand exactly how they work. Keep in mind that POST beep codes vary in the length of the pause, and not the duration of the beep tones.

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.

Beep code	Probable cause
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	Memory failure or too many devices on RIMMs
1–3–2	First 64 Kb RAM parity test failure
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
3–1–1	Timer tick interrupt test failure
3–1–2	Interval timer channel 2 test failure
3–1–4	Time-of-day clock test failure
3–2–4	Comparing CMOS memsize against actual
3–3–1	Memory size mismatch occurred

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 vii and "Removing the cover" on page 61 (desktop) or "Removing the cover" on page 77 (tower) 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 126 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.

Problem type	Go to:
Diskette drive	"Diskette drive problems" on page 117
General	"General problems" on page 120
Intermittent	"Intermittent problems" on page 120
Keyboard, mouse, or pointing-device	"Keyboard, mouse, or pointing device problems" on page 121
Memory	"Memory problems" on page 122
Monitor	"Monitor problems" on page 118
Option	"Option problems" on page 123
Parallel port	"Parallel port problems" on page 124
Printer	"Printer problems" on page 125
Serial Port 1	"Serial port problems" on page 125
Serial Port 2	"Serial port problems" on page 125
Software	"Software problems" on page 126
Universal Serial Bus Ports	"Universal Serial Bus port problems" on page 126

Diskette drive problems

Diskette drive problems	Action
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	If there is a diskette in the drive, verify that: 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 37. 2. The computer is checking for the diskette drive in the startup sequence. Use the Configuration/Setup Utility program to verify this. 3. The diskette you are using is good and not damaged. Try inserting another diskette if you have one. 4. The diskette is inserted correctly, with its label up and its metal shutter end first in the drive. 5. The diskette contains the necessary files to start the computer (the diskette must be startable). 6. The diskette drive cable is properly installed and securely connected. 7. There is no problem with your software program (see "Software problems" on page 126). If you cannot correct the problem, have the computer serviced.

Monitor problems

Monitor problems	Action
General monitor problems.	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. If you cannot find the problem, check the other listings on monitor problems in this table. If you cannot correct the problem, have the computer serviced.

Wavy, unreadable, rolling, distorted, or jittery screen images.	If the monitor self-tests show that the monitor is working properly, verify that:
	
	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:
	
	  a. Turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.)
	
	  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.
	
	  c. Turn on the monitor.
	
	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.
	
	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.
	
	Note: An enhanced monitor signal cable with additional shielding might be available for your monitor. See your IBM reseller or marketing representative for information.
	
	If you cannot correct the problem, have the computer serviced.

Monitor problems	Action
Screen flickers.	Set the monitor for the highest, noninterlaced refresh rate supported by your monitor and the video controller in your computer. **Attention:** Using a resolution or refresh rate that is not supported by your monitor might damage it. 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. If this does not correct the problem, have the monitor and computer serviced.
The monitor works when you turn on the system, but goes blank when you start some application programs.	Verify that: 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 10. 2. The necessary device drivers for the application programs are installed. If you cannot correct the problem, have the computer serviced.
The monitor works when you turn on the system, but goes blank after some period of computer inactivity.	The computer is probably set for energy savings using one of the power-management settings. If power-management features are enabled, disabling or changing the settings might solve the problem (see "Power-management features" on page 51). If you cannot correct the problem, have the computer serviced.
Blank screen.	Verify that: 1. The computer power cord is plugged into the computer and a working electrical outlet. 2. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. 3. The monitor signal cable is securely connected to the monitor and the monitor connector on the back of the computer. To find the monitor connector, see "Connecting computer cables" on page 10. If you cannot correct the problem, have the computer serviced.
Only the cursor appears.	Have the computer serviced.

Monitor problems	Action
Wrong characters appear on the screen.	Have the computer serviced.

General problems

General problems	Action
The computer does not start when you press the power switch.	Verify that: 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 10. 2. The computer cover is properly installed. If you cannot correct the problem, have the computer serviced.
Problems such as a broken cover lock or indicator lights not working.	Have the computer serviced.

Intermittent problems

Intermittent problems	Action
A problem occurs only occasionally and is difficult to detect.	Verify that: 1. All cables and cords are securely connected to the rear of the computer and attached devices. 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. 3. If SCSI devices are installed, the last external device in each SCSI chain is terminated correctly. (See your SCSI documentation.) If you cannot correct the problem, have the computer serviced.

Keyboard, mouse, or pointing device problems

Keyboard, mouse, or pointing-device problems	Action
All or some keys on the keyboard do not work.	Verify that: 1. The computer and the monitor are turned on. 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 10. If you cannot correct the problem, have the computer serviced.
The mouse or pointing device does not work.	Verify that: 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 10. 2. The device drivers for the mouse are installed correctly. 3. The mouse or pointing device is dirty. For information about cleaning the mouse, see "Mouse" on page 35. If you cannot correct the problem, have the computer and the device serviced.

Memory problems

Memory problems	Action
The amount of memory displayed is less than the amount of memory installed.	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. Verify that: 1. You have installed the correct type of RIMMs for your computer. See "Working with memory" on page 93 for instructions on adding RIMMs. 2. The RIMMs are properly installed and securely connected. 3. If you added or removed memory, you saved the new configuration before exiting the Configuration/Setup Utility program. 4. All RIMM connectors have either a RIMM or a continuity module installed. 5. You do not have more than 32 devices total on your RIMMs. If the problem persists, run the memory test from the diagnostic program supplied with your computer. (See "IBM Enhanced Diagnostics program" on page 126 for further information.) The system might have detected a bad RIMM and automatically reallocated memory to enable your computer to continue to operate. If you cannot correct the problem, have the computer serviced.

Option problems

Option problems	Action
An IBM option that was just installed does not work.	Verify that:

Verify that:

1. The option is designed for your computer.

2. You followed the installation instructions supplied with the option and in Chapter 5, "Installing options" on page 59.

3. All option files (if required) are installed correctly. See "Installing files from Option Diskettes" on page 131 for information about installing option files.

4. You have not loosened any other installed options or cables.

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.

6. You updated the configuration information in the Configuration/Setup Utility program, if necessary, and have no conflicts. For more information, see Chapter 4, "Using the Configuration/Setup Utility program" on page 37.)

If the problem persists, run the diagnostic programs. (See "IBM Enhanced Diagnostics program" on page 126 for information about diagnostic programs provided with your computer.)

If you cannot correct the problem, have the computer and the option serviced.

Option problems	Action
An IBM option that previously worked does not work now.	Verify that all option hardware and cable connections are secure.
	If the option comes with its own test instructions, use those instructions to test the option.
	If the failing option is a SCSI option, verify that:
	1. The cables for all external SCSI options are connected correctly.
	2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.
	3. All external SCSI options are turned on. External SCSI options must be turned on before the system is turned on.
	For more information, see your SCSI documentation.
	If you cannot correct the problem, have the computer serviced.

Parallel port problems

Parallel port problems	Action
Parallel port cannot be accessed.	Verify that:
	1. Each port is assigned a unique address.
	2. The parallel port adapter, if you added one, is properly installed and firmly seated. See "Installing options in the desktop model" on page 61 or "Installing options in the tower model" on page 76 for instructions on adding adapters.
	If you cannot correct the problem, have the computer serviced.

Serial port problems

Serial port problems	Action
Serial port cannot be accessed.	Verify that:
	1. Each port is assigned a unique address.
	2. The serial-port adapter, if you added one, is properly installed and firmly seated. See "Installing adapters" on page 66 (desktop) or "Installing adapters" on page 80 (tower) for instructions on adding adapters.
	If you cannot correct the problem, have the computer serviced.

Printer problems

Printer problems	Action
The printer does not work.	Verify that:
	1. The printer is turned on and is online.
	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 10 for the location of the parallel, serial, and USB ports.)
	Note: Non-IBM printer signal cables might cause unpredictable problems.
	3. You have assigned the printer port correctly in your operating system or application program.
	4. You have assigned the printer port correctly in the Configuration/Setup Utility program. For more information, see Chapter 4, "Using the Configuration/Setup Utility program" on page 37.
	5. If the problem persists, run the tests described in the documentation that comes with your printer.
	If you cannot correct the problem, have the computer serviced.

Software problems

Software problem	Action
Is your software program OK?	To determine if problems are caused by installed software, verify that:
	1. Your computer has the minimum memory requirements needed to use the software. See the information supplied with the software to verify memory requirements. Note: If you have just installed an adapter, you might have a memory address conflict.
	2. The software is designed to operate on your computer.
	3. Other software works on your computer.
	4. The software you are using works on another computer.
	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.
	If you cannot correct the problem, have the computer serviced.

Universal Serial Bus port 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.

IBM Enhanced Diagnostics program

The IBM Enhanced Diagnostics program is available on:

- The *Product Recovery CD* that comes with computers that have preinstalled software.
- The IBM *Device Driver and IBM Enhanced Diagnostics CD* that comes with computers that do not have preinstalled software.
- The IBM Enhanced Diagnostic diskette (if you have created one).

You can create an IBM Enhanced Diagnostics diskette from:

- The *Product Recovery CD.*
- The *Device Driver and IBM Enhanced Diagnostics CD.*
- The World Wide Web (http://www.ibm.com/pc/support) by downloading the diskette image.

These diagnostic programs run independently of the operating system and will help isolate your computer hardware from software that was preinstalled (or that you have installed) on your hard disk. Use the IBM Enhanced Diagnostics to diagnose and isolate hardware problems.

You can use this program to test the hardware (and some software) 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 *Product Recovery CD* or the *Device Driver and IBM Enhanced Diagnostics CD*, you might need to change the primary startup sequence to use CD-ROM as the First Startup Device.

For instructions to change the startup sequence, see "Setting the startup sequence" on page 48

To run diagnostics from the *Product Recovery CD*:

1. Place the *Product Recovery CD* in the CD-ROM drive and turn on the computer.
2. The Main menu displays.
3. Select **System utilities**.
4. In the System utilities menu, select **Run Diagnostics**.
5. The IBM Enhanced Diagnostics program is started.
6. When you finish running the diagnostic program, remove the CD from the CD-ROM drive, and turn off the computer.
7. If you changed the startup sequence, restore it to the original settings.

To run diagnostics from the *Device Driver and IBM Enhanced Diagnostics CD*:

1. Place the *Device Driver and IBM Enhanced Diagnostics CD* in the CD-ROM drive and turn on your computer.
2. A menu appears with a selection to run IBM Enhanced Diagnostics.
3. Select **Run IBM Enhanced Diagnostics** to start the IBM Enhanced Diagnostics program.

4. If you changed the startup sequence, restore it to the original settings.

5. When you finish running the diagnostic program, remove the CD from the CD-ROM drive, and turn off the computer.

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

1. Go to http://www.ibm.com/pc/support/ on the World Wide Web.

2. In the **Quick Path** field, type the type/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 to the directory where the file was downloaded.

8. Insert a blank high-capacity diskette into the diskette drive.

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 create an IBM Enhanced Diagnostics diskette from the *Product Recovery CD*.

1. If the Access IBM program is not already open, click the Windows **Start**; then click **Access IBM**.

2. In Access IBM, click **Start up**.

3. In the displayed menu, click **Create a diagnostic diskette** and follow the instructions on the screen.

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 the operating system and turn off the computer.

2. Insert the *IBM Enhanced Diagnostic* diskette into the diskette drive.

3. Turn on your computer.

4. Follow the instructions that appear on the screen. For help, press F1.

Other diagnostic programs

The *Software Selections CD* that comes with your computer also contains diagnostic programs designed specifically for certain operating environments (Windows 95, Windows 98, 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. They are especially useful in isolating problems related to the operating system and device drivers.

CoSession Remote

CoSession Remote availability varies by computer model and country. CoSession Remote is a program that can be used by another individual, such as your system administrator, to help diagnose problems with your computer from a remote location. To use CoSession Remote, the program must be installed in your computer, and your computer must have a modem or a LAN connection.

Important

Before attempting to use CoSession Remote, contact IBM or your in-house administrator for specific instructions on setting up and using the program.

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 61 (desktop) or "Removing the cover" on page 77 (tower), depending on your model.

3. Locate the fail safe jumper on the system board. See the system board label inside your computer for the location of the jumper. See also "Identifying parts on the system board" on page 64 (desktop) or "Identifying parts on the system board" on page 78 (tower), depending on the model of your computer.

4. Move the jumper from the normal position to the clear position.

5. Replace any adapters that were removed and replace the cover. See "Replacing the cover and connecting the cables" on page 76 (desktop) or "Replacing the cover and connecting the cables" on page 92 (tower).

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, turn off the computer and monitor.

9. Unplug the power cords from electrical outlets.

10. Remove the diskette from drive A.

11. Remove the cover. See "Removing the cover" on page 61 (desktop) and "Removing the cover" on page 77 (tower).

12. Remove any adapters that impede access to the fail safe jumper.

13. Move the fail safe jumper from the clear position to the normal position.

14. Replace any adapters that were removed.

15. Install the cover and reconnect any cables that were disconnected.

16. Turn on the computer to restart the operating system.

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 (.EXE or .COM) files from the diskette to your hard disk. See the documentation that comes with the option to determine if you need to install files.

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 x 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, or 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 61 or "Removing the cover" on page 77.

3. Locate the battery. See the system board label inside your computer or see "Identifying parts on the system board" on page 64 (desktop) or "Identifying parts on the system board" on page 78 (tower).

4. If necessary, remove any adapters that impede access to the battery. See "Installing adapters" on page 66 (desktop) or "Installing adapters" on page 80 (tower) for more information.

5. Remove the old battery.
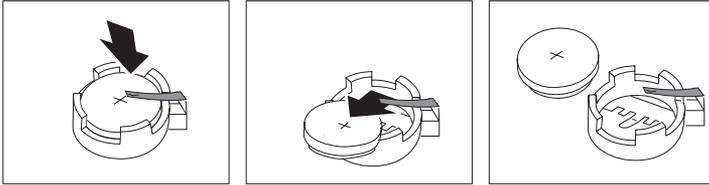
6. Install the new battery.
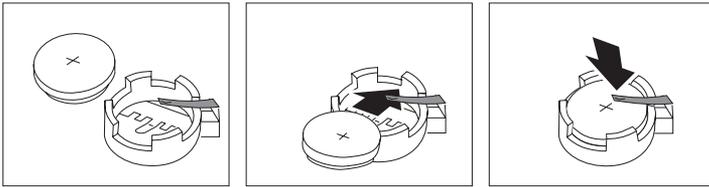
7. Replace any adapters that were removed to gain access to the battery. See "Installing adapters" on page 66 (desktop) or "Installing adapters" on page 80 (tower) for instructions for replacing adapters.

8. Replace the cover and plug in the power cord.

   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:

`http://www.ibm.com`	Main IBM home page
`http://www.ibm.com/pc`	IBM Personal Computing
`http://www.ibm.com/pc/support`	IBM Personal Computing Support
`http://www.ibm.com/pc/us/ibmpc`	IBM Commercial Desktop PCs (U.S.)
`http://www.ibm.com/pc/us/intellistation`	IBM IntelliStation Workstations (U.S.)
`http://www.ibm.com/pc/us/accessories`	Options by IBM (U.S.)
`http://www.ibm.com/pc/us/netfinity`	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.

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 Statement of Limited Warranty. See "Getting help by telephone" on page 137 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.

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
```

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

Using electronic support services

If you have a modem, you can get help from several popular services. Bulletin boards and online information services provide assistance through question-and-answer message areas, live chat rooms, searchable databases, and more.

Technical information is available on a wide range of topics, such as:

- Hardware setup and configuration
- Preinstalled software
- OS/2, DOS, and Windows
- Networking
- Communications
- Multimedia

In addition, the latest device driver updates are available.

The IBM Bulletin Board System (BBS) can be reached 24 hours a day, 7 days a week. Modem speeds of up to 14 400 baud are supported. Long distance telephone charges might apply. To access the IBM BBS:

- In the U.S., call 1-919-517-0001.
- In Canada:
    - In Montreal, call 514-938-3022.
    - In Toronto, call 905-316-4255 or 416-956-7877.
    - In Vancouver, call 604-664-6464.

Commercial online services, such as America Online (AOL), contain information about IBM products. (For AOL, use the "Go to" keyword **IBM Connect**.)

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.

To access the IBM Automated Fax System, do the following:

- In the U.S., call 1-800-426-3395.
- In Canada, call 1-800-465-3299.

Getting help online

Online Housecall is a remote communication tool that allows an IBM technical-support representative to access your PC by modem. Many problems can be remotely diagnosed and corrected quickly and easily. In addition to a modem, a remote-access application program is required. This service is not available for servers. There might be a charge for this service, depending on the request.

For more information about configuring your PC for Online Housecall:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-565-3344.
- In all other countries, contact your IBM reseller or IBM marketing representative.

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.[4]

Country		Telephone number
Austria	Österreich	1-546 585 075
Belgium - Dutch	Belgie	02-717-2504
Belgium - French	Belgique	02-717-2503
Canada	Canada	1-800-565-3344
Denmark	Danmark	03-525-6905
Finland	Suomi	9-22-931805
France	France	01-69-32-40-03
Germany	Deutschland	069-6654-9003
Ireland	Ireland	01-815-9207
Italy	Italia	02-4827-5003
Luxembourg	Luxembourg	298-977-5060
Netherlands	Nederland	020-504-0531
Norway	Norge	2-305-3203

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[4] Response time will vary depending on the number and complexity of incoming calls.

Country		Telephone number
Portugal	Portugal	01-791-5147
Spain	España	091-662-4270
Sweden	Sverige	08-632-0063
Switzerland - German	Schweiz	01-212-1810
Switzerland - French	Suisse	022-310-0418
Switzerland - Italian	Svizzera	091-971-0523
United Kingdom	United Kingdom	01475-555555
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.

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 141.

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 though 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.

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.

Appendix A. Using the Software Selections CD

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

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

Features of the CD

The IBM *Software Selections CD* contains diagnostic programs and other support software for Windows 95, Windows 98, Windows NT Workstation 3.51, and Windows NT Workstation 4.0.

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

You can use the CD to:

- Install some software products directly from the CD on models equipped with a CD-ROM drive.

- Create an image of the IBM *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 programs. 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 CD

To use the IBM *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 IBM *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 IBM *Software Selections CD*. Information about using the IBM *Software Selections CD* 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 clear your selection.

3. To complete the installation, 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. 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.

Serial numbers

Record and retain the following information.

Product Name	PC 300PL
Model/Type (M/T)	_____
Serial Number (S/N)	_____

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.

Device records

Use the following tables to keep a record of the options in or attached to your computer. This information can be helpful when you install additional options, or if you ever need to have your computer serviced.

Location	Option Description
System Memory	
(Mem 1 RIMM)	□ 64 MB □ 128 MB □ 256 MB
(Mem 2 RIMM)	□ 64 MB □ 128 MB □ 256 MB
(Mem 3 RIMM)	□ 64 MB □ 128 MB □ 256 MB
Expansion Slot 1	_____
Expansion Slot 2	_____
Expansion Slot 3	_____
Expansion Slot 4	_____
PCI Expansion Slot 5 (tower only)	_____
PCI Expansion Slot 6 (tower only)	_____
Microprocessor	□ Intel _____ MHz
Parallel Connector	_____
Serial Connector A	_____
Serial Connector B	_____
USB Connector 1	_____
USB Connector 2	_____
Monitor Connector	_____
Audio Connectors	_____
Keyboard Connector	104-key keyboard □ Other _____
Mouse Connector	□ ScrollPoint mouse □ 2-button mouse □ Other: _____

Location	Option Description
5.25-Inch Bay 1	☐ IDE CD-ROM drive ☐ Other: _____
3.5-Inch Bay 2	☐ Zip drive _____ ☐ Other: _____
3.5-Inch Bay 3	☐ 1.44 MB diskette drive ☐ Other: _____
3.5-Inch Bay 4	☐ EIDE hard disk drive ☐ 1.44 MB diskette drive ☐ Other: _____
3.5-Inch Bay 5 (tower only)	EIDE hard disk drive ☐ Other: _____
3.5-Inch Bay 6 (tower only)	EIDE hard disk drive ☐ Other: _____
Key manufacturer address Phone number Key code number	_____ _____ _____

Appendix C. Product warranties and notices

This appendix includes product warranties, trademarks, and notices.

Warranty Statements

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

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)** (Part 1 - General Terms on page 151)
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)** (Part 1 - General Terms on page 154)
- **Worldwide Country-Unique Terms** (Part 2 - Country-Unique Terms on page 158)

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

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

Machine -   PC 300PL Types 6584 and 6594

Warranty Period* -   Parts: Three (3) Years Labor: One (1) Year

IBM will provide warranty service without charge for:

1. parts and labor during the first year of the warranty period
2. parts only, on an exchange basis, in the second and third years of the warranty period.

   IBM will charge you for any labor it provides in performance of the repair or replacement.

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

The IBM Warranty for Machines

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

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

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

Extent of Warranty

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

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

Items Not Covered by Warranty

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

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

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

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. In the United States, call IBM at 1-800-772-2227. In Canada, call IBM at 1-800-565-3344. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

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

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

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

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
   a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
   b. secure all programs, data, and funds contained in a Machine,
   c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
   d. inform IBM or your reseller of changes in a Machine's location.

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

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

Production Status
Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed.

Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability
Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

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

2. the amount of any other actual direct damages, up to the greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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

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

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

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

PC 300PL Types 6584 and 6594
Warranty Period* -

- EMEA and Argentina - Parts: Three (3) Years Labor: Three (3) Years

- Japan - Parts: One (1) Year Labor: One (1) Year

- All other countries not listed - Parts: Three (3) Years Labor: One (1) Year

  IBM will provide warranty service without charge for:

  1. parts and labor during the first year of the warranty period
  2. parts only, on an exchange basis, in the second and third years of the warranty period.

  IBM will charge you for any labor it provides in performance of the repair or replacement.

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

The IBM Warranty for Machines

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

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

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

Extent of Warranty

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

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED

WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY
NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE
LIMITED IN DURATION TO THE WARRANTY PERIOD. NO
WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

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

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

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

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. You may
be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at
your location or at a service center, to keep Machines in, or restore them to,
conformance with their Specifications. IBM or your reseller will inform you of the
available types of service for a Machine based on its country of installation. IBM
may repair the failing Machine or exchange it at its discretion.

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

Any feature, conversion, or upgrade IBM or your reseller services must be installed
on a Machine which is 1) for certain Machines, the designated, serial-numbered
Machine and 2) at an engineering-change level compatible with the feature,
conversion, or upgrade. Many features, conversions, or upgrades involve the
removal of parts and their return to IBM. A part that replaces a removed part will
assume the warranty service status of the removed part.

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

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that
   prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a
   Machine that you do not own; and
3. where applicable, before service is provided
   a. follow the problem determination, problem analysis, and service request
      procedures that IBM or your reseller provides,
   b. secure all programs, data, and funds contained in a Machine,

c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfil their obligations, and

d. inform IBM or your reseller of changes in a Machine's location.

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

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

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

Limitation of Liability
Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

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

2. the amount of any other actual direct damages, up to the greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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

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

Part 2 - Worldwide Country-Unique Terms

ASIA PACIFIC

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

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

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

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

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

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

Limitation of Liability: The following is added to this Section:
Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

The following terms apply to all EMEA countries.

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

Warranty Service
If you purchased an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchased an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

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

The following terms apply to the country specified:

EGYPT: Limitation of Liability: The following replaces item 2 in this Section:
2. as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

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

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

The following paragraphs are added to this Section:
The minimum warranty period for Machines is six months.

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

Extent of Warranty: The second paragraph does not apply.

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

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

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

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

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

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

Limitation of Liability: The following replaces items one and two of the first paragraph of this Section:
1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and 2. the amount of any other actual direct damages, up to the greater of Irish Pounds 75,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

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

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

Applicability of suppliers and resellers (unchanged).

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

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

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

UNITED KINGDOM: Limitation of Liability: The following replaces items 1 and 2 of the first paragraph of this Section:
1. death or personal injury or physical damage to your real property solely caused by IBM's negligence;
2. the amount of any other actual direct damages or loss, up to the greater of Pounds Sterling 150,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

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

Applicability of suppliers and resellers (unchanged).

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

NORTH AMERICA

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

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

Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. 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. Subject to IBM's valid intellectual property or other legally protectable rights, any functionally equivalent product, program, or service may be used instead of the IBM product, program, or service. The evaluation and verification of operation in

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Year 2000 readiness and instructions

This is a Year 2000 Readiness Disclosure.

A product is Year 2000 Ready if the product, when used in accordance with its associated documentation, is capable of correctly processing, providing and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware, and firmware) used with the product properly exchange date data with it.

This IBM PC hardware product has been designed to process four-digit date information correctly within and between the 20th and 21st centuries. If your IBM computer is on when the century changes, you should turn it off and then back on again once, or restart the operating system, to ensure that the internal clock resets itself for the new century.

This IBM PC product cannot prevent errors that might occur if software you use or exchange data with is not ready for the Year 2000. IBM software that comes with this product is Year 2000 Ready. However, software from other companies might come with this IBM PC product. IBM cannot take responsibility for the readiness of that software. You should contact the software developers directly if you wish to verify readiness, understand limitations, or look for any software updates.

To learn more about IBM PC products and the Year 2000, visit our Web site at http://www.ibm.com/pc/year2000. The information and tools there can help you with your Year 2000 transition plan, especially if you have multiple IBM PCs. IBM encourages you to check periodically for updated information.

Trademarks

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HelpCenter
HelpWare
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Netfinity
Netfinity Manager
OS/2
PC300
ScrollPoint
ThinkPad
Wake on LAN

Intel, Pentium, and LANDesk are trademarks of Intel Corporation in the United States and/or other countries.

Microsoft, MS-DOS, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States and/or other countries.

Other company, product, and service names may be trademarks or service marks of others.

Electronic emission 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. 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 caractérisques et le rend conforme aux normes de la classe A.

Class B Notices

PC 300PL Types 6584 and 6594

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

FC 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.

Class A Notices

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.

Other Notices
European community 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.

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 Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. 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. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). 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 made by an authorized Canadian maintenance facility 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 LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the sum of the LOAD NUMBERS of all the devices does not exceed 100.

Étiquette d'homologation du ministère des Communications du Canada

AVIS : L'étiquette du ministère des Communications du Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme à certaines normes de protection, d'exploitation et de sécurité des réseaux de télécommunications. 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'empêchent pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être effectuées par un centre d'entretien canadien autorisé désigné par le fournisseur. La compagnie 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 d'un 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 DE CHARGE (IC) assigné à chaque dispositif terminal indique, pour éviter toute surcharge, le pourcentage de la charge totale qui peut être raccordé à un circuit téléphonique bouclé utilisé par ce dispositif. L'extrémité du circuit bouclé peut consister en n'importe quelle combinaison de dispositifs pourvu que la somme des INDICES DE CHARGE de l'ensemble des dispositifs ne dépasse pas 100.

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
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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