Personal Computer

Installing Options in Your Personal Computer

PC 300PL

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IBM

Note

Before using this information and the product it supports, be sure to read the general information under Appendix C, "Notices" on page 79.

Contents

Safety Information

DANGER:

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

To Connect	To Disconnect
Turn everything OFF.	Turn everything OFF.
First, attach all cables to devices.[1]	First, remove power cord from outlet.[2]
Attach signal cables to receptacles.	Remove signal cables from receptacles.
Attach power cord to outlet.	Remove all cables from devices.
Turn device ON.	
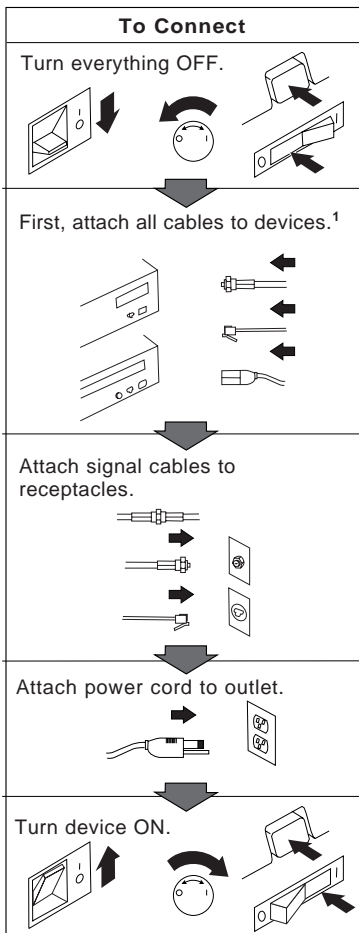
[1] In the U.K., by law, the telephone cable must be connected after the power cord.
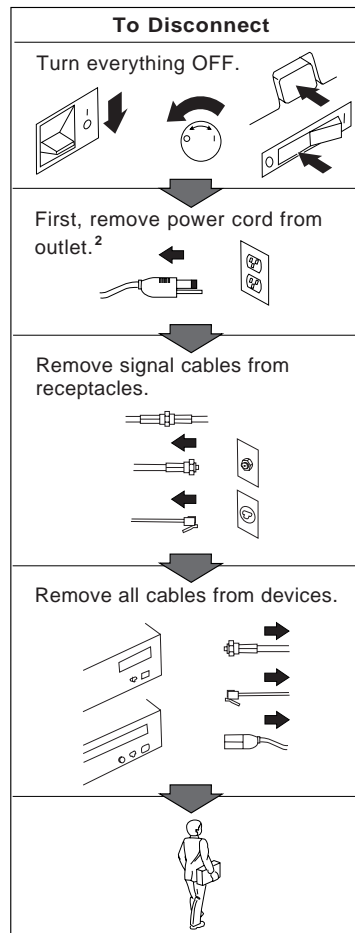
[2] In the U.K., by law, the power cord must be disconnected after the telephone line cable.

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

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

Lithium Battery Notice

CAUTION:
Danger of explosion if battery is incorrectly replaced.

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

Do not:

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

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

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

Remplacer uniquement par une batterie IBM de type 33F8354 ou d'un type équivalent recommandé par le fabricant. La batterie contient du lithium et peut exploser en cas de mauvaise utilisation, de mauvaise manipulation ou de mise au rebut inappropriée.

Ne pas :

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

Mettre au rebut les batteries usagées conformément aux règlements locaux.

About This Book

Thank you for selecting an IBM Personal Computer.
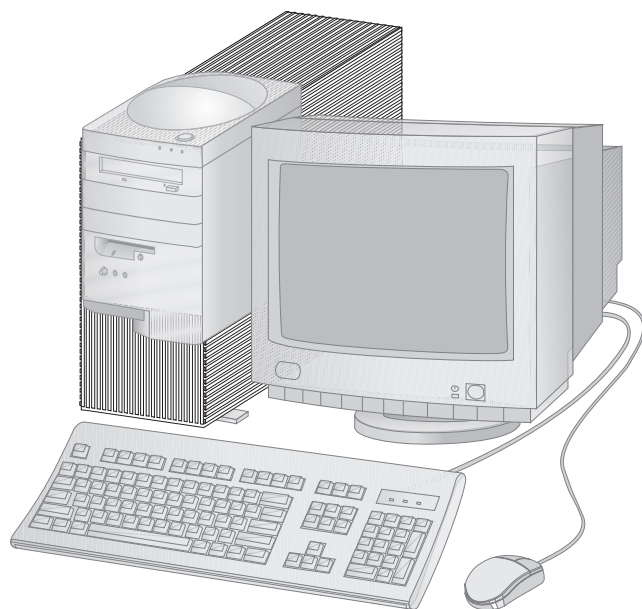
This book provides instructions for installing, removing, and replacing most options. Also, this book contains information to help you decide which options to add to your computer.

Note: The illustrations in this publication might be slightly different from your hardware.

How This Book Is Organized

This book contains the following chapters and appendixes:

- Chapter 1, "Overview" provides an introduction to the options and features for your computer. Safety precautions and handling techniques are discussed along with the required tools you will need to install and remove options.

- Chapter 2, "Preparing to Install and Remove Options" provides instructions for removing the cover and cables for your computer and for locating the components you want to work with.

- Chapter 3, "Working with Options on the System Board" provides instructions for locating, accessing, and working with options on the system board.

- Chapter 5, "Working with Internal Drives" provides instructions for installing and removing adapters and drives.

- Chapter 6, "Working with Security Options" describes features such as the security U-bolt and erasing lost or forgotten passwords. Information on diskette-write protection is also provided.

- Chapter 7, "Completing the Installation" provides instructions for reassembling your computer after you have finished installing options. Information about using the Configuration/Setup Utility program is also provided.

- Appendix A, "Changing the Battery" explains how to change your computer backup battery and the precautions to take when handling and disposing of the battery.

- Appendix B, "Interrupt and DMA Resources" contains the default interrupt and direct memory access (DMA) resources for your computer.

- Appendix C, "Notices" contains IBM notices and trademark information.

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.

- *Using Your Personal Computer*
  This publication contains the following:

  - Instructions for configuring, operating, and maintaining your computer
  - Information on diagnosing and solving computer problems and how to get help and service
  - Warranty information

- *Understanding Your Personal Computer*
  This online publication (provided only with computers that have IBM-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 the section on ordering publications in the "Getting Help, Service, and Information" chapter in *Using Your Personal Computer.*

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

- *Adaptec SCSI Documentation*
  This documentation, which is provided with computers that have an IBM-installed SCSI adapter, includes information on configuring the adapter and instructions for installing and configuring SCSI devices.

- *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.

- *Hardware Maintenance Manual*
  This separately purchased publication contains information for trained service technicians. To obtain a copy, refer to the section on ordering publications in the "Getting Help, Service, and Information" chapter in *Using Your Personal Computer.*

- *Technical Information Manual*
  This publication is available on the World Wide Web only, at
  `http://www.us.pc.ibm.com/cdt/treport.html`. It contains information for
  individuals who want to know more about the technical aspects of their
  computer.

Chapter 1. Overview

Adding hardware options to your computer is an easy way to increase its capabilities. Instructions for removing, installing, and replacing options are included in this book. When adding an option, use these instructions along with the instructions that come with the option. If you have installed options before, you might be able to perform some activities without detailed instructions.

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 or remove any option, read the safety procedures and component-handling guidelines in this chapter. These precautions and guidelines will help you work safely.

Refer to *Using Your Personal Computer* for general information on the use, operation, and maintenance of your computer. *Using Your Personal Computer* also contains information to help you solve problems and get repair service or other technical assistance.

Available Options and Features

The following are some of the available options and features that are discussed in this book:

- System board components

  - System memory, called dual in-line memory modules (DIMMs)
  - Microprocessor upgrades
  - Switch for diskette-write protection
  - Jumper for erasing lost or forgotten passwords
  - Battery

- Adapters

  - Industry standard architecture (ISA) adapters
  - Peripheral component interconnect (PCI) adapters

- Internal drives

- Security U-bolt

The following are some options and features that are available for your computer. For more information, refer to the documentation that comes with the option.

- You can add an infrared transceiver to enable wireless communication between your computer and other infrared-capable devices. Information about related software is included on the *Ready-to-Configure CD*. For more information on the transceiver, refer to the documentation that comes with it.

- Your computer can be remotely started using *Wake on LAN*, which is supported by the Ethernet that is built into your system board. For more information on Wake on LAN, see *Using Your Personal Computer*.

- To help with power management, you can add a modem and have your computer start when a ring is detected by the modem. Using an internal modem, you can use the Configuration/Setup Utility program to enable *Modem Ring Detect*, or using an external modem, you can enable *Serial Port Ring Detect*. For more information, see *Using Your Personal Computer*.

IBM provides help in selecting drives, cables, and other options for your computer. For the latest information about available options:

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

- Within Canada, call 1-800-565-3344 or 1-800-465-7999.

- Outside the United States and Canada, contact IBM, your IBM reseller or IBM marketing representative.

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

`http://www.ibm.com`	Main IBM home page
`http://www.pc.ibm.com`	IBM Personal Computer home page
`http://www.us.pc.ibm.com/desktop/`	IBM Commercial Desktop home page
`http://www.us.pc.ibm.com/servers/`	IBM PC Server home page
`http://www.us.pc.ibm.com/options/`	IBM Options home page
`http://www.us.pc.ibm.com/intellistation/`	IBM IntelliStation home page
`http://www.us.pc.ibm.com/thinkpad/`	IBM Thinkpad home page

Tools Required

To install or remove options in your computer, you will need a flat-head screwdriver. Any additional tools needed depend on the specific option and are noted in the instructions that come with the option.

Electrical Safety

Warning: Electrical current from power, telephone, and communication cables can be hazardous. To avoid any shock hazard, disconnect all power cords and cables as described in the following information.

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

For your safety, always do the following *before* removing the cover:

1. Shut down all programs as described in your operating-system documentation.

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

   Note: Personal computer users in the United Kingdom who have a modem or fax machine attached to their computer must disconnect the telephone line from the computer *before* unplugging any power cords (also known as power cables). When the computer is reassembled, users must reconnect the telephone line *after* plugging in the power cords.

3. Unplug all power cords from electrical outlets.

4. Disconnect all communication cables from external receptacles.

5. Disconnect all cables and power cords from the back of the computer.

   Note: Do not reconnect any cables or power cords until you reassemble the computer and put the cover back on.

CAUTION:
Never remove the cover on the power supply. If you have a problem with the power supply, have your computer serviced.

Handling Static-Sensitive Devices

Have you ever walked across a carpeted floor, then touched an object and received a small electrical shock? That's static electricity, and although harmless to you, it can seriously damage computer components and options.

Important

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 are installing 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. Preparing to Install and Remove Options

This chapter provides instructions for accessing and locating the options you want to install or remove.

Using the Stabilizing Feet

The four feet attached to the bottom cover rotate 90 degrees to provide additional stability for your computer.

When you need to access the inside of the computer, you might find it easier to lay the computer on its side. If you do so, you should rotate the feet in towards the computer, so they do not break off due to the weight of the computer.

When you are finished installing the option(s) and have reattached the side cover, turn the four stabilizing feet a quarter turn out from the computer and set it carefully back on its feet.
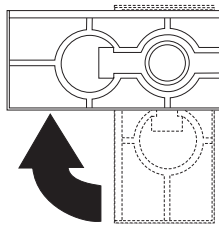
Disconnecting Cables and Removing the Side Cover

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Remove any media (diskettes, compact discs, or tapes) from the drives, and then turn off all attached devices and the computer.

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

1 Unplug all power cords from electrical outlets.

2 If you have a modem or fax machine attached to your computer, disconnect the telephone line from the wall outlet and the computer.

3 Disconnect all cables attached to the computer; this includes power cords, input/output (I/O) cables, and any other cables connected to the computer.
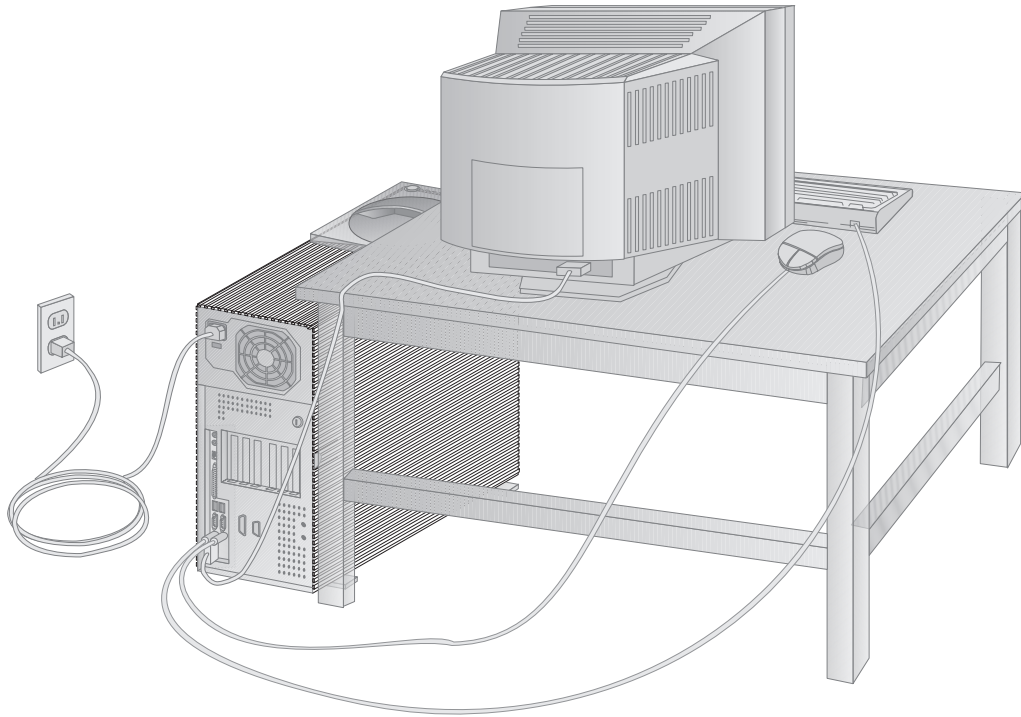
Note: Your computer might differ from the one shown here. For more information on the rear connectors, see *Setting Up Your Personal Computer.*

Note: For more information on ports, including infrared and universal serial bus (USB), refer to *Understanding Your Personal Computer*. [1]

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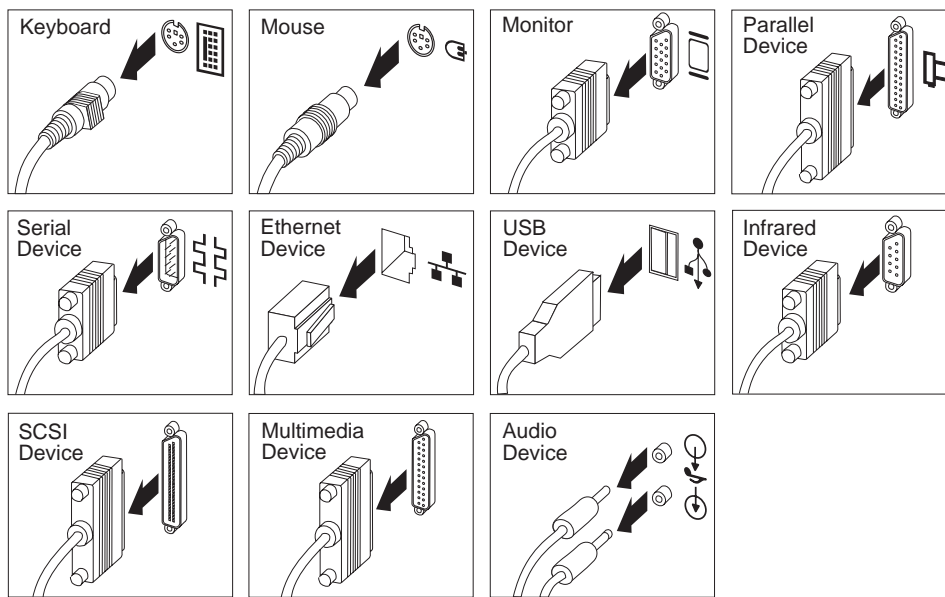
[1] For more information on *Understanding Your Personal Computer*, see "Related Publications" on page ix.

4 If necessary, unlock the computer cover. (The cover lock is located on the rear of the computer.)
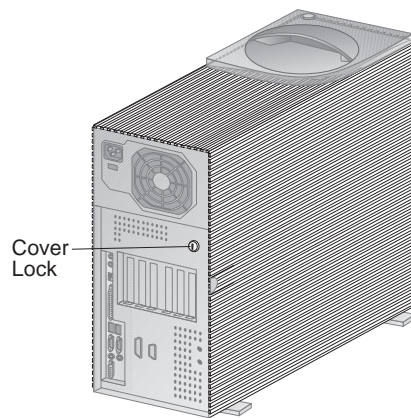
5 One side of the cover is removable and has a cover-release tab at the back edge. You might find it easier to remove the side cover if you lay the computer on its other side.

6 Pull out on the cover-release tab at the rear of the side cover.
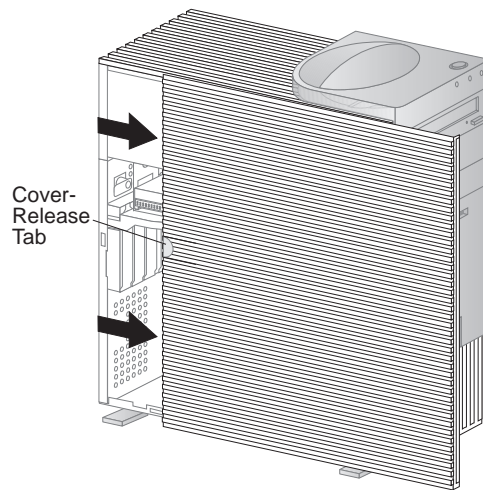
7 Slide the side cover toward the front of the computer and lift it off.

Locating Components

The following information helps you locate components and serves as a reference when you need to install options or connect input/output devices.

Internal View

The following illustration shows the internal view of your computer as seen from the front. For information on removing the cover, see "Disconnecting Cables and Removing the Side Cover" on page 7.

Note: The following illustration is for reference only.

1	Drive cage for bays 1 through 4
2	System board
3	Riser card
4	Adapter card
5	Expansion slots
6	Drive Cage for Bays 5 and 6
7	Bay 6, hard disk drive
8	Bay 5
9	Power supply
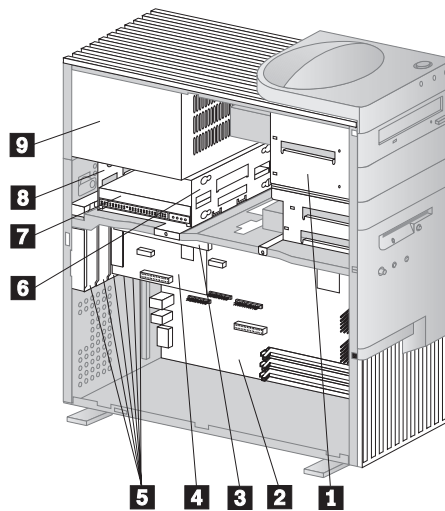
External View

The following illustration shows the external view of your computer as seen from the front.

Note: The following illustration is for reference only.

1	Power-on button
2	Power-on light
3	Hard disk drive light
4	Client LAN light
5	Bay 1, CD-ROM drive
6	CD ROM eject button
7	CD ROM emergency eject
8	Bay 2
9	Bay 3
10	Bay 4, 3.5" diskette drive
11	Microphone in jack
12	Headphone out jack
13	Volume control knob
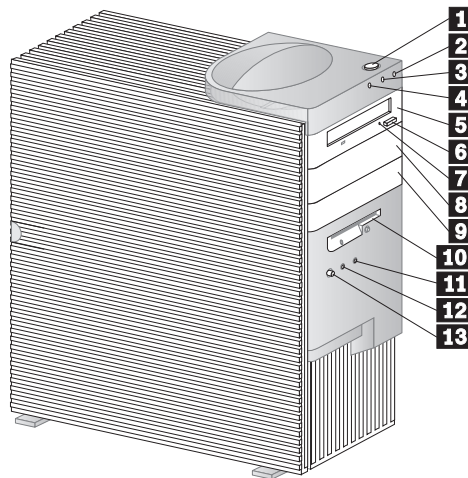
Your computer comes with a diskette drive installed in bay 4 and a hard disk drive installed in bay 6. If your computer comes with a CD-ROM drive, it is installed in bay 1; if your computer comes with a SCSI adapter, it is installed in an expansion slot.

Input/Output Connectors

Input/output (I/O) connectors provide ports for transferring information into and out of your computer. You can connect a variety of I/O devices to your computer, including a monitor, keyboard, mouse, and printer. For more information on the ports and their specific technologies, see *Understanding Your Personal Computer.*

At the rear of your computer is a panel that provides access to the I/O connectors. Adapters installed in expansion slots might also provide I/O connectors. The following illustration shows the I/O connectors on the rear of your computer.
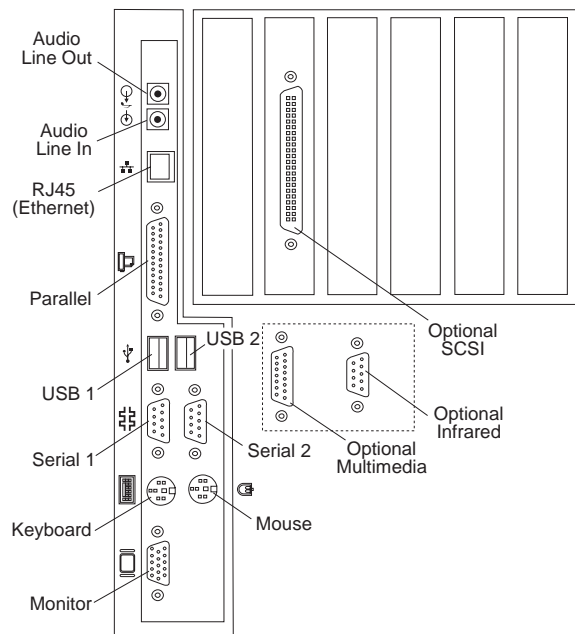
Chapter 3. Working with Options on the System Board

This chapter provides information about system board options discussed in this book.

The information in this chapter helps you identify parts on the system board.

This chapter also provides instructions for installing, removing, and replacing system board components, specifically system memory and the microprocessor. For information on other system board components, see the appropriate section.

Accessing the System Board

Note: For information on removing the computer cover, see "Disconnecting Cables and Removing the Side Cover" on page 7.

To access the system board, it helps to place the computer on its side on a table. You might need to remove adapters, or drives in bays 5 and 6. Also, you might need to remove cables that are attached to the system board. When disconnecting cables, it is important to note where they attach, so you can 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.

If you plan to install, remove, or replace hardware in your computer, you will need to know the layout of the system board. The following illustration shows the layout of the system board in your computer. The numbered pointers show the components that are discussed in this book.

|	
1	Battery
2	Configuration switches
3	Microprocessor connector
4	CMOS clear (password) jumper
5	Memory Module Connector 0
6	Memory Module Connector 1
7	Memory Module Connector 2
8	System board latch
9	Video memory or Rainbow Runner Studio upgrade connector
10	Video memory or Rainbow Runner Studio upgrade connector
11	Rainbow Runner Studio upgrade connector
12	VESA feature connector
13	115 Kbps infrared connector
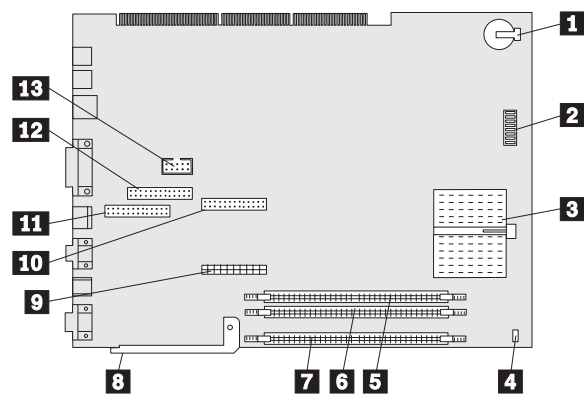
Note: An illustration of the system board and additional information are provided on a label found on the underside of the computer cover.

Working with System Memory

You can add memory to your computer to increase system performance. Your computer has three connectors for installing system-memory modules. The maximum amount of system memory your computer supports is 384 MB.

Note: To locate the memory connectors inside your computer, see "Identifying Parts on the System Board" on page 15.
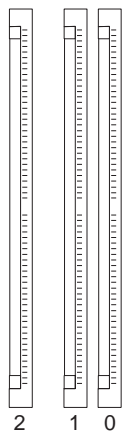
The memory modules your computer uses are *dual inline memory modules (DIMMs)*. The IBM-installed DIMMs that come with your computer are nonparity (NP) or ECC (error correcting code) EDO (Extended Data Out) modules.

When installing or replacing DIMMs, follow these guidelines:

- Use only 3.3 V dc unbuffered DIMMs.
- Each memory connector supports a maximum of 128 MB of EDO memory.
- Install only ECC EDO DIMMS to enable ECC.
- 60 ns EDO DIMMs are supported.

Memory Configuration

When you are adding or removing memory, you can use any combination of DIMM sizes 16, 32, 64, or 128 MB. Be sure to fill each system-memory connector sequentially, starting at *Mem 0.* For the location of Mem 0, see "Identifying Parts on the System Board" on page 15.

The following table shows possible memory configurations for your computer; this table and additional information are also found on the underside of the computer cover. Again, alternative configurations are possible.

Note: Values in the following table are represented in megabytes (MB).

Table 1. Memory Configurations

| Total Memory (MB)	Mem 0	Mem 1	Mem 2
16	16	0	0
32	32	0	0
32	16	16	0
48	16	16	16
48	16	32	0
48	16	16	16
64	32	16	16
64	32	32	0
80	32	32	16
96	32	32	32
96	32	64	0
112	32	64	16
128	32	64	32
160	32	128	0
160	32	64	64
176	32	128	16
192	32	128	32
224	32	128	64
288	32	128	128
384	128	128	128

Installing a Memory Module

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

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the new system memory.
- Turn off the computer and all other connected devices.
- Lay the computer on its side. Carefully rotate the feet a quarter turn, so they do not support the weight of the computer while it is on the side.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).


Note: For information on memory configuration, see Table 1 on page 17.

1 To locate the memory connectors inside your computer, see "Identifying Parts on the System Board" on page 15.

2 Be sure the retaining clips are in the open position, as shown in the second illustration below. If the retaining clips are perpendicular with the connector, push outward on them until they click open.
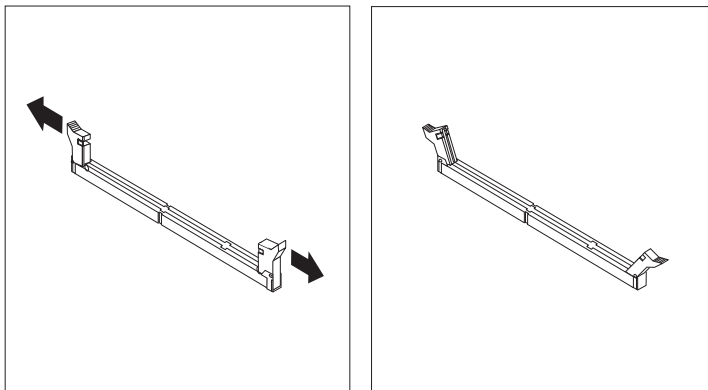
3 Touch the static-protective package containing the memory module to any *unpainted* metal surface in the computer, and then remove the module.

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

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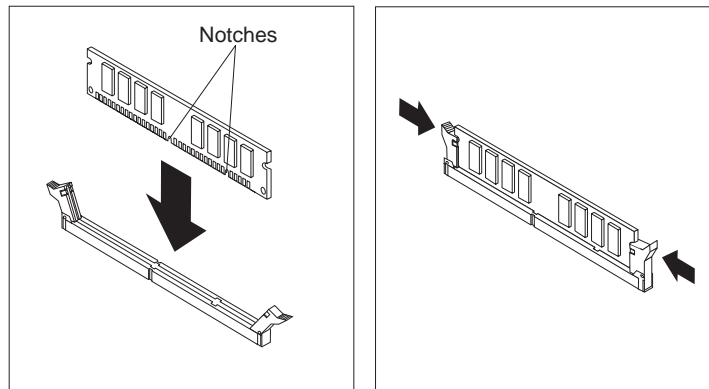
5 Firmly push the module straight down into the connector until the retaining clips pop up and snugly fit around both ends of the module.

6 To install another memory module, repeat steps 1–4.

7 Go to the device-record form in *Using Your Personal Computer* and record this installation.

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 66.

Removing a Memory Module

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


Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all other connected devices.
- Lay the computer on its side. Carefully rotate the feet a quarter turn, so they do not support the weight of the computer while it is on the side.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).

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1 To locate the memory connectors inside your computer, see "Identifying Parts on the System Board" on page 15.

2 At both ends of the memory module connector, push outward on the retaining clips until the module is loosened.

   Note: Be careful not to push too hard on the retaining clips because the module may abruptly eject from the connector.
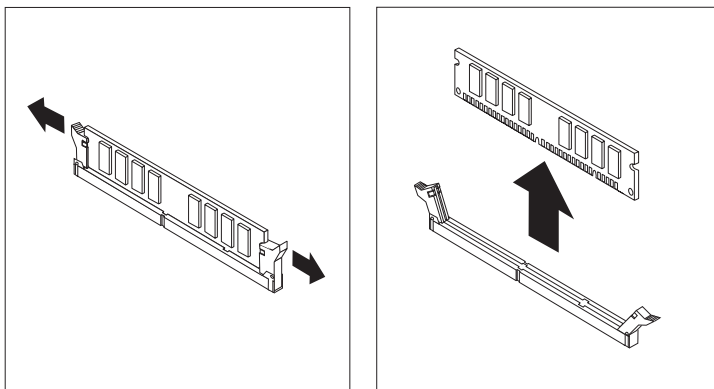
3 Lift the memory module out of the connector.

4 Store the module in a static-protective package.

┌─ **What to do next** ───┐
│   │
│ • To work with another option, go to the appropriate section.   │
│ • To complete the installation, go to Chapter 7, "Completing the Installation" │
│   on page 66.   │
│   │
└──┘

Installing Video Upgrades

Your computer supports one of several video upgrade options. These options include different types of multimedia or a video memory upgrade.

Important

Your computer supports a maximum of *one* video upgrade option. This means that you can add either a memory upgrade or a multimedia option, but not both.

Video Memory

The maximum amount of video memory the system board supports is 4 MB. Your computer comes with 2 MB of video memory already installed, and you can add an additional 2 MB of memory to increase system performance. (You can order an MGA Mystique 2 MB memory module from Matrox Graphics Inc.)


Tip

To see the amount of video memory installed in your computer, perform the following procedures:

1. Turn on your computer and start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 70).

2. Select **Devices and I/O Ports**.

3. Select **Video Setup**.

4. Look under **Video Memory**. If the value is 2048 KB, your computer has 2 MB of video memory and can accept the upgrade. If the value is 4096 KB, the system board is already equipped with the maximum amount of video memory and an upgrade is not needed.

5. Exit from the Configuration/Setup Utility program.

Video Multimedia Modules

Your computer also supports the Matrox Rainbow Runner Studio multimedia upgrade modules (see the *Using Your Personal Computer* for more information about these multimedia upgrades).   These multimedia upgrades require the additional installation of a cable and connector with a module. To install the cable and connector, you must remove the multimedia knockout panel on the back of the computer. Follow the instructions included with the multimedia option from Matrox.


Multimedia   Infrared
Knockout   Knockout
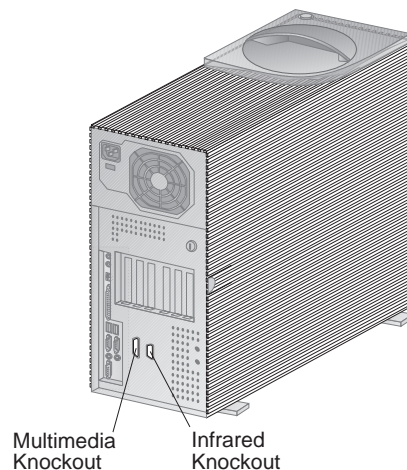
Installing Video Modules

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the side cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).
- Locate the video upgrade module connectors on the system board. Refer to "Identifying Parts on the System Board" on page 15.
- If an adapter impedes your access to the video module connectors, remove it. For more information, see "Removing Adapters" on page 42.

You will be able to upgrade your computer's multimedia functionality in only one of the ways shown in the following illustration.
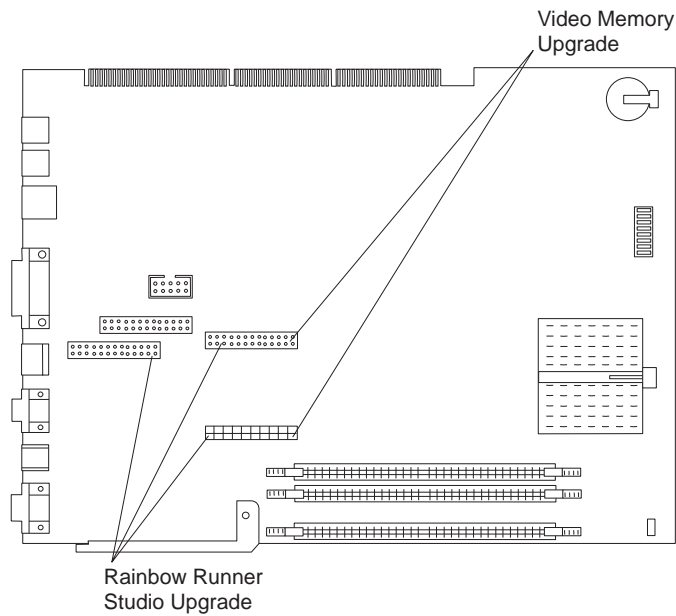
To install video option upgrades:

1 Touch the static-protective package containing the upgrade module to any *unpainted* metal surface in the computer, and then remove the module from the package. Follow the instructions included with the option.

2 Go to the device-record form in *Using Your Personal Computer* and record this installation.

What to do next

- If you have removed an adapter and want to reinstall it, go to "Installing Adapters" on page 35.
- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 66.

Replacing a Microprocessor

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

Your computer comes with an Intel® microprocessor installed on the system board. It can be either a Pentium® or a Pentium with MMX™ technology.

Tip

To see which microprocessor is installed in your computer, perform the following procedures:

1. Turn on your computer and start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 70).

2. Select **System Summary**.

3. Look under **Processor**. The processor will be shown at the top of the list as either Pentium MMX or Pentium.

4. Exit from the Configuration/Setup Utility program.

For the latest information on microprocessor upgrades available for your computer, contact your IBM reseller or IBM marketing representative. If you do upgrade the microprocessor, use the instructions that come with the upgrade along with the instructions in this publication.

CAUTION:
The microprocessor and heat sink will be hot if the computer has been running. To avoid the possibility of a burn, if the computer has been on, let the microprocessor and heat sink cool for 10 minutes before continuing with the procedure.


Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the new microprocessor.
- Turn off the computer and lay it on its side. Carefully rotate the feet a quarter turn, so they do not support the weight of the computer while it is on the side.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).

Warning: When removing the heat sink and the microprocessor, be careful not to scrape any system board component. Also, the retaining clip is under tension and may disengage suddenly if it is not held while it is being removed.

1 Locate the microprocessor on the system board (see "Identifying Parts on the System Board" on page 15).

2 The slots on the ends of the retaining clip hook over the tabs found on the microprocessor connector. At the top of the clip is a "loop" to help with removal.

To remove the retaining clip, simultaneously press down on the loop and unhook the nearest tab from the slot; then unhook the tab on the other side.
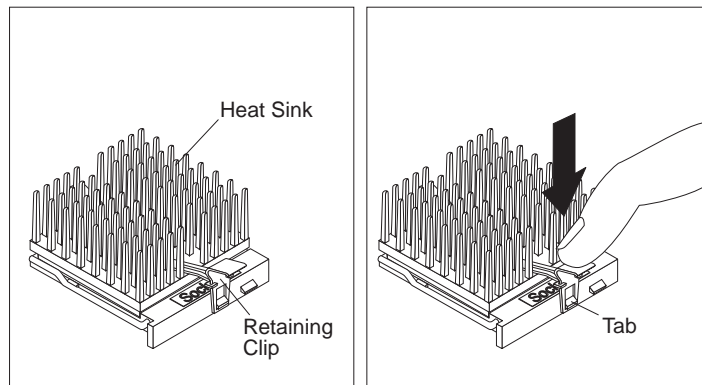

CAUTION:
Thermal grease is used to seal the heat sink to the microprocessor. Be careful not to get the grease on your skin. If the grease touches your skin or clothing, wash the area with soap and water.

3 Remove the retaining clip and the heat sink.
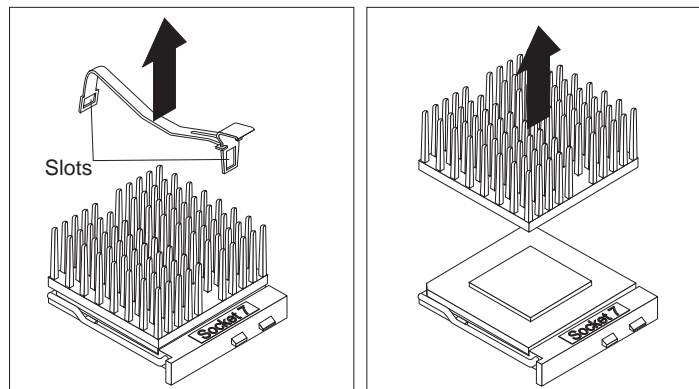
4 Release the lever on the side of the microprocessor connector and lift it all the way up. This releases the microprocessor. Lift the microprocessor out of the socket.
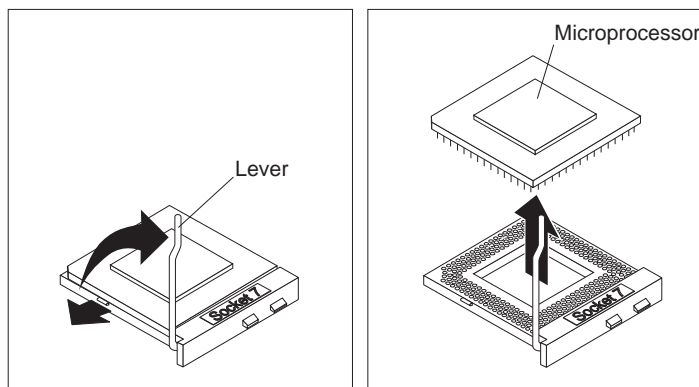

5 Store the old microprocessor in a static-protective package.

6 Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface in the computer, and then remove the new microprocessor.

7 Align the pins of the new microprocessor with the socket and insert the microprocessor until it is properly seated.

Warning: Be careful when inserting the microprocessor into the socket, because the pins of the microprocessor connect only one way.
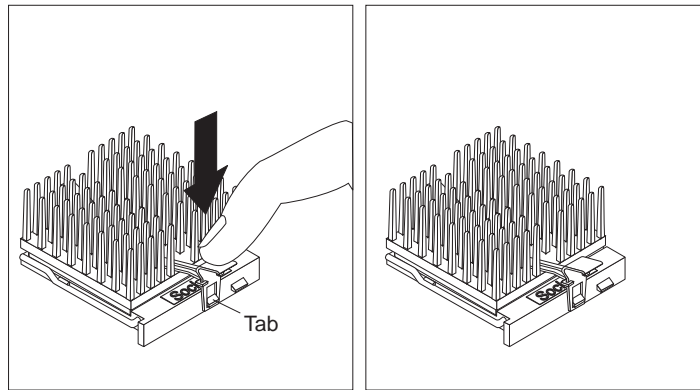
Lower the lever to lock the microprocessor into position.
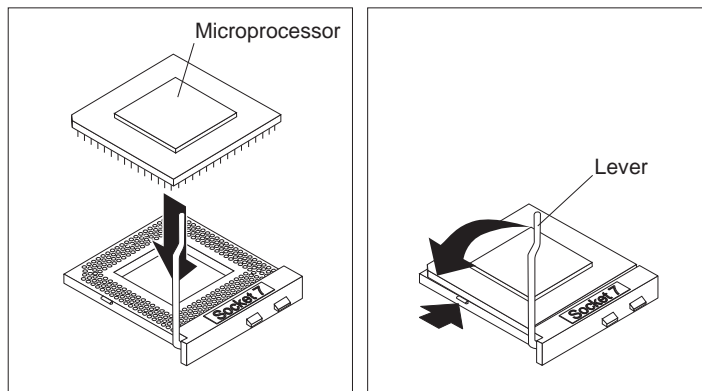
8 Apply thermal grease to the heat sink; then replace the heat sink and clip.
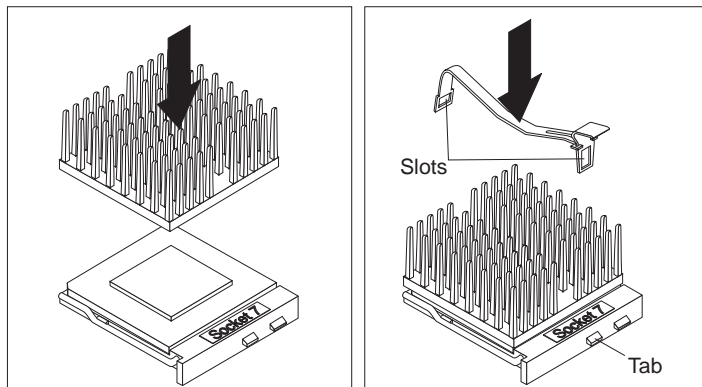
9 Press down on the loop to rehook the clip to the tabs on the connector.

Tab

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 66.

Chapter 4. Working with Adapters

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

When you are installing or removing adapters, it is important to resolve any resource conflicts that might arise. For example, if you install an ISA legacy adapter, you might need to manually configure the adapter by setting a variety of switches on the adapter and by using the Configuration/Setup Utility program.

Many adapters now use *Plug and Play* technology, which enables the computer to automatically configure the adapter, provided that the required resources are available. Refer to the instructions that come with your adapter to determine if it is Plug and Play. For more information, see "Adapter Configuration" on page 33.

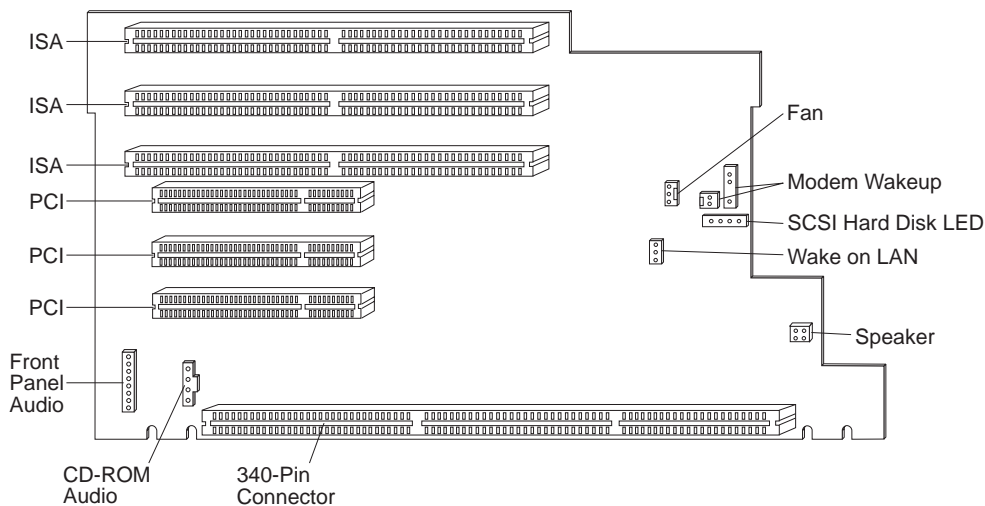## Adapters and the Riser Card

Your computer uses a riser card for expansion. The riser card contains expansion slots that connect adapters to the industry standard architecture (ISA) and peripheral component interconnect (PCI) buses.

You can install a variety of adapters in the expansion slots on the riser card. Some IBM Personal Computer models come with a SCSI adapter. For information on locating the riser card, see "Locating Components" on page 11.

The riser card in your computer has three ISA slots and three PCI slots. These slots are dedicated to either the ISA or PCI bus.

The following illustration shows the expansion slots on the riser card.

Note: The diskette and IDE drive connectors are also on the riser card. When installing optional drives, refer to the two illustrations below for the location of the appropriate connectors.

The following illustration shows the IDE drive connectors on the back of the riser card.

Diskette Drive

3.5 V Select

LED Panel   Secondary IDE   Primary IDE   Power
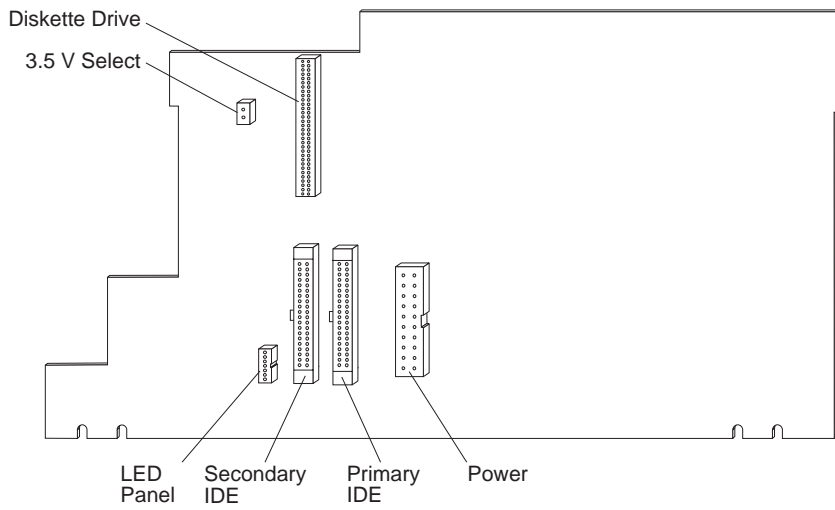
Adapter Configuration

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

Plug and Play Adapters

Your computer uses the *Plug and Play* method to configure adapters. Support for Plug and Play is built into the system board of your computer.

If an adapter is Plug and Play, there are no switches or jumpers that must be set on the adapter. A Plug and Play adapter comes with configuration specifications set in memory to provide installation information to the computer during startup. When you install or remove Plug and Play adapters, this information is interpreted by the *basic input/output system (BIOS)*, which supports Plug and Play technology. If the required resources are available, then the BIOS software automatically configures the adapter around the resources already in use by other devices.

Most adapters designed for PCI slots are Plug and Play devices; many ISA adapters are not Plug and Play devices.

Notes:

1. If a resource conflict arises after installing a Plug and Play adapter, you might need to change the default resource settings on the adapter. For more information, refer to the documentation that comes with the adapter.

2. For information on error messages from resource conflicts, see *Using Your Personal Computer.*

Legacy Adapters

Adapters that are not Plug and Play-compatible are known as *legacy* devices. If you install a legacy adapter, you must manually configure it by setting switches on the adapter and by allocating system resources using the Configuration/Setup Utility program.

In the Configuration/Setup Utility program, the ISA Legacy Resources screen shows the computer resources that are typically required by adapters:

- Memory resources
- I/O port resources
- DMA resources
- Interrupt resources

From the appropriate screens, you can select available resources for the adapter you are installing. Resources not being used by ISA legacy adapters are listed as [**Available**]. You must set the resources used by the newly installed ISA legacy adapter to [**Not available**]; this reserves the resources for the legacy adapter and prevents the BIOS from using these resources for the system or other Plug and Play adapters.

Just as you change system resources when you install an ISA legacy adapter, you must also change resources when you remove an ISA legacy adapter. If you remove a legacy adapter, change the resources it formerly used to [**Available**]. This allows the Plug and Play software to automatically use these resources for future configurations, or you can use these resources for future manual configurations.

Note: Refer to the documentation that comes with the adapter for information on required system resources.

For information on configuring ISA legacy adapters, see "Configuring an ISA Legacy Adapter" on page 73 or refer to *Using Your Personal Computer*. For information on error messages from resource conflicts, see *Using Your Personal Computer*.

Installing Adapters

```
┌─ Before you begin ──────────────────────────────────────────────┐
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- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the new adapter.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer.
- Lay the computer on its side. Carefully rotate the feet a quarter turn, so they do not support the weight of the computer while it is on the side.
- Remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).

1 Review the instructions that come with the adapter to determine if it must be installed in an ISA or PCI slot.

2 Remove the screw and cover for the appropriate expansion slot. If you cannot access the expansion slot screw, see "Removing the Bottom Cover" on page 40.
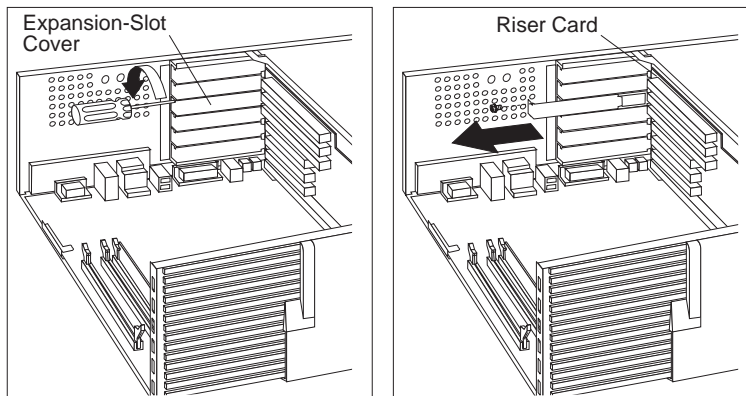
3 Touch the static-protective package containing the adapter to any *unpainted* metal surface in the computer; then, remove the adapter from the package.

4 Install the adapter into the appropriate slot on the riser card and screw it in. The components of a PCI adapter face down toward the system board and the components of an ISA adapter face up. If a component in the computer or on the adapter interferes with the installation, use another slot.
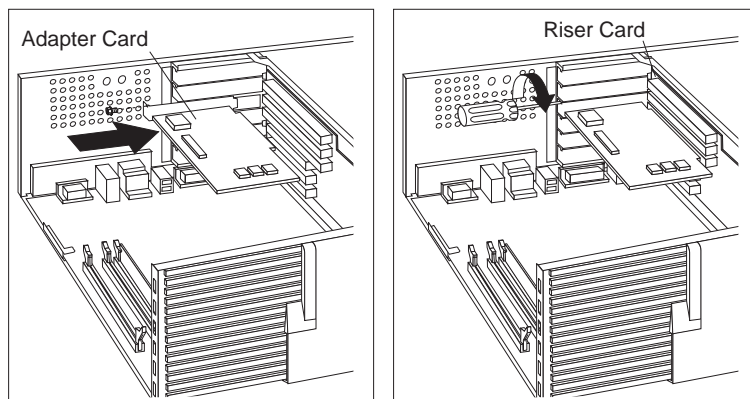
5 If you removed the bottom cover, see "Replacing the Bottom Cover" on page 40.

6 Go to the device-record form in *Using Your Personal Computer*, and write the adapter name next to the slot into which you installed it.

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 66.
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Installing a Full-Sized ISA Adapter

To install a full-sized PCI adapter in the bottom expansion slot, you might need to remove the bottom cover and the system board.

1 Remove the bottom cover. (See "Removing the Bottom Cover" on page 40.)

2 Remove the system board.

    a. Push the system board latch down slightly to disengage the plastic tab on the latch from the system board support.
    b. Grasp and turn the latch to the extended position. This releases the system board.
   c. While pulling the latch, slide the system board out and set it aside.
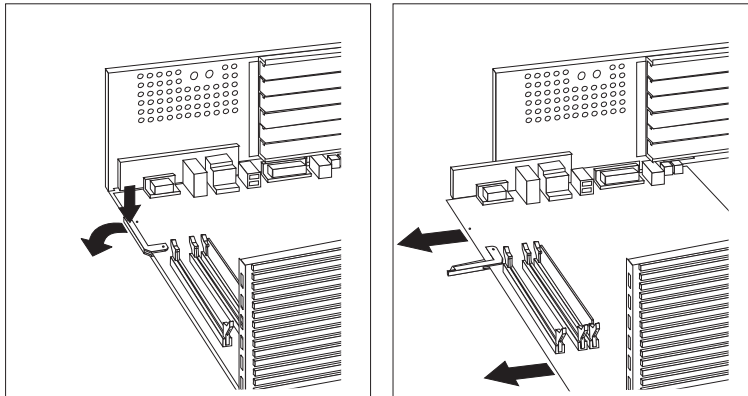
3 Remove the bottom expansion slot screw and cover.
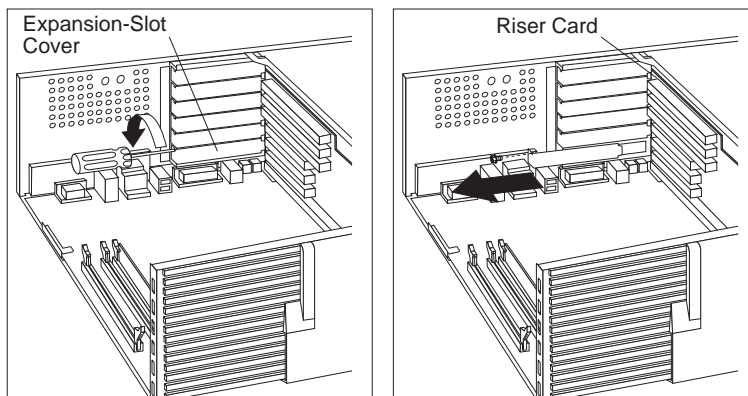
4 Slide the full-sized adapter into the bottom expansion slot, pressing on both ends to make sure it is properly seated in the riser card.
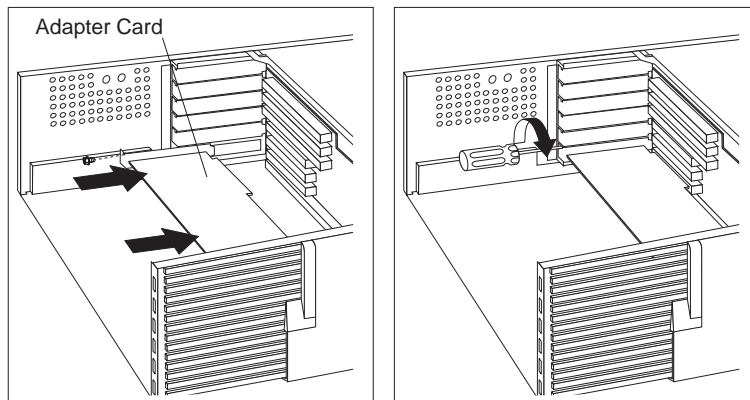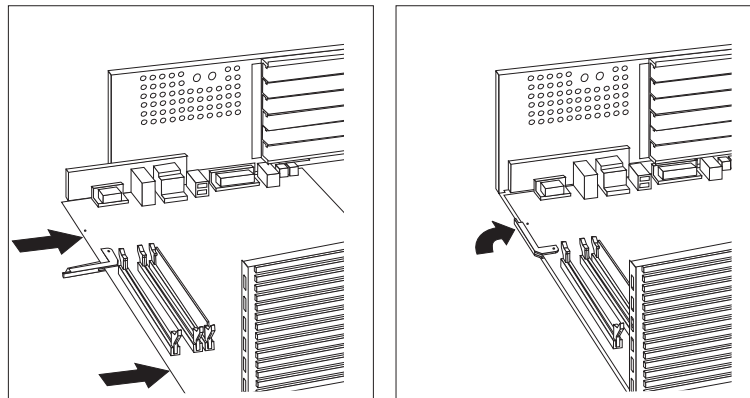

5 Reinsert the system board in the computer.

a. Make sure the system board latch is sticking out so that the tab on the underside of the latch can line up with the opening in the support. An illustration of the system board latch and the system board support follows.
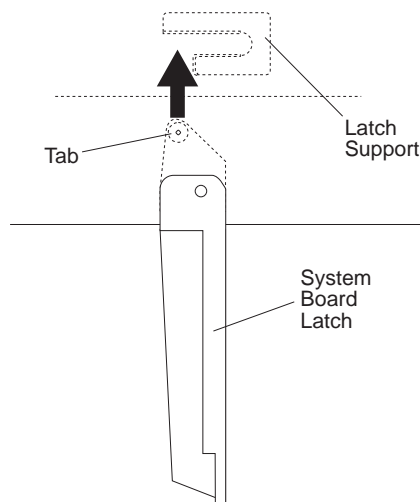
b. Align the system board in the track and slide it in until it stops at .2 of an inch from the card edge connector in the riser card. If necessary, lift up on the edge of the system board to clear the bottom of the computer.

c. When the system board is nearly seated in the card edge connector, rotate the latch back. You will feel the tab on the underside of the latch engage

the support and draw the system board all the way in to seat in the connector.

Because you cannot see the connection with the full-sized adapter in place, it is important to engage the system board latch in the support to make sure it is fully seated.

6 When the system board and adapter are solidly seated, insert the screw to hold the full-sized adapter in the expansion slot.

7 Replace the bottom cover and the top screw (See "Replacing the Bottom Cover" on page 40).

8 Go to the device-record form in *Using Your Personal Computer*, and write the adapter name next to the slot into which you installed it.

Removing the Bottom Cover

If you cannot access the expansion slot screw, you must remove the computer bottom cover.

1 Lay the computer on its side. Carefully rotate the feet a quarter turn, so they do not support the weight of the computer while it is on the side.

2 Remove the screws from the bottom cover.
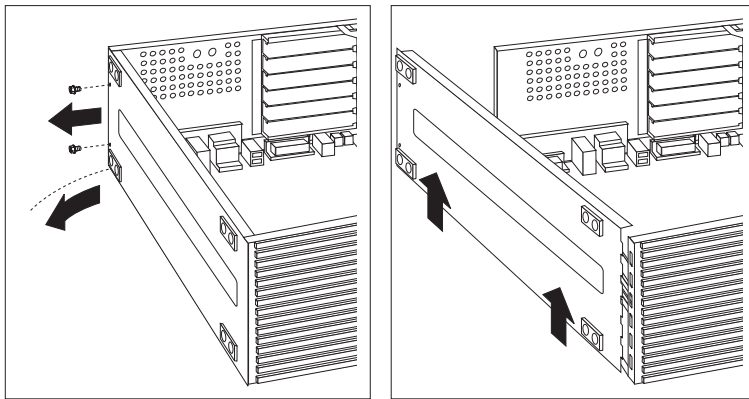
3 Pivot the plain end of the bottom cover away from the computer.

4 Lift up slightly on the pronged end of the cover and remove.

Replacing the Bottom Cover

1 Lay the computer on its side.

2 Hold the bottom cover at an angle and align the pronged end with the slots.

3 Fit the prongs into the slots and pivot the bottom cover until it is closed.
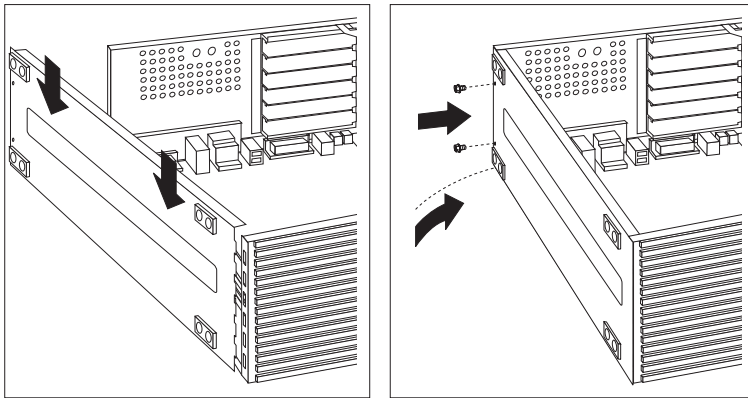
4 Align the holes and insert the two bottom screws.

What to do next

- To work with another option, go to the appropriate section.
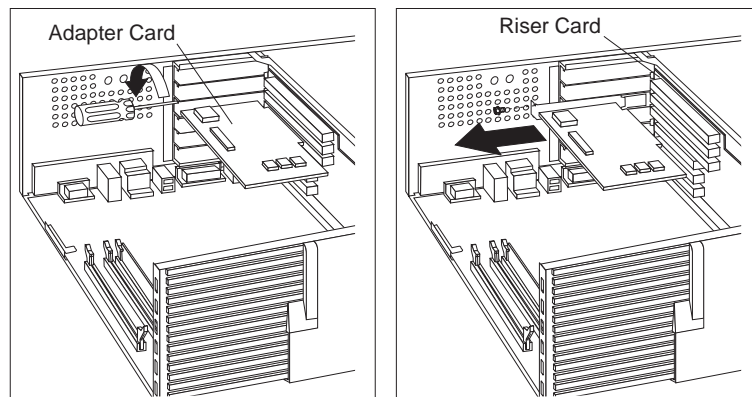- To complete the installation, go to Chapter 7, "Completing the Installation" on page 66.
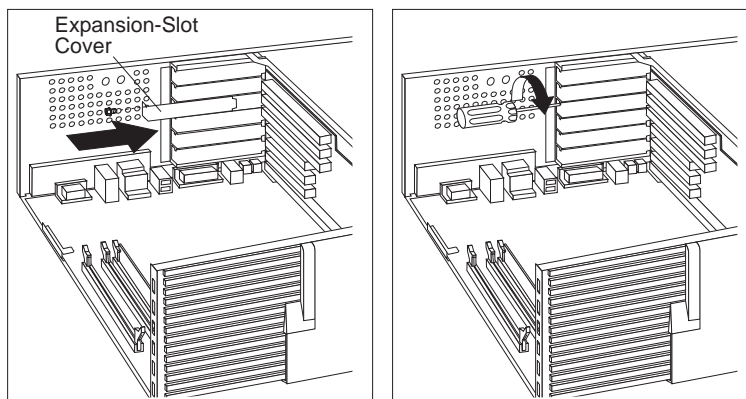
Removing Adapters

1 Locate the adapter and remove the screw.

If you cannot access the expansion slot screw, you must remove the computer bottom cover (see "Removing the Bottom Cover" on page 40).

2 Remove the adapter and insert it into a static-protective package.

3 If you are not installing another adapter in this slot, install an expansion-slot cover and screw.

Expansion-Slot Cover

4 Go to the device-record form in *Using Your Personal Computer* and delete the name of the adapter you removed.

Note: Removing an adapter frees up system resources. If you remove an ISA legacy adapter, you must use the Configuration/Setup Utility program to set the previously used resources to [**Available**]. For more information, see Chapter 7, "Completing the Installation" on page 66.

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 66.

Chapter 5. Working with Internal Drives

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

When you are installing an internal drive, it is important to note which drive types and sizes you can install in each bay. Also, it is important to correctly connect the internal drive cables to the installed drive. For more information, see "Internal Drives" on page 45.

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 types of drives available for your computer are:

- Hard disk drives
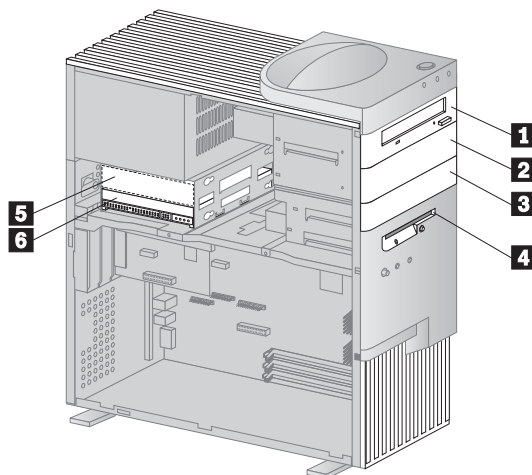- Tape drives
- CD-ROM drives

Internal drives are installed in *bays* at the front and rear of your computer. Within this book, the bays are referred to as bay 1, bay 2, and so on.

Drive bays 1 through 4, at the front of your computer, are contained in one drive cage, and drive bays 5 and 6, at the back of your computer, are contained in another.

Your computer comes with the following IBM-installed drives:

- A 3.5-inch diskette drive in bay 4.
- A 3.5-inch hard disk drive in bay 6.
- If your computer has a preinstalled CD-ROM drive, it is installed in bay 1.

The following illustration shows the location of the drive bays in your computer.

Drive Bay Specifications

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

| Bay	Drives Supported	Max. Height mm (in.)	Min. Height mm (in.)
Table 2. Drive Bay Specifications			
1	5.25-inch CD-ROM	41.3 (1.6)	—
2	Tape backup drive CD-ROM drive Hard disk drive	25.4 (1.0)	25.4 (1.0)
3	Hard disk drive	25.4 (1.0)	25.4 (1.0)
4	3.5-inch diskette drive	25.4 (1.0)	—
5	Hard Disk drive	25.4 (1.0)	25.4 (1.0)
6	Hard disk drive	25.4 (1.0)	25.4 (1.0)

Notes:

- You cannot install drives that are greater than 41.3 mm (1.6 in.) high.
- You must install drives that require removable media (diskettes, tapes, or CDs) in the accessible bays: bay 1, 2, 3, or 4.
- You can install one diskette drive only in the PC 300PL.
- To properly mount a 3.5-inch drive into bay 1 or 2, you must use a 3.5-inch conversion kit for a 5.25-inch bay. For more information, contact your IBM reseller or IBM marketing representative.

Power and Signal Cables

Your computer uses cables to connect the power supply to the riser card and to integrated drive electronics (IDE) drives. The diskette drive is powered through a cable attached to the riser card. The following cables are provided:

- Four-wire *power cables* connect most drives to the power supply. At the ends of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the riser card. The diskette-drive power cable is attached to the riser card.

- Flat *signal cables* connect IDE drives to the riser card; signal cables are sometimes called *ribbon cables.* There are two sizes of signal cables that come with your computer:

    - The wider signal cable has three connectors. Two of these connectors attach to installed drives and the third attaches to the primary IDE connector on the back of the riser card.

    - The narrower signal cable has two connectors. They connect to the diskette drive and the diskette drive connector on the riser card.

The following illustration shows the connectors on the riser card.
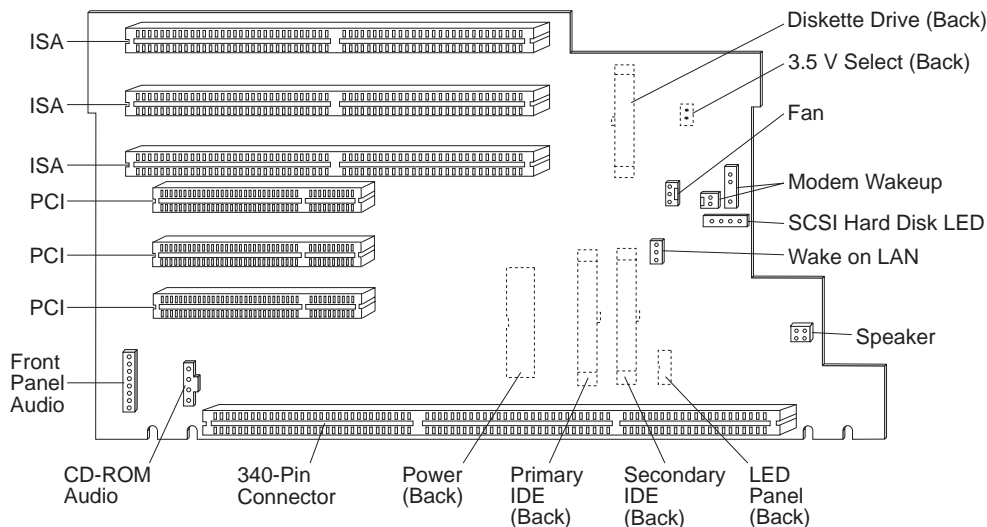
The following are some important points to remember when connecting power and signal cables to internal drives:

- The diskette drive and hard disk drive that are preinstalled in your computer come with power and signal cables attached. If your computer comes with a

CD-ROM drive, cables are attached to it, also. If you replace any drives, it is important to remember which cables are attached to which drives.

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

- If more than one IDE device is used on a single cable, one must be designated as the primary or master device and all others as secondary or subordinate devices; otherwise, some of the IDE devices might not be recognized by the system. The primary or secondary designation is determined by switch or jumper settings on each IDE device.

- To optimize performance when installing more than two hard disk drives, be sure to attach hard disk drives with faster data transfer speeds (Mode 1 or higher) to the primary hard disk drive signal cable (hard disk drives 0 and 1).

- On some models, to install more than two IDE hard disk drives, you must purchase an additional signal cable. The cable must meet the following specifications:
    - Maximum length: 0.46 meters (18 inches)
    - Wire size: 28 AWG
    - Cable capacitive loading: 200 pF maximum

- You can install one diskette drive only.

- To attach an external drive, you must install an adapter in the computer.

SCSI Cable

If your computer is equipped with a SCSI adapter, a ribbon cable is provided to connect internal SCSI devices. This cable provides four connectors for attaching the SCSI adapter and up to three internal SCSI devices.

For more information on connecting SCSI devices, see the *Adaptec SCSI Documentation* provided with your computer.

Working with Drives in Bays 1, 2, 3, or 4

To install or remove drives in bays 1, 2, 3, or 4, you must remove the side and top-handle covers of your computer, and take out the two screws holding the drive cage in place.

Also, any drive bay that lacks a preinstalled drive has a metal shield mounted on the computer frame and a bay panel mounted in the cover of the computer. Before installing a drive in any of the front bays, you must remove the metal shield. Unless you are installing a hard disk drive, you must also remove the bay panel.


Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the drive you want to install or replace.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer.
- Lay the computer on its side. Carefully rotate the feet a quarter turn, so they do not support the weight of the computer while it is on the side. Remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).


To access drive bays 1 through 4:

1 Disconnect any cables connected to drives 1 through 4 in order to remove the drive cage.
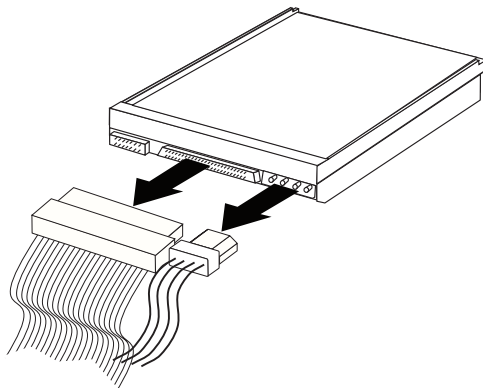
2 Remove the top handle cover and set it aside.
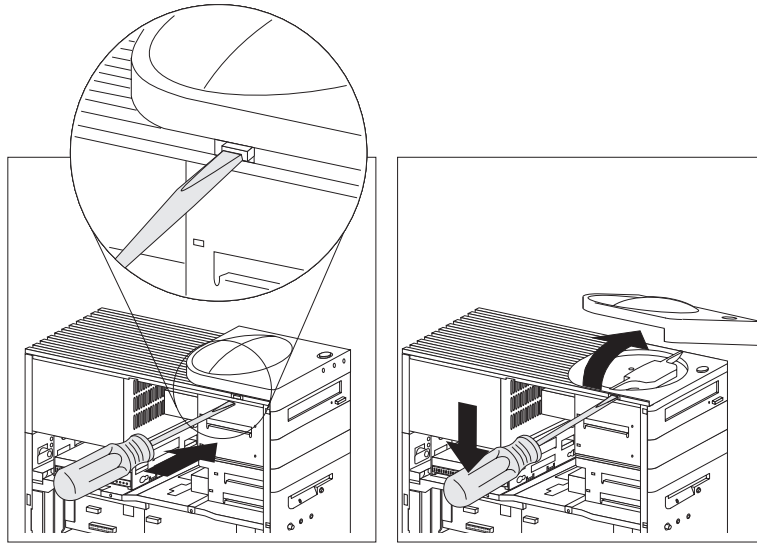
3 Remove the top-handle screw and the screw from the drive support bracket that hold the drive cage for bays 1 through 4 in place. Then, pull the drive cage towards the power supply until it stops, and then lift it out of the computer.
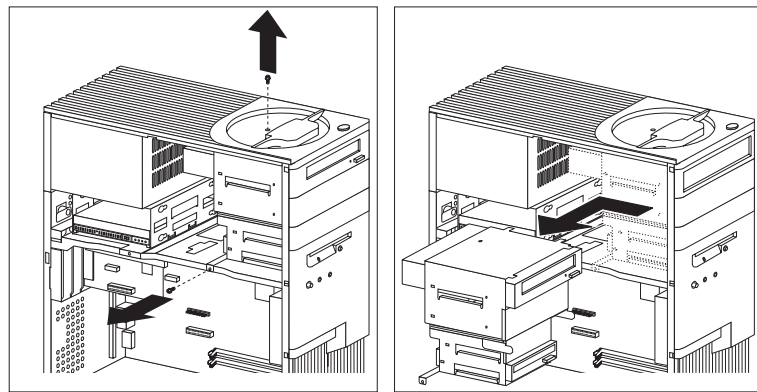
Installing a Drive in Bay 1, 2, 3, or 4

Before you begin

- Read "Working with Drives in Bays 1, 2, 3, or 4" on page 49.
- Read the documentation that comes with the drive.
---

1 Remove the metal shield that covers the bay you want to use.

   a. With the front of the drive cage facing you, remove the metal shield that covers the bay you want to use.

   b. You will need to pull out the tabs on the sides of the metal shield until it flexes enough for you to lift off one side, then the other.
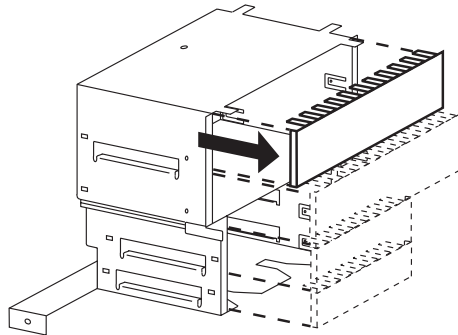

    Note: If you remove a drive which has removable media from a bay and you do not intend to install a new drive immediately, replace the bay panel and the metal shield.

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

3 Insert the drive into the desired unoccupied drive bay. Insert and tighten the four screws on the sides that hold it in place. The following illustration shows a CD ROM drive being installed in bay 1.
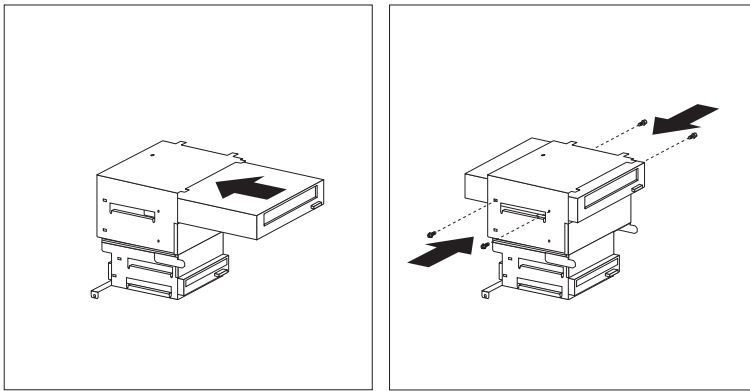

4 Insert the drive cage and slide it to the right until it docks against the front of the computer and the screwholes in the drive cage and the bracket align.

5 Insert and tighten the screw anchoring the drive cage at the side, then the screw on top near the handle.
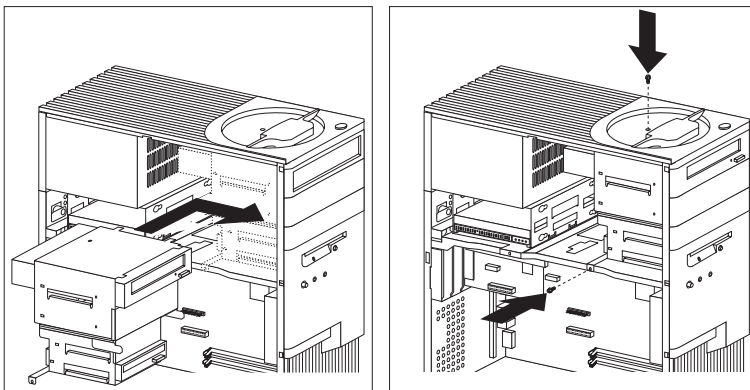
6 Attach the cables. Refer to "Power and Signal Cables" on page 47 for an illustration showing the locations of the connectors on the riser card.
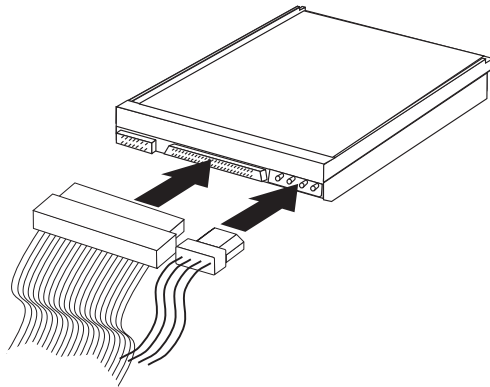
7 Remove the bay panel, if necessary.

    a. Locate the appropriate bay panel in the computer cover.
    b. Use the tip of a screwdriver, if necessary, to flex the plastic tabs holding the bay panel in the cover.
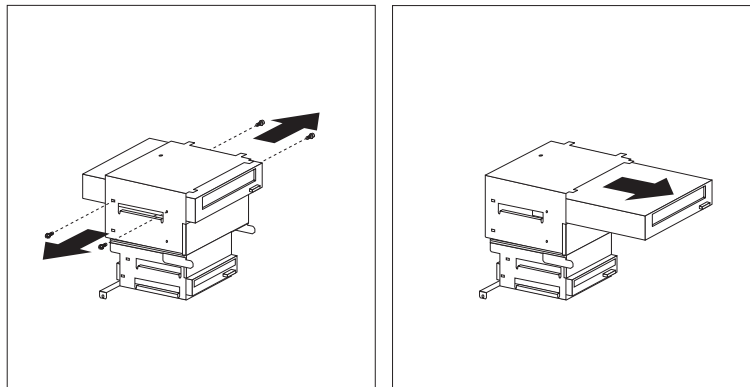   c. Remove the bay panel.
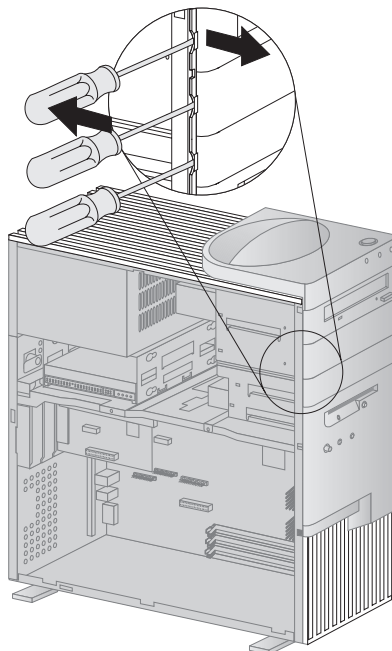
8 Go to the device-record form in *Using Your Personal Computer* and record the new installation.

Removing a Drive from Bay 1, 2, 3, or 4

**1** Disconnect the cables from the drive you want to remove.
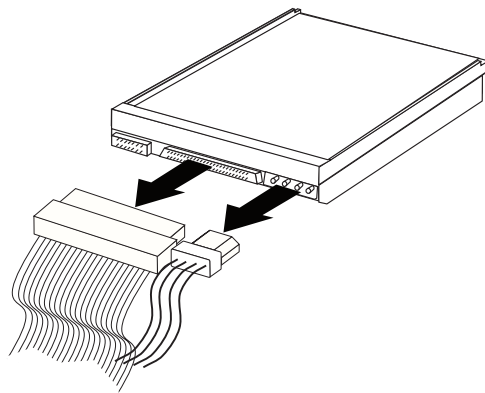
2 Remove the screws holding the front drive cage in the computer and slide the drive cage out of the computer. The following illustration shows a 5.25-inch drive (a CD-ROM) being removed from bay 1.


3 To remove a drive from any of these four bays, you must remove the four screws from the sides of the drive, then slide the drive out of the bay.

4 Place the removed drive in a static-protective package.

5 If you are not installing another drive, replace the metal shield in the front drive cage and the bay panel on the front of the computer.

Press the metal shield over the desired empty drive bay. It will cling loosely.
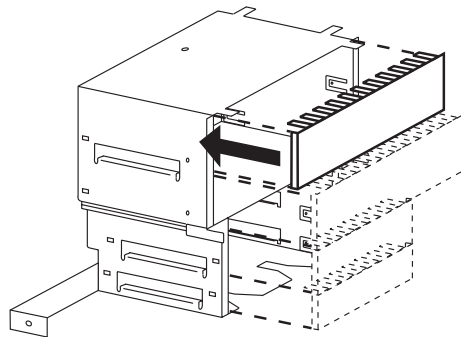
6 If you are installing a hard disk drive, install only the bay panel.

 a. Align the right-hand edge of the bay panel with the matching opening in the front of the computer.
 b. Gently press the left edge closed until it snaps.
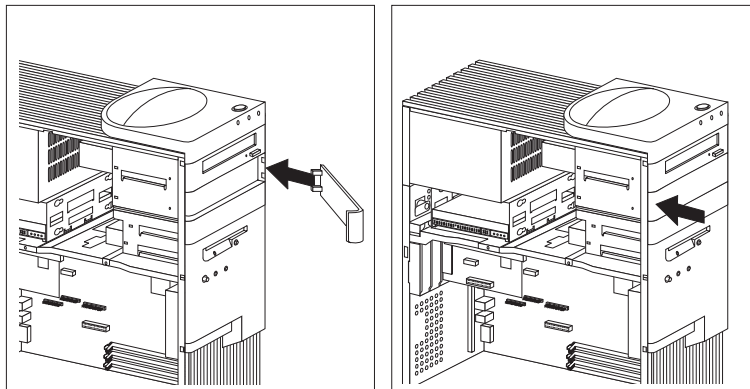
7 Go to the device-record form in *Using Your Personal Computer* and record the installation.

## Installing and Removing Drives in Bays 5 and 6

You can install non-removable-media drives in bays 5 and 6. (Your computer comes with a hard disk drive in bay 6.) To install or remove drives in these bays, you must remove the rear drive cage that holds the drives.

To install or remove drives in these bays:

1 Remove the screw holding the drive cage and carefully slide the drive cage past the cover lock and out.
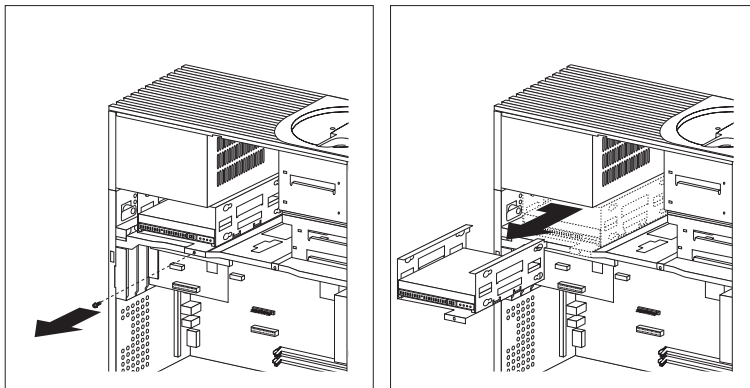

2 Disconnect the cable from the hard disk drive in bay 6. If there is a drive in bay 5, disconnect its cable.
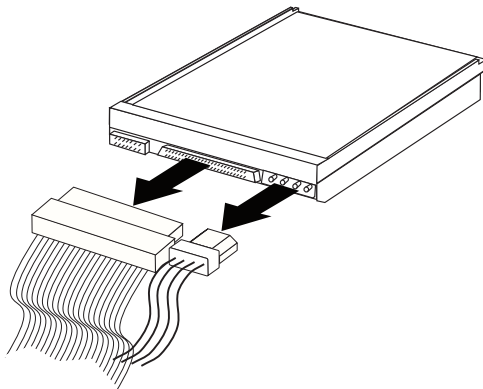
3 Lift the drive cage out of the computer.

> **Note:** The screws holding the drive in bay 5 are on top of the cage; the screws holding the drive in bay 6 are on the bottom.

4 If you are removing a drive, remove the screws holding the drive in the cage and slide the drive out of the cage. (To remove the screws from bay 6, turn over the drive cage.)
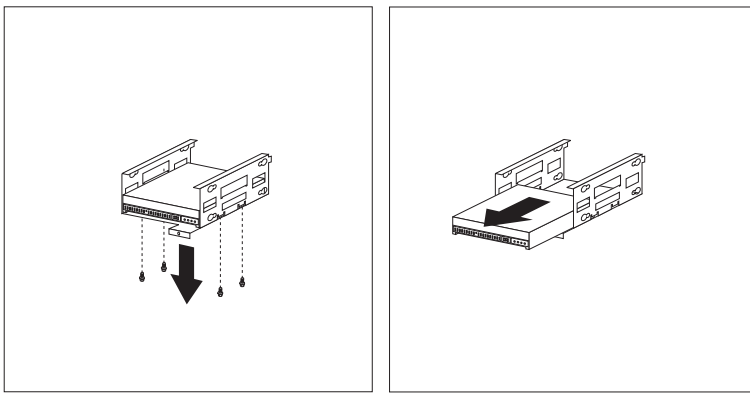
If you are installing a drive, slide the drive into the bay and secure it with the screws.

5 Reinstall the rear drive cage and secure it with the screw you removed in step 1.

6 Connect the cables to the drive.

7 Go to the device-record form in *Using Your Personal Computer*, and write the adapter name next to the slot into which you installed it.

Chapter 6. Working with Security Options

This chapter describes some of the security options that are available for your computer.

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).

To help prevent hardware theft, you can add a security U-bolt and cable to your computer. To erase lost or forgotten passwords, you can move the CMOS clear (password) jumper on the system board.

Note: Use the Configuration/Setup Utility program to set, change, or delete passwords. For more information, see *Using Your Personal Computer.*

There may be a chassis intrusion detection switch enabled on your computer. If it is enabled, you will be required to type in an administrator password after you have reassembled the computer and reconnected it. For more information on the chassis intrusion detector, see "Chassis Intrusion Detector" in *Using Your Personal Computer.* To guard against writing over diskettes, you can set the write-protect switch on the system board.

The following list is a quick reference to these procedures:

- "Installing a U-Bolt" on page 60
- "Erasing Lost or Forgotten Passwords" on page 62
- "Setting the Diskette Write-Protect Switch" on page 65

Installing a U-Bolt

You can add a U-bolt to the rear of your computer. Adding a U-bolt enables you to add a security cable and lock which helps prevent hardware theft. After you add the security cable, make sure that it does not interfere with other cables that are connected to the computer.

Before you begin

- Obtain the following:
  - A 19-mm (3/4 in.) U-bolt and threaded nuts that fit the U-bolt
  - A security cable
  - A lock, such as a combination lock or padlock
  - An adjustable wrench
- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all connected devices.
- Disconnect all external cables and power cords, and remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).


Note: The external connectors on the rear of your computer might differ from the ones shown in this section.

1 Locate the two holes on the lower right edge of the rear of the computer.

2 Insert the U-bolt through the rear panel; then, attach and tighten the nuts with an adjustable wrench.
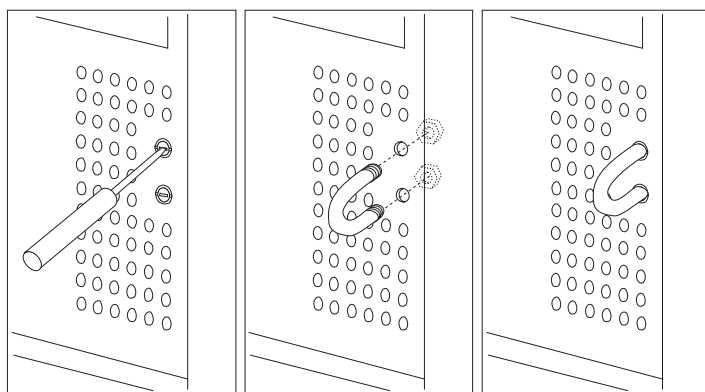
3 If you cannot access the nuts with the wrench, you will need to remove the side cover. See "Disconnecting Cables and Removing the Side Cover" on page 7.

4 Replace the computer cover. For more information, see "Replacing the Side Cover and Connecting the Cables" on page 67.

5 Thread the cable through the U-bolt and around an object that is not a part of or permanently secured to the building structure or foundation, and from which it cannot be removed, then fasten the cable ends together with a lock.

The following illustration shows an example of how this might work.
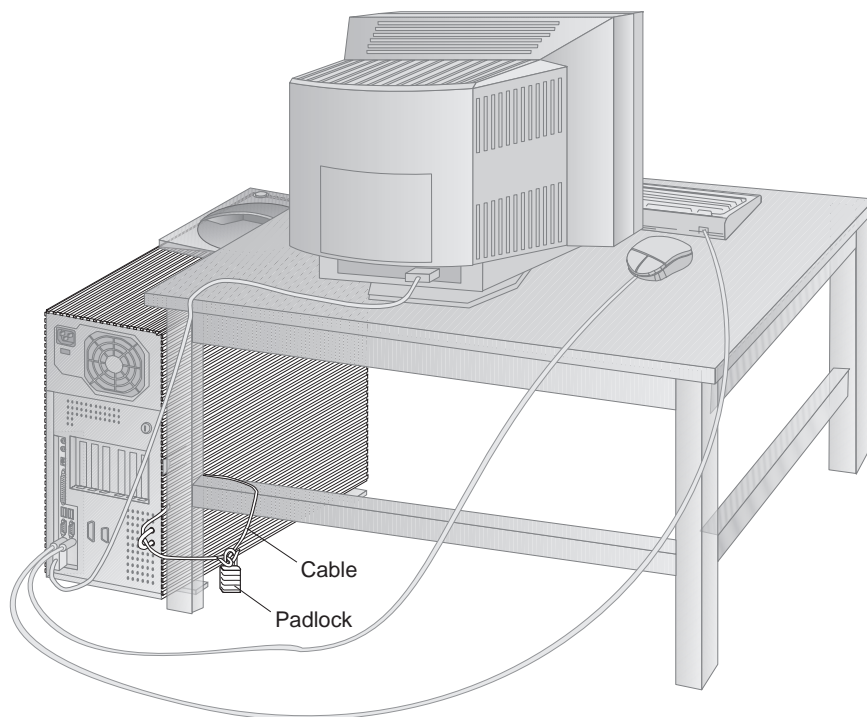
Erasing Lost or Forgotten Passwords

Note: To set a password, see "Setting Passwords" on page 75. To change or delete a password, see *Using Your Personal Computer.*

Your computer uses *complementary metal-oxide semiconductor (CMOS)* memory on the system board for storing configuration and setup information. CMOS memory maintains information about:

- Date and time
- Security features
- Power-management devices
- Storage devices
- Keyboard and mouse
- ISA legacy configuration information
- Plug and Play configuration information
- Port assignments
- I/O addresses and interrupts
- Other selectable features

Within the security features are the settings for the power-on and administrator passwords. If you need to *erase* a lost or forgotten password, you must erase all of the configuration and setup information by moving the jumper designated for CMOS memory.


Important

Clearing CMOS memory erases the configuration of your computer. Because you need to reconfigure the computer after clearing CMOS memory, record the configuration information of your computer *before* moving the CMOS jumper.


Before you begin

- Using the Configuration/Setup Utility program, record all configuration information.
- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all connected devices.
- Disconnect all external cables and power cords, and remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).

The jumper is located on the system board; it is labeled *CMOS clear.* To locate this jumper, see "Identifying Parts on the System Board" on page 15 or see the label on the underside of the computer cover.

1 Move the jumper from its normal position pins (1 and 2) to pins 2 and 3. It might be helpful to use needle-nose pliers to move the jumper, but be careful not to scrape any system board components or crush the jumper.
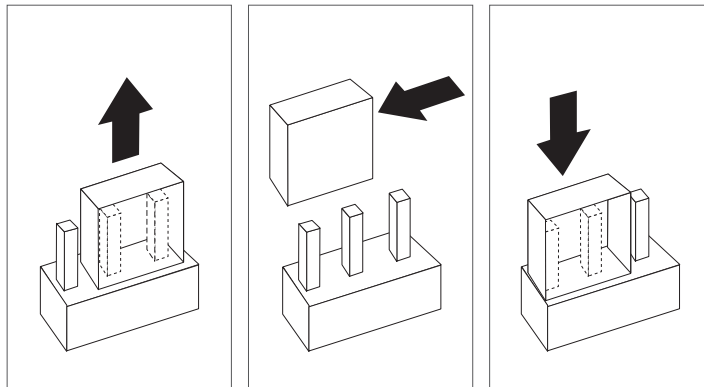
2 Wait one minute and then move the jumper back to its normal position (pins 1 and 2). This clears CMOS memory.
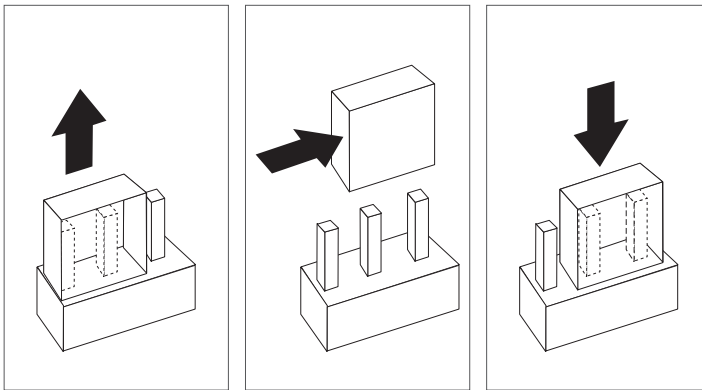
What to do next

After clearing CMOS memory, you must reconfigure the computer. After reassembling the computer (go to Chapter 7, "Completing the Installation" on page 66), use the Configuration/Setup Utility program to reset the date and time, reset any passwords, and reconfigure the computer. For more information, refer to "Setting Passwords" on page 75 and *Using Your Personal Computer.*

Setting the Diskette Write-Protect Switch

The diskette write-protect switch controls whether you can write information to a diskette using a diskette drive. The ability to prevent writing to a diskette is particularly useful if you are concerned about the security of information that can be obtained through a network.

Note: This switch does not affect the ability to read information from a diskette.

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all connected devices.
- Disconnect all external cables attached to the computer, and then remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7).
---

1 Locate the configuration switches on the system board. For more information, refer to the label on the underside of the computer cover, or refer to "Identifying Parts on the System Board" on page 15. The write-protect switch is one of eight found in the configuration switches (DIP switch).

2 For normal diskette operation or for read-only diskette operation, set switch 8 as illustrated below. It might be helpful to use a ballpoint pen or a small screwdriver to set the switch.
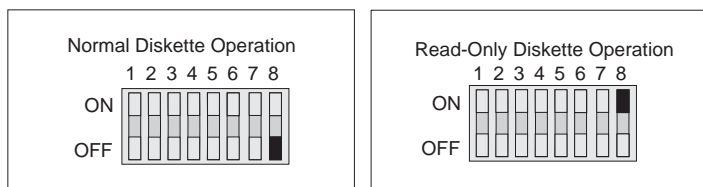
What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 66.

Chapter 7. Completing the Installation

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

There may be a chassis intrusion detection switch enabled on your computer. If it is enabled, you will be required to type in an administrator password after you have reassembled the computer and reconnected it. For more information on the chassis intrusion detector, see "Chassis Intrusion Detector" in *Using Your Personal Computer.*

The following list is a quick reference to the completion procedures:

Replacing the Side Cover and Connecting the Cables
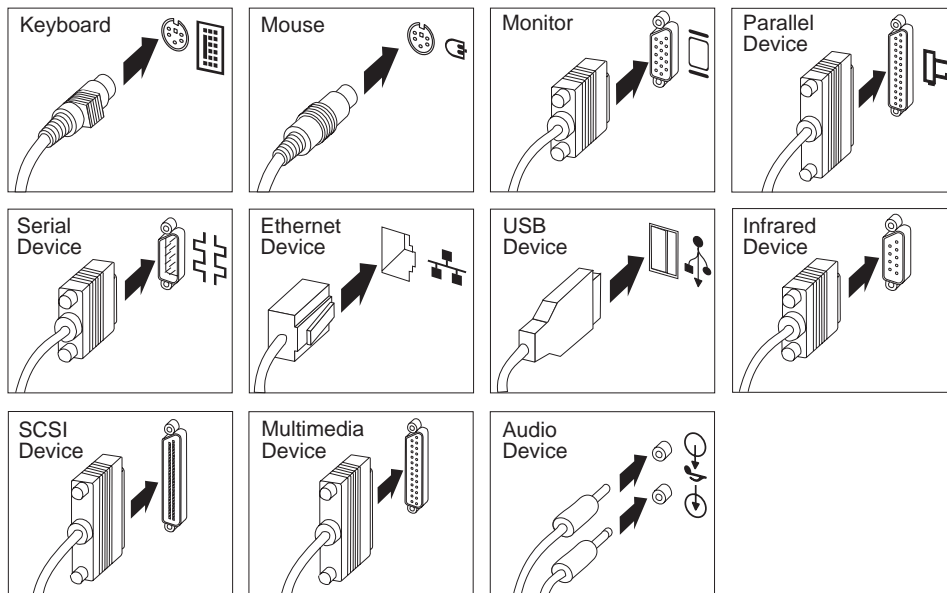

Before you begin

Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.

---

 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 down on the computer frame. Secure the cover by sliding it until the cover aligns with the rear of the computer.
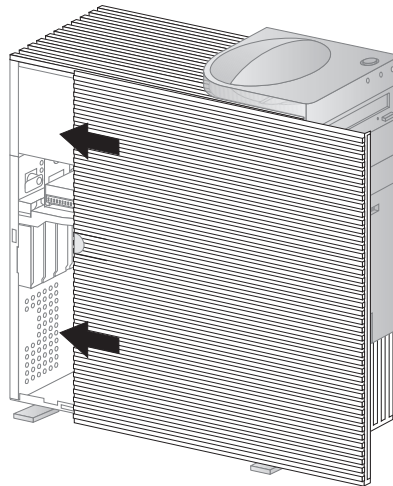
 4 If desired, go to the back of the computer and lock the cover.

5 Reconnect the external cables and cords to the computer.

Keyboard	Mouse	Monitor	Parallel Device
Serial Device	Ethernet Device	USB Device	Infrared Device
SCSI Device	Multimedia Device	Audio Device	

6 If you have a modem or fax machine attached to the computer, reconnect the telephone line to the wall outlet and the serial port. Plug the power cords into properly grounded electrical outlets.

7 Update the computer configuration. See "Updating the Computer Configuration" on page 69.

Important

In the United Kingdom, by law, the telephone cable must be connected after the power cord.

Resetting the Stabilizing Feet

You may find it easier to work on the bottom cover and the drives if you lay the computer on its side. If you do so, carefully rotate the feet a quarter turn in toward the computer, so they do not support the weight of the computer while it is on the side. After all options are installed and the side cover is back on, rotate the feet a quarter turn out from the computer and carefully set the computer upright.

Updating the Computer Configuration

Important

The configuration information in this section applies to installing options. For more information on using the Configuration/Setup Utility program, see *Using Your Personal Computer.*

Also, you may need to install device drivers after updating the configuration settings. For more information, see the instructions that come with the option to determine if device drivers are required and how to install them. Also, video device drivers are on the *Ready-to-Configure CD.*

After you add, remove, or replace options, you must update the information in the configuration settings. This reconfiguration is performed automatically by the computer (but you must save the changes), or *manually* by you. When the computer automatically configures an option, it uses system programs. If the system programs do not update the settings, you can use the Configuration/Setup Utility program to reconfigure the appropriate settings.

For example, when you start your computer after adding most internal hard disk drives, the settings are automatically updated and you use the Configuration/Setup Utility program to save those changes. However, if a resource conflict arises after an ISA legacy adapter is installed or removed, you must manually update the computer configuration and save the information.
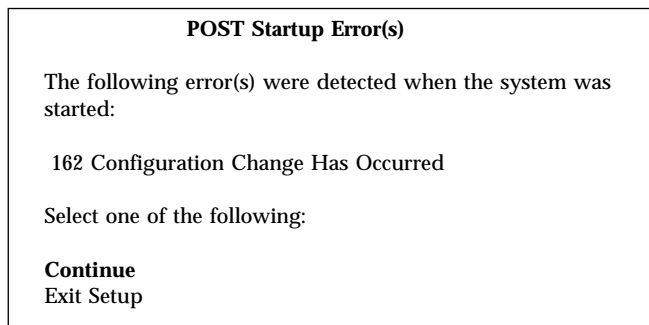
Notes:

1. Make a record of all customized settings before you make any modifications.

2. For more information on error messages from resource conflicts, see *Using Your Personal Computer.*

Starting the Configuration/Setup Utility Program

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

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

```
                    POST Startup Error(s)

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

 162 Configuration Change Has Occurred

Select one of the following:

Continue
Exit Setup
```

Note: Depending on the configuration changes that occurred, the error message you see might be different from the one shown here.

If the preceding screen appears, select **Continue** until you reach the Configuration/Setup Utility menu.

If the preceding screen does not appear, use the following procedures to access the Configuration/Setup Utility menu.
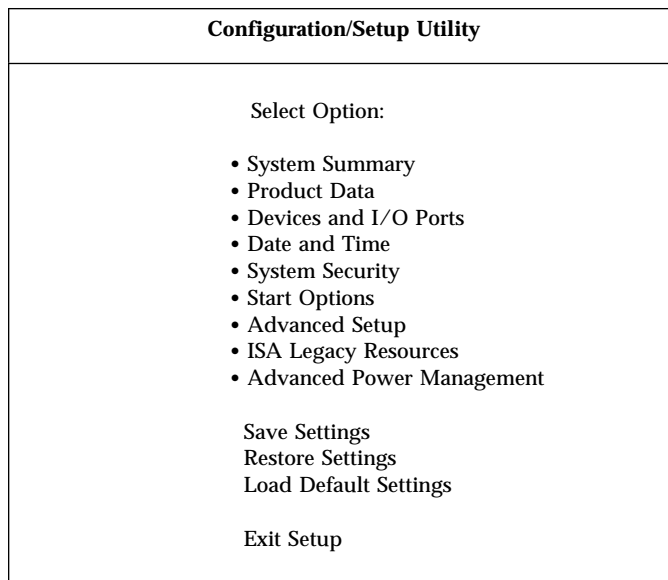
To access the Configuration/Setup Utility program:

1 Turn on the computer.

If your computer is on when you start this procedure, you must shut down the operating system, turn off the computer and wait a few seconds, and then restart the computer. Do not use **Ctrl+Alt+Del** to restart the computer.

2 When the Configuration/Setup Utility prompt appears in the lower left corner of the screen, press **F1**.

   a. If you have *not* set an administrator password, the Configuration/Setup Utility program menu appears. If you have set an administrator password, type the administrator password and press **Enter**.

   b. If you have set both an administrator and a power-on password, you can type either of the passwords at the password prompt. However, if you type your power-on password, you can *view* limited information in the Configuration/Setup Utility program, but you cannot *change* settings. To change settings in the Configuration/Setup Utility program, type your administrator password at the password prompt.

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

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

Changing Settings and Exiting

In the Configuration/Setup Utility menus, you can accept the configuration changes by viewing and saving the changes, or you can make manual changes and then save the settings.

The following is a quick reference for identifying symbols in the Configuration/Setup Utility program. For information on the function of keys, see *Using Your Personal Computer*.

- If a bullet (•) is beside a menu item, an additional menu is available.
- Most information enclosed in brackets ([ ]) can be changed. You cannot change information that is not surrounded by [ ].
- If a right arrowhead (▶) is beside a menu item, a configuration change occurred in that category. The ▶ might also appear in subsequent menus.
- If an asterisk (*) is beside a menu item, a resource conflict is detected.

When you complete your changes or finish viewing information, follow these steps:

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

2 The Exit Setup menu appears. Select Save Settings and press **Enter**.

Configuring an ISA Legacy Adapter

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

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

To set the legacy resource information for an installed adapter:

1 Start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 70).

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

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

4 Set the appropriate resource to **Not available**.

5 Press **Esc** to return to the main menu.

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

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

Note: For more information on adapters and resolving conflicts, see "Adapter Configuration" on page 33 and Appendix B, "Interrupt and DMA Resources" on page 78.

Configuring Startup Devices

Startup devices are devices where the computer looks for an operating system when it is powered on. After adding new devices to the computer, you might want to change the sequence of the startup devices. You can use the Configuration/Setup Utility program to change the sequence of startup devices.

To change the sequence of startup devices:

1 Start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 70).

2 Select **Start Options** from the Configuration/Setup Utility menu.

3 Select **First Startup Device**.

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

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

6 Press **Esc** to return to the main menu.

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

Setting Passwords

If you used the CMOS-clear jumper to erase the computer configuration and setup information, you must reconfigure the computer, set the date and time, and reset the power-on or administrator passwords.

Note: For more information on password protection and setting the date and time, see *Using Your Personal Computer*.

To reset the power-on or administrator passwords:

1 Start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 70).

2 Select **System Security** from the Configuration/Setup Utility menu.

3 Select **Administrator Password** or **Power-on Password**.

4 Follow the instructions to change the password. For more information, see the passwords section of *Using Your Personal Computer*.

5 Press **Esc** to return to the main menu.

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

Note: For information on clearing CMOS memory, see "Erasing Lost or Forgotten Passwords" on page 62.

Appendix A. Changing 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.

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the replacement battery.
- Turn off the computer and all connected devices.
- Disconnect all external cables attached to the computer and then remove the computer cover (see "Disconnecting Cables and Removing the Side Cover" on page 7 if you need additional information).

For information on locating the battery, see "Identifying Parts on the System Board" on page 15.

1 If necessary, remove any adapters or cables that might impede access to the battery. For instructions, see "Removing Adapters" on page 42.

2 Read "Lithium Battery Notice" on page vi.

3 Remove the old battery.
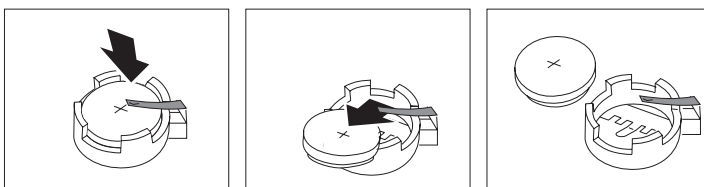
4 Install the new battery.
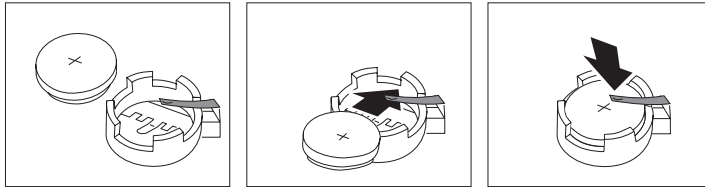
> **Note:** When the computer is turned on for the first time after battery
> replacement, an error message might be displayed. This is normal
> after replacing the battery.

5 Use the Configuration/Setup Utility program to set the date and time and any
passwords. For information on setting the date and time, refer to *Using Your
Personal Computer*. For information on setting passwords, see "Setting
Passwords" on page 75.

What to do next

- To work with another option, go to the appropriate section.
- To complete the replacement, go to Chapter 7, "Completing the Installation"
  on page 66.
- Dispose of the old battery as required by local ordinances or regulations.

Appendix B. Interrupt and DMA Resources

This appendix lists the settings for the default interrupt and direct memory access (DMA) resources for your computer.

Note: The interrupt and DMA settings might change under configuration control.

Table 3. Interrupt Resources	
Interrupt Request	**System Resource**
0	Timer
1	Keyboard
2	Interrupt Controller
3[2]	Serial Port 2 or Infrared
4[2]	Serial Port
5[2]	Audio
6	Diskette
7[2]	Parallel Port
8	Real Time Clock
9	Available
10	Available
11	Available
12[2]	Mouse
13	Coprocessor
14	IDE Drives (0, 1) if installed
15	IDE Drives (2, 3) if installed

Table 4. DMA Resources		
DMA Request	**Data Width**	**System Resource**
0	8 bits	Available
1	8 bits	Available
2	8 bits	Diskette
3[2]	8 bits	Parallel Port
4	–	Available
5	16 bits	Available
6	16 bits	Available
7	16 bits	Available

---

[2] Can be modified to alternative settings or disabled.

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