User Guide

A20i Type 2255, 2275

Contents

Safety Information

DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

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

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

DANGER

Le courant électrique provenant de l'alimentation, du téléphone et des câbles de transmission peut présenter un danger.

Pour éviter tout risque de choc électrique :

- **Ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.**
- **Branchez tous les cordons d'alimentation sur un socle de prise de courant correctement câblé et mis à la terre.**
- **Branchez sur des socles de prise de courant correctement câblés tout équipement connecté à ce produit.**
- **Lorsque cela est possible, n'utilisez qu'une seule main pour connecter ou déconnecter les câbles d'interface.;**
- **Ne mettez jamais un équipement sous tension en cas d'incendie ou d'inondation, ou en présence de dommages matériels.**
- **Avant de retirer les carters de l'unité, mettez celle-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui la relient aux réseaux, aux systèmes de té lécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).**

- **Lorsque vous installez, que vous déplacez, ou que vous manipulez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.**

Connexion:	Déconnexion:
1. Mettez les unités hors tension.	1. Mettez les unités hors tension.
2. Commencez par brancher tous les cordons sur les unités.	2. Débranchez les cordons d'alimentation des prises.
3. Branchez les câbles d'interface sur des connecteurs.	3. Débranchez les câbles d'interface des connecteurs.
4. Branchez les cordons d'alimentation sur des prises.	4. Débranchez tous les câbles des unités.
5. Mettez les unités sous tension.	

Lithium battery notice

CAUTION:
Danger of explosion if battery is incorrectly replaced.

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

Do not:
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

ATTENTION

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

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

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

Mettre au rebut les batteries usagées conformément aux règlements locaux.

Modem safety information

To reduce the risk of fire, electrical shock, or injury when using telephone equipment, always follow basic safety precautions, such as:

- Never install telephone wiring during a lightening storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

Consignes de sécurité relatives au modem

Lors de l'utilisation de votre matériel téléphonique, il est important de respecter les consignes ci-après afin de réduire les risques d'incendie, d'électrocution et d'autres blessures :

- N'installez jamais de cordons téléphoniques durant un orage.
- Les prises téléphoniques ne doivent pas être installées dans des endroits humides, excepté si le modèle a été con u à cet effet.
- Ne touchez jamais un cordon téléphonique ou un terminal non isolé avant que la ligne ait été déconnectée du réseau téléphonique.
- Soyez toujours prudent lorsque vous procédez à l'installation ou à la modification de lignes téléphoniques.
- Si vous devez téléphoner pendant un orage, pour éviter tout risque de choc électrique, utilisez toujours un téléphone sans fil.
- En cas de fuite de gaz, n'utilisez jamais un téléphone situé à proximité de la fuite.

Laser compliance statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive or a DVD-ROM drive. CD-ROM drives and DVD-ROM drives are also sold separately as options. CD-ROM drives and DVD-ROM drives are laser products. These drives are certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, these drives are certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

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

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

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

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

DANGER

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

DANGER

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

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

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

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

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

DANGER

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

About this book

This publication provides instructions for installing most options into your computer. It also contains information to help you decide which options to add to your computer.

How this book is organized

This book contains the following chapters and appendices:

- "Overview" on page 1 provides an introduction to the options available for your computer.
- "Installing external options" on page 9 provides information to orient you to the connectors on your computer and instructions for installing external options and peripheral devices.
- "Installing internal options-desktop model" on page 15 provides instructions for removing the cover and installing hard disk drives, memory, and adapters in the desktop model computer.
- "Installing internal options-microtower model" on page 25 provides instructions for removing the cover and installing hard disk drives, memory, and adapters in the microtower model computer.
- "Updating the computer configuration" on page 37 provides instructions for updating the computer configuration, installing device drivers, and erasing a lost or forgotten password.
- "Changing the battery" on page 43 provides instructions to help you change the battery if you need to.
- "Updating System Programs" on page 45 provides instructions to help you update your system programs and how to recover from a POST/BIOS update failure.
- "System address maps" on page 47 provides information for programmers describing the address maps of the computer.
- "Interrupt request and direct memory access channel assignments" on page 49 provides information about the interrupt and direct memory access channel assignments.
- "Notices and trademarks" on page 51 contains notice and trademark information.

Information resources

This publication is intended to provide the necessary instructions for installing most options into your computer. This publication also includes an overview of computer features, locating connectors, and updating configuration settings.

Access IBM, on your desktop, provides a link to more information about your computer.

For those with Internet access, the most up-to-date manuals for your computer are available from the World Wide Web. To access this information, point your browser to:

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

Type your machine type and model number in the **Quick Path** field, and click **Go**.

Chapter 1. Overview

Adding hardware options to your computer is an easy way to increase its capabilities. Instructions for installing external and internal options are included in this publication. When adding an option, use these instructions along with the instructions that come with the option.

This chapter provides a brief introduction to the options and features that are available for your computer. Also, important information about required tools, electrical safety, and static-sensitive devices is included.

> **Important**
>
> Before you install any option, read "Safety Information" on page v. These precautions and guidelines will help you work safely.

See Access IBM for general information about the use, operation, and maintenance of your computer. Access IBM also contains information to help you solve problems and get repair service or other technical assistance.

Identifying your computer

To properly install options, you will need to know the model of your computer. The best way to identify your computer is by the machine type/model number. The machine type/model number indicates the various features of the computer, such as the type of microprocessor and the number of drive bays. You can find this number on the small label on the front of your computer. An example of the machine type/model number is 2255-13A.

The information in this publication is for the desktop, and microtower model computers.

- The desktop type is 2255.
- The microtower type is 2275.

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

Desktop model computer

Desktop models come with a hard disk drive and diskette drive (only some models). Some models come with a CD-ROM, DVD-ROM, or Combo drive. The power button is located on the right side of the computer as you are facing it.

Microtower model computer

Microtower models come with a diskette drive and a hard disk drive. Some models come with a CD-ROM, DVD-ROM, or Combo drive. The power button is located on the right side of the computer as you are facing it.

Features

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

Not all models come with all features that are summarized here.

Microprocessor
AMD Duron™ microprocessor with 128KB L1 cache and 64 KB L2 cache or AMD Athlon™ microprocessor with 128KB L1 cache and 256 KB L2 cache memory

Memory

- Support for SDRAM or dual in-line memory modules (DIMMs)
    - 3.3 V, synchronous, 168-pin, unbuffered, 133 MHz nonparity dynamic random access memory (SDRAM)
    - 64 MB, 128 MB, and 256 MB unbuffered nonparity DIMMs for a maximum of 512 MB
    - DIMM heights of 38.1 mm (1.5 inches)

Internal drives

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

Video controller

- Unified video memory technology

Audio subsystem

- 16-bit integrated Sound Blaster Pro compatible audio subsystem

Connectivity
- Modem
- 10/100 Mb Ethernet

System management features
- Wake on LAN
- Wake on Ring (in the Configuration/Setup Utility program, this feature is called Serial Port Ring Detect for an external modem and Modem Ring Detect for an internal modem)
- Wake on Alarm

Input/output features

- 25-pin, ECP/EPP parallel connector
- One 9-pin serial connector
- Three or Four USB connectors
- PS/2 mouse connector
- PS/2 keyboard connector
- 15-pin monitor connector
- Audio line-in, Audio line-out and Microphone connectors
- S/PDIF connector (some models only)
- IEEE 1394 connector (some models only)
- Game port (some models only)

Expansion

- Drive bays:
    - Desktop model: 3
    - Microtower model: 4
- PCI expansion slots
    - Desktop model: 3
    - Microtower model: 3
- PCMCIA adapter (some desktop models)

Power

- 120 W or 155 W power supply with manual voltage selection switch
- Automatic 50/60 Hz input frequency switching
- Advanced Power Management support
- Advanced Configuration and Power Interface (ACPI) support

Security features

- Power-on and administrator passwords
- Lockable Cover (microtower models only)
- Startup sequence control

IBM standard software

Your computer might come with standard software. If it does, an operating system, device drivers to support built-in features, and other support programs are included.

Operating systems (supported)
• Microsoft Windows Millennium Edition (Me)

Operating systems (tested for compatibility)
• Microsoft Window 2000

Specifications

This section lists the physical specifications for the computer. The desktop and microtower models have three 32-bit PCI expansion slots. The desktop models have three drive bays and microtower models have 4 drive bays.

Note: The computer is classified as a Class A or Class B digital device. See the *Quick Reference* for further information about this classification.

Physical specifications-desktop model

Dimensions

    Width: 88 mm (3.4 in.)
    Height: 305 mm (12.0 in.)
    Depth: 380 mm (14.9 in.)

Weight

    Minimum configuration as shipped: 8.5 kg (18 lb)

Environment

    Air temperature:

        System on: 10° to 35° C (50° to 95° F)
        System off: 10° to 43° C (50° to 110° F)
        Maximum altitude: 2134 m (7000 ft)
        Note: The maximum altitude, 2134 m (7000 ft), is the maximum altitude at which the specified air temperatures apply. At higher altitudes, the maximum air temperatures are lower than those specified.

    Humidity:

        System on: 8% to 80%
        System off: 8% to 80%

Electrical input

    Input voltage:

        Low range:

            Minimum: 90 V ac
            Maximum: 137 V ac
            Input frequency range: 57–63 Hz
            Voltage switch setting: 115 V ac

        High range:

            Minimum: 180 V ac
            Maximum: 265 V ac
            Input frequency range: 47–53 Hz
            Voltage switch setting: 230 V ac

    Input kilovolt-amperes (kVA) (approximate):

        Minimum configuration as shipped: 0.08 kVA
        Maximum configuration: 0.30 kVA

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

Heat output (approximate) in British thermal units (Btu) per hour:

    Minimum configuration: 13.7 Btu/hr (4 watts)
    Maximum configuration: 341 Btu/HR (100 watts)

Airflow

    Approximately 0.28 cubic meters per minute (10 cubic feet per minute) maximum

Acoustical noise-emission values

    Average sound-pressure levels:

        At operator position:

            Idle: 38 dBA
            Operating: 43 dBA

        At bystander position - 1 meter (3.3 ft):

            Idle: 33 dBA
            Operating: 37 dBA

    Declared (upper limit) sound-power levels:

        Idle: 3.75 bels
        Operating: 4.99 bels

    Note: These levels were measured in controlled acoustical environments according to the 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 a given 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.

Physical specifications - microtower model

Dimensions

    Width: 385 mm (15.1 in.)
    Height: 192 mm (7.5 in.)
    Depth: 388 mm (15.2 in.)

Weight

    Minimum configuration as shipped: 9.3 kg (20 lb)

Environment

    Air temperature:

        System on: 10° to 35° C (50° to 95° F)
        System off: 10° to 43° C (50° to 110° F)
        Maximum altitude: 2134 m (7000 ft)

        Note: The maximum altitude, 2134 m (7000 ft), is the maximum altitude at which the specified air temperatures apply. At higher altitudes, the maximum air temperatures are lower than those specified.

    Humidity:

        System on: 8% to 80%
        System off: 8% to 80%

Electrical input

    Input voltage:

        Low range:

            Minimum: 90 V ac
            Maximum: 137 V ac
            Input frequency range: 57–63 Hz
            Voltage switch setting: 115 V ac

        High range:

            Minimum: 180 V ac
            Maximum: 265 V ac
            Input frequency range: 47–53 Hz
            Voltage switch setting: 230 V ac

    Input kilovolt-amperes (kVA) (approximate):

        Minimum configuration as shipped: 0.08 kVA
        Maximum configuration: 0.3 kVA

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

Heat output (approximate in British thermal units (Btu) per hour:

    Minimum configuration: 13.7 Btu/hr (4 watts)
    Maximum configuration: 341 Btu/HR (100 watts)

Airflow

    Approximately 0.28 cubic meters per minute (10 cubic feet per minute) maximum

Acoustical noise-emission values

    Average sound-pressure levels:

        At operator position:

            Idle: 38 dBA
            Operating: 43 dBA

        At bystander position - 1 meter (3.3 ft):

            Idle: 33 dBA
            Operating: 37 dBA

    Declared (upper limit) sound-power levels:

        Idle: 3.75 bels
        Operating: 4.99 bels

    Note: These levels were measured in controlled acoustical environments according to the 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 a given 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.

Available options

The following are some available options:

- External options
  - Parallel port devices, such as printers and external drives
  - Serial port devices, such as external modems and digital cameras
  - Audio devices, such as external speakers for the sound system
  - USB devices, such as printers and scanners
  - Monitor
- Internal options
  - System memory
    - Dual in-line memory modules (DIMMs)
  - Adapters
    - Peripheral component interconnect (PCI) adapters
  - Internal drives
    - CD-ROM drive or DVD-ROM drive
    - Hard disk drive
    - Diskette drives and other removable media drives

Tools required

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

Handling static-sensitive devices

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

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

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

- Limit your movement. Movement can cause static electricity to build up around you.

- Always handle components carefully. Handle adapters and memory modules by the edges. Never touch any exposed circuitry.

- Prevent others from touching components.

- When you install a new option, touch the static-protective package containing the option to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.

- When possible, remove the option and install it directly in the computer without setting the option down. When this is not possible, place the static-protective package that the option came in on a smooth, level surface and place the option on it.

- Do not place the option on the computer cover or other metal surface.

Chapter 2. Installing external options

This chapter shows the various external connectors on your computer to which you can attach external options, such as external speakers, a printer, or a scanner. For some external options, you must install additional software in addition to making the physical connection. When adding an external option, use the information in this chapter to identify the required connector, and then use the instructions that come with the option to help you make the connection and install any software or device drivers that are required for the option.

Important

Before you install or remove any option, read "Safety Information" on page v. These precautions and guidelines will help you work safely.
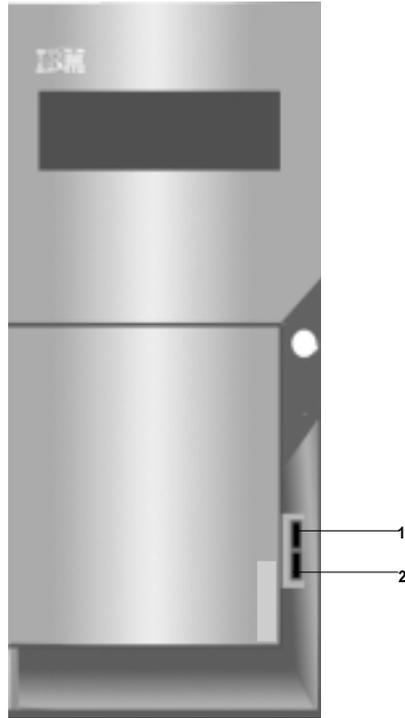

Locating the connectors on the front of your computer

The following illustration shows the location of the connectors on the front of the desktop computer.

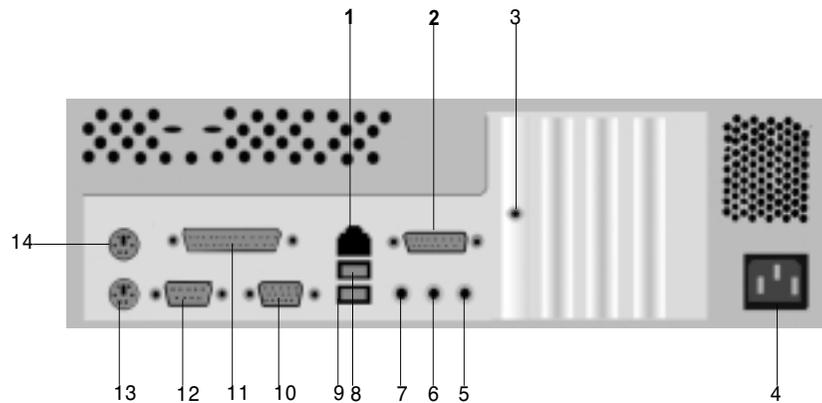| 1	USB connector
2	USB connector (Some models are IEEE 1394 connector)
3	S/PDIF connector
4	Microphone connector
5	Headphone connector
6	Volume control knob

The following illustration shows the location of the connectors on the front of the microtower computer.

1	Front USB connector
2	Front USB connector

Locating the connectors on the rear of your computer

The following illustration shows the location of the connectors on the rear of the desktop model.

1 LAN connector	8	USB connector
2 Game Port (some models only)	9	USB connector
3 Speaker out connector	10	Monitor connector
4 Power connector	11	Parallel connector
5 Microphone connector	12	Serial connector
6 Audio line-in connector	13	Keyboard connector
7 Audio line-out connector	14	Mouse connector

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

The following illustration shows the location of the connectors on the rear of the microtower model.
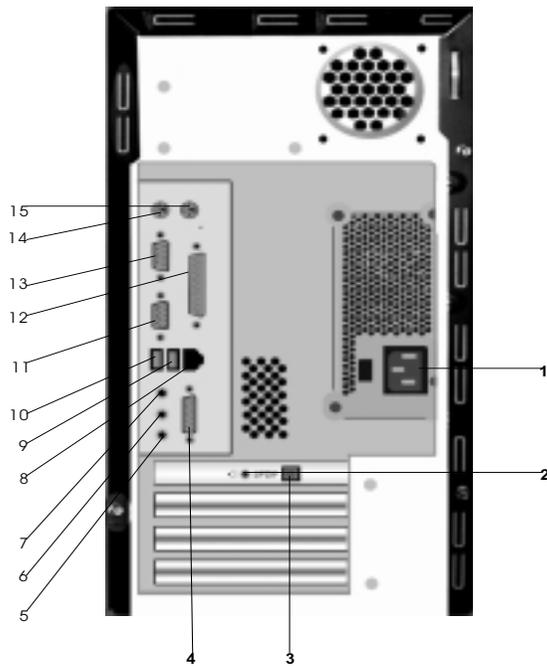
1	Power connector	9	USB connector
2	Speaker out connector	10	USB connector
3	S/PDIF connector (some models only)	11	Monitor connector
4	Game Port (some models only)	12	Parallel connector
5	Microphone connector	13	Serial connector
6	Audio line-in connector	14	Keyboard connector
7	Audio line-out connector	15	Mouse connector
8	LAN connector		

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

Connector	Description
Mouse connector	Used to attach a mouse, trackball, or other pointing device that uses a mouse connector.
Keyboard connector	Used to attach a keyboard that uses a keyboard connector.
USB connectors	Used to attach a device that requires a Universal Serial Bus (USB) connection, such as a USB scanner or USB printer. If you have more than four USB devices, you can purchase a USB hub, which you can use to connect additional USB devices.
Serial connectors	Used to attach an external modem, serial printer, or other device that uses a 9-pin serial connector.
Parallel connector	Used to attach a parallel printer, parallel scanner, or any other device that requires a 25-pin parallel connection.

Connector	Description
Monitor connector	Used to attach a monitor. Some models might have two monitor connectors. There is one on the system board.
Microphone connector	Used to attach a microphone to your computer when you want to record voice or other sounds on the hard disk if you use speech-recognition software.
Audio line-in connector	Used to receive audio signals from an external audio device, such as a stereo system. When you attach an external audio device, a cable is connected between the audio line-out connector of the device and the audio line-in connector of the computer.
Audio line-out connector	Used to send audio signals from the computer to external devices, such as powered stereo speakers (speakers with built-in amplifiers), headphones, multimedia keyboards, or the audio line-in connector on a stereo system or other external recording device.
S/PDIF connector	Used to connect personal audio device, for example, minidisk.

Obtaining device drivers

You can obtain device drivers for operating systems that are not standard at http://www.ibm.com/pc/support/ on the World Wide Web. Installation instructions are provided in README files with the device driver files.

Chapter 3. Installing internal options-desktop model

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

Removing the cover

> **Important:**
>
> Read "Safety Information" on page v and "Handling static-sensitive devices" on page 7 before removing the cover.

To remove the cover:

1. Shut down your operating system, remove any media (diskettes, CDs, from the drives, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer.
4. Remove the screw that secures the top cover at the rear of the system unit.
5. Hold both sides of the system unit top cover and push it foward about 1 inch (2.54cm). Lift the top cover up to remove it completely.
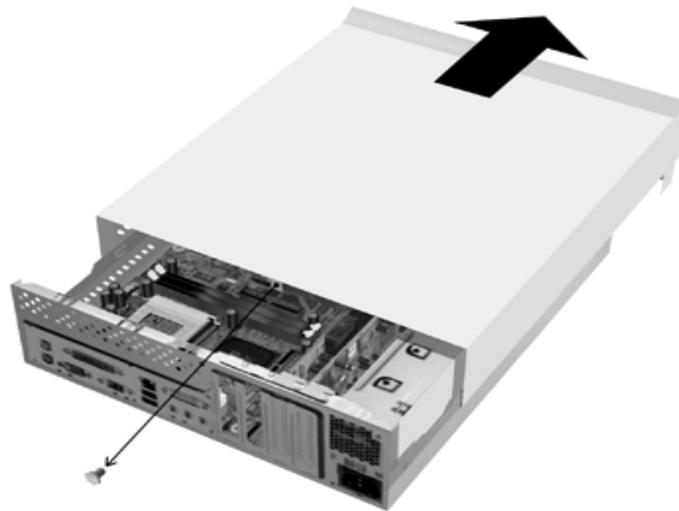
Locating components

The following illustration will help you locate the various components in your computer.
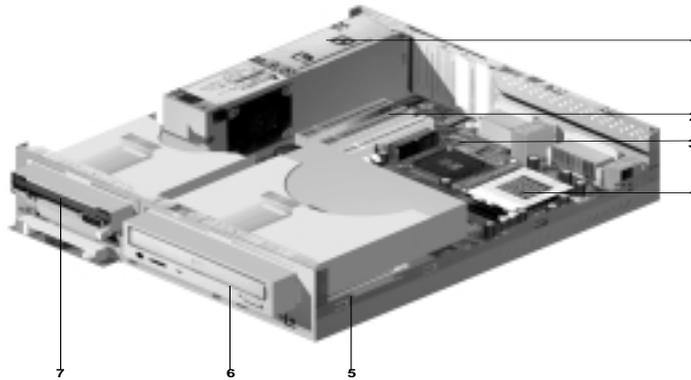
1	Power supply	5	Hard disk drive
2	PCI slot	6	CD-ROM, DVD-ROM, or other drive
3	System board	7	Diskette drive (some models only)
4	Microprocessor		

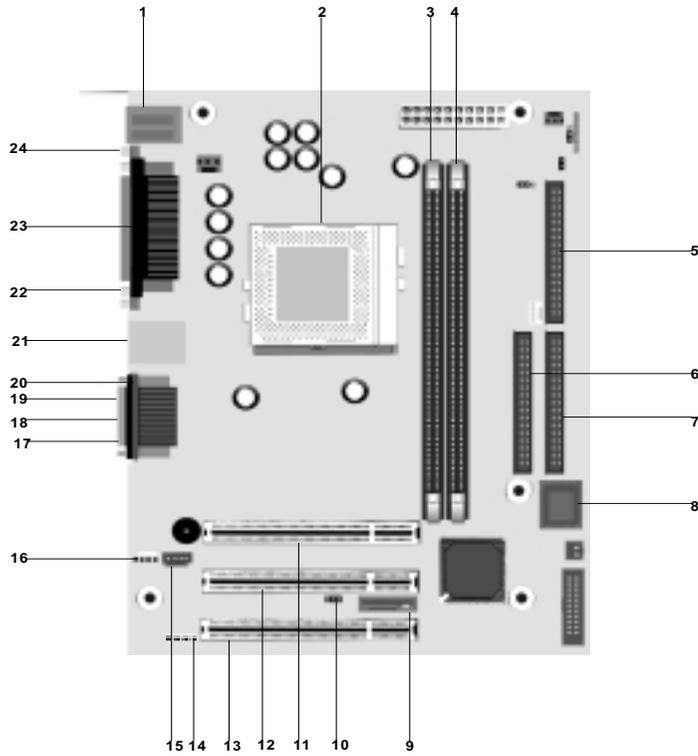# Installing options on the system board

This section provides instructions for installing options, such as system memory and adapters, on the system board.

Accessing the system board

To access the system board, you must remove the computer cover. For information on removing the computer cover, see "Removing the cover" on page 15. You might need to remove adapters to access some components on the system board. For information about adapters, see "Installing adapters" on page 19. When disconnecting cables, be sure to note where they are attached, so that you can correctly reattach them later.

Identifying parts on the system board

The system board, also called the planar or motherboard, is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are IBM-installed or that you can install later.

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

1 PS/2 Keyboard and mouse connector

2 CPU 462 pin socket

3 DIMM 0

4 DIMM 1

5 Diskette drive connector

6 Primary IDE connector

7 Secondary IDE connector

8 Flash ROM

9 CMOS battery connector

10 JP7 1-2: normal(default)
        2-3: CMOS clear

11 PCI Slot 1

12 PCI Slot 2

13 PCI Slot 3

14 S/PDIF connector

15 CD-ROM audio connector

16 Speaker-out connector

17 Microphone connector

18 Audio line-in connector

19 Audio line-out connector

20 Game Port (some models only)

21 2 USB connectors and LAN connector

22 Monitor connector

23 Parallel connector

24 Serial connetor

Installing memory

Your computer has two connectors for installing dual in-line memory modules (DIMMs) that provide up to a maximum of 512 MB of system memory.

Removing a DIMM

To remove a DIMM:

1. Locate the DIMM connectors. See "Identifying parts on the system board" on page 16.
2. At both ends of the DIMM connector on the system board, slowly but firmly push outward on the retaining clips until the module is loosened. Lift the DIMM out of the connector.
3. Store the DIMM in a static-protective package. Do not discard or lose this part. It might be needed later if you change your memory configuration.

Installing a DIMM

When installing DIMMs, the following rules apply:

- Fill each system memory connector sequentially, starting at DIMM 0.
- Use 3.3 V, 133 MHz, unbuffered, SDRAM DIMMs.
- Use only 64, 128, or 256 MB DIMMs in any combination.

To install a DIMM:

1. Touch the static-protective package containing the DIMM to any unpainted metal surface in the computer, and then remove the DIMM.
2. If the retaining clips are not already open, open them.

3. Position the DIMM above the connector so that the two notches on the bottom edge of the module align properly with the empty connector.
4. Firmly push the module straight down into the connector until the retaining clips pop up and fit snugly around both ends of the module.

Installing adapters

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

Adapter slots

Your computer has three expansion slots for peripheral component interconnect (PCI) adapter. You can install a low profile PCI adapter card .

Installing adapters

To install an adapter:

1. Remove the cover. See "Removing the cover" on page 15.
2. Remove the slot screw and slot cover for the appropriate expansion slot.
3. Install the adapter into the appropriate slot on the system board.
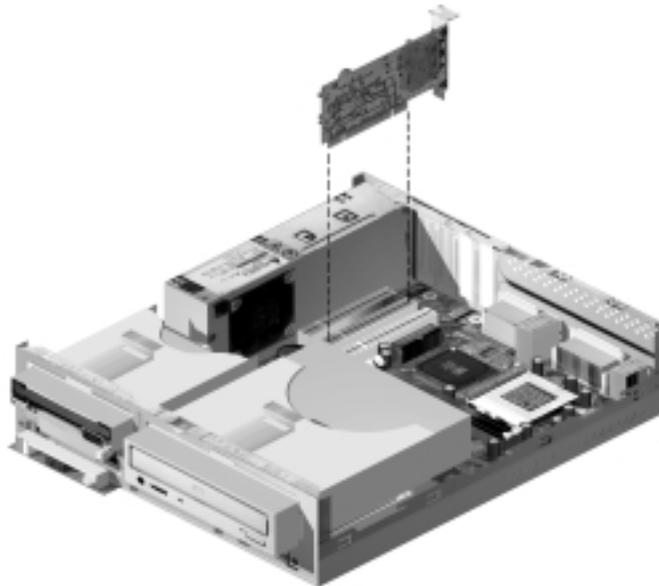
What to do next:

- To work with another option, go to the appropriate section.
- To complete the installation, go to "Replacing the cover and connecting the cables" on page 23.

Installing internal drives

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

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

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

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

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

Drive specifications

Your computer comes with the following IBM-installed drives:

- A CD-ROM drive, DVD-ROM, or other type of drive in bay 2 (some models)
- A 3.5-inch hard disk drive in bay 1
- A 3.5-inch diskette drive in bay 3 (some models)

Models that do not have drives installed in bays 2 and 3 have a static shield and bay panel installed.

The following illustration shows the locations of the drive bays.
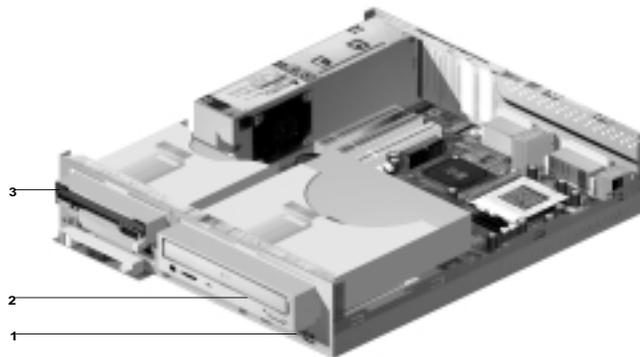
The following table describes some of the drives that you can install in each bay and their height requirements.

Bay 1 - Max Height: **25.4 mm (1.0 in.)**

Bay 2 - Max Height: **41.3 mm (1.6 in.)**

Bay 3 - Max Height: **25.4 mm (1.0 in.)**

Notes:
1. Drives that are greater than 41.3 mm (1.6 in.) high cannot be installed.
2. Install removable media (tape or CD) drives in the accessible bay: bay 2 or 3.

Power and signal cables for internal drives

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

- Four-wire *power cables* connect most drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.

- Flat *signal cables*, also called *ribbon cables*, connect IDE and diskette drives to the system board. There are two sizes of ribbon signal cables that come with your computer:
  - The wider signal cable has two or three connectors.
    - If the cable has three connectors, one of these connectors is attached to the drive, one is a spare, and the third is attached to the primary or secondary IDE connector on the system board.
    - If the cable has two connectors, one of these connectors is attached to the hard disk drive, and the other is attached to the primary or secondary IDE connector on the system board.

      Note: If you want to add another device, and your computer does not come with a standard CD-ROM, you will need a second signal cable with three connectors. You will need an 80-conductor ATA 100 signal cable if you are replacing the existing signal cable or adding a second hard disk drive. ATA 100 signal cables are color-coded. The blue connector is attached to the system board, the black connector is attached to the master device, and the gray middle connector is attached to the secondary (or slave) device.

      If your computer comes with a CD-ROM drive, it has an ATA 100 signal cable. However, if you are installing a hard disk drive, you must change the switch or jumper setting on the CD-ROM drive to secondary and change the connector that is used for the CD-ROM drive to the gray middle connector.
  - The narrower signal cable has two connectors for attaching the diskette drive to the diskette-drive connector on the system board.

- Note: To locate connectors on the system board, see "Identifying parts on the system board" on page 16.

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

- The drives that are standard in your computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive.

- When you install a drive, ensure that the drive connector at the *end* of the signal cable is always connected to a drive; also, ensure that the drive connector at the other end is connected to the system board. This reduces electronic noise from the computer.

- If two IDE devices are used on a single cable, one must be designated as the primary, or master, device and the other as the secondary, or slave, device; otherwise, some of the IDE devices might not be recognized by the computer. The primary or secondary designation is determined by switch or jumper settings on each IDE device.

- If two IDE devices are on a single cable and only one is a hard disk drive, the hard disk drive must be set as the master device.

- If you have only one IDE device on a cable, it must be set as master.

For help in selecting drives, cables, and other options for your computer, see "Available options" on page 7.

Installing internal drives

To install an internal drive, following these steps.

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

1. Remove the cover (see "Removing the cover" on page 15).
2. Lift the latch that secures the CD-ROM drive mounting tray.
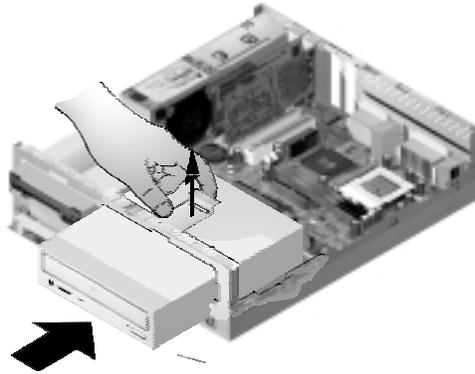
3. Install the drive into the bay. Align the screw holes and insert the two screws.
4. Slide in the drive and engage the latch to secure drive cage.
5. Connect the power and signal cables to the drive.

Replacing the cover and connecting the cables

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

To replace the cover and connect cables to your computer:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
2. Clear any cables that might impede the replacement of the cover.
3. Place the cover over the computer and slide it to the rear until it is fully closed.
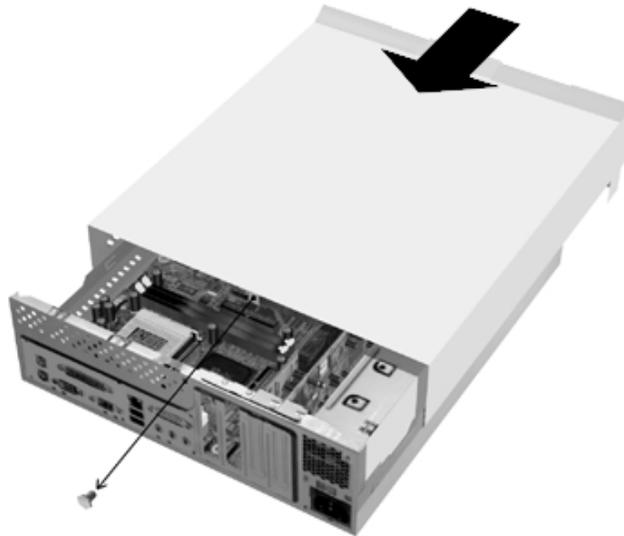
4. Reconnect the external cables and cords to the computer. See "Chapter 2. Installing external options," on page 9.
5. To update the configuration, see "Chapter 5. Updating the computer configuration," on page 37.

Chapter 4. Installing internal options-microtower model

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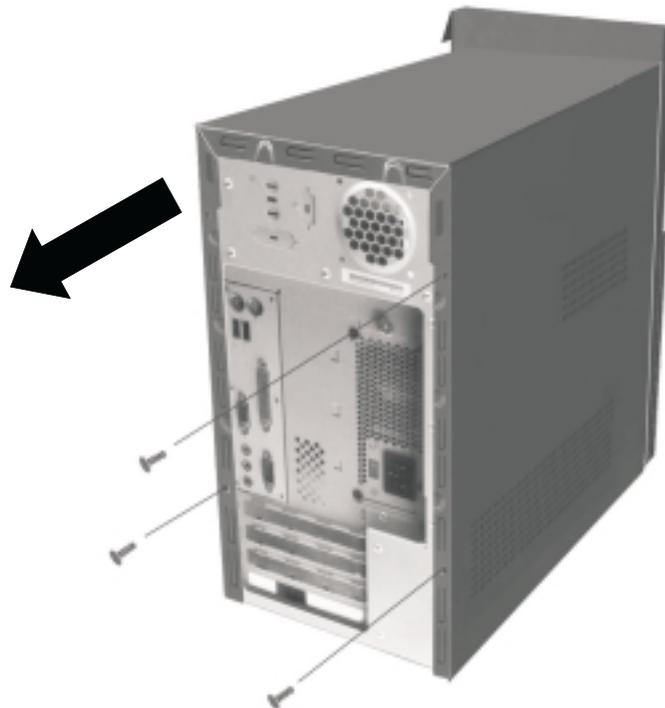
Removing the cover

> **Important:**
>
> Read "Safety Information" on page v and "Handling static-sensitive devices" on page 7 before removing the cover.
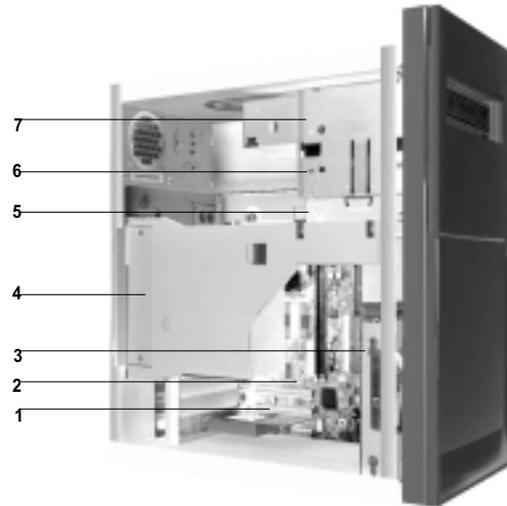
To remove the cover:

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

Locating components

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

1	PCI slot	5	Diskette drive
2	System board	6	Optional drive bay
3	Hard disk drive	7	CD/DVD drive bay
4	Power supply		

Removing the power supply

To perform some operations inside the computer, you might need to move the power supply to access parts of the system board that are difficult to see or hard to reach. Use the following procedure to provide easier access to the system board.

1. Remove the screw securing the power supply to the rear of the chassis.
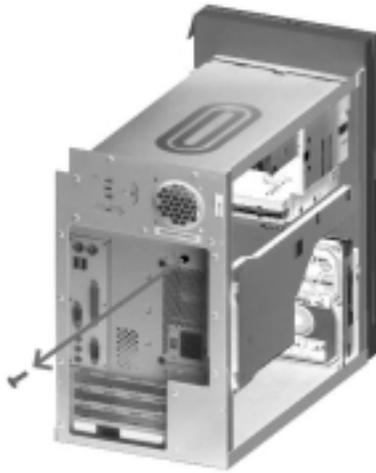
2. Slide the power supply unit up toward the top of the chassis.
3. Rotate the power supply outward as shown.
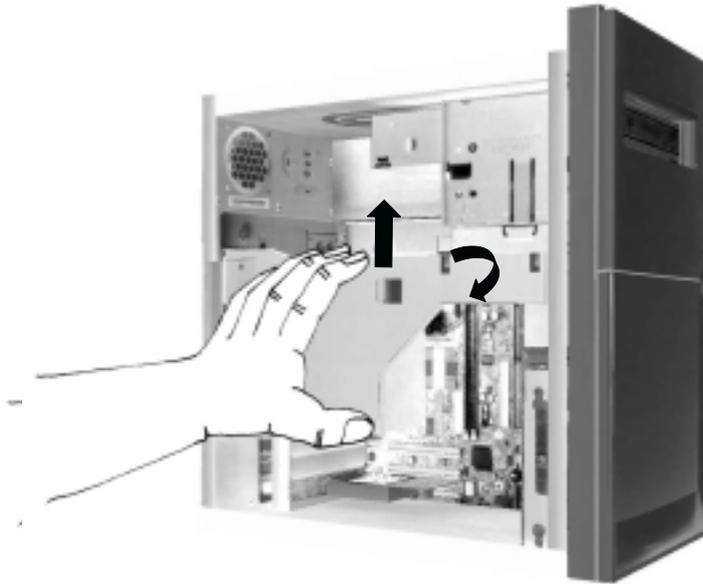
4. Pull the power supply forward and carefully rotate it toward the front of the chassis. Lay it to the side.
5. To replace the power supply, reverse these steps.

Installing options on the system board

This section provides instructions for installing options, such as system memory and adapters, on the system board.

Accessing the system board

To access the system board, you must remove the computer cover. For information on removing the computer cover, see "Removing the cover" on page 25. You might need to move the power supply aside or remove adapters to access some components on the system board. For information about adapters, see "Installing adapters" on page 31. When disconnecting cables, be sure to note where they are attached, so that you can correctly reattach them later.

Identifying parts on the system board

The system board, also called the *planar* or *motherboard*, is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are IBM-installed or that you can install later.
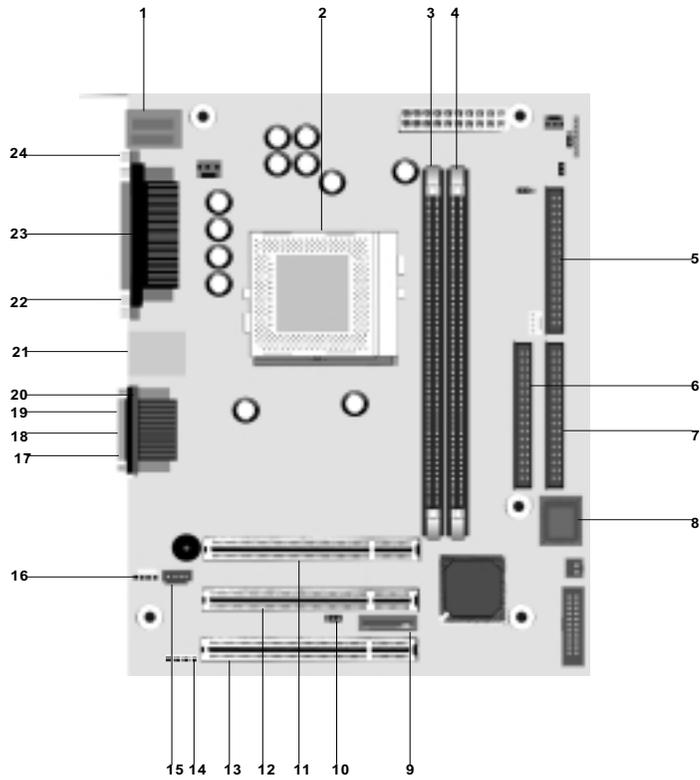
Note: An illustration of the system board and additional information is provided on a label located on the inside of the computer chassis.

1 PS/2 Keyboard and mouse connector	13 PCI Slot 3
2 CPU 462 pin socket	14 S/PDIF connector
3 DIMM 0	15 CD-ROM audio connector
4 DIMM 1	16 Speaker-out connector
5 Diskette drive connector	17 Microphone connector
6 Primary IDE connector	18 Audio line-in connector
7 Secondary IDE connector	19 Audio line-out connector
8 Flash ROM	20 Game Port (some models only)
9 CMOS battery connector	21 2 USB connectors and LAN connector
10 JP7 1-2: normal(default) 2-3: CMOS clear	22 Monitor connector
11 PCI Slot 1	23 Parallel connector
12 PCI Slot 2	24 Serial connetor

Installing memory

Your computer has two connectors for installing dual in-line memory modules (DIMMs) that provide up to a maximum of 512 MB of system memory.

Removing a DIMM

To remove a DIMM:

1. Locate the DIMM connectors. See "Identifying parts on the system board" on page 28.
2. At both ends of the DIMM connector on the system board, slowly but firmly push outward on the retaining clips until the module is loosened. Lift the DIMM out of the connector.
3. Store the DIMM in a static-protective package. Do not discard or lose this part. It might be needed later if you change your memory configuration.

Installing DIMMs

When installing DIMMs, the following rules apply:

- Fill each system memory connector sequentially, starting at DIMM 0.
- Use 3.3 V, 133 MHz, unbuffered, SDRAM DIMMs.
- Use only 64, 128, or 256 MB DIMMs in any combination.

To install a DIMM:

1. To locate the DIMM connectors. See "Identifying parts on the system board" on page 28.
2. If the retaining clips are not already open, open them.
3. Position the DIMM above the connector so that the two notches on the bottom edge of the module align properly with the empty connector.

4. Firmly push the module straight down into the connector until the retaining clips pop up and fit snugly around both ends of the module.

Installing adapters

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

Adapter slots

Your computer has three expansion slots for peripheral component interconnect (PCI) adapters. You can install an adapter with length in 270 mm(10.6 in.), width in 106 mm(4.1 in.), and thickness in 12 mm(0.47 in.).

Installing adapters

To install an adapter:

1. Remove the cover. See "Removing the cover" on page 25.
2. Remove the slot screw and slot cover for the appropriate expansion slot.

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

Installing internal drives

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

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

• Hard disk drives
• CD-ROM drives or DVD-ROM drives
• Removable media drives

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

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

Drive specifications

Your computer comes with the following IBM-installed drives:

- A CD-ROM, DVD-ROM, or other type of drive in bay 1
- An optional drive in bay 2
- A 3.5-inch diskette drive in bay 3
- A 3.5-inch hard disk drive in bay 4

Models that do not have drives installed in bays 1 and 2 have a static shield and bay panel installed. The following illustration shows the locations of the drive bays.
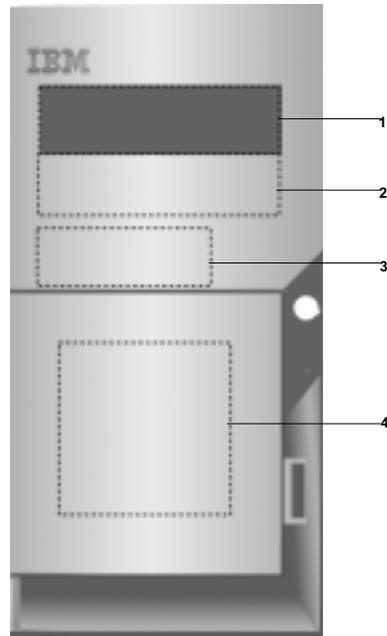
The following table describes some of the drives that you can install in each bay and their height requirements.

Bay 1 - Max Height:	**41.3 mm (1.6 in.)**
Bay 2 - Max Height:	**41.3 mm (1.6 in.)**
Bay 3 - Max Height:	**25.4 mm (1.0 in.)**
Bay 4 - Max Height:	**25.4 mm (1.0 in.)**

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

Power and signal cables for internal drives

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

- Four-wire *power cables* connect most drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.

- Flat *signal cables*, also called *ribbon cables*, connect IDE and diskette drives to the system board. There are two sizes of ribbon signal cables that come with your computer:

  — The wider signal cable has two or three connectors.

    – If the cable has three connectors, one of these connectors is attached to the drive, one is a spare, and the third is attached to the primary or secondary IDE connector on the system board.

    – If the cable has two connectors, one of these connectors is attached to the hard disk drive, and the other is attached to the primary or secondary IDE connector on the system board.

      Note: If you want to add another device, and your computer does not come with a standard CD-ROM drive or DVD-ROM drive , you will need a second signal cable with three connectors. You will need an 80-conductor ATA 100 signal cable if you are replacing the existing signal cable or adding a second hard disk drive. ATA 100 signal cables are color-coded. The blue connector is attached to the system board, the black connector is attached to the master device, and the gray middle connector is attached to the secondary (or slave) device.

      If your computer comes with a CD-ROM drive or DVD-ROM drive, it has an ATA 100 signal cable. However, if you are installing a hard disk drive, you must change the switch or jumper setting on the CD-ROM drive or DVD-ROM drive to secondary and change the connector that is used for the CD-ROM drive or DVD-ROM drive to the gray middle connector.

  — The narrower signal cable has two connectors for attaching the diskette drive to the diskette-drive connector on the system board.

Note: To locate connectors on the system board, see "Identifying parts on the system board" on page 28.

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

- The drives that are standard in your computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive.

- When you install a drive, ensure that the drive connector at the *end* of the signal cable is always connected to a drive; also, ensure that the drive connector at the other end is connected to the system board. This reduces electronic noise from the computer.

- If two IDE devices are used on a single cable, one must be designated as the primary, or master, device and the other as the secondary, or slave, device; otherwise, some of the IDE devices might not be recognized by the computer. The primary or secondary designation is determined by switch or jumper settings on each IDE device.

- If two IDE devices are on a single cable and only one is a hard disk drive, the hard disk drive must be set as the master device.

- If you have only one IDE device on a cable, it must be set as master.

Installing internal drives

To install an internal drive:

1. Remove the cover (see "Removing the cover" on page 25).

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

2. Remove the bay panel, and insert a flat-blade screwdriver into one of the slots on the static shield in the drive bay into which you are installing the drive. Gently pry the static shield loose from the drive bay.

3. Install the drive into the bay. Align the screw holes and insert the two screws.
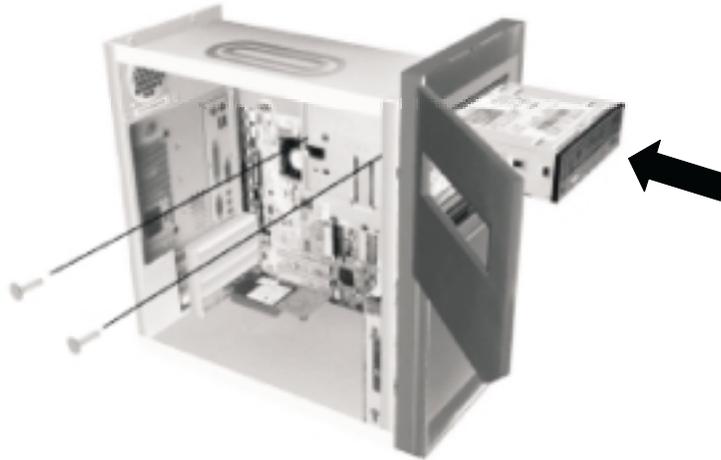
4. If the drive you installed is a removable-media drive, place the bezel frame that comes with your computer over the drive bay.


What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to "Replacing the cover and connecting the cables" on page 34.

Replacing the cover and connecting the cables

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

To replace the cover and connect cables to your computer:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.

2. Clear any cables that might impede the replacement of the cover.
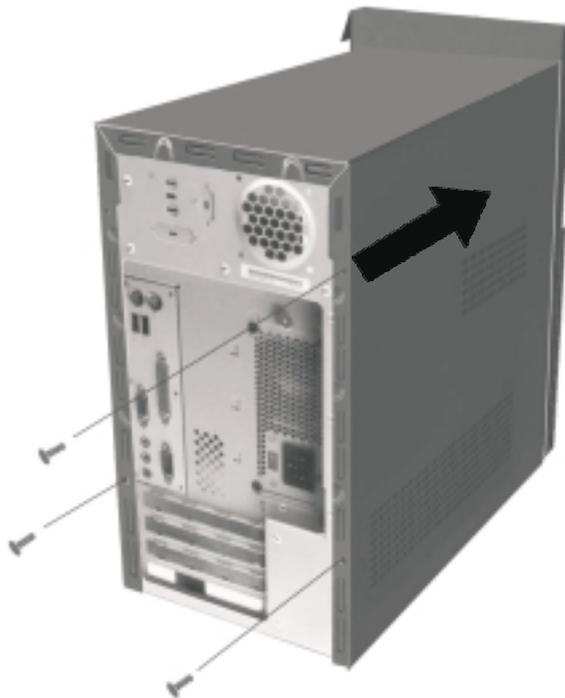
3. Position the cover over the chassis so that the front edge is approximately one inch away from the front bezel.

4. Lower the cover down over the chassis so that the rail guides engage the rails.

5. Slide the cover forward. You might need to lift the front of the cover slightly to align it properly.

6. Insert the three thumbscrews into the holes in the cover and the chassis and tighten.

7. Reconnect the external cables and cords to the computer. See "Installing external options" on page 9.
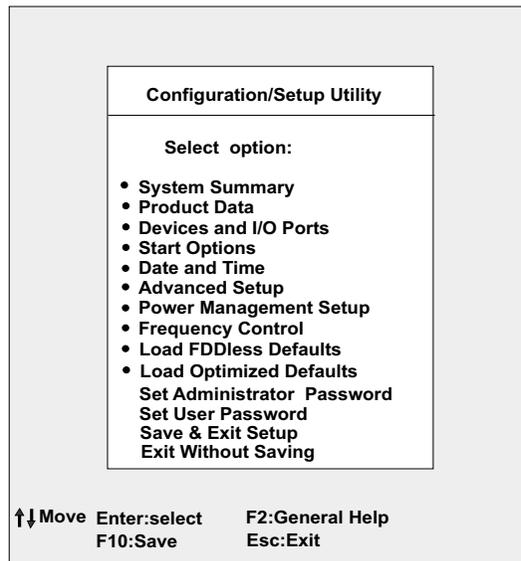

Important:

When the power cord is first plugged in, the computer might appear to power on for a few seconds, then power off. This is a normal sequence to enable the computer to self-initialize.

Chapter 5. Updating the computer configuration

This chapter includes information about updating configuration settings. Your IBM Personal Computer is already configured for immediate use. You can view your computer's configuration settings using the Configuration/Setup Utility. The Configuration/Setup Utility lets you view and change important information about your computer and its hardware.The Configuration/Setup Utility menu appears immediately after you press **F1**.

Configuration/Setup Utility menu

```
              Configuration/Setup Utility

                 Select  option:

           • System Summary
           • Product Data
           • Devices and I/O Ports
           • Start Options
           • Date and Time
           • Advanced Setup
           • Power Management Setup
           • Frequency Control
           • Load FDDless Defaults
           • Load Optimized Defaults
             Set Administrator  Password
             Set User Password
             Save & Exit Setup
             Exit Without Saving

  ↑↓ Move  Enter:select      F2:General Help
           F10:Save          Esc:Exit
```

Note: The Configuration/Setup Utility menu that you see on your computer may look slightly different from the menu shown here, but the options will operate just the same.

The Configuration/Setup Utility menu lists system configuration options. When you select one of these options, a menu for that option appears.

The following table lists specific keys on the keyboard that will help you move through the Setup menus.

Keys Function

↑ ↓   Use these arrow keys to highlight an option in a menu. (Press the Enter key to choose the option.)

← →   Use these arrow keys to change the value of a setting. In some menus, you can use these keys to move from one field to another.

F10   Press this key to save your changes.

Enter   Press this key to select a highlighted option from a menu.

Esc   After viewing or making changes to the settings on a menu, press this key to exit from the menu.

F2   Press this key if you want help for a selected item in a menu.

+ -   Use the + and - keys to change the value in the Date and Time setting menu.

Note: Not all of the above keys are available on every menu. The available keys in a menu appear on the bottom of that menu.

Viewing system information and product data

To view general hardware information about your computer, select the System Summary option from the Configuration/Setup Utility menu. The items displayed in the System Information menu are not configurable. Setup automatically updates this menu when you do either of the following:

• Add or change hardware on your computer

• Make changes to other menus in Setup and save those changes

To view other computer information such as the model number, serial number, and BIOS version and date, select the Product Data option from the Configuration/Setup Utility menu. Like in the System Information menu, the items displayed are not configurable.

Changing parameter settings

In the Setup menus, all configuration information that you can change is enclosed in brackets like these: [ ]. You cannot change any information that is not enclosed inbrackets. Use the up- or down-arrow keys to highlight options then press Enter to display a menu. When changing the setting of a particular parameter, highlight the setting then use the left- or right-arrow key to change the setting.

Load FDDless Defaults

For models that do not include a diskette drive, this option allows you to reload optimized settings for operating without a diskette drive.

If you have made changes in Setup but would like to restore the default settings, follow these steps:

1.From the Configuration/Steup Utility menu, highlight the option, then press
   Enter. A dialog box appears confirming if you want to Load FDDless Defaults.

2.Type Y to select Yes, then press Enter.

3.Highlight the Save & Exit Setup Option, then press Enter. A dialog box appears
   SAVE to CMOS and EXIT(Y/N)?

Load Optimized Defaults

When you purchase an IBM personal computer, it is already configured for use. The original configuration settings, also called factory or default settings, are stored in the CMOS. Setup includes an option, Load Optimized Defaults, that lets you reload the original configuration at any time. If you have made changes in Setup but would like to restore the default settings, follow these steps:

1. From the Configuration/Setup Utility menu, highlight the option Load Optimized Defaults
   then press Enter. A dialog box appears confirming if you want to Load Optimized Defaults.

2. Type Y to select Yes, then press Enter.

3. Highlight the Save & Exit Setup option, then press Enter. A dialog box appears saying
   "SAVE to CMOS and EXIT (Y/N)?"

Canceling the default settings

You might make changes to the Setup parameter that you do not want to keep. To cancel the changes that you have made, follow these steps:

1. Return to the Configuration/Setup Utility menu

2. Highlight the Exit Without Saving option then press Enter and Y. Then press Enter again.

The Setup program then clears all the changes that you made and resets the parameters to the previous settings. These settings are the settings that were in place when you started Setup.

Exiting Setup

When you have finished viewing the settings and making changes, press Esc to return to the Configuration/Setup Utility menu. From this location, you can exit Setup and save your changes or exit without saving your changes.

To exit Setup without saving the changes, follow these steps:

1. From the Configuration/Setup Utility menu, press the Esc key.

2. A dialog box appears saying "Quit without Saving (Y/N)? ". Type Y, and then press Enter.

Note: You also can Exit the Setup by highlighting the Save & Exit Setup option or Exit without Saving option and follow the dialog box directions.

To exit setup and save the changes, follow these steps:

1. From the Configuration/Setup Utility menu, select Save and Exit Setup. Then, press Enter.

2. A dialog box appears saying "Save to CMOS and EXIT (Y/N)? ". Type Y, and then press Enter. The computer restarts using the new settings.

Start Options

The start options are settings that affect the way your computer acts when started.

Startup Sequence

This setting controls which devices your computer will attempt to read data from when it is started.

Your computer can be started from several devices, including the hard disk drive, diskette drive, and CD-ROM drive. The startup program looks for these devices in a selected sequence. The startup sequence on your computer is preset from the factory to have the computer start up from a CD-ROM, diskette, or hard disk. This startup sequence allows you to start the diagnostic and recovery programs from the Product Recovery and Diagnostics CD, use emergency diskettes to recover from a startup failure, and start from your hard disk for normal day-to-day operation. In order to boot from the CD-ROM, place CD Drive before HDD in the boot sequence list.

Virus Warning

This setting determines if the BIOS will monitor the boot sector and partition table of the hard disk drive for any attempt at modification. If any attempt is made, the BIOS will halt the system and an error message will appear.

Afterwards, if necessary, you will be able to run an anti-virus program to locate and remove the problem before any damage is done.

Enabled   Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.

Disabled   No warning message will appear when anything attempts to access the boot sector or hard disk partition table.

Note: Many disk diagnostic programs that attempt to access the boot sector table can cause the above warning message. If you are running such a program, you can avoid the virus warning by disabling the virus protection before you run the program. After running the program, remember to re-enable virus protection.

Quick Power-On Self Test

This setting causes the computer to run a shortened power-on self test (POST). The shortened POST takes less time to complete, but does not test the computer as thoroughly as the normal POST.

Enabled   Enable quick POST

Disabled   Normal POST

Boot Up Floppy Seek

This setting determines whether or not the computer will check for the presence of a diskette drive at startup.

Boot Up NumLock Status

This setting determines the default state of the numeric keypad. By default, the system boots up with NumLock on.

On   The numeric keypad provides numeric functions.

Off   The numeric keypad provides arrow-key, Home, PgUp, PgDn, End, Insert, and Delete functions.

Gate A20 Option

This entry allows you to select how the gate A20 is handled. The gate A20 is a device used to address memory above 1 Mbytes. Initially, the gate A20 was handled via a pin on the keyboard. Today, while keyboards still provide this support, it is more common, and much faster, for the system chipset to provide support for gate A20.

Normal keyboard

Fast   chipset

Typematic Rate Setting

This setting determines whether or not the typematic (repeat) function is enabled. If the typematic function is enabled and a key is held down, the key will repeat after a brief delay. If the typematic function is disabled, the key will not repeat when held brief delay. If the typematic function is disabled, the key will not repeat when held.

Enabled   Enable typematic rate (repeat)

Disabled   Disable typematic rate (no repeat)

Typematic Rate (Chars/Sec)

When the typematic rate is enabled, you can select the rate at which the keys are repeated.

Typematic Delay (Msec)

When the typematic rate is enabled, you can select the delay between when the key was first depressed and when the acceleration begins.

Halt When Error occurence

This option allows system halt when POST error occur. Select "Enabled" system will halt and "Disabled" system will halt for 5 seconds then POST continues.

Halt On

Use this setting to determine under what conditions the power-on self test (POST) will halt when errors are detected.

ALL errors   System halts in case of any errors

No errors   System won't halt in case of any errors

ALL, But keyboard System halts except for the keyboard error

ALL, But diskette   System halts except for the diskette error

ALL, But disk/key   System halts except for the diskette or keyboard error

Date and Time

Use this setting to set the date and time.

Advanced Setup

You can use these features to configure advanced hardware features. Do not attempt to change these settings unless you have an advanced technical knowledge of computer hardware. If these settings are configured incorrectly, the computer might not function correctly.

Power Management Setup

The Power Management Setup allows you to configure your system to use the most effective method of saving energy, while operating in a manner consistent with your own style of computer use.

Set Administrator Password

In this option, you can set up a password to restrict access to the Setup Utility. You can also change or remove the password.

If you set up a password for entering setup, you must type this password each time you want to enter the Setup utility. If you do not type the correct password, you cannot enter Setup.

If you set up a password in this option, you can view and change the setting in the Configuration/Setup Utility.

Set User Password

In this option, you can set up a password to restrict access to the Setup Utility or to your system. You can also change or remove the password.

If you set up a system password, you must type this password each time you power on your system.

If you set up a password in this option, you can only enter and view the setting in the Configuration/Setup Utility.

Erasing a lost or forgotten password (clearing CMOS)

This section will explain how to remove the password or clear it.

To erase a forgotten password:

1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Remove the cover. See "Removing the cover" on page 15 (desktop models) and "Removing the cover" on page 25 (microtower models).
4. Refer to "Identifying parts on the system board" on page 16 (desktop models) and "Installing options on the system board" on page 28 (microtower models).
5. Move the jumper JP7 from the "normal" position to "CMOS clear" position, then move the jumper JP7 back to the "normal" position.
6. Replace the cover and plug in the power cord. See "Replacing the cover and connecting the cables" on page 23 (desktop models), and "Replacing the cover and connecting the cables" on page 34 (microtower models).
7. Restart the computer, leave it on for approximately 10 seconds, and then turn off the computer.

Appendix A. Changing the battery

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

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

Refer to "Lithium battery notice" on page vi for information about replacing and disposing of the battery.

To change the battery:

1. Turn off the computer and all attached devices.
2. Unplug the power cord and remove the cover. See "Removing the cover" on page 15 (desktop model), "Removing the cover" on page 25 (microtower model).
3. Locate the battery. Refer to the system board label inside your computer or see "Identifying parts on the system board" on page 16 (desktop model), or "Identifying parts on the system board" on page 28 (microtower model).
4. If necessary, remove any adapters that impede access to the battery. See "Installing adapters" on page 19 (desktop model), or "Installing adapters" on page 31 (microtower) for more information.
5. Remove the old battery.
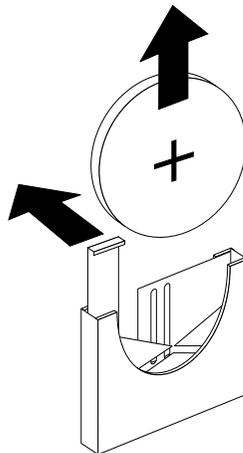
6. Install the new battery.
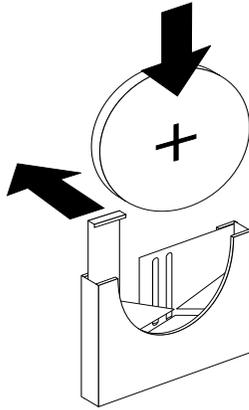
7. Replace any adapters that were removed to gain access to the battery. See "Installing adapters" on page 19 (desktop model), or "Installing adapters" on page 31 (microtower model) for instructions for replacing adapters.

8. Replace the cover and plug in the power cord. See "Replacing the cover and connecting the cables" on page 23 (desktop model), "Replacing the cover and connecting the cables" on page 34 (microtower model) and the *Quick Reference*.

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

9. Turn on the computer and all attached devices.

10. Use the Configuration/Setup Utility program to set the date and time and any passwords.

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

Appendix B. Updating System Programs

The following contains information about updating system programs (POST/BIOS) and how to recover from a POST/BIOS update failure.

System programs

System programs are the basic layer of software built into your computer. They include the power-on self-test (POST), the basic input/output system (BIOS) code, and the Configuration/Setup Utility program. POST is a set of tests and procedures that is performed each time you turn on your computer. BIOS is a layer of software that translates instructions from other layers of software into electrical signals that the computer hardware can understand. You can use the Configuration/Setup Utility program to view and change the configuration and setup of your computer.

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

IBM might make changes and enhancements to the system programs. When updates are released, they are available as downloadable files on the World Wide Web (see *Quick Reference*). Instructions for using the system programs updates are available in a README file included in the update files.

To update system programs (flash the EEPROM):

1. Insert a system programs update (flash) diskette into the diskette drive (drive A) in your computer. System programs updates are available at http://www.ibm.com/pc/support/ on the World Wide Web.

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

Appendix C. System address maps

The following charts represent how the hard disk stores different types of information. Address ranges and byte sizes are approximate.

System memory map

The first 640 KB of system board RAM is mapped starting at address hex 00000000. A 256 byte area and a 1 KB area of this RAM are reserved for BIOS data. Memory can be mapped differently if POST detects an error.

Table 1. System memory map.

Address range (decimal)	Address range (hex)	Description
0~640 KB	(000000 ~ 09FFFF)	Main memory
640~768 KB	(0A0000 ~ 0BFFFF)	VGA memory
768~816 KB	(0C0000 ~ CBFFFF)	Video BIOS Memory
816~896 KB	(0CC000 ~ 0DFFFF)	ISA Card BIOS & Buffer Memory
896~960 KB	(0E0000 ~ 0EFFFF)	BIOS Extension Memory Setup and Post Memory PCI Development BIOS
960~1024 KB	(0F0000 ~ 0FFFFF)	System BIOS memory
	(100000 ~ Upper Limit)	Main memory
	(Upper Limit ~ 4 GB)	PCI memory

I/O address map

The following table lists resource assignments for the I/O address map. Any addresses that are not shown are reserved.

Table 2. I/O address map.

Address (hex)	Description
000-00F	DMA controller-1
0020 – 0021	Interrupt controller 1
0022 – 003F	General I/0 locations, available to PCI bus
040-043	System timer
060-060	Keyboard controller 8742
061-061	System Speaker
070-071	CMOS RAM Address and Real Time Clock
081-08F	DMA controller-2
0A0-0A1	Interrupt controller-2

Table 2. I/O address map.

Address (hex)	Description
0C0-0DF	DMA controller-2
0F0-0FF	Math Co-Processor
170-177	Secondary IDE
1F0-1F7	Primary IDE
200-207	Game Port (some models only)
278-27F	Parallel Printer Port 2
2F8-2FF	Serial Asynchronous Port 2
378-37F	Parallel Printer Port 1
3F0-3F5	Floppy Disk Controller
3F6-3F6	Secondary EIDE
3F7-3F7	Primary EIDE
3F8-3FF	Serial Asynchronous Port 1
0CF8	Configuration Address Register
0CFC	Configuration Data Register
778-77A	Parallel Printer Port 1

Appendix D. Interrupt request and direct memory access channel assignments

The following tables list one possible assignment for the IRQs and DMA channels.

Table 3. IRQ channel assignments.

IRQ	System resource
NMI	Critical system error
SMI	System-management interrupt for power management
0	Timer
1	Keyboard
2	Cascade interrupt from slave PIC
3	COM2
4	USB
5	Modem
6	Diskette controller
7	LPT1
8	Real-time clock
9	ACPI
10	Audio and IEEE1394
11	Ethernet, Video and Cardbus
12	Mouse port
13	Math coprocessor
14	Primary IDE (if present)
15	Secondary IDE (if present)

Table 4. DMA channel assignments.

DMA channel	Assignment
0	Available
1	Audio
2	Floppy Diskette
3	Printer Port
4	Cascade
5	Available
6	Available
7	Available

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