

Personal Computer

**Using Your Personal Computer**

**PC 300 GL (6272 and 6282)**



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**Note**

Before using this information and the product it supports, be sure to read the general information under Appendix B, "Product Warranties, License Information, and Notices" on page 121.

## **Second Edition (April 1997)**

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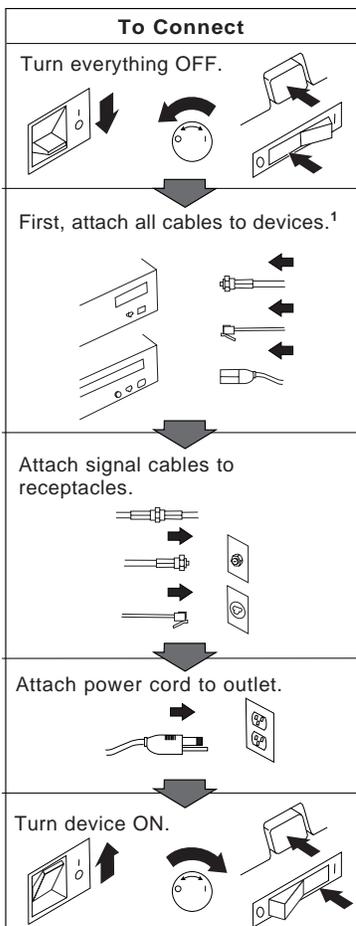
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## Safety Information

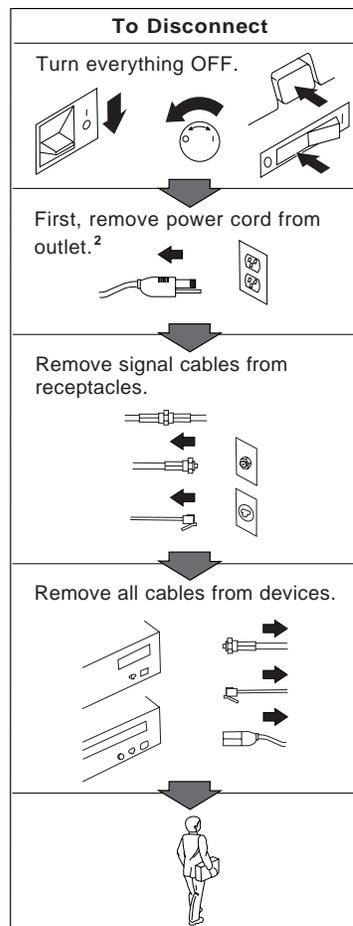


### DANGER:

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.



<sup>1</sup> In the U.K., by law, the telephone cable must be connected after the power cord.



<sup>2</sup> In the U.K., by law, the power cord must be disconnected after the telephone line cable.

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## Laser Compliance Statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is 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, the drive is 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 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.**

Opening the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not open.**

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

### **DANGER**

<p><b>Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.</b></p>
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## **Lithium Battery Notice**

### **CAUTION:**

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

**When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.**

### ***Do not:***

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

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

### **ATTENTION**

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

**Remplacer uniquement par une batterie IBM de type 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.**



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## About This Book

This book will help you become familiar with your IBM Personal Computer and its many features. It describes how to configure, operate, and maintain your computer. In the unlikely event you experience problems, you will also find helpful troubleshooting information, as well as instructions for obtaining service in this book.

The book is organized as follows:

- Chapter 1, "Your IBM Personal Computer," contains an overview of the features of your computer.
- Chapter 2, "Arranging Your Workspace," contains information about setting up your work area to optimize use of your computer. Safety considerations are also discussed.
- Chapter 3, "Operating Your Computer," contains instructions for the day-to-day operation of your computer, such as starting and shutting down your computer, using a diskette or CD-ROM drive, and using system management features.
- Chapter 4, "Taking Care of Your Computer," contains information about the proper handling and care of your computer.
- Chapter 5, "Using the Configuration/Setup Utility Program," contains information about configuration procedures.
- Chapter 6, "Solving Problems," contains information that will help you identify and correct problems that might arise as you use your computer.
- Chapter 7, "Getting Help, Service, and Information," contains a description of the wide variety of resources available from IBM to assist you in the use of your computer. This chapter also describes how to obtain additional information about IBM products.
- Appendix A, "Computer Records," contains forms for recording information about your computer, which can be helpful if you decide to install any additional options, or if you ever need to have your computer serviced.
- Appendix B, "Product Warranties, License Information, and Notices," contains a copy of the warranty and license agreement for your computer, as well as legal notices and trademark information.

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## Related Publications

The following publications, together with this book, contain information about your computer.

- *Setting Up Your Personal Computer*  
This publication contains instructions to help you set up your computer.
- *Installing Options in Your Personal Computer*  
This publication contains instructions for adding memory, adapters, drives, and other options to your computer.
- *Understanding Your Personal Computer*  
This online publication (provided only with computers that have preinstalled software) includes general information about using personal computers and in-depth information about the specific features of your computer. To purchase a printed copy of this publication, refer to “Ordering Publications” on page 115.
- *About Your Software*  
This publication (provided only with computers that have preinstalled software) contains information about the preinstalled software package.
- *Your Ready-to-Configure CD*  
This publication contains information about the *Ready-to-Configure CD* that comes with your computer. The publication also contains instructions for starting the CD.

The following publications contain more information about your computer. Both publications can be found on the Internet at <http://www.pc.ibm.com/cdt> or can be ordered from IBM. To purchase a copy, refer to “Ordering Publications” on page 115.

- *Hardware Maintenance Manual*  
This publication contains information for trained service technicians.
- *Technical Information Manual*  
This publication contains information for individuals who want to know more about the technical aspects of their computer.

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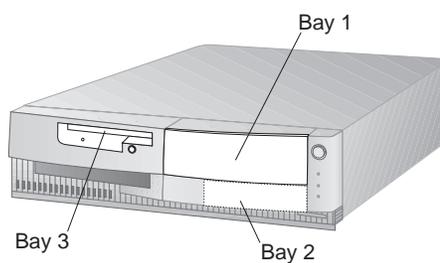
## Identifying Your Computer

In most instances, the best way to identify your computer is by the model/type number. The model/type number indicates the various features of the computer, such as the type of microprocessor or whether the computer is a desktop or minitower. You can find this number on the small label on the front of your computer. An example of a model/type number is *6282-54A*.

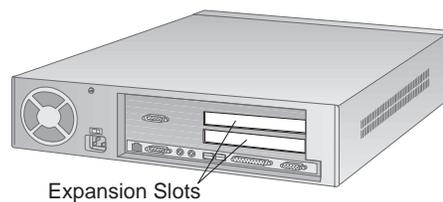
Throughout this book, however, your computer is identified by the number of drive bays offered with these models. If your computer has three drive bays, it is referred to as the 3-bay design. If your computer has four drive bays, it is referred to as the 4-bay design. These naming conventions are used only where it is appropriate. Instructions without these naming conventions apply to all computer models.

### 3-Bay Design

With the cover on, bay 2 in the 3-bay design is not visible. This bay is intended for a hard disk drive, which does not have accessible media such as a CD-ROM drive or diskette drive. The 3-bay design has two expansion slots for adapters, as shown in the rear view below.



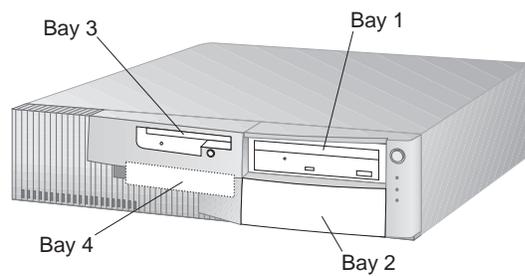
Front View



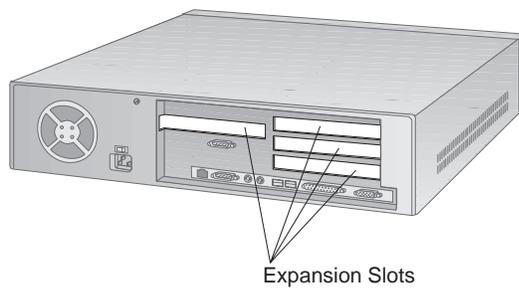
Rear View

## 4-Bay Design

With the cover on, bay 4 in the 4-bay design is not visible. This bay is intended for a hard disk drive, which does not have accessible media such as a CD-ROM drive or diskette drive. The 4-bay design has four expansion slots for adapters, as shown in the rear view below.



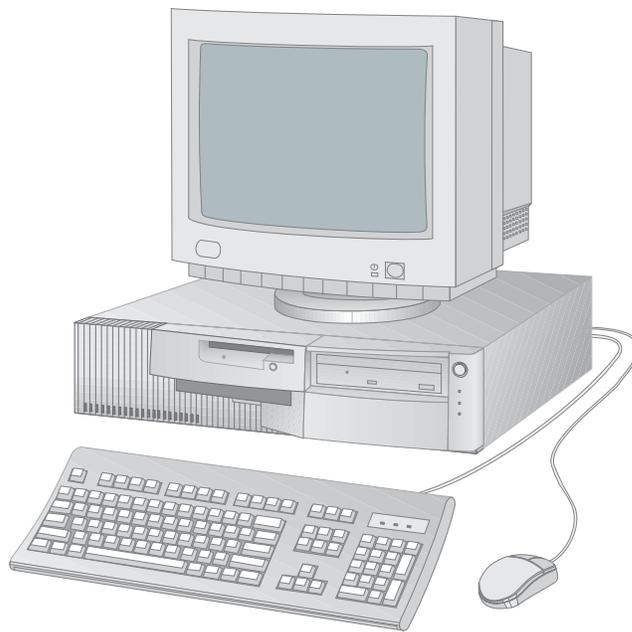
Front View



Rear View

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## Chapter 1. Your IBM Personal Computer



Thank you for selecting an IBM Personal Computer. Your computer incorporates many of the latest advances in personal computer technology and is easy to expand and upgrade as your needs change.

**Note:** Your computer might differ from the one shown above.

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## What Your IBM Personal Computer Offers

This section describes the major features of your computer.

### Microprocessor

At the core of your computer is an Intel Pentium microprocessor or an Intel Pentium microprocessor with MMX technology. With its advanced performance features, the microprocessor supplies the speed and power you need to take advantage of complex programs. In addition, the microprocessor with MMX technology improves the performance of multimedia and communications applications by accelerating calculations commonly performed for audio, video, speech synthesis and recognition, 2D and 3D graphics, and data communications.

Your computer supports microprocessor speeds of 100 MHz to 200 MHz<sup>1</sup>, and the system board is designed for microprocessor upgrades as they become available.

### System Memory

Your computer comes standard with either extended data out (EDO) dynamic random access memory (DRAM) or synchronous dynamic random access memory (SDRAM). Both EDO and SDRAM memory use advanced technology to increase system performance.

### L2 Cache

On the system board is 256 KB of level 2 (L2) cache, which helps speed the exchange of information between the microprocessor and system memory.

### Graphics Support

Your computer comes with a graphics subsystem integrated on the system board. The high-performance graphics are powered by the Cirrus Logic CL-GD5446 64-bit VisualMedia accelerator, which provides video playback. Also, your computer supports a maximum of 2 MB of video memory installed on the system board. Some computers come with the maximum amount of video memory preinstalled. If your computer comes with 1 MB of video memory, an optional 1 MB upgrade is available.

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<sup>1</sup> MHz denotes internal clock speed of the microprocessor only; other factors might also affect application performance.

## **Integrated Ethernet Subsystem**

Some models have an integrated 10Base-T, Ethernet controller and an RJ-45 connector that provide a high-performance network connection. The integrated Ethernet is a Plug and Play device that has built-in support for Wake on LAN and a viewable MAC (media access control) address for your computer. (See “System Management Settings” on page 64 for more information.) Device drivers for the Ethernet subsystem are provided on the *Ready-to-Configure CD* that comes with your computer. If your computer has IBM-preinstalled software, the device drivers are already installed on the hard disk drive. For instructions on connecting a network cable to your computer, refer to *Setting Up Your Personal Computer*.

## **System Management Features**

Your computer has features that make it possible for a network administrator to manage and control it remotely over a network. These features are:

- Enablement for LANClient Control Manager software
- Capable of using remote program load (RPL) and dynamic host configuration protocol (DHCP)
- Enablement for Wake on LAN
- Primary startup sequence and automatic power on startup sequence
- Enablement for POST/BIOS updates over a network
- Desktop Management Interface (DMI) BIOS and DMI software

For information on these features, refer to “Using System Management Features” on page 32 and “System Management Settings” on page 64.

## **Audio Support**

In some models, an audio adapter is preinstalled. The audio adapter is Sound Blaster compatible and provides a musical instrument digital interface (MIDI) for connecting optional game controls or electronic musical devices. Also, three ports are provided for connecting powered speakers, an audio input device such as a portable CD-ROM, and a microphone.

## **ISA Bus**

Your computer has an industry standard architecture (ISA) bus, which is one of the most widely used and successful input/output (I/O) buses available. The ISA bus is popular because so many adapters and devices have been designed and marketed for it.

## **PCI Bus**

Your computer also has a peripheral component interconnect (PCI) bus. PCI is an advanced bus standard designed to keep up with performance improvements of microprocessor buses and advanced peripheral devices. The PCI bus adds to the capability of the ISA bus, speeding up the exchange of information among the microprocessor and peripheral devices within your computer system.

## **Expansion with Adapters**

By installing adapters, you can expand the capabilities of your computer and take advantage of a variety of peripheral devices and applications. Your computer uses a riser card for connecting adapters to the ISA bus or PCI bus.

## **High-Capacity Hard Disk Drives**

Your computer comes with a hard disk drive that has an enhanced integrated drive electronics (EIDE) interface. The hard disk drive is a SMART (self-monitoring, analysis and reporting technology) drive capable of predicting potential problems. When used with the proper software applications, the SMART hard disk drive protects data and improves reliability.

## **CD-ROM Drive**

In some models, a CD-ROM drive is preinstalled. A CD-ROM (compact disc read-only memory) drive plays back or reads information from a CD providing quick access to large amounts of information. A compact disc can store more than 650 MB of data, such as the large files needed for audio, full-motion video, and animated graphics.

## **Parallel Port**

Your computer has one parallel port. The parallel port is most often used to communicate with a parallel printer, but it can also be used with other parallel devices.

The parallel port can operate in several different modes. The default mode for your computer is standard parallel port (SPP). However, your computer also supports the extended capabilities port/enhanced parallel port (ECP/EPP) modes. For more information, see “Changing Parallel Port Settings” on page 51.

## Serial Ports

Your computer has two standard, 16550-UART serial ports that can be used to connect devices such as modems and printers.

## Universal Serial Bus Ports

The Universal Serial Bus (USB) interface is based on a new technology that adds more diversity and capabilities to personal computers. Two USB connectors are provided so you can take advantage of new USB devices as they become available.

The USB interface incorporates Plug and Play technology which allows you to install devices that configure automatically. Also, you can install and remove devices without having to shut off your computer. In addition, an option called a *hub* enables you to plug in more than one device at a time. A hub converts a single USB connector into multiple ports where USB devices can be attached.

**Note:** Your computer does not support a keyboard or mouse attached to the USB port.

## Ease-of-Use Features

Using the computer is easier with features such as Plug and Play technology, diagnostic programs, and system management features.

Support for Plug and Play technology is built into the system board of your computer. This allows you to add Plug and Play adapters that are self-configuring, provided that the requested resources are not already in use. In most cases, Plug and Play technology eliminates having to manually configure a device by setting switches or jumpers or by setting ISA legacy resources.

If you have a problem with your computer, a diagnostic program called QAPLus/PRO helps determine if a hardware component is causing the problem. QAPLus/PRO and other operating system-specific diagnostic programs are included on the *Ready-to-Configure CD* that comes with your computer.

**Note:** Create the QAPLus/PRO diskette as soon as possible, so that you will be ready to diagnose a problem if one should occur.

If your computer is properly connected to a network, you can take advantage of advanced system management features, such as Wake on LAN, RPL, and DHCP. For more information, see "Using System Management Features" on page 32.

## Ergonomic Features

Your computer has ergonomic features which make it more comfortable to use. The power switch and indicator lights are located on the front panel for easy access and visibility. Also, you can easily change monitor settings to reduce or eliminate flicker and jitter, or you can adjust the angle of the keyboard to make typing more comfortable.

## IBM-Preinstalled Software

IBM-preinstalled software is provided with some computer models. This software includes an operating system, device drivers to support built-in features, and other support programs. Detailed information about this software is included in *About Your Software*, which is included with the preinstallation package.

## Supported Operating Systems

Your computer is designed to use a variety of operating systems in order to meet your particular needs. Computer models with IBM-preinstalled software use one of the following operating systems:

- Windows NT 4.0
- Windows 95

The following operating systems are also supported by your computer:

- IBM PC DOS
- IBM DOS 7.0
- Windows 3.1, 3.11
- Windows NT 3.51
- MS DOS 6.0, 6.2, 6.3
- OS/2 2.11, 3.0
- OS/2 Warp
- OS/2 Warp Connect 3.0, 4.0
- OS/2 LAN Server 2.0
- OS/2 LAN Server 3.0
- Windows for WorkGroups 3.11
- Novell Netware 3.12
- Novell Netware 4.1
- SCO OpenServer
- Solaris 2.5
- DEC PathWorks 5.1

**Note:** For a complete listing of operating systems certified for use with your computer, see <http://www.pc.ibm.com/cdt/index.html> for the online compatibility report.

## Advanced Power Management

Energy conservation is an important concern. Your computer has Advanced Power Management (APM) features that allow you to set different levels of energy conservation for specific components of your computer. You can view and change APM settings using the Configuration/Setup Utility program.

## Asset Security Features

### Important

For the latest information on IBM Personal Computer Asset Security features, refer to the following Internet page: <http://www.pc.ibm.com/asset>.

IBM provides a variety of computer security features for your computer. These security features help protect both your hardware and software. The following features are available:

- Power-on and administrator password protection
- Startup-sequence control
- Hard disk drive and diskette drive access control
- Enablement for updating the POST/BIOS over the network
- Cover lock (standard on most 4-bay models)
- U-bolt and security cabling (optional)
- Registration, tracking, and recovery
- Operating system security

**Password Protection:** Password protection is available to help you secure your computer. A power-on password protects your computer by locking the keyboard and mouse. There are three modes to choose from when using a power-on password. Also, you can use an administrator password to protect the configuration settings of your computer. For more information, see “Using Passwords” on page 53.

**Startup-Sequence Control:** You can control the primary startup sequence and automatic power on startup sequence of your computer. For more information see “Default Settings for the Startup Sequence” on page 68 and “Automatic Power On Startup Sequence” on page 69.

**Hard Disk Drive and Diskette Drive Access Control:** You can control access to the hard disk and diskette drives of your computer. To access the settings for these features, enter the Configuration/Setup Utility program and select System Security. For more information on using the Configuration/Setup Utility program, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 39.

**Updating the POST/BIOS Over the Network:** If your computer is properly configured, you can update the POST/BIOS settings over the network. For more information, see “Update POST/BIOS from Network” on page 69.

**Cover Lock and U-Bolt Cabling:** You can use the cover lock, which is standard on most 4-bay models, to secure the outside cover. The cover-lock keys are unique to your computer, and locksmiths are not authorized to duplicate them. If the keys are lost, you must order replacements from the key manufacturer. The key serial number and the address of the manufacturer are on a tag attached to the keys.

You can also use an optional U-bolt that enables you to secure your computer with a cable and lock.

**Registration, Tracking, and Recovery:** Registration of your computer and its serialized components is offered online via the Internet. You simply select the registration provider, fill out the online registration form, and then send the completed form to the provider through E-mail. The provider will send you confirmation and a sticker to apply to your computer. Your provider will offer online update registration service for five years.

**Operating System Security:** Some operating systems provide security features such as a keyboard and mouse lock-up feature. Refer to the operating system documentation for more information.

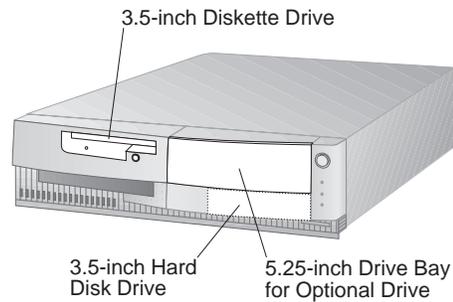
## **Service and Support**

You can obtain assistance for using your computer, as well as service, from a number of sources. Help is available by phone, fax, and modem. For detailed information, see Chapter 7, “Getting Help, Service, and Information” on page 109.

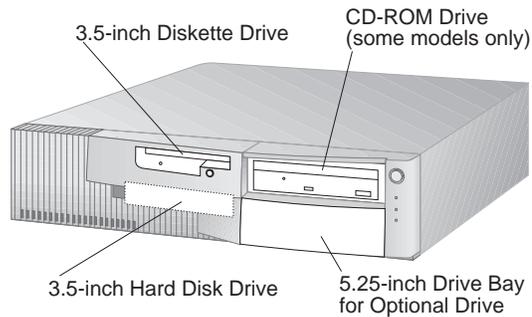
## Expandability

You can easily expand the capabilities of your computer by adding system memory, video memory, drives, or adapters.

**Drive Bays:** The 3-bay design has three drive bays, and the 4-bay design has four drive bays. The following illustrations show the locations of diskette, CD-ROM and hard disk drives. Unoccupied drive bays can be used for installing additional devices.

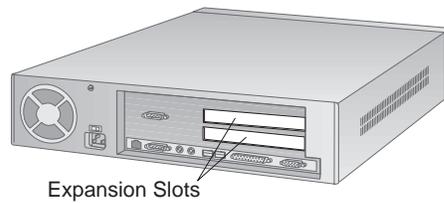


3-Bay Design

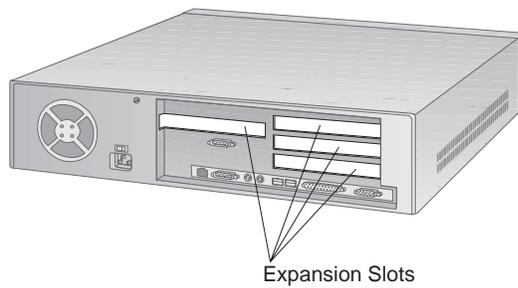


4-Bay Design

**Expansion Slots:** The 3-bay design has two expansion slots, and the 4-bay design has four expansion slots. The following illustrations show the locations of expansion slots by model. Any unoccupied slots can be used for installing optional adapters.



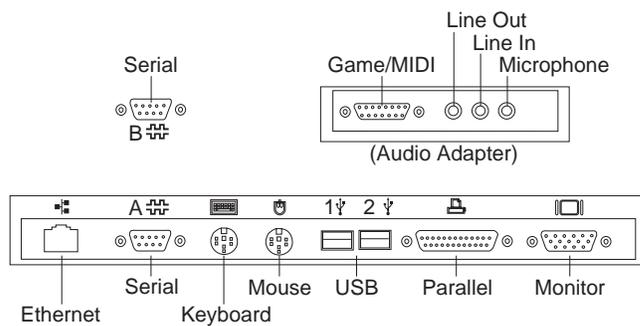
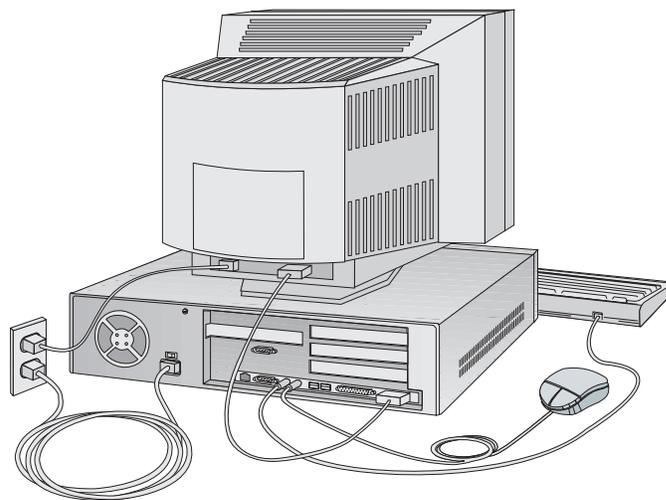
3-Bay Design



4-Bay Design

## External Connectors

The location of the external connectors for I/O devices varies by model. Models with an integrated Ethernet subsystem have an RJ-45 connector. Also, if an audio adapter is installed, connectors appear above the I/O panel in an expansion slot.



**Note:** Your computer might not have all the connectors shown.

---

## Features at a Glance

The following information summarizes the features that are available for both the 3-bay design and the 4-bay design. For a list of features specific to your computer, refer to the System Summary screen in the Configuration/Setup Utility program. For more information, see “Viewing the System Summary” on page 45.

---

### Mechanical Designs

- 3-Bay Design: Three drive bays, two expansion slots
- 4-Bay Design: Four drive bays, four expansion slots

### Microprocessor

- Intel Pentium microprocessor or Intel Pentium microprocessor with MMX technology
- System board supports speeds from 100 MHz to 200 MHz
- Upgrades supported

### Memory

- Maximum addressable: 128 MB
- Two 168-pin DIMM sockets, 3.3 V
- SDRAM or EDO DRAM modules

### Level 2 Cache

- 256 KB installed
- Upgradable to 512 KB

### Graphics

- Integrated CL-GD5446 64-bit VisualMedia accelerator
- 1 or 2 MB DRAM video memory preinstalled; 1 MB models upgradable to 2 MB

### Ethernet Subsystem (optional feature)

- 10Base-T connectivity
- RJ-45 connector
- Support for Wake on LAN

### Diskette Drives

- Standard: One 3.5-inch 1.44 MB drive
- Maximum: Two
- Options:
  - 5.25-inch 1.2 MB drive
  - 3.5-inch 1.44 MB or 2.88 MB drive

### Hard Disk Drives

- Standard: One PCI bus-master EIDE drive
- Maximum for the 3-bay design: Two
- Maximum for the 4-bay design: Three

### Expansion

- Riser card with ISA/PCI expansion slots
- Plug and Play support

### Input/Output Features

- ECP/EPP parallel port
- Two 16550-UART serial ports
- Two universal serial bus (USB) ports
- Monitor port
- Mouse (PS/2) port (mouse included)
- Keyboard port (keyboard included)
- Ethernet port (optional feature)

### Power

- 3-Bay Design: 85 W, 115/230 V ac, 50/60 Hz
- 4-Bay Design: 145 W, 115/230 V ac, 50/60 Hz
- Built-in overload and surge protection
- Advanced power management
- Wake on LAN enabled

### Asset Security Features

- Security features are provided for both the software and hardware of your computer. For more information, see “Asset Security Features” on page 7.

### System Management

- Enabled for LANClient Control Manager software
- Wake on LAN support
- Wake Up on Alarm
- Update POST/BIOS from the network
- DMI BIOS and DMI software

### IBM-Preinstalled Software

- Preinstalled in some models are an operating system, device drivers to support built-in features, and other support programs. See *About Your Software* for a detailed description of the preinstalled package.
- For information on supported operating systems, see “Supported Operating Systems” on page 6, or online at <http://www.pc.ibm.com/cdt/index.html>.

---

## System Specifications

The size, weight, and heat output specifications vary by model. The other system specifications apply to both the 3-bay design and the 4-bay design.

### Size

- 3-Bay Design
  - Depth: 400 mm (15.8 in.)
  - Height: 95 mm (3.7 in.)
  - Width: 369 mm (14.5 in.)
- 4-Bay Design
  - Depth: 420 mm (16.5 in.)
  - Height: 110 mm (4.3 in.)
  - Width: 440 mm (17.3 in.)

### Weight

- 3-Bay Design
  - Minimum configuration as shipped: 6.80 kg (15 lb)
  - Maximum configuration: 8.16 kg (18 lb)<sup>2</sup>
- 4-Bay Design
  - Minimum configuration as shipped: 9.07 kg (20 lb)
  - Maximum configuration: 11.3 kg (25 lb)<sup>2</sup>

---

<sup>2</sup> Maximum configuration weight depends on actual optional features installed. Figures shown are for a system fully populated with typical optional features.

## Heat Output

- 3-Bay Design
  - Approximate heat output in British thermal units (Btu) per hour:
    - Minimum configuration: 110 Btu (35 watts)<sup>3</sup>
    - Maximum configuration: 273 Btu (80 watts)<sup>4</sup>
- 4-Bay Design
  - Approximate heat output in British thermal units (Btu) per hour:
    - Minimum configuration: 120 Btu (35 watts)<sup>3</sup>
    - Maximum configuration: 685 Btu (200 watts)<sup>4</sup>

Heat output varies depending on the number and type of optional features installed and the power-management optional features in use.

## Environment

- Air temperature:
  - System on: 10° to 32°C (50° to 95°F)
  - System off: 10° to 43°C (50° to 110°F)
- Humidity:
  - System on: 8% to 80%
  - System off: 8% to 80%
- Maximum altitude: 2134 m (7000 ft)

---

<sup>3</sup> Minimum wattage for base models will comply with EnergyStar requirements.

<sup>4</sup> Maximum heat specifications are based on the maximum capacity of the system power supply, 85 watts for the 3-bay design and 145 watts for the 4-bay design.

### Electrical Input<sup>5</sup>

- Sine-wave input (50 to 60 Hz) is required
- Input voltage for the 3-bay design:
  - Low range:
    - Minimum: 100 V ac at 3 A
    - Maximum: 127 V ac at 3 A
    - Voltage switch setting: 115 or 115 V
  - High range:
    - Minimum: 200 V ac at 1.5 A
    - Maximum: 240 V ac at 1.5 A
    - Voltage switch setting: 230 or 230 V
  - Input kilovolt-amperes (kVA) (approximately):
    - Minimum configuration as shipped: 0.08 kVA
    - Maximum configuration: 0.30 kVA
- Input voltage for the 4-bay design:
  - Low range:
    - Minimum: 100 V ac at 5 A
    - Maximum: 127 V ac at 5 A
    - Voltage switch setting: 115 or 115 V
  - High range:
    - Minimum: 200 V ac at 3 A
    - Maximum: 240 V ac at 3 A
    - Voltage switch setting: 230 or 230 V
  - Input kilovolt-amperes (kVA) (approximately):
    - Minimum configuration as shipped: 0.08 kVA
    - Maximum configuration: 0.30 kVA

Power consumption varies depending on the number and type of optional features installed and the power-management optional features in use.

---

<sup>5</sup> Maximum power specifications are based on the maximum capacity of the system power supply, 85 watts for the 3-bay design and 145 watts for the 4-bay design.

## **Airflow**

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

## **Acoustical Noise-Emission Values**

- Average sound-pressure levels:
  - At operator position:
    - 38 dBA idle
    - 43 dBA operating
  - At bystander position-1 meter (3.3 ft):
    - 33 dBA idle
    - 37 dBA operating
- Declared (upper limit) sound power levels:
  - 4.8 bels idle
  - 5.1 bels operating

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. Arranging Your Workspace

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

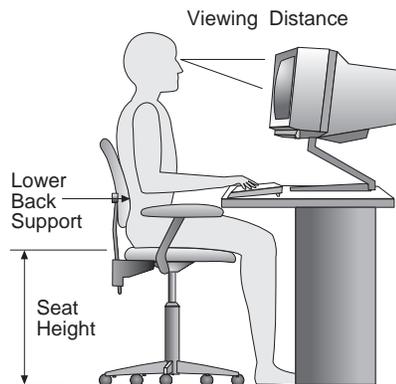
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### Comfort

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

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

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



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

---

## 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, when possible. Reduce overhead lighting, if necessary, by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight. You might have to adjust the Brightness and Contrast controls on the monitor as the room lighting changes throughout the day.

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

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

---

## Air Circulation

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

---

## Electrical Outlets and Cable Lengths

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

When arranging your workspace:

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

For more information about power cords, see “Power Cord Notice” on page 131.

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## Chapter 3. Operating Your Computer

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

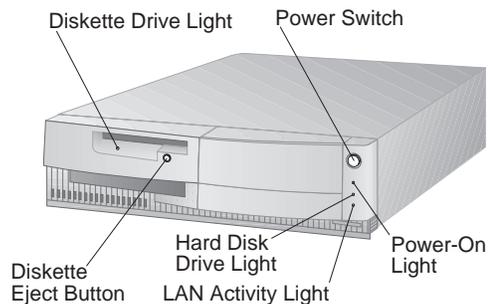
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### Recognizing Controls and Status Indicators

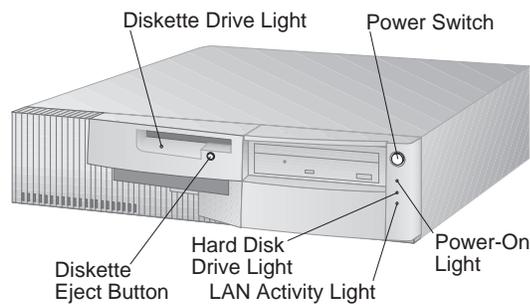
Look at the front of your computer. The buttons are controls that allow you to perform a specific function, such as powering on the computer. The lights are status indicators that tell you when a certain function is in use, such as the diskette drive.

**Note:** If your computer has a preinstalled CD-ROM drive, controls and status indicators are available. For more information, see “Using a CD-ROM Drive” on page 29.

The following illustrations show the controls and status indicators for both models.



3-Bay Design



#### 4-Bay Design

The following list explains the controls and status indicators located on the front of your computer.

- **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. Do not eject a diskette when the light is on.
- **Diskette Eject Button:** Push this button to release a diskette from the drive.
- **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.
- **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.
- **LAN Activity Light:** This light indicates network activity.

---

## Starting Your Computer

**Note:** If your computer is configured correctly, it can be started remotely over a network. For more information, see “Wake on LAN” on page 69.

1. Turn on all devices connected to the computer.
2. Press and release the power switch on your computer. This starts the computer, and the following actions occur:
  - a. The IBM logo appears centered on the screen.
  - b. The power-on self-test (POST) is performed. You can recognize this by looking for the increasing number in the upper-left corner of the screen. This number is the amount of memory being tested by POST. When the number stops, the memory is tested and POST is complete.

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, and see “Solving POST Problems” on page 74 and “POST Error Message Charts” on page 77 for more information. (If you do not hear a beep during POST, refer to “Troubleshooting Charts” on page 96. You might need to have your computer serviced.)

- c. The computer allows you to enter the Configuration/Setup Utility program (by pressing **F1**) or run a fast POST (by pressing **Esc**). These options are shown in the lower-left corner of the screen.
3. If the computer is not password protected, you hear a beep, and the first screen of the operating system or application program appears.<sup>6</sup>

If the computer is password protected, a prompt is displayed for entering either the power-on or administrator password. If both a power-on and an administrator password have been set, you must type either password at the password prompt. (Refer to “Using Passwords” on page 53 for instructions on setting and using passwords.) Type your password at the prompt and press **Enter**. The first screen of the operating system or application program appears.

---

<sup>6</sup> Models with integrated Ethernet have special factory settings that affect the primary startup sequence. If your model comes with integrated Ethernet, the computer tries to perform a remote program load (RPL) of the operating system. If RPL is unsuccessful, several messages might appear and then your computer loads the operating system from the hard disk drive. For more information on these factory settings, see “Network-Enabled Startup Sequence” on page 66. For information on the messages that might appear, see “Error Messages Specific to the Integrated Ethernet” on page 107.

---

## Shutting Down Your Computer

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

In some operating systems, you can set up the computer to automatically turn off after the operating system has shut down. If you have not selected this setting, you must manually turn off the computer by pressing and releasing the power switch.

### **Important**

If you plan to restart your computer, do not use **Ctrl+Alt+Del** while the operating system is running. Instead, follow the shutdown procedure for your operating system, turn off the computer by pressing and releasing the power switch, wait a few seconds until all the status-indicator lights are off, and then follow the procedures in “Starting Your Computer” on page 21.

---

## Using a Mouse

A *mouse* is a device that you use to point to and select objects on the monitor screen. The mouse that comes with your computer attaches with a cable to the mouse port on the back of the computer. For information on connecting the mouse, see *Setting Up Your Personal Computer*.

**Note:** Optional mouse devices might connect to the computer through a serial port. A mouse device cannot be connected through the USB port.

With a mouse, you can move the *pointer* on the screen. If you have never used a mouse before, it might feel a bit awkward at first. However, with a little practice, the mouse movements will seem natural.

To set up the mouse, place the mouse beside the keyboard on a flat surface or *mouse pad*. A mouse pad is a flat, smooth foam-rubber pad available at most computer stores. The mouse has a ball on the bottom, so working on a flat, smooth surface is important. Most operating systems allow you to configure the mouse buttons for either right-hand or left-hand operation. When a two-button mouse is configured for right-handed user, the left button is used for most tasks. When a two-button mouse is configured for a left-handed user, the right button is used for most tasks. For more information, see your operating system documentation.

To use the mouse, slide it from side to side and forward and backward over a flat surface. When you see an item that you want to select on the screen, simply move the pointer to that item (this is called *pointing*), and press and release either the left or right button on the mouse (this is called *clicking*).

To learn how to use the mouse with the software in your computer, see the documentation accompanying the software. Some programs support only one mouse button, others support two, and some support three. Despite the differences, some terms are fairly standard throughout the industry.

- |                     |  |
|---------------------|--|
| <b>Point</b>        | Move the mouse so the pointer is on the object you want.   |
| <b>Click</b>        | Press and release the mouse button once.   |
| <b>Double-click</b> | Rapidly press and release the mouse button twice.  |
| <b>Drag</b>         | Point to an object, press the mouse button, and hold it down as you move the mouse to relocate the object. |
| <b>Drop</b>         | After dragging an object to a new location, release the mouse button.                                      |

---

## Using a Diskette Drive

You can use 3.5-inch diskettes in the diskette drive of your computer. If you want to use 5.25-inch diskettes, you must install a 5.25-inch diskette drive. (Refer to *Installing Options in Your Personal Computer* for instructions on installing optional diskette drives.)

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

### Identifying Diskettes

The labeling on 3.5-inch diskettes is not consistent among manufacturers. Some diskettes are labeled with the letters *DD* or *HD* to identify the diskette type; other diskettes might not be labeled. However, the appearance of the lower-right corner of a 3.5-inch diskette always can be used to identify the diskette type, as shown in the following illustrations.



1 MB Double Density (DD)

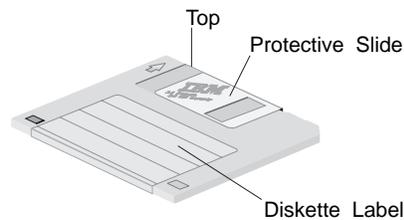


2 MB High Density (HD)

## Handling and Storing Diskettes

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

- Data is stored on the magnetic surface of the diskette. On 3.5-inch diskettes, this surface is protected by a plastic cover. If the cover is damaged, *do not* use the diskette. A damaged diskette might damage the diskette drive.
- A protective slide on the top of a 3.5-inch diskette covers part of the magnetic surface. The diskette drive moves this slide to read data from or write data to the diskette. *Do not* move this slide, because fingerprints and dust can cause loss of data.



- Never touch the magnetic disk itself.
- Keep diskettes away from magnets or devices that create a strong magnetic field, such as electric motors and generators. Diskettes are sensitive to magnets found in television sets, telephones, stereo speakers, and other such items. A magnetic field can erase the data on your diskettes. *Do not* set diskettes on the monitor or use magnets to attach notes to your computer.
- Do not store diskettes at high temperatures, low temperatures, or in direct sunlight. Temperatures ranging from 4° to 53°C (39° to 127°F) are acceptable for 3.5-inch diskettes. Keep diskettes away from heat. The plastic outer covering might warp, damaging the diskette.

## Labeling Diskettes

Before using a diskette, label it so that you can identify the data stored on it. Labels usually come in the package with the diskettes. Diskette labels can become a problem if you do not apply them correctly. Loose edges or an excessive buildup of labels can prevent the diskette from being inserted or ejected.

To prevent this problem, take the following precautions:

- Remove an old label before you apply a new one.
- Apply labels carefully to ensure that all edges are secure.
- Apply labels only to the front of diskettes. Do not place a label where it interferes with the protective slide or covers an opening in the protective diskette case.

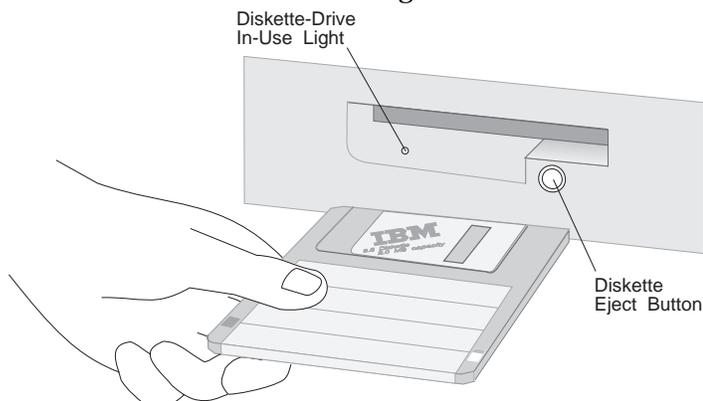
## Inserting and Removing Diskettes

### Important

Always make certain that the diskette drive is empty before inserting a diskette. If the diskette eject button is flush with the front of the computer, a diskette can be inserted. If the diskette eject button is not flush with the computer, a diskette is already inserted.

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. The diskette eject button pops out.

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.

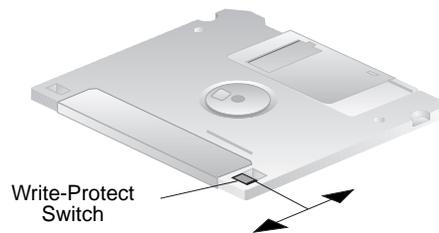


## Write Protecting Diskettes

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.

Most 3.5-inch diskettes have a write-protect switch that 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.

The write-protect switch is located on the back of 3.5-inch diskettes.



- 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.

## Formatting Diskettes

You can buy diskettes either formatted or unformatted. Formatted diskettes are ready to use; unformatted diskettes must be formatted by your operating system before you can use them. The format operation checks a diskette for defects and prepares it for storing data. If data is already stored on the diskette, the format operation writes over it, and the data is lost.

The operating system `FORMAT` command specifies how to format a specific type of diskette.

**Important**

Always format diskettes to their correct capacity. Failing to do so might cause unreliable results. Differences such as magnetic coatings, the thickness of the diskette material, and the recording technique used all affect the formatting operation. Refer to your operating-system documentation for detailed information on formatting diskettes.

The following table shows diskette types, their formatted capacities, and the drive type that can be used with each diskette.

3.5-Inch Diskette Type	Formatted Capacity	Drive Type
1 MB (MF2DD)	720 KB	1.44 MB
2 MB (MF2HD)	1.44 MB	1.44 MB

**Notes:**

1. MF2DD = Mini-floppy, two-sided, double density
2. MF2HD = Mini-floppy, two-sided, high density
3. If you are using DOS, use `FORMAT A: /F:720` to format a 1 MB diskette in a 1.44 MB drive.

## Copying Diskettes

If you are using DOS, you can copy one or more files to or from a diskette using the `COPY` command. Groups of files can be copied faster using the `XCOPY` command. Both `COPY` and `XCOPY` can copy files to different types of diskettes. For duplicating a diskette, use the `DISKCOPY` command. `DISKCOPY` requires that both the source diskette (the diskette you copy from) and the target diskette (the diskette you copy to) be the same type.

Refer to your operating-system documentation for more information on copying diskettes.

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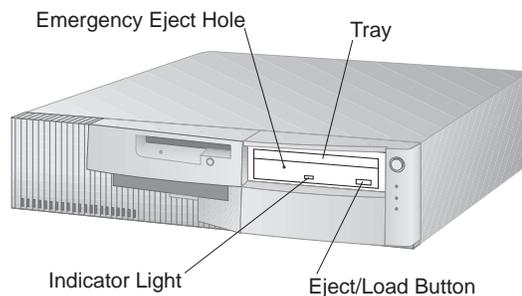
## Using a CD-ROM Drive

Some models have a preinstalled CD-ROM drive. CD-ROM (compact disc read-only memory) technology offers quick access to enormous amounts of information. A compact disc can store more than 650 MB of data, such as the large files needed for audio, still and full-motion video, and still and animated graphics. A CD-ROM drive can play back or read from a CD, but it 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.

The following illustration shows the controls and status indicator for a preinstalled CD-ROM drive.



**Note:** Your computer might differ from the one shown above.

## Handling a CD

When handling a CD, follow these guidelines:

- Hold the CD by its edges. Do not touch the surface.
- To remove dust or fingerprints, wipe the CD 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 CD.
- Do not drop or bend the CD.

## Loading a CD

To load a CD into the 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. If you have placed your computer in a vertical position using the optional floor stand, extend the two CD-retainer clips on the lower side of the CD-ROM drive tray to keep the CD in position as you open and close the drive.
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 CD.
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 above and to the left of the CD-ROM indicator light.

If you have installed a CD-ROM drive yourself and need additional information about the drive, refer to the documentation that comes with the CD-ROM drive.

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## Using Audio Features

If your computer comes with a preinstalled audio adapter, it is Sound Blaster compatible and capable of playing and recording sounds.

The device drivers for the preinstalled audio adapter are preinstalled on the hard disk drive. If you install this adapter as an option, use the device drivers on the *Ready-to-Configure CD*.

If you connect an optional device to the audio adapter, follow the manufacturer's instructions (device drivers might also be required). Contact the manufacturer for information on the necessary device drivers.

The following ports are available on the audio adapter:

- *Game/MIDI (musical instrument digital interface)* port for connecting a game control or a musical device such as an electronic keyboard.<sup>7</sup>
- *Line in* port for connecting musical devices such as a portable CD-ROM or stereo.
- *Line out* port for connecting powered speakers. Your audio system requires a set of speakers connected to the line output in order to hear audio from the adapter. These speakers must be powered (with a built-in amplifier). In general, any powered speakers designed for use with personal computers might be used with your audio adapter. These speakers are available with a wide range of features and power output.
- *Microphone in* for connecting a microphone.



---

<sup>7</sup> An electronic device connected to the Game/MIDI port might require an optional adapter cable. For more information, refer to the documentation that comes with the electronic device.

---

## Using System Management Features

This section is intended primarily for network administrators. It describes features of your computer that make it possible for a network administrator to remotely manage and control your computer.

The BIOS (basic input output system) of your computer supports an interface called Desktop Management Interface (DMI). DMI is a mechanism for gathering information about the hardware and software in your computer to enable network administrators to remotely monitor and control computers in a network environment. DMI can be used to remotely track many types of information about computers, including serial numbers, memory attributes, product-specific characteristics of installed peripherals, and operating system configuration information. This information can be accessed using a DMI browser. DMI browsers are provided by all major operating systems and all major LAN management packages, including TME 10 NetFinity, Intel LANDesk, and Microsoft SMS.

The Wake on LAN feature can be used by a network administrator to turn on your computer from a remote location. When Wake on LAN is used in conjunction with network management software, such as LANClient Control Manager and TME 10 NetFinity (provided on the *Ready-to-Configure CD* that comes with your computer), many types of functions, such as data transfers, software updates, and POST/BIOS flashes can be performed remotely on your computer and other Wake on LAN-enabled computers linked to your network. These functions can be done after hours and on weekends, which saves time and increases productivity since users are not interrupted during normal working hours. Refer to “Wake on LAN” on page 69 for further information.

Other features such as remote program load (RPL) and dynamic host configuration protocol (DHCP) also allow a network administrator to remotely control your computer. If you use remote program load in conjunction with LANClient Control Manager software, you can use a feature called Hybrid RPL. Using LANClient Control Manager, you set up your computer by installing hybrid images (or files) on the hard disk drive. Then, each time the computer starts from the network, LANClient Control Manager recognizes your computer as a Hybrid RPL client and a *bootstrap* program is downloaded to your computer. This bootstrap program is small and helps prevent network congestion. Working off the hybrid images, the bootstrap program initiates the startup process from the hard disk drive of your computer. An advantage to Hybrid RPL is that the network load associated with standard RPL is avoided. For more information on these two features, refer to “RPL and DHCP” on page 65.

---

## Updating the POST/BIOS

POST/BIOS is the basic layer of software built into every IBM computer. POST (power-on self-test) is a set of tests and procedures that is performed every time you turn on your computer. The BIOS (basic input output system) is a layer of software that translates instructions from other layers of software into electrical signals that the computer hardware can understand. Also included in the POST/BIOS is the Configuration/Setup Utility program, which enables you to view and change the configuration and setup of your computer.

In the past, the POST/BIOS was contained in a read-only memory (ROM) module on the system board. If you wanted to update POST routines, BIOS instructions, and the Configuration/Setup Utility program, you had to disassemble the computer and replace modules, or you had to replace the system board. Now, a module called *electrically erasable programmable read-only memory* (EEPROM, also referred to as *flash memory*) has replaced the ROM module on the system board. You can easily update POST information, the BIOS code, and the Configuration/Setup Utility program in your computer from an update diskette. This procedure is often referred to as *flashing the POST/BIOS*.

If your computer is properly connected to a network, you can update the POST/BIOS over the network. For further information, refer to “Update POST/BIOS from Network” on page 69.

As part of the continuing work to improve quality, IBM might make changes and enhancements to the POST/BIOS. When updates are released, they are available via download files on the World Wide Web (<http://www.pc.ibm.com>) or through the PC Company Bulletin Board Service (see “Using Electronic Support Services” on page 109). Instructions for using POST/BIOS updates will be available in a README file included in the download files.



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## Chapter 4. Taking Care of Your Computer

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

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### 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 will 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

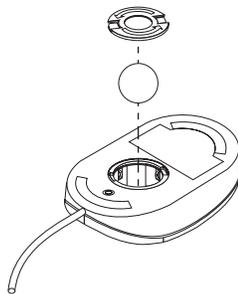
Do not use abrasive cleaners when cleaning the surface of the monitor screen. The screen surface is easily scratched, so avoid touching it with pens, pencil points, and erasers.

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.

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 and then let them dry.
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.

---

## Replacing the Battery

Your computer has a special type of memory that maintains the date, time, and the 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 vii of this publication and *Installing Options in Your Personal Computer* for information about replacing 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.

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## Moving Your Computer

### CAUTION:

- **Do not move your computer while it is on. Always turn off the computer before you move it.**
- **Do not risk injury by moving or lifting the computer by yourself. Ask another person to help you.**

Normal shipping and handling can cause loss of data from a hard disk. If your computer has a hard disk drive, take the following precautions:

1. Back up all files and data from the hard disk.

Operating systems can vary in the way they perform backup procedures. Some operating systems save only data files, while others make copies of application program files *and* data files. Refer to your operating system documentation for information about software backup.

2. Remove all media (diskettes, compact discs, tapes, and so on) from the drives.
3. Turn off the computer and all attached devices. Your hard disk drive automatically parks the read/write heads in a nondata area. This process prevents damage to the hard disk.
4. Unplug the power cords from electrical outlets.
5. Note where you have attached your cables to the rear of the computer; then remove them.
6. If you saved the original shipping cartons and packing materials, use them to pack the units. If you are using different cartons, cushion the units to avoid any damage.

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## Chapter 5. Using the Configuration/Setup Utility Program

This section discusses the Configuration/Setup Utility program that is provided with your computer. The Configuration/Setup Utility program enables you to view and change the configuration and setup of your computer, regardless of which operating system you are using.

### Important

Operating systems often provide a way of changing many of the same settings found in the Configuration/Setup Utility program. If you do use the operating system to make changes, be aware that these changes might conflict with or override any similar settings in the Configuration/Setup Utility program.

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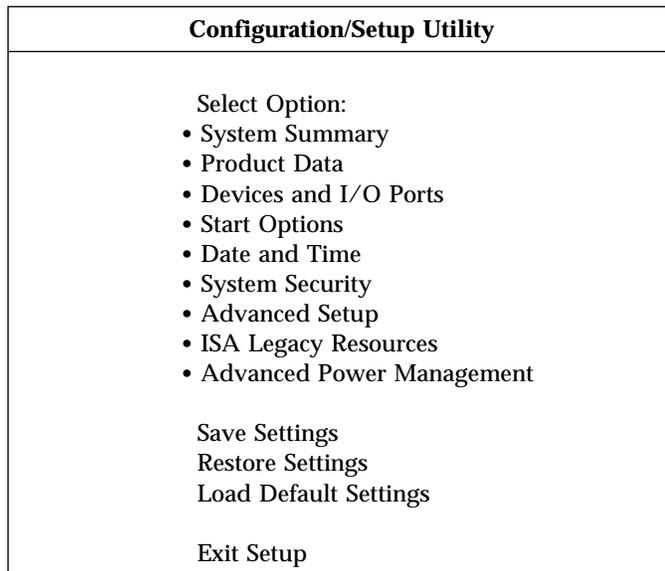
### Starting the Configuration/Setup Utility Program

1. Start the computer by following steps 1 and 2 on page 21.
2. When the Configuration/Setup Utility prompt appears in the lower-left corner of the screen, quickly press **F1**. If you have *not* set an administrator password, the Configuration/Setup Utility program menu appears.

If you have set an administrator password, a prompt appears on the screen. Type the administrator password, and press **Enter**.

If the computer is protected by both an administrator and power-on password, you can type either password at the prompt and press **Enter**. However, if you need to change settings in the Configuration/Setup Utility program, you must enter the administrator password. Entering the power-on password will only enable you to *view* the **System Summary** and **Product Data** information of your computer.

After you start the Configuration/Setup Utility program, the following menu appears.



The following is a list of the categories that appear in the preceding menu. After each category are the actions you can take within each one.

- **System Summary**

You can view information about the current options and features in your computer. Included in the system summary is information about the microprocessor, memory, video controller, and diskette and hard disk drives.

- **Product Data**

You can view information about the machine type and model, flash EEPROM revision level, system-board identifier, system serial number, and BIOS date.

- **Devices and I/O Ports**

You can view and change settings for devices and I/O ports, including video, IDE drive, serial port, parallel port, and Ethernet settings.

- **Start Options**

You can view and change settings for device startup sequence, keyboard speed, virus detection, various power-on options, and other features of your computer.

- **Date and Time**

You can view and change the date and time of the internal clock in your computer.

- **System Security**

You can view and change settings that control access to the hard disk and diskette drives. You can also set, change, and delete power-on and administrator passwords.

- **Advanced Setup**

You can view and change settings for advanced hardware features, including ROM shadowing and microprocessor, memory, and PCI control. If the settings in Advanced Setup are not configured correctly, your computer might malfunction.

- **ISA Legacy Resources**

You can view and change system resources (DMA, interrupt, memory, and I/O port) used by ISA legacy adapters.

- **Advanced Power Management**

You can view and change settings that affect the energy-saving features of your computer, including the automatic power-on feature.

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## Viewing and Changing Settings in the Configuration/Setup Utility Program

You must use the keyboard to navigate through the different menus of the Configuration/Setup Utility program. Active keys for each menu are always displayed at the bottom of each screen. The following table shows the functions of the available keys.

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Keys	Function
↑ ↓	Use these arrow keys to move between menu items until the item you want is highlighted.
← →	Use these arrow keys to display and toggle between choices for a menu item.
<b>Enter</b>	Press this key to select a highlighted menu item.
<b>Esc</b>	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.
<b>0-9</b>	Use these number keys in some menus to change the numerical value of a setting.
<b>F1</b>	Press this key for help on a selected menu item.
<b>F9</b>	Press this key if you changed a setting and you want to restore the setting that was active before you made the change.
<b>F10</b>	Press this key to return the setting of a selected menu item to a default value.

---

The Configuration/Setup Utility program uses the following symbols to assist you with viewing and changing settings.

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Symbol	Meaning
•	An additional menu is available.
[ ]	You can only change settings within these brackets.
▶	A change has been made or the Configuration/Setup Utility program 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. Resolve this conflict before exiting from the Configuration/Setup Utility program so that your computer will function properly.

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## Exiting from the Configuration/Setup Utility Program

When you finish viewing or changing settings in the Configuration/Setup Utility program, follow these steps to exit from the program:

1. Press **Esc** until you return to the Configuration/Setup Utility program menu.
2. Do one of the following:
  - a. To restore the settings before they were changed and saved, select **Restore Settings**.
  - b. To load the default values for all settings, select **Load Default Settings**.<sup>8</sup>
  - c. To save any changed settings (including restored settings or default settings), select **Save Settings**. If you do not save settings here, you are given the opportunity to do so in the Exit Setup menu.
3. Press **Esc** to enter the Exit Setup menu and follow the instructions on the screen.

---

<sup>8</sup> If you are a network administrator using RPL or DHCP in conjunction with network-management software, read "Network-Enabled Startup Sequence" on page 66 before loading the default settings.

---

## Saving Settings After Installing an Option

In most cases, when you add or remove hardware from your computer, the BIOS (basic input/output system) detects the changes and then updates the configuration automatically. Although the computer changes the configuration settings automatically, you must *save* these changes in the Configuration/Setup Utility program for the new configuration to take effect. If you do not save the new settings, your operating system will not start.

To save the configuration after adding or removing hardware, complete the following steps.

1. When you turn on the computer, an error message indicating that a configuration change has occurred appears approximately 30 seconds after the memory count numbers stop cycling in the upper-left corner of the screen. When the configuration error message disappears, the POST Startup Errors screen appears, and you are prompted to **Continue** or **Exit Setup**. Select **Continue**. (If you select **Exit Setup**, you will get another error message.)
2. The Configuration/Setup Utility program menu appears with a right arrowhead (▶) next to the menu category in which the configuration change has occurred. Select this menu item if you want to view the new configuration settings, and then press **Esc** to return to the Configuration/Setup Utility program menu.
3. Select **Save Settings** from the Configuration/Setup Utility program menu.
4. Press **Esc** to exit the Configuration/Setup Utility program, and follow the instructions on the screen.

---

## Viewing the System Summary

You can use the Configuration/Setup Utility program to view a summary of the options and features in your computer. To view the system summary:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **System Summary** from the Configuration/Setup Utility program menu. The System Summary screen appears.

Depending on the model and configuration, your screen might appear slightly different from the one shown here.

System Summary	
Processor	Pentium
Processor Speed	166 MHz
Math Coprocessor	Internal
System Memory	640 KB
Extended Memory	31 MB
Video Controller	Cirrus Logic GD-5446 SVGA
Cache Size	256 KB
Cache State	Enabled
Shadow RAM	384 KB
System ROM	F000h - FFFFh
Memory Type	Non-parity
Diskette Drive A:	1.44 MB, 3.5"
Diskette Drive B:	Not Installed
Hard Disk Drive 0	1.2 GB
CD-ROM Drive 1	Installed
Hard Disk Drive 2	Not installed
Hard Disk Drive 3	Not installed

---

## Setting the Date and Time

Your computer has an internal clock that maintains the date and time. A battery keeps the clock active when you turn off the computer.

To set the date and time:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **Date and Time** from the Configuration/Setup Utility program menu.
3. Type the date and time in the appropriate fields.
4. Press **Esc** to return to the Configuration/Setup Utility program menu.
5. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu and press **Enter**.
6. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

Your operating system might also have a function for setting the date and time. Refer to your operating system documentation for more information.

---

## Changing Keyboard Speed

You can change the speed at which the keyboard responds when you hold down a key. The normal *typematic rate* is 10 characters per second, but you can use the Configuration/Setup Utility program to increase this rate to up to 30 characters per second.

To change the keyboard speed:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **Start Options** from the Configuration/Setup Utility program menu.
3. Set **Keyboard Speed** to **Normal** or **Fast**. Use Left Arrow (←) or Right Arrow (→) to toggle between selections.
4. Press **Esc** to return to the Configuration/Setup Utility program menu.
5. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
6. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

---

## Changing Monitor Settings

Your computer has a graphics controller. SVGA is a video standard for displaying text and graphic images on a monitor screen. Like other video standards, SVGA supports a variety of *video modes*. Video modes are different combinations of resolution, refresh rate, and color defined by a video standard for displaying text or graphics.

SVGA provides higher-resolution graphics, faster refresh rates, and more colors than previous video standards, such as video graphics array (VGA). At the same time, SVGA supports all standard VGA modes.

To get the best possible image on your screen and to reduce or eliminate flicker, you might need to reset the resolution and refresh rate of your monitor. Refer to your operating system documentation for further information on monitor settings.

### Important

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 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 graphics controller can support. If you are not sure if your monitor is DDC-compliant, refer to the documentation provided with the monitor.

To change the monitor settings, select **Devices and I/O Ports** and then **Video Setup** from the Configuration/Setup Utility program menu.

The following modes are supported by your computer.

Resolution (Pels)	Bits per Pixel	Refresh Rates (Hz)	Memory Required (MB)
640 x 480	8/15/16	60, 72, 75, 85	1
640 x 480	32	60, 72, 75, 85	2
800 x 600	8/15/16	60, 72, 75, 85	1
800 x 600	32	60, 72, 75, 85	2
1024 x 768	8	43i, 60, 70, 72, 75, 85	1
1024 x 768	15/16	43i, 60, 70, 72, 75	2
1280 x 1024	8	45i, 60, 72, 75	2
1600 x 1200	8	49i	2

**Notes:**

1. 43, 45, and 49 Hz are interlaced (i); all other refresh rates shown are noninterlaced.
2. If 2 MB of memory is required for the video mode, an optional 1 MB of memory must be installed in the system board.

Some application programs require *video device drivers* to use SVGA modes. If your computer has IBM-preinstalled software, the video device drivers are included and instructions are provided online. If your software is not preinstalled, the video device drivers are on the *Ready-to-Configure CD*.

Some application programs provide their own video device drivers to take advantage of SVGA modes. These device drivers are installed through a setup program built into the application program. Setting up these applications to operate in SVGA modes might be confusing because terminology for these modes is not consistent throughout the industry. If you are uncertain about the terminology used by your application program, refer to the documentation that comes with the application for additional information.

## Software Compatibility

The graphics controller can display application programs written for any of the following video modes. Monochrome graphics adapter (MGA), color graphics adapter (CGA), enhanced graphics adapter (EGA), multicolor graphics array (MCGA), and video graphics array (VGA) are all video standards used with earlier personal computers.

<b>Video Standard</b>	<b>Monitor Resolution</b>	<b>Colors (1 MB DRAM)</b>
MGA	720 x 350	—
CGA	320 x 200	4
EGA	640 x 350	16
MCGA	320 x 200	256
	640 x 480	2
VGA	640 x 480	16

---

## Changing Serial Port Settings

If you add a serial adapter or use special hardware or software that causes a configuration conflict, you might need to change the serial port settings. The serial port can use any of the following settings:

- The four available port addresses are (in hex): 3F8, 2F8, 3E8, 2E8.
- The two *recommended* IRQ assignments are: IRQ 4 and IRQ 3. You can also use IRQ 9, IRQ 10, IRQ 11, IRQ 14, and IRQ 15, but these settings might not work with some operating systems and applications.

To change the serial port settings:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **Devices and I/O Ports** from the Configuration/Setup Utility program menu.
3. Select **Serial Port Setup**.
4. Use the arrow keys to select the settings for **Serial Port A Address** or **Serial Port A IRQ**.
5. Press **Esc** to return to the Configuration/Setup Utility program menu.
6. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
7. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

**Note:** For more information on the serial ports, see *Understanding Your Personal Computer*.

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## Changing Parallel Port Settings

If you add a parallel adapter or use special hardware or software that causes a configuration conflict, you might need to change the parallel port settings.

The parallel port can operate in several different modes. The default mode for your computer is SPP (standard parallel port). However, your computer also supports the ECP/EPP (extended capabilities port/enhanced parallel port) mode. ECP/EPP has two advantages over SPP. When your computer is in ECP/EPP mode, you can print documents faster than when the computer is in SPP mode, and you can attach devices other than printers, such as communication and storage devices, to the parallel port. You can set modes of operation for the parallel port using the Configuration/Setup Utility program.

The parallel port can use any of the following settings:

- The three available port addresses are (in hex): 3BC, 378, and 278.
- The two available IRQ assignments are: IRQ 7 and IRQ 5.

To change the parallel port settings:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **Devices and I/O Ports** from the Configuration/Setup Utility program menu.
3. Select **Parallel Port Setup**.
4. Use the arrow keys to select the settings.
5. Press **Esc** to return to the Configuration/Setup Utility program menu.
6. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
7. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

**Note:** For more information on the parallel port, see *Understanding Your Personal Computer*.

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## Changing Plug and Play Control Features

If you are installing a Plug and Play adapter or other device and experience problems, you might need to change certain settings in Plug and Play Control in the Configuration/Setup Utility program.

**Note:** If you experience any error message related to Plug and Play adapters or devices, see “POST Error Message Charts” on page 77 for complete information on solving the problem.

A setting that might affect the way a Plug and Play adapter behaves is the Address Decode setting. Most Plug and Play adapters use 16-bit address decoding (this is the default setting for Address Decode.). Some Plug and Play adapters have not fully implemented this addressing scheme. If you are experiencing problems with a Plug and Play adapter, changing the address decoding to **10-bit** might fix the problem. Conversely, if you are experiencing an 1852 error message, changing the address decode setting to **16-bit** might fix the problem.

Another setting that affects any type of Plug and Play device is the Plug and Play Operating System setting. If you install a Plug and Play adapter or device and experience a 185x error messages, and your computer will be loading a Plug and Play-compliant operating system, set this value to **Yes**.

**Note:** Check your operating system documentation to determine if it supports this function.

The 185x error messages occur because the computer is unable to configure all adapters and devices in the system due to conflicting resource assignments. Selecting **Yes** allows the configuration of Plug and Play devices to be performed by the operating system.

To change Plug and Play control settings, select **Advanced Setup** and then **Plug and Play Control**. The next menu displays **Address Decode** and **Plug and Play Operating System**.

---

## Using Passwords

Two types of password protection are available to help you secure your computer and the information you store in it. The *power-on* password feature deters unauthorized persons from gaining access to the information stored in your computer. The *administrator password* feature helps prevent unauthorized persons from accessing the Configuration/Setup Utility program and changing the setup of your computer. If you are responsible for maintaining the settings of several computers, you might want to set an administrator password.

Other password security features might be available through your operating system or network.

### Power-On Password

You do not need a power-on password to use your computer, but setting this type of password deters unauthorized persons from using your computer. When a power-on password is set, you must type the password at the password prompt that appears as the computer starts.

When you set the power-on password, you can choose one of three password prompt modes:

- On** In On mode, you are prompted for the power-on password when you turn on the computer. Until the correct password is entered, the computer will not run the CONFIG.SYS or AUTOEXEC.BAT<sup>9</sup> instructions, the operating system will not start, and the keyboard will remain locked. If you have a mouse connected to the mouse port, it also 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.
- Off** In Off mode (also 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 run the CONFIG.SYS and AUTOEXEC.BAT instructions and start the operating system. However, if you have a mouse connected to the mouse port, refer to the following text box.

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<sup>9</sup> CONFIG.SYS and AUTOEXEC.BAT do not exist with some operating systems, such as Windows NT.

### Important Information for Mouse Users

This information applies only to those who have a mouse connected to the mouse port; a serial mouse is not affected by the Off mode.

The Off mode prevents the computer from detecting that a mouse is attached. Because the mouse device driver will not be loaded automatically through the CONFIG.SYS or AUTOEXEC.BAT files in this mode, an error message that the mouse port is disabled will appear and the computer will halt. To enable the operating system to load without displaying the error message, read the information below that applies to your operating system.

If you are using OS/2, do one of the following before enabling the Off mode:

- Set the CONFIG.SYS file so the operating system does not stop on a device-driver error. To do this, put the command "PAUSEONERROR=NO" near the top of the CONFIG.SYS file.

or

- Remove the mouse driver statement from the CONFIG.SYS file.

If you are using Windows 95, do the following:

- When the computer is started and the mouse port disabled error message appears, enter either your power-on or administrator password to enable the keyboard. Then use the keyboard to put a checkmark in the "Do not display this message in the future" checkbox.

Once the operating system starts in the Off mode, the keyboard will remain locked. If you have a mouse connected to the mouse port, it also will remain locked.

Although you are not prompted to type a password in this mode, you can type either your power-on or administrator password anytime after POST has completed, even after the operating system has loaded. If you type a password, the keyboard will unlock, but the mouse connected to the mouse port will remain disabled.

The Off mode is useful for network servers and other computers that operate unattended. If a power failure occurs, the computer will automatically restart and resume operating in this mode when power is restored, without operator intervention.

**Dual** In 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, timer, or Wake on LAN.

If you start the computer by using the power switch, the computer operates the same as it does in the On mode. Refer to page 53 for further 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 Off mode. Refer to page 53 for further information.

**Note:** Even though the mouse and keyboard are not active, the system can still be managed remotely by network management software, such as TME 10 NetFinity or Intel LANDesk.

If both a power-on and administrator password are set, you can type either of the passwords at the password prompt that appears as you *start your computer*. However, if you want to change any settings in the Configuration/Setup Utility program, you must type your administrator password at the password prompt that appears when you *try to access the Configuration/Setup Utility program*. If you type your power-on password at this prompt, 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 keyboard and mouse will unlock, and the computer will begin normal operation.

**Setting and Changing a Power-On Password:** Use the Configuration/Setup Utility program to set or change a power-on password. You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for this password.

**Important**

Keep a record of your power-on password in a secure place. When a power-on password has been set, you cannot activate the keyboard and mouse without first using the password. 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. Refer to “Erasing Lost or Forgotten Passwords” on page 60 for further information.

To set or change a power-on password:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **System Security** from the Configuration/Setup Utility program menu.
3. Select **Power-on Password**.
4. Type your password and press Down Arrow (↓).
5. Type your password again.
6. At **Password Prompt**, select **On**, **Off**, or **Dual**. Press Left Arrow (←) or Right Arrow (→) to toggle between selections.
7. Select **Change Power-on Password**, and follow the instructions on the screen.
8. The System Security menu appears. Press **Esc** to return to the Configuration/Setup Utility program menu.
9. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
10. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

**Deleting a Power-On Password:** Use the Configuration/Setup Utility program to delete a power-on password.

To delete a power-on password:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **System Security** from the Configuration/Setup Utility program menu.
3. Select **Power-on Password**.
4. Select **Delete Power-on Password** and follow the instructions on the screen.
5. The System Security screen appears. Press **Esc** to return to the Configuration/Setup Utility program menu.
6. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
7. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

## Administrator Password

Setting an administrator password deters unauthorized persons from changing settings in the Configuration/Setup Utility program. When an administrator password is set, you can change settings in the Configuration/Setup Utility program only after typing the administrator password at the password prompt that appears when you try to access the Configuration/Setup Utility program.

If you are responsible for maintaining the settings of several computers, you might want to set an administrator password.

When you set an administrator password, a password prompt appears each time you try to access the Configuration/Setup Utility program. 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 Configuration/Setup Utility program menu appears.

If both a power-on and administrator password are set, you can type either of the passwords at the password prompt *that appears as you start your computer*. However, if you want to change any settings in the Configuration/Setup Utility program, you must type your administrator password at the password prompt *that appears when you try to access the Configuration/Setup Utility program*. If you type your power-on password at this prompt, you will be able to view limited information in the Configuration/Setup Utility program, but you will not be able to change any settings.

**Setting and Changing an Administrator Password:** Use the Configuration/Setup Utility program to set or change an administrator password. You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the password.

**Important**

Keep a record of your administrator password in a secure place. When an administrator password has been set, you cannot access the Configuration/Setup Utility program without first using the administrator password. 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. Refer to “Erasing Lost or Forgotten Passwords” on page 60 for further information.

To set or change an administrator password:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **System Security** from the Configuration/Setup Utility program menu.
3. Select **Administrator Password**.
4. Type your password and press Down Arrow (↓).
5. 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**, the user will be able to change the power-on password if an administrator password is set. If you select **No**, the user will not be able to change the power-on password if an administrator password is set.)
7. Select **Set or Change Administrator Password** and follow the instructions on the screen.
8. The Administrator Password menu appears. Press **Esc** twice to return to the Configuration/Setup Utility program menu.
9. Before you exit from the Configuration/Setup Utility program, select **Save Settings** from the Configuration/Setup Utility program menu.
10. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

**Deleting an Administrator Password:** Use the Configuration/Setup Utility program to delete an administrator password.

To delete an administrator password:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **System Security** from the Configuration/Setup Utility program menu.
3. Select **Administrator Password**.
4. Select **Delete Administrator Password** and follow the instructions on the screen.
5. The System Security screen appears. Press **Esc** to return to the Configuration/Setup Utility program menu.
6. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
7. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

## Erasing Lost or Forgotten Passwords

To erase a lost or forgotten power-on or administrator password, you must remove the computer cover and move the CMOS-clear jumper (also referred to as the *password jumper*) on the system board. See *Installing Options in Your Personal Computer* for instructions on removing the computer cover and moving jumpers. Refer to the system board label inside the computer cover for the location of the CMOS-clear (password) jumper.

### Important

If you move the CMOS-clear jumper, the Configuration/Setup Utility program will load the default settings. You will need to reconfigure the computer. Use the Configuration/Setup Utility program to reconfigure the computer and to set a new password.

If your model has integrated Ethernet support, note that erasing the computer configuration erases special factory settings for the primary startup sequence. For more information on these settings, see “Network-Enabled Startup Sequence” on page 66.

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## Using Advanced Power Management Features

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

### Important

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).

## Automatic Hardware Power Management Features

With Automatic Hardware Power Management, you can have the computer, microprocessor, and monitor (if the monitor supports DPMS) go into reduced-power states if they are inactive for a certain length of time.

There are three levels of power management. For each level, you can specify the amount of time that the computer must be inactive before the power management options you select begin to take effect. For Level 1, you can select 5 minutes to 4 hours; for Level 2, you can select 10 minutes to 5 hours; and for Level 3, you can select 15 minutes to 6 hours. At each level, you can define the amount of energy savings by specifying values for the following options.

- **System Power:** With this option, you can select **On** if you want the computer to remain on, or **Off** if you want the computer to shut down.
- **Processor Speed:** With this option, you can set your microprocessor to run at 1, 10, 25, or 50 percent of its internal clock speed, or you can disable the microprocessor entirely. Any computer activity returns the microprocessor to full speed.

- **Display:** With this option, you can disable the monitor entirely, or 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.
- **Hard Disk Drive:** With this option, you can enable the hard disk drive to “spin down” (shut down the drive motor) after about 20 minutes of inactivity on the drive. When you attempt to read from or write to the hard disk, the spindle starts back up within a few seconds.

**Setting Automatic Hardware Power Management Features:** To set Automatic Hardware Power Management features, complete the following steps.

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **Advanced Power Management** from the Configuration/Setup Utility program menu.
3. Be sure **APM BIOS Mode** is set to **Enabled**. If it is not, press Left Arrow (←) or Right Arrow (→) to change the setting.
4. Select **Automatic Hardware Power Management**.
5. Set **Automatic Hardware Power Management** to **Enabled**.
6. Select values for the three levels of power management (system power, processor speed, and display), as necessary.
7. Set **Hard Disk** to **Enabled** or **Disabled**.
8. Press **Esc** twice to return to the Configuration/Setup Utility program menu.
9. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
10. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

## Automatic Power On Features

The Automatic Power On features within the Advanced Power Management menu allow you to enable and disable features that turn your computer on automatically.

- **Serial Port/Modem Ring Detect:** Set this feature to **Enabled** to allow your system to power on when a ring is detected on an internal modem or on a modem connected to a serial port.
- **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 or a daily event.
- **Wake on LAN:** If your computer has a properly configured Ethernet LAN connection and you have network-management software, you can use the IBM-developed Wake on LAN feature. When you set Wake on LAN to **Enabled**, your computer will turn on when it receives a specific signal from another computer over the LAN. For more information, see “Wake on LAN” on page 69.

**Setting Automatic Power On Features:** To set Automatic Power On features, complete the following steps.

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **Advanced Power Management** from the Configuration/Setup Utility program menu.
3. Select **Automatic Power On**.
4. Select the menu item for which you want to view or change settings. Use Left Arrow (←) or Right Arrow (→) to toggle between selections.
5. Press **Esc** twice to return to the Configuration/Setup Utility program menu.
6. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
7. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

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## System Management Settings

This section, which describes how to configure the network interface in your computer, is intended primarily for network administrators. For further information on the system management capabilities of your computer, refer to “Using System Management Features” on page 32.

The Configuration/Setup Utility program includes settings that can be enabled and disabled to configure the network interface in your computer. These settings are:

- Ethernet support
- Remote program load (RPL) and dynamic host configuration protocol (DHCP)
- Automatic power on startup sequence
- Wake on LAN
- Update POST/BIOS from network

If you have an integrated Ethernet subsystem, you can also view the media access control (MAC) address for your computer in the Configuration/Setup Utility program. To access the MAC address, select **Devices and I/O Ports** from the Configuration/Setup Utility program menu, and then select **Ethernet Setup**. You can view but not change the MAC address setting.

Instructions for accessing the other system management settings in the Configuration/Setup Utility program follow.

### Ethernet Support

This setting is used to enable or disable the integrated Ethernet controller in your computer. The setting is enabled by default.

If you do not use the integrated Ethernet, disable the Ethernet Support setting. By doing this, you free up system resources that can be used for optional adapters.

To access the Ethernet Support setting, select **Devices and I/O Ports** and then **Ethernet Setup** from the Configuration/Setup Utility program menu.

**Note:** The serial number for the system board integrated Ethernet is 10000000. You might need this information if you install optional network adapters.

## RPL and DHCP

Remote program load (RPL) enables your computer to start directly from a server over a LAN that has been configured for RPL. Network-management software, such as LANClient Control Manager, is required to take advantage of RPL.

Dynamic host configuration protocol (DHCP) makes it possible for a DHCP server on your intranet<sup>10</sup> to assign an internet protocol (IP) address to your computer so that a boot image can be remotely loaded. DHCP can be used by network-management software such as Intel LANDesk Configuration Manager.

Models with an integrated Ethernet subsystem are enabled to use RPL and DHCP as selected through the Configuration/Setup Utility program. A model without the integrated Ethernet can also use these features, but only if it is equipped with an optional network adapter that has built-in read-only memory (ROM) support for RPL or DHCP. See the documentation that comes with the optional adapter for more information.

If you install an optional network adapter with those models that have integrated Ethernet, disable **Ethernet Support** if you want to use the RPL or DHCP features of the optional adapter. See “Ethernet Support” on page 64 for information on disabling the integrated Ethernet subsystem.

To enable or disable RPL or DHCP, complete the following steps:

1. Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 39).
2. Select **Devices and I/O Ports** from the Configuration/Setup Utility program menu, and then select **Ethernet Setup**.
3. Set **Ethernet Support** to **Enabled**.
4. Under **Network Boot**, use the arrow keys to select **RPL** or **DHCP**. (Select **Disabled** if you do not want to start an operating system from the network.)
5. Press **Esc** until you return to the Configuration/Setup Utility program menu.
6. Select **Start Options**, and then select **Startup Sequence**. You must include the **Network** setting somewhere in your startup sequence.

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<sup>10</sup> An intranet is a network within an organization that provides services similar to those provided by the Internet, but that is not necessarily connected to the Internet.

7. Refer to “Exiting from the Configuration/Setup Utility Program” on page 43 for instructions on saving your settings and exiting from the Configuration/Setup Utility program.

**Note:** When you are using the RPL and DHCP features, you might encounter error messages specific to the integrated Ethernet subsystem. If this happens, record the error message and report the problem to your network administrator. Also, information about these error messages is documented in “Error Messages Specific to the Integrated Ethernet” on page 107.

**Network-Enabled Startup Sequence:** If your computer is equipped with the integrated Ethernet subsystem, the settings for the primary startup sequence have been *factory-changed* to support network-management software, such as LANClient Control Manager. If your computer is properly configured, you can use these settings to perform a remote program load each time your computer is started.

**Note:** These factory settings are not the default settings for your computer. If the default settings are ever restored, the factory settings will be erased. (For the default settings, see “Default Settings for the Startup Sequence” on page 68.) If the default settings are loaded, you can always change these settings back to the values shown in the table below.

To view or change any of the startup sequence settings, select **Start Options** from the Configuration/Setup Utility program menu, and then select **Startup Sequence**. The primary startup sequence is the first group of startup devices that you see. The factory settings for these devices are listed below.

---

First Startup Device	Diskette Drive 0
Second Startup Device	Network (RPL) <sup>11</sup>
Third Startup Device	Hard Disk Drive 0
Fourth Startup Device	Disabled

---

As the above settings imply, once your computer is started (and there is no flash diskette loaded in the diskette drive), the computer tries to perform an RPL over a network. When this happens, the following message appears on the screen.

Press "Home" key to cancel RPL

If your computer is properly connected to a LAN, RPL will continue to run until it is successful or until you cancel it by pressing the **Home** key. If your computer is

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<sup>11</sup> Although RPL does not show up in this menu, this is the action (remote program load) that is taking place when the second startup device is accessed. You can change this setting in the **Ethernet Setup** menu, under **Network Boot**. See “RPL and DHCP” on page 65 for more information.

not connected to a LAN or if you cancel RPL, the computer accesses the third startup device, the hard disk drive, and attempts to load the operating system. Note that if you have enabled DHCP under **Network Boot** (in **Ethernet Setup** menu) instead of RPL, the following message also appears on the screen each time a network boot occurs.

Press "Spacebar" to Boot from Network

If your computer is properly connected to a LAN, you must press the spacebar to invoke DHCP. If the computer is not connected to LAN or if you cancel RPL by pressing the Home key, the computer bypasses DHCP and accesses the third startup device.

**Important**

If you do not plan to use the integrated Ethernet subsystem, disable it. For more information, see "Ethernet Support" on page 64. If you disable the integrated Ethernet, the RPL or DHCP message will not appear on the screen each time you start the computer.

If you see an error message associated with RPL or DHCP, refer to "Error Messages Specific to the Integrated Ethernet" on page 107 for more information.

**Default Settings for the Startup Sequence:** The default settings for the startup sequence of your computer are shown below. Default settings differ between those computers that have integrated Ethernet and those computers that do not. To view or change any of the startup sequence settings, select **Start Options** from the Configuration/Setup Utility program menu, and then select **Startup Sequence**.

**Note:** If you decide to load the default settings, the values shown in “Network-Enabled Startup Sequence” on page 66 will change.

The following are the default settings for those computers that do have an integrated Ethernet subsystem.

Menu Item	Setting
Start Options	
Startup Sequence	
First Startup Device	Diskette Drive 0
Second Startup Device	Hard Disk Drive 0
Third Startup Device	Network (RPL)
Fourth Startup Device	Disabled
Automatic Power On Startup Sequence	Enabled
First Startup Device	Network
Second Startup Device	Hard Disk Drive 0
Third Startup Device	Disabled
Fourth Startup Device	Disabled

The following are the default settings for those computers that do not have an integrated Ethernet subsystem.

Menu Item	Setting
Start Options	
Startup Sequence	
First Startup Device	Diskette Drive 0
Second Startup Device	Hard Disk Drive 0
Third Startup Device	Disabled
Fourth Startup Device	Disabled
Automatic Power On Startup Sequence	Enabled
First Startup Device	Hard Disk Drive 0
Second Startup Device	Disabled
Third Startup Device	Disabled
Fourth Startup Device	Disabled

## Automatic Power On Startup Sequence

When your computer is turned on remotely, the Automatic Power On Startup Sequence determines the order of the startup devices. The startup device is the device that will be used to load the operating system. The settings for the Automatic Power On Startup Sequence are used in conjunction with the automatic power on features in your computer, such as Serial Port/Modem Ring Detect, Wake on Alarm, and Wake on LAN.

To access the Automatic Power On Startup Sequence settings, select **Start Options** from the Configuration/Setup Utility program menu, and then select **Startup Sequence**.

## Wake on LAN

This setting is used to enable or disable the IBM-developed Wake on LAN feature, which makes it possible for your computer to be powered on remotely by a network administrator. Remote network-management software must be used to support Wake on LAN. Examples of such software are LANClient Control Manager and TME 10 NetFinity.

To access the Wake on LAN setting, select **Advanced Power Management**, and then select **Automatic Power On** from the Configuration/Setup Utility program menu.

**Note:** To use Wake on LAN with an optional network adapter, the adapter must support Wake on LAN and be properly configured.

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## Update POST/BIOS from Network

When this feature is enabled, the POST/BIOS in your computer can be updated remotely by a network administrator. If you have set an administrator password for your computer, it does *not* have to be entered by the network administrator. Network management software is required in order to take advantage of this feature.

To access this setting, select **System Security** from the Configuration/Setup Utility program menu, and then select **POST/BIOS Update**.



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## Chapter 6. Solving Problems

Computer problems can be caused by hardware, software, or user error (for example, pressing the wrong key). Using the diagnostic aids discussed in this chapter, you might be able to 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 “Diagnostic Programs” on page 104 for a description of these programs).

If the hardware checks out OK, 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 came with IBM-preinstalled software, refer to *About Your Software* and the operating system documentation that comes with your computer. If you have installed software applications yourself, consult the documentation that comes with the software.

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## Error Messages

Error messages that appear on the screen might be text, numeric, or both. There are several types of error messages:

- POST error messages

Messages that appear when POST finds problems with the hardware during startup or when a change in the hardware configuration is found. POST error messages are 3-, 4-, 5-, 8-, or 12-character alphanumeric messages and include brief explanations (except I999XXXX errors).

For more information about what caused an error message to appear and what action to take, refer to “Solving POST Problems” on page 74 and “POST Error Message Charts” on page 77.

- Software-generated error messages

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

- Diagnostic error messages

Messages that appear if a hardware problem is detected by a diagnostic test program. The messages present text information that can be used to identify a failing part.

- Integrated Ethernet-specific error messages

Messages that appear if a problem arises with the integrated Ethernet and the RPL or DHCP environments. These messages are specific to the integrated Ethernet controller and software code of your computer.

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## Power-On Self-Test

Each time you turn on your computer, it performs a series of tests that check the 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 (if installed) are working

As POST starts, numbers showing the amount of memory being tested appear in the upper-left corner of the screen until the total amount of memory in the system is reached. Options for running a fast POST or accessing the Configuration/Setup Utility program appear in the lower-left corner of the screen.

**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, you will hear one beep and 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 further information on using passwords, refer to “Using Passwords” on page 53.)

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.) For more information about what caused an error message to appear and what action to take, refer to “Solving POST Problems” on page 74 and “POST Error Message Charts” on page 77.

If you do not hear a beep during POST, refer to “Troubleshooting Charts” on page 96. You might need to have your computer serviced.

## Solving POST Problems

If you receive an error message during the power-on self-test (POST), completing the steps outlined in this section might enable you to resolve the problem.

### Note

If you have just added, removed, or changed the location of a device and you receive an error message, follow the procedure on page 44. If this does not eliminate the error message, proceed with the following instructions.

1. Write down all error code numbers and descriptions that appear on the screen as you start your computer. (Note that a single problem can cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on your computer.)
2. If you have set a power-on password, a password prompt appears. If you have set both power-on and administrator passwords, you can type either of the passwords at the password prompt. However, if you think you might need to change any settings in the Configuration/Setup Utility program, you must type your administrator password at the password prompt. If you type your power-on password, you will be able to view error codes and error code descriptions displayed on the POST Startup Errors screen, and you will also be able to view limited information in the Configuration/Setup Utility program. However, you will not be able to change any settings.
3. In the case of most errors, the Configuration/Setup Utility program starts automatically so that you can attempt to identify and correct the problem. When the Configuration/Setup Utility program starts, a screen labeled POST Startup Errors appears. (Note that the POST Startup Errors screen does not appear immediately. You must wait approximately one minute.) If the POST Startup Errors screen does not appear, proceed to step 6.
4. 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. (See the **Important** text box in step 5 for information on exiting the Configuration/Setup Utility program without making any changes to current settings.) To select an item, press Up Arrow (↑) or Down Arrow (↓) to highlight the item, and then press **Enter**.

5. If you selected **Continue** in step 4, 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 likely a malfunction in that item. If you made a change, continue here. If you did not make a change, go to step 5e.

To use the Configuration/Setup Utility program, do the following:

- a. Select the menu item that is flagged (or that you wish to view) by pressing Up Arrow (↑) or Down Arrow (↓), and then press **Enter**.
- b. 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**.)
- c. When you have finished viewing and changing settings, press **Esc** to return to the Configuration/Setup Utility program menu.
- d. Before you exit from the program, select **Save Settings**. When you exit from the Configuration/Setup Utility program menu (see step 5e), your operating system will start automatically (unless there is an unresolved problem with the IDE hard disk drive).

**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 saving 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 the settings and 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 an IDE device).

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

6. For more information about what caused an error message to appear and what action to take, refer to the following chart.

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<b>Problem</b>	<b>Go to:</b>
POST error code or message appears.	“POST Error Message Charts” on page 77.
After more than one beep, application program or operating system appears.	“Diagnostic Programs” on page 104.
Blank screen, unreadable screen, or other unusual response occurs.	“Troubleshooting Charts” on page 96.

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If you are unable to resolve a problem and need assistance, refer to Chapter 7, “Getting Help, Service, and Information” on page 109.

## POST Error Message Charts

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.

### Important

If you find it necessary to remove the computer cover, see *Installing Options in Your Personal Computer*.

POST Message	Description
101 102	A failure occurred during testing of the system board and microprocessor. <b>Action:</b> Have the computer serviced.
110	A memory parity failure occurred during testing of the system board. <b>Action:</b> Run the diagnostic programs to verify that a problem exists in a DIMM. (See “Diagnostic Programs” on page 104 for information about diagnostic programs provided with your computer.) Refer to <i>Installing Options in Your Personal Computer</i> if you need to reconfigure the system memory to aid in identifying the defective DIMM. If you cannot identify the defective DIMM in this way, have the computer serviced.
114	An adapter read-only memory (ROM) error occurred. <b>Action:</b> Remove all adapters that are not required for system startup and reinstall them one at a time, retesting after each is reinstalled. When an adapter fails, replace it. If the problem cannot be isolated and corrected, have the computer serviced.
121	A hardware error occurred. <b>Action:</b> Have the computer serviced.

POST Message	Description
161	<p>The battery on the system board is dead.</p> <p><b>CAUTION:</b>  <b>Danger of explosion if lithium battery is incorrectly replaced.</b></p> <p><b>Replace the battery with the same or equivalent type recommended by the manufacturer. Dispose of batteries as required by local ordinances or regulations. (See “Lithium Battery Notice” on page vii and “Replacing the Battery” on page 37 for important information on battery use, disposal, and replacement.)</b></p> <p><b>Action:</b> The computer can be used until you replace the battery. However, you will have to run the Configuration/Setup Utility program to set the time and date each time the computer is turned on until a new battery is installed. (For instructions on using the Configuration/Setup Utility program, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 39.)</p>
162	<p>A change in device configuration occurred. This message is displayed under one or more of the following conditions:</p> <ul style="list-style-type: none"> <li>• A new device has been installed.</li> <li>• A device has been moved to a different location or cable connection.</li> <li>• A device has been removed or disconnected from a cable.</li> <li>• A device is failing and is no longer recognized by the computer as being installed.</li> <li>• An external device is not turned on.</li> <li>• An invalid checksum is detected in CMOS memory (nonvolatile RAM).</li> </ul> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Verify that all external devices are turned on. External devices must be turned on before the computer is turned on.</li> <li>2. Verify that all devices are properly installed and securely connected.</li> <li>3. If you added, removed, or changed the location of a device, you must save the new configuration in the Configuration/Setup Utility program. Refer to page 44 for further information and instructions on saving the configuration.</li> <li>4. If you did not add, remove, or change the location of a device, a device is probably failing. Running the diagnostic programs might isolate the failing device. (See “Diagnostic Programs” on page 104 for information about diagnostic programs provided with your computer.)</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
163	<p>The clock is not working correctly.</p> <p><b>Action:</b> Set the correct date and time. If the date and time are set correctly and saved and the 163 error message reappears, replace the battery.</p> <p>If this does not correct the problem, have the computer serviced.</p> <p><b>Note:</b> The computer can be used until it is serviced, but any application programs that use the date and time will be affected.</p>
164	<p>A change in the memory configuration occurred. This error can be caused by adding, removing, or incorrectly installing memory.</p> <p><b>Note:</b> The computer can be used with decreased memory capacity until the error is corrected.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. If you added memory, see <i>Installing Options in Your Personal Computer</i> to verify that the new memory is correct for your computer and that it is installed correctly.</li> <li>2. If you added or removed memory, you must save the new configuration in the Configuration/Setup Utility program. Refer to page 44 for further information and instructions on saving the configuration.</li> <li>3. Running the diagnostic programs might isolate the location of the problem DIMM and provide additional information. (See "Diagnostic Programs" on page 104 for information about diagnostic programs provided with your computer.)</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
20X	<p>A failure occurred during testing of the memory. This error can be caused by incorrectly installed memory, a failing DIMM, or a system-board failure.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. If you have added memory, see <i>Installing Options in Your Personal Computer</i> and Chapter 5, "Using the Configuration/Setup Utility Program" on page 39 of this booklet to verify that the new memory is correct for your computer, and that it is installed and configured correctly.</li> <li>2. Run the diagnostic programs to verify the problem. (See "Diagnostic Programs" on page 104 for information about diagnostic programs provided with your computer.)</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
301 303	<p>A failure occurred during testing of the keyboard and keyboard controller. These error messages also might be accompanied by continuous beeping.</p> <p><b>Action:</b></p> <p>Ensure that:</p> <ol style="list-style-type: none"> <li>1. Nothing is resting on the keyboard and pressing a key.</li> <li>2. No key is stuck.</li> <li>3. The keyboard cable is securely attached to the keyboard connector on the computer. (For the location of the keyboard connector, refer to "External Connectors" on page 11.)</li> </ol> <p><b>Note:</b> If you have just connected a new mouse or other pointing device, turn the computer off and disconnect that device. Wait at least 5 seconds, and then turn the computer on. If the error message goes away, replace the device. If the error message remains, have the keyboard and cable or the computer serviced.</p>
601	<p>A failure occurred during testing of the diskette drive and diskette-drive controller. This error can be caused by a loose or incorrectly connected cable, a failing drive, or a failing system board.</p> <p><b>Note:</b> The computer can be used, but one or more diskette drives might not work.</p> <p><b>Action:</b> Verify that all diskette drive cables are properly installed and securely connected.</p> <p>Running the diagnostic programs might isolate the diskette drive that failed, but you must have your computer serviced. (See "Diagnostic Programs" on page 104 for information about diagnostic programs provided with your computer.)</p>
602	<p>The computer is not able to start the diskette in the drive. The diskette might be damaged or formatted incorrectly.</p> <p><b>Action:</b> Try another startable diskette that is formatted correctly and is in good condition. (For information and instructions on formatting diskettes, refer to "Formatting Diskettes" on page 27 and your operating system documentation.)</p> <p>If this does not correct the problem, have the computer serviced.</p>

POST Message	Description
604	<p>A failure occurred during the testing of a diskette drive.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Verify that the Configuration/Setup Utility program correctly reflects the type of diskette drive you have installed. (For instructions on using the Configuration/Setup Utility program, refer to Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.)</li> <li>2. Run the diagnostic programs. (See "Diagnostic Programs" on page 104 for information about diagnostic programs provided with your computer.)</li> <li>3. If the diagnostic programs detect a failure, replace the diskette drive.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
662	<p>A diskette drive configuration error occurred.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Verify that the Configuration/Setup Utility program correctly reflects the number of diskette drives you have installed. (For instructions on using the Configuration/Setup Utility program, refer to Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.)</li> <li>2. If you installed or removed a diskette drive, you must save the new configuration in the Configuration/Setup Utility program. Refer to page 44 for further information and instructions on saving the configuration.</li> </ol> <p>If this does not correct the problem, have the computer serviced.</p>

POST Message	Description
1762	<p>An IDE configuration error occurred. This could be caused by one of the following:</p> <ul style="list-style-type: none"> <li>• A hard disk or other IDE drive (such as an IDE CD-ROM drive) was added or removed, but the changes to the Configuration/Setup Utility program have not yet been saved. Refer to page 44 for further information and instructions on saving the configuration.</li> <li>• A hard disk or other IDE drive was added, but the master/subordinate (slave) setting on the drive is improperly set.</li> <li>• The power or IDE cable is disconnected or not fully seated.</li> <li>• A hard disk drive is failing.</li> </ul> <p><b>Action:</b> Verify that the Configuration/Setup Utility program correctly reflects the number of IDE drives installed (hard disk drives, CD-ROM drives, and so on). For more information, refer to Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</p> <p><i>If the information is correct</i>, save the settings, exit from the Configuration/Setup Utility program, and restart the computer.</p> <p><i>If the information is not correct</i>, do the following.</p> <ol style="list-style-type: none"> <li>1. Exit from the Configuration/Setup Utility program <i>without</i> saving the settings.</li> <li>2. Verify that the power cable and IDE cable are fully seated into the drive connectors, and the IDE cable is fully seated into the connector on the system board.</li> <li>3. If you just added a new drive, verify that the drive you added has the master-subordinate (slave) setting set correctly. If the new drive is the only drive attached to the IDE cable, it must be set as the master. If it is the second drive on the IDE cable, it must be set as the subordinate.</li> </ol> <p><b>Note:</b> If you installed two new drives on the same cable, ensure that one is set as a master and one is set as a subordinate.</p> <p>See the instructions that came with your new drive for the jumper locations and settings.</p> <ol style="list-style-type: none"> <li>4. Restart the computer. If the 1762 error message appears again, verify that the IDE drive information in the Configuration/Setup Utility program is correct. If it is correct, save the information and restart the computer. If the information is still incorrect, you might have a failing drive. Have the computer serviced.</li> </ol>

POST Message	Description
178X	<p>A failure occurred during testing of the hard disk drive or a primary or secondary IDE device.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Run the diagnostic programs. (See “Diagnostic Programs” on page 104 for information about diagnostic programs provided with your computer.)</li> <li>2. If the diagnostic programs detect a failure, replace the defective hard disk drive or primary or secondary IDE or EIDE device.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
1800	<p>A PCI adapter has requested a hardware interrupt that is not available.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the hardware interrupt settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters. For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i> and <i>Understanding Your Personal Computer</i>. For information about required interrupt resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 39.</li> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all hardware interrupts are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make an interrupt available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>. <b>Note:</b> If you remove an ISA legacy adapter, set the hardware interrupt used by the removed adapter to <b>Available</b> before installing another adapter.</li> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make an interrupt available to the PCI adapter you want to install.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1801	<p>A PCI adapter has requested memory resources that are not available.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.  For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required memory resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</li> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all memory resources are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make memory available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.  <b>Note:</b> If you remove an ISA legacy adapter, set the memory resources used by the removed adapter to <b>Available</b> before installing another adapter.</li> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make memory available to the PCI adapter you want to install.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1802	<p>A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the I/O address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.  For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required I/O resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, “Using the Configuration/Setup Utility Program” on page 39.</li> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all I/O addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make an I/O address available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.  <b>Note:</b> If you remove an ISA legacy adapter, set the I/O address used by the removed adapter to <b>Available</b> before installing another adapter.</li> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make an I/O address available to the PCI adapter you want to install.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1803	<p>A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the memory address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.</li> </ol> <p>For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required memory resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</p> <ol style="list-style-type: none"> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all memory addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make a memory address available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.</li> </ol> <p><b>Note:</b> If you remove an ISA legacy adapter, set the memory address used by the removed adapter to <b>Available</b> before installing another adapter.</p> <ol style="list-style-type: none"> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make a memory address available to the PCI adapter you want to install.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1804	<p>A PCI adapter has requested a memory address that is not available.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the memory address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapter.</li> </ol> <p>For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required memory resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</p> <ol style="list-style-type: none"> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all memory addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make a memory address available to the PCI adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.</li> </ol> <p><b>Note:</b> If you remove an ISA legacy adapter, set the memory address used by the removed adapter to <b>Available</b> before installing another adapter.</p> <ol style="list-style-type: none"> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make a memory address available to the PCI adapter you want to install.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
1805	<p>A PCI adapter read-only memory (ROM) error occurred.</p> <p><b>Action:</b> Remove all of the PCI adapters that are not required for system startup and reinstall them one at a time, retesting after each is reinstalled. When an adapter fails, replace it.</p> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1850	<p>A Plug and Play adapter has requested a hardware interrupt that is not available.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the hardware interrupt settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.  For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required interrupt resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</li> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all hardware interrupts are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make an interrupt available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.  <b>Note:</b> If you remove an ISA legacy adapter, set the hardware interrupt used by the removed adapter to <b>Available</b> before installing another adapter.</li> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make an interrupt available to the Plug and Play adapter you want to install.</li> <li>5. If your system will be loading a Plug and Play operating system, ensure that Plug and Play Operating System is set to <b>Yes</b>. See "Changing Plug and Play Control Features" on page 52 for more information.</li> <li>6. Ensure that the address decode value for the adapter is properly set. See "Changing Plug and Play Control Features" on page 52 for more information.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1851	<p>A Plug and Play adapter has requested memory resources that are not available.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.  For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required memory resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</li> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all memory resources are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make memory available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.  <b>Note:</b> If you remove an ISA legacy adapter, set the memory resources used by the removed adapter to <b>Available</b> before installing another adapter.</li> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make memory available to the Plug and Play adapter you want to install.</li> <li>5. If your system will be loading a Plug and Play operating system, ensure that Plug and Play Operating System is set to <b>Yes</b>. See "Changing Plug and Play Control Features" on page 52 for more information.</li> <li>6. Ensure that the address decode value for the adapter is properly set. See "Changing Plug and Play Control Features" on page 52 for more information.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1852	<p>A Plug and Play adapter has requested an I/O address that is not available, or the Plug and Play adapter might be defective.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the I/O address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.  For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required I/O resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</li> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all I/O addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make an I/O address available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.  <b>Note:</b> If you remove an ISA legacy adapter, set the I/O address used by the removed adapter to <b>Available</b> before installing another adapter.</li> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make an I/O address available to the Plug and Play adapter you want to install.</li> <li>5. If your system will be loading a Plug and Play operating system, ensure that Plug and Play Operating System is set to <b>Yes</b>. See "Changing Plug and Play Control Features" on page 52 for more information.</li> <li>6. Ensure that the address decode value for the adapter is properly set. See "Changing Plug and Play Control Features" on page 52 for more information.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1853	<p>A Plug and Play adapter has requested a memory address that is not available, or the Plug and Play adapter might be defective.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the memory address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.  For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required memory resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</li> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all memory addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make a memory address available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.  <b>Note:</b> If you remove an ISA legacy adapter, set the memory address used by the removed adapter to <b>Available</b> before installing another adapter.</li> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make a memory address available to the Plug and Play adapter you want to install.</li> <li>5. If your system will be loading a Plug and Play operating system, ensure that Plug and Play Operating System is set to <b>Yes</b>. See "Changing Plug and Play Control Features" on page 52 for more information.</li> <li>6. Ensure that the address decode value for the adapter is properly set. See "Changing Plug and Play Control Features" on page 52 for more information.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1854	<p>A Plug and Play adapter has requested a memory address that is not available.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the memory address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.</li> </ol> <p>For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required memory resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</p> <ol style="list-style-type: none"> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all memory addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make a memory address available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.</li> </ol> <p><b>Note:</b> If you remove an ISA legacy adapter, set the memory address used by the removed adapter to <b>Available</b> before installing another adapter.</p> <ol style="list-style-type: none"> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make a memory address available to the Plug and Play adapter you want to install.</li> <li>5. If your system will be loading a Plug and Play operating system, ensure that Plug and Play Operating System is set to <b>Yes</b>. See "Changing Plug and Play Control Features" on page 52 for more information.</li> <li>6. Ensure that the address decode value for the adapter is properly set. See "Changing Plug and Play Control Features" on page 52 for more information.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
1855	<p>A Plug and Play adapter read-only memory (ROM) error occurred.</p> <p><b>Action:</b> Remove all of the Plug and Play adapters that are not required for system startup and reinstall them one at a time, retesting after each is reinstalled. When an adapter fails, replace it.</p> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1856	<p>A Plug and Play adapter has requested a DMA address that is not available.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that all ISA legacy adapters are set correctly in the Configuration/Setup Utility program. If the DMA address settings are not correct, change and save the settings. Setting the resources used by ISA legacy adapters to <b>Not available</b> enables the Plug and Play function to configure around the legacy adapters.  For background information on PCI, ISA, Plug and Play, and legacy (non-Plug and Play) adapters, refer to <i>Installing Options in Your Personal Computer</i>. For information about required DMA resource settings for ISA legacy adapters, refer to the documentation that comes with these adapters. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</li> <li>2. Make sure that switches on all ISA legacy adapters are set correctly. For information about switch settings, refer to the documentation that comes with the ISA legacy adapters.</li> <li>3. If all DMA addresses are being used by ISA legacy adapters, you might need to remove an ISA legacy adapter to make a DMA address available to the Plug and Play adapter you want to install. For instructions on removing adapters, see <i>Installing Options in Your Personal Computer</i>.  <b>Note:</b> If you remove an ISA legacy adapter, set the DMA address used by the removed adapter to <b>Available</b> before installing another adapter.</li> <li>4. If you have other PCI or Plug and Play adapters installed, you might need to remove one of these adapters to make a DMA address available to the Plug and Play adapter you want to install.</li> <li>5. If your system will be loading a Plug and Play operating system, ensure that Plug and Play Operating System is set to <b>Yes</b>. See "Changing Plug and Play Control Features" on page 52 for more information.</li> <li>6. Ensure that the address decode value for the adapter is properly set. See "Changing Plug and Play Control Features" on page 52 for more information.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

POST Message	Description
1962	<p>A startup sequence error occurred.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure the startup options are set correctly in the Configuration/Setup Utility program. If the settings are not correct, change and save them. For instructions on using the Configuration/Setup Utility program, see Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</li> <li>2. Make sure the primary IDE cable is properly installed and securely connected.</li> <li>3. Make sure all adapters are installed correctly. For instructions on adding adapters, see <i>Installing Options in Your Personal Computer</i>.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
2462	<p>A video configuration error occurred.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Make sure the monitor signal cable is securely attached to the monitor connector. (For the location of the connector, refer to "External Connectors" on page 11.)</li> <li>2. If you just added or removed video memory, you must save the new configuration in the Configuration/Setup Utility program. Refer to page 44 for further information and instructions on saving the configuration.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
5962	<p>An IDE CD-ROM configuration error occurred.</p> <p><b>Action:</b> Follow the procedures listed for POST error message 1762 on page 82.</p>

POST Message	Description
8603	<p>A failure occurred during testing of the mouse. This error can be caused by the mouse or by a failing system board.</p> <p><b>Note:</b> This error can also occur if electrical power was lost for a very brief period and then restored. In this case, turn off the computer for at least 5 seconds, and then turn it back on.</p> <p><b>Action:</b> Ensure the keyboard and mouse are securely attached to the correct connectors. If they are connected correctly, use the following procedure:</p> <ol style="list-style-type: none"> <li>1. Turn off the computer.</li> <li>2. Disconnect the mouse from the computer.</li> <li>3. Turn on the computer.</li> </ol> <p>If the POST error message does not reappear, the mouse is probably failing. (See the documentation that came with the mouse for additional testing information.) If the problem remains, have the mouse serviced.</p> <p>If the POST error message reappears, run the diagnostic tests to isolate the failure. If the diagnostic tests do not find a problem and the POST error message remains, have the computer serviced.</p>
I9990301	<p>A hard disk failure occurred.</p> <p><b>Action:</b> Have the computer serviced.</p>
Other Numbers	<p>The computer POST found an error.</p> <p><b>Action:</b> Follow the instructions on the screen.</p>

## 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, see *Installing Options in Your Personal Computer*.

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:

- Remove the software or device you just added.
- Run the diagnostic programs to determine if your computer is running correctly. (See “Diagnostic Programs” on page 104 for information about diagnostic programs provided with your computer.)
- Reinstall the new software or new device.

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

<b>Problem Type</b>	<b>Go to:</b>
Diskette Drive	Page 97
General	Page 99
Intermittent	Page 99
Keyboard, Mouse, or Pointing-Device	Page 100
Memory	Page 100
Monitor	Page 97
Option	Page 101
Parallel Port	Page 101
Printer	Page 102
Serial Port	Page 102
Software	Page 103
Speaker Feedback	Page 103

Diskette Drive Problems	Action
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	<p>If there is a diskette in the drive, verify that:</p> <ol style="list-style-type: none"> <li>1. The diskette drive is enabled. Use the Configuration/Setup Utility program to check this. For instructions on using the Configuration/Setup Utility program, refer to Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.</li> <li>2. The computer is checking for the diskette drive in the startup sequence. Use the Configuration/Setup Utility program to verify this.</li> <li>3. The diskette you are using is good and not damaged. Try inserting another diskette if you have one.</li> <li>4. The diskette is inserted correctly, with its label up and its metal-shutter end first in the drive.</li> <li>5. The diskette contains the necessary files to start the computer (the diskette must be startable).</li> <li>6. The diskette drive cable is properly installed and securely connected.</li> <li>7. There is no problem with your software program (see Software Problem on page 103).</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
Monitor Problems	Action
General monitor problems.	<p>Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, refer to the information supplied with the monitor for adjustment and testing instructions.</p> <p>If you cannot find the problem, check the other listings on monitor problems in this table.</p> <p>If the problem cannot be isolated and corrected, have the monitor and computer serviced.</p>

Monitor Problems	Action
Wavy, unreadable, rolling, distorted, or jittery screen images.	<p>If the monitor self-tests show that the monitor is working properly, verify that:</p> <ol style="list-style-type: none"> <li>1. The location of the monitor is appropriate. Magnetic fields around other devices, such as transformers, appliances, fluorescent lights, and other monitors might be causing the problem. To determine if this is the difficulty:               <ol style="list-style-type: none"> <li>a. Turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.)</li> <li>b. Adjust the placement of the monitor and other devices so that they are at least 305 mm (12 in.) apart. Also, when relocating the monitor, be sure it is at least 75 mm (3 in.) from the diskette drives to prevent diskette drive read/write errors.</li> <li>c. Turn on the monitor.</li> </ol> </li> <li>2. An IBM monitor signal cable is properly connected to the monitor and computer, and that the cable is installed securely. Non-IBM monitor signal cables might cause unpredictable problems.</li> <li>3. You are not trying to run your monitor at a higher refresh rate than the monitor supports. Refer to the documentation that comes with your monitor for supported refresh rates.</li> </ol> <p><b>Note:</b> An enhanced monitor signal cable with additional shielding might be available for your monitor. See your IBM reseller or marketing representative for information.</p> <p>If the problem cannot be isolated and corrected, have the monitor and computer serviced.</p>
Screen flickers.	<p>Set the monitor for the highest, noninterlaced refresh rate supported by your monitor and the video controller in your computer.</p> <p><b>Attention:</b> Using a resolution or refresh rate that is not supported by your monitor might damage it.</p> <p>If this does not correct the problem, have the monitor and computer serviced.</p>
The monitor works when you turn on the system, but goes blank when you start some application programs.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The monitor signal cable is securely connected to the monitor connector on the computer. For the location of the monitor connector, see "External Connectors" on page 11.</li> <li>2. The necessary device drivers for the application programs are installed.</li> </ol> <p>If the problem cannot be isolated and corrected, have the monitor and computer serviced.</p>
The monitor works when you turn on the system, but goes blank after some period of computer inactivity.	<p>The computer is probably set for energy savings with the Advanced Power Management (APM) feature. If the APM feature is enabled, disabling APM or changing APM settings may solve the problem (see "Using Advanced Power Management Features" on page 61).</p> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

<b>Monitor Problems</b>	<b>Action</b>
Blank screen.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The computer power cord is plugged into the computer and a working electrical outlet.</li> <li>2. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly.</li> <li>3. The monitor signal cable is securely connected to the monitor connector on the computer. To find the monitor connector, see “External Connectors” on page 11.</li> </ol> <p>If the problem cannot be isolated and corrected, have the monitor and computer serviced.</p>
Only the cursor appears.	Have the computer serviced.
Wrong characters appear on the screen.	Have the computer serviced.
<b>General Problems</b>	<b>Action</b>
The computer does not start when you press the power switch.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. All cables are securely connected to the proper connectors on the computer. For the location of the connectors, refer to “External Connectors” on page 11.</li> <li>2. The voltage-selection switch is set to the correct position.</li> <li>3. The computer cover is properly installed.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
Problems such as a broken cover lock or indicator lights not working.	Have the computer serviced.
<b>Intermittent Problems</b>	<b>Action</b>
A problem occurs only occasionally and is difficult to detect.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. All cables and cords are securely connected to the rear of the computer and attached devices.</li> <li>2. When the computer is turned on, the fan grill is not blocked (there is air flow around the grill), and the fans are working. If airflow is blocked or the fans are not working, the computer might overheat.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

<b>Keyboard, Mouse, or Pointing-Device Problems</b>	<b>Action</b>
All or some keys on the keyboard do not work.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The computer and the monitor are turned on.</li> <li>2. The keyboard cable is securely connected to the keyboard connector on the computer. For the location of the keyboard connector, see "External Connectors" on page 11.</li> </ol> <p>If the problem cannot be isolated and corrected, have the keyboard and computer serviced.</p>
The mouse or pointing device does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The mouse or pointing-device cable is securely attached to the proper connector on the computer. Depending on the type of mouse you have, it will connect to either the mouse or serial connector. To find the mouse and serial connectors, see "External Connectors" on page 11.</li> <li>2. The device drivers for the mouse are installed correctly.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer and the device serviced.</p>
<b>Memory Problems</b>	<b>Action</b>
The amount of memory displayed is less than the amount of memory installed.	<p>The amount of available memory shown might be somewhat less than expected because of basic input/output system (BIOS) shadowing in random access memory (RAM).</p> <p>Verify that:</p> <ol style="list-style-type: none"> <li>1. You have installed the correct type of dual inline memory module (DIMM) for your computer. Refer to <i>Installing Options in Your Personal Computer</i> for instructions on adding DIMMs.</li> <li>2. The DIMMs are properly installed and securely connected.</li> <li>3. If you added or removed memory, you saved the new configuration in the Configuration/Setup Utility program. See page 44 for instructions on saving the configuration.</li> </ol> <p>If the problem persists, run the memory test from the diagnostic program that comes with your computer. (See "Diagnostic Programs" on page 104 for further information.) The system might have detected a bad DIMM and automatically reallocated memory to enable you to continue to operate.</p> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
"Not enough memory" message is displayed.	<p>Verify that terminate-and-stay-resident programs (TSRs) are not taking up memory. (See "Managing TSR Programs" on page 106.)</p>

Option Problems	Action
An IBM option that was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The option is designed for your computer.</li> <li>2. You followed the installation instructions supplied with the option and in <i>Installing Options in Your Personal Computer</i>.</li> <li>3. All option files (if required) are installed correctly. See "Installing Files from Option Diskettes" on page 106 for information about installing option files.</li> <li>4. You have not loosened any other installed options or cables.</li> <li>5. If the option is an adapter, you have provided enough hardware resources for the adapter to function correctly. Refer to the documentation that comes with the adapter (as well as the documentation for any other installed adapters) to determine the resources required for each adapter.</li> <li>6. You updated the configuration information in the Configuration/Setup Utility program, if necessary, and have no conflicts.</li> </ol> <p>If the problem persists, run the diagnostic programs. (See "Diagnostic Programs" on page 104 for information about diagnostic programs provided with your computer.)</p> <p>If the problem cannot be isolated and corrected, have the computer and the option serviced.</p>
An IBM option that previously worked does not work now.	<p>Verify that all of the option hardware and cable connections are secure.</p> <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the problem cannot be isolated and corrected, have the computer and option serviced.</p>
Parallel Port Problems	Action
Parallel port cannot be accessed.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. Each port is assigned a unique address.</li> <li>2. The parallel-port adapter, if you added one, is properly installed and firmly seated. Refer to <i>Installing Options in Your Personal Computer</i> for instructions on adding adapters.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>

Serial Port Problems	Action
Serial port cannot be accessed.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. Each port is assigned a unique address.</li> <li>2. The serial-port adapter, if you added one, is properly installed and firmly seated. Refer to <i>Installing Options in Your Personal Computer</i> for instructions on adding adapters.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
Printer Problems	Action
The printer does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The printer is turned on and is online.</li> <li>2. The printer signal cable is securely connected to the correct parallel, serial, or USB port on the computer. (Refer to "External Connectors" on page 11 for the location of the parallel, serial, and USB ports.) <p><b>Note:</b> Non-IBM printer signal cables might cause unpredictable problems.</p> </li> <li>3. You have assigned the printer port correctly in your operating system or application program.</li> <li>4. You have assigned the printer port correctly in the Configuration/Setup Utility program. (To change the settings, refer to Chapter 5, "Using the Configuration/Setup Utility Program" on page 39.)</li> <li>5. If the problem persists, run the tests described in the documentation that comes with your printer.</li> </ol> <p>If the problem cannot be isolated and corrected, have the computer and printer serviced.</p>

<b>Software Problem</b>	<b>Action</b>
Is your software program OK?	<p>To determine if problems are caused by installed software, verify that:</p> <ol style="list-style-type: none"> <li>1. Your computer has the minimum memory requirements needed to use the software. Refer to the information supplied with the software to verify memory requirements.</li> </ol> <p><b>Note:</b> If you have just installed an adapter or memory, you might have a memory address conflict.</p> <ol style="list-style-type: none"> <li>2. The software is designed to operate on your computer.</li> <li>3. Other software works on your computer.</li> <li>4. The software you are using works on another computer.</li> </ol> <p>If you received any error messages while using the software program, refer to the information supplied with the software for a description of the messages and solutions to the problem.</p> <p>If the problem cannot be isolated and corrected, have the computer serviced.</p>
<b>Speaker Feedback</b>	<b>Action</b>
Speaker feedback during recording. <sup>12</sup>	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The recording level on the microphone is not turned all the way up. If so, reduce the gain on the microphone.</li> <li>2. The speaker volume is not turned all the way up. If so, reduce the speaker volume.</li> <li>3. The microphone is away from the powered speakers.</li> </ol>

<sup>12</sup> Recording is an option only when an optional audio adapter is installed. There are no internal speakers with your computer. External powered speakers and a microphone are optional features for your computer.

## Diagnostic Programs

IBM provides programs that you can run to diagnose hardware and some software problems. A description of these programs follows.

### QAPlus/PRO

You can use QAPlus/PRO to diagnose hardware problems. QAPlus/PRO also includes several utility programs that provide helpful information about your computer.

For testing purposes, QAPlus/PRO isolates your computer hardware from any software that was preinstalled (or that you have installed) on your hard disk. The program runs independent of the operating system, and *must be run from diskette*. 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.

QAPlus/PRO is provided on the *Ready-to-Configure CD* that comes with your computer. You can create a startable QAPlus/PRO diskette using the Diskette Factory on the *Ready-to-Configure CD*. Refer to *Your Ready-to-Configure CD* for information and instructions on starting the CD. Once you start the CD, follow the instructions on the screen.

**Note:** A startable QAPlus/PRO diskette might be provided with some models.

To start QAPlus/PRO, do the following:

1. Turn off your computer and any attached devices.
2. Insert the QAPlus/PRO diskette into diskette drive A.
3. Turn on all attached devices; then turn on your computer.
4. Follow the instructions on the screen.

## Other QAPLus Diagnostic Programs

The *Ready-to-Configure CD* that comes with your computer also contains diagnostic programs designed specifically for certain operating environments (QAPLus/WIN-WIN for Windows 3.1 and Windows 95). Because these versions of QAPLus 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. Although the hardware diagnostic capabilities of these QAPLus programs are not quite as strong as those of QAPLus/PRO, they are still good tools for isolating hardware problems.

**CoSession:** CoSession is a remote-control diagnostic program that can be used by another individual, such as your in-house administrator, to help diagnose problems with your computer from a remote location. CoSession is provided on the *Ready-to-Configure CD* that comes with your computer. To use CoSession, it must be installed in your computer, and your computer must have a modem.

### Important

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

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## **Installing Files from Option Diskettes**

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

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

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## **Managing TSR Programs**

Terminate-and-stay-resident programs (TSRs) are loaded into memory and stay there so you can access them whenever you want. If you are loading or using an application program and receive a message that you do not have enough memory, TSR programs might be taking up valuable space.

Check the documentation that comes with each TSR program to find out how to solve this problem. You might be able to remove the program from memory for the rest of your current work session. Sometimes you can change the order in which the TSRs are loaded so that memory is used more efficiently. Or perhaps you can remove from the AUTOEXEC.BAT file the TSR programs that you do not use frequently.

See your operating system documentation for assistance on editing or disabling statements in the AUTOEXEC.BAT file.

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## Error Messages Specific to the Integrated Ethernet

**Note:** The error messages shown in this section are available only with those models that come with the integrated Ethernet subsystem. These error messages are not available when RPL (remote program load) or DHCP (dynamic host configuration protocol) is used through optional network adapters.

An error message appears on the screen after the Ethernet controller is initialized and a failure condition occurs. These error messages are shown below. If you experience any error related to the integrated Ethernet subsystem, record the error message, and notify your network administrator of the problem.

### RPL-Related Error Messages

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

The two most common error messages are shown below.

RPL-ROM-ERR: 105 The Integrated Ethernet Failed the Loopback Test  
RPL-ROM-ERR: 107 Media Test Failed; Check the Cable

Error 105 indicates that a power-on diagnostic test performed by the Ethernet chip did not execute correctly. If this error message appears, you must have the computer serviced. Error 107 indicates that the cable from the LAN is not securely connected to the Ethernet port on your computer.<sup>13</sup> Check the cable to ensure that it is properly connected.

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

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RPL-ROM-ERR: 101	Integrated Ethernet was unable to initialize
RPL-ROM-ERR: 102	Integrated Ethernet could not be reset
RPL-ROM-ERR: 100	The integrated Ethernet cannot be found
RPL-ROM-ERR: 103	There are multiple Ethernets in the system. Please specify the correct serial number in NET.CFG.
RPL-ROM-ERR: 104	The integrated Ethernet EEPROM is faulty or not present
RPL-ROM-ERR: 106	The integrated Ethernet is configured for PnP on non-PnP system
RPL-ROM-ERR: 110	Integrated Ethernet RAM failed the memory test

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<sup>13</sup> If you have an integrated Ethernet model, and you start your computer without a proper, physical network connection, the RPL-error 107 will always appear. Unless you have changed the primary startup sequence, the computer loads the operating system from the hard disk drive. If you do not use the integrated Ethernet, you can avoid this error message by disabling the integrated Ethernet. For more information, see "Ethernet Support" on page 64.

## DHCP-Related Error Messages

Error messages related to DHCP and the integrated Ethernet controller are shown in the following table. Each error message consists of an error code followed by a text message.

If you encounter one of these error messages, record the message, and contact your network administrator.

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E61: Service boot cancelled.	M38: Cannot open TFTP connection.
E62: Cannot initialize controller.	M39: Cannot read from TFTP connection.
E63: Cannot initialize controller.	M40: BOOTP cancelled by keystroke.
E67: Cannot initialize controller.	M40: DHCP cancelled by keystroke.
E6d: Cannot find BOOTP server.	M41: BOOTP timeout.
E6e: Cannot start from downloaded image.	M41: DHCP timeout.
E71: Too many MTFPT packages.	M42: No client or server IP.
M10: ARP cancelled by keystroke.	M43: No bootfile name.
M11: ARP timeout.	M44: Cannot ARP redirected BOOTP server.
M20: Cannot copy memory.	M6f: System is locked! Press Ctrl+Alt+Del to reboot.
M21: Cannot write to memory.	M90: Cannot initialize controller for multicast.
M22: Cannot write to memory.	M91: MTFPT cancelled by keystroke.
M30: Cannot ARP TFTP address.	M92: MTFPT open timeout.
M31: TFTP cancelled by keystroke.	M93: Unknown MTFPT opcode.
M32: TFTP open timeout.	M94: MTFPT read cancelled by keystroke.
M33: Unknown TFTP opcode.	M95: MTFPT timeout.
M34: TFTP read cancelled by keystroke.	M96: Cannot ARP MTFPT address.
M35: TFTP timeout.	M98: Cannot open MTFPT connection.
M99: Cannot read from MTFPT connection.	Txx: <message from TFTP error packet>

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

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## **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. This section provides information about those sources.

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

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### **Solving Problems**

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 suspect a hardware problem, run the diagnostic tests and make a note of any error messages you receive. Then look up the message in the documentation and take the appropriate action.

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

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### **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 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 PC Company Bulletin Board System (BBS) can be reached 24 hours a day, 7 days a week. Modem speeds of up to 14400 baud are supported. Long distance telephone charges might apply. To access the PC Company BBS:

- In the U.S., call 1-919-517-0001.
- In Canada:
  - In Halifax, call 902-420-0300.
  - In Montreal, call 514-938-3022.
  - In Toronto, call 905-316-4255 or 416-956-7877.
  - In Vancouver, call 604-664-6461 or 604-664-6464.
  - In Winnipeg, call 204-934-2735.

Commercial online services that contain information about IBM products include:

- CompuServe  
Use the following GO words: APTIVA, IBMPS2, ThinkPad, PowerPC, ValuePoint, IBMSVR, or IBMObI.
- PRODIGY  
Use the Jump command; type **IBM** and select **PC Product Support**.
- America Online  
Use the “Go to” keyword **IBM Connect**.

On the World Wide Web, the IBM Personal Computers home page has information about IBM Personal Computer products and support. The address for the IBM Personal Computer home page is:

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

## 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 free marketing and technical information on many topics, including hardware, operating systems, and local area networks (LANs).

You can call the IBM PC Company 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 PC Company 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 change 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 Support Line. 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, you are eligible for Server Startup 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:

- 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.

These services are available 24 hours a day, 7 days a week.<sup>14</sup>

- In the U.S. and Puerto Rico, 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 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.

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## **Purchasing Additional Services**

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

## **Enhanced PC Support Line**

Enhanced PC Support is available for desktop and mobile IBM computers that are not connected to a network. Technical support is provided for IBM computers and

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<sup>14</sup> Response time will vary depending on the number and complexity of incoming calls.

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 114.

### **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” on page 114.

## 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 IBM reseller or IBM marketing representative.

## Warranty and Repair Services

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

Warranty upgrades in the U.S. include:

- Carry-in service to on-site service

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

- On-site service to premium on-site service

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

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

For more information about warranty upgrades and extensions:

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

---

## **Ordering Publications**

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

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



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## Appendix A. 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.

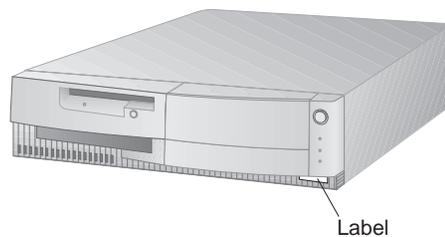
---

### Identification Numbers

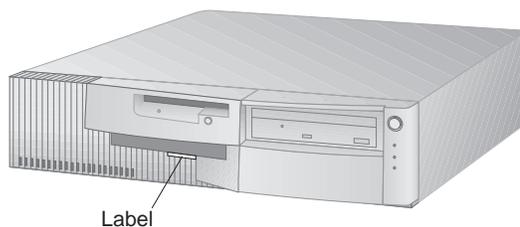
Record and retain the following information.

Product Name	PC 300 GL (6272 and 6282)
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 small label on the front of the computer.



3-Bay Design



4-Bay Design

## 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
Intel Pentium Microprocessor	<input type="checkbox"/> 120 MHz <input type="checkbox"/> 133 MHz <input type="checkbox"/> 150 MHz <input type="checkbox"/> 166 MHz <input type="checkbox"/> 200 MHz <input type="checkbox"/> Intel Pentium microprocessor with MMX <input type="checkbox"/> Other: <hr/>
System Memory (Mem 1 DIMM) (Mem 2 DIMM)	<input type="checkbox"/> 16 MB <input type="checkbox"/> 32 MB <input type="checkbox"/> 64 MB <input type="checkbox"/> 16 MB <input type="checkbox"/> 32 MB <input type="checkbox"/> 64 MB
L2 Cache	<input type="checkbox"/> 256 KB <input type="checkbox"/> 512 KB
Video Memory	<input type="checkbox"/> 1 MB <input type="checkbox"/> 2 MB
Mouse Connector	<input type="checkbox"/> 2-button <input type="checkbox"/> Other: <hr/>
Keyboard Connector	<input type="checkbox"/> 104-key keyboard <input type="checkbox"/> Other: <hr/>
Parallel Connector	<hr/>
Serial Connectors	<hr/>
USB Connectors	<hr/>
Expansion Slot 1	<hr/>
Expansion Slot 2	<hr/>
Expansion Slot 3	<hr/>
Expansion Slot 4	<hr/>
Bay 1	<hr/>
Bay 2	<hr/>
Bay 3	<hr/>
Bay 4	<hr/>

<b>Location</b>	<b>Option Description</b>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____



---

## Appendix B. Product Warranties, License Information, and Notices

---

### Hardware Limited Warranty

The following is the statement of limited warranty for the United States, Canada, and Puerto Rico.

International Business Machines Corporation

Armonk, New York, 10504

#### Statement of Limited Warranty

*The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally 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. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. If you have any questions, contact IBM or your reseller.*

**Machine:** PC 300 GL (6272 and 6282)

**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.*

#### Production Status

Each 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.

#### 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 first year of the warranty period IBM or your reseller, if authorized by IBM, will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine. During the second and third years, IBM will provide replacement parts in exchange for defective parts.

If a Machine does not function as warranted during the first year of the warranty period, IBM or your reseller will repair it or replace it with one that is at least functionally equivalent, without charge. The replacement may not be new, but will be in good working order. If IBM or your reseller is unable to repair or replace the Machine, you may return it to your place of purchase and your money will be refunded.

For IBM or your reseller to provide warranty service for a feature, conversion, or upgrade, IBM or your reseller may require that the Machine on which it is installed be 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many of these transactions involve the removal of parts and their return to IBM. You represent that all removed parts are genuine and unaltered. A part that replaces a removed part will assume the warranty service status of the replaced part.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user. However, for Machines which have a life-time warranty, this warranty is not transferable.

### **Warranty Service**

To obtain warranty service or replacement parts for the Machine, you should contact your 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.

IBM or your reseller will provide certain types of repair and exchange service, either at your location or at a service center, to restore Machines to good working order.

When a type of 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. 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 ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange.

You agree to:

1. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
2. where applicable, before service is provided —
  - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide,
  - b. secure all programs, data, and funds contained in a Machine, and
  - c. 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.

### **Extent of Warranty**

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

Non-IBM machines are provided by IBM "AS IS" WITHOUT WARRANTIES OF ANY KIND.

The warranties will be voided by misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, removal or alteration of Machine or parts identification labels, or failure caused by a product for which IBM is not responsible.

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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.

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

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

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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 the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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System Programs – No.

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Novell	Novell, Inc.
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PRODIGY	Prodigy Services Company
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### **Federal Communications Commission (FCC) Statement**

**Note:** This equipment has been tested and found to comply with the limits for a Class 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.

### **Industry Canada Class B Emission Compliance Statement**

This Class B digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

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

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## 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.

## Telecommunication Notices

### 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 are usually available only in that country:

<b>IBM Power Cord Part Number</b>	<b>Used in These Countries</b>
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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