Chapter Contents

Chapter 6 Glossary

The following terms can be found in Chapter 6.

Direct Memory Access (DMA)
The ability to transfer data directly into memory, without requiring the help of the microprocessor.

Dual In-line Package switches (DIP Switches)
Small switches typically used to configure non-PnP expansion cards. DIP switches are so small, you have to use a paper clip to flip them to the desired position.

Interrupt Request (IRQ)
A request generated by an installed or attached device to get the microprocessor's attention.

Jumpers
Small plastic connectors that fit over exposed wires on an expansion card. Jumpers typically are used to configure legacy expansion cards.

Legacy
The term applied to pre-PnP ISA expansion cards.

Motherboard
The main board in your computer. The motherboard contains major components such as RAM, expansion cards, and the microprocessor.

Plug and Play (PnP)
A standard that allows a computer system to automatically configure expansion boards and other devices.

Random-Access Memory (RAM)
Your computer's primary memory in which program instructions and data are stored so that they are accessible to the Central Processing Unit (CPU). RAM is extremely fast, but does not retain information once its power is removed. RAM is measured in megabytes (MB).

Chapter 6

Upgrading Your Computer

Your UMAX computer is designed to meet your current and future requirements. To accommodate your future needs, you can upgrade your computer's *Random-Access Memory* (RAM), install a second hard drive or CD-ROM drive, and install and remove expansion cards.

This chapter describes how to perform these upgrades to your computer. Topics include:

- Instructions to follow before you upgrade your computer. See "Cautions Before Upgrading" on page 6-4.

- Removing the back and side panels to access the inside of your computer. See "Accessing the Inside of Your Computer" on page 6-5.

- Identifying your computer's major interior components. See "Looking at the Inside of Your Computer" on page 6-8.

- Procedures for installing RAM (page 6-10), a new hard drive (page 6-13), and a second CD-ROM drive (page 6-18).

- Procedures for installing and removing expansion cards. See "Installing and Removing Expansion Cards" on page 6-19.

- Information about your computer's *Plug-and-Play* technology. See "Plug-and-Play Technology" on page 6-21.

Cautions Before Upgrading

Observe the following precautions before you upgrade your computer.

Antistatic Grounding

Your computer contains many sensitive components that are prone to damage from static electricity. A static-electric charge is present in your body. Your body can pick up static electricity especially in carpeted rooms and in dry weather.

When your body touches an object with an opposite charge, the static electricity is discharged and you feel a "shock." This shock can severely damage your computer's components. Even mild static shock can damage the sensitive electronics of your computer. Therefore, before you touch the inside of your computer, touch a metal part on the outside of the computer several times to remove the static-electric charge from your body. In addition, avoid touching any exposed integrated circuitry or connectors inside your computer or individual components installed in your computer.

To further reduce the chance of danger from static electricity, wear a grounding strap around your wrist.

Loose Parts

When upgrading your computer, never let loose metal parts remain in your computer. If you accidentally drop a screw or a paper clip in the system, remove it before turning on your computer. If a metal part is touching any part of the circuit boards in the system, it can cause a short-circuit, which may damage the computer.

To minimize the chance of loose parts entering your computer, do not remove parts from their antistatic bag until you are ready to use them.
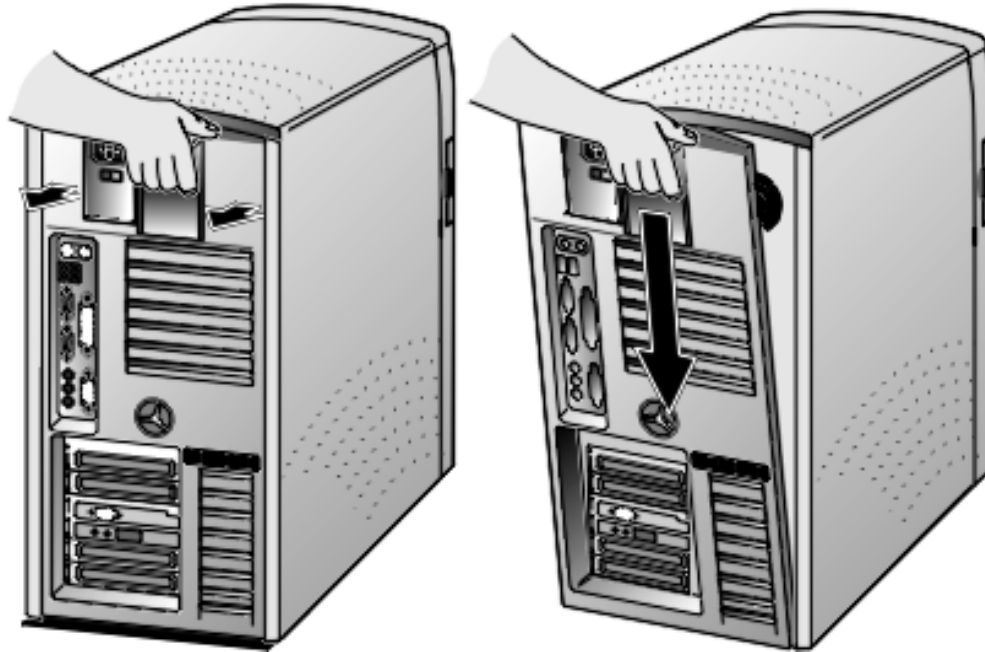
Accessing the Inside of Your Computer

To gain access to the inside of your computer, remove the back and side panels.

Removing the Back Panel

To remove the back panel:

1 Turn off your computer and all peripherals attached to it.

2 Remove all power cords and cables from the back of the system unit.

3 Face the back of the system unit.

4 Loosen the plastic thumbscrew on the center of the back panel, below the ventilation slots (see the illustration on the left side of Figure 6-1).

5 Grab the slot near the top of the back panel (see the illustration on the left side of Figure 6-1), then gently pull out the back panel and push down to remove it (see the illustration on the right side of Figure 6-1).
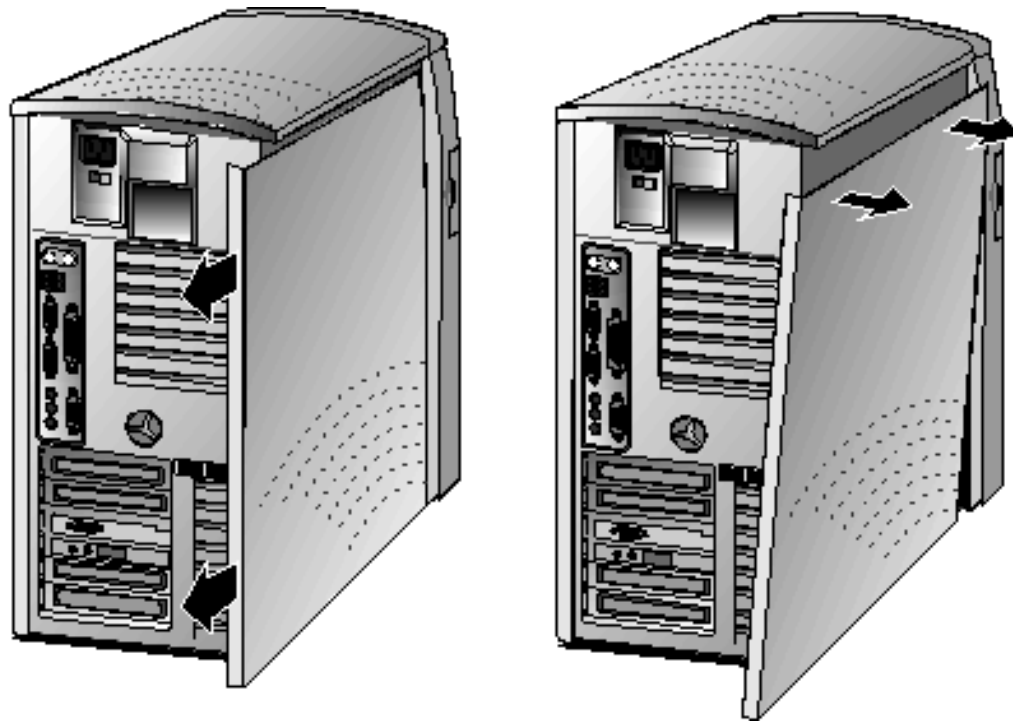
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Figure 6-1. Removing the Back Panel

6   Place the back panel to one side for now.

Removing the Side Panel

To remove the side panel:

1   Facing the back of the system unit, loosen the top and bottom of the right side panel.

2   Carefully slide the right side toward the back of the system unit (see Figure 6-2).

3   Remove the right side panel and pleace it to one side for now.

4   Set the system unit on a flat surface, such as on a desk, with the component side facing up so you can view and access the inside of the system.
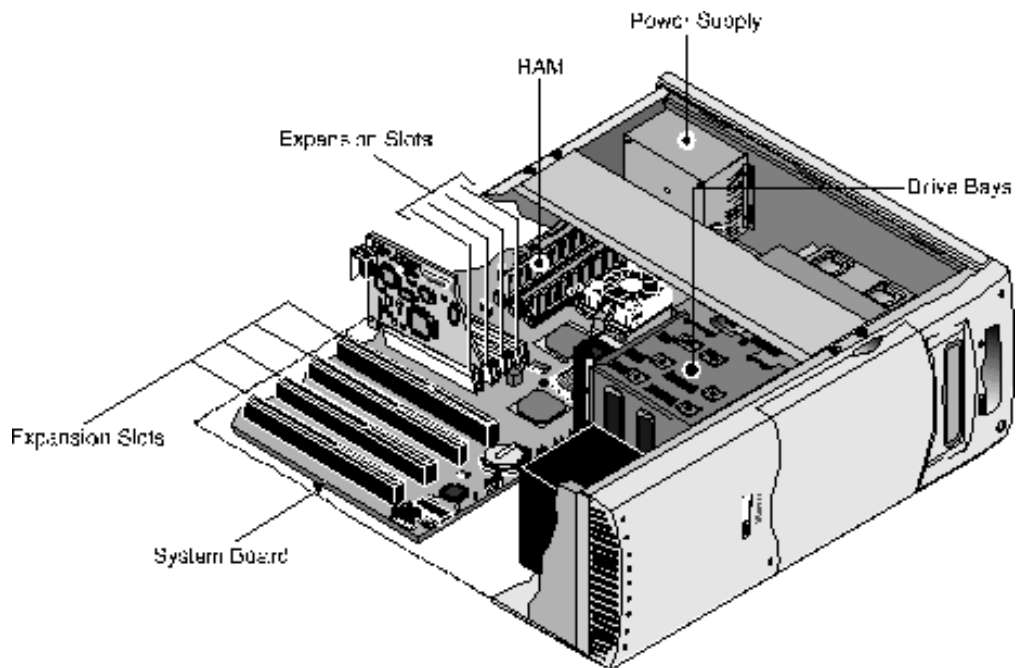
Figure 6-2. Removing the Side Panel

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Looking at the Inside of Your Computer

Once you gain access to the inside of your computer, you can see the major components, such as the hard drive, RAM, and microprocessor. Figure 6-3 shows the major components inside your computer. A description of these components follows.

Figure 6-3. Major System Components

System Board

The system board (or *motherboard*) is the large, flat board inside your computer. The system board accommodates most of the important parts of your computer, such as the microprocessor, memory, and expansion slots.

Power Supply

The power supply looks like a silver cube at the back of the system unit. The back of the power supply has a small red voltage slide switch on the back, which is accessible at the rear of the system unit. If you use your computer in the United States only, do not change the setting of this switch.

RAM

Your computer uses Single Inline Memory Modules (SIMMs) or Dual Inline Memory Modules (DIMMs). For information on installing RAM, refer to page 6- 10.

Drive Bays

The front of the computer has drive bays for installing internal drives. Counting from the top of the computer:

- The top bay (Bay 1) contains the factory-installed CD-ROM drive.

- In single-drive systems, bays 2 and 3 are usually empty. However, if you ordered a second hard drive, it will be factory-installed in one of these bays.

- Bay 4 contains the factory-installed hard drive.

- Bay 5 is usually empty. However, if you ordered a Zip drive, it will be factory-installed in this bay.

You can install additional hard drives or a second CD-ROM drive in these bays. For information, refer to pages 6-13 and 6-18, respectively.

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Expansion Slots

There are a number of 16-bit Industry-Standard Architecture (ISA) and faster, 32-bit Peripheral Component Interconnect (PCI) expansion slots on the system board. You can easily identify the difference between these two slot types. ISA slots are twice as long and typically darker than PCI slots. Each time you add a new card (such as a video adapter or internal modem), you install it in one of these available slots. For information on installing and removing expansion cards, refer to page 6-19.

Installing RAM

Your computer supports two types of RAM modules:

- SIMMs

- DIMMs

SIMMs and DIMMs are available in many configurations and specifications. Before you add RAM, be sure you obtain the appropriate SIMMs or DIMMs for your computer's system board. In addition, refer to the manual that came with the system board to see whether the system board has certain rules, such as where the added RAM is to be installed.
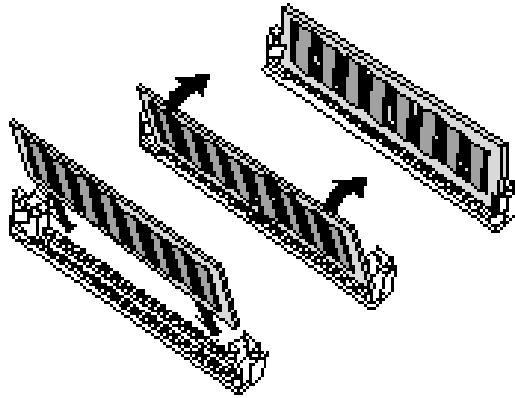
Installing and Removing SIMMs

To install SIMMs:

1   Turn off your computer and remove the back and side panels (see "Accessing the Inside of Your Computer" on page 6-5).

2   Insert the SIMM into the socket at a 45-degree angle.

> **SIMMs are keyed so they cannot be inserted the wrong way. If you cannot insert a SIMM into a socket, make sure you are not trying to insert the SIMM backward.**

3   Gently press the SIMM toward the back of the socket until the SIMM snaps into place below the clamps.

Figure 6-4. Installing SIMMs

To remove SIMMs:

1 Turn off your computer and remove the back and side panels (see "Accessing the Inside of Your Computer" on page 6-5).

2 Gently pull the clamps securing the SIMM in the socket. The SIMM pops out of the socket.

3 Tilt the SIMM toward the front of the socket and remove it gently.

Never forcibly remove a SIMM, and never try to remove a SIMM without first releasing it from the socket. Otherwise, you may break the SIMM and the socket.

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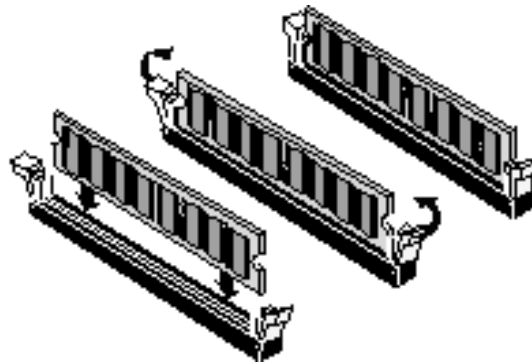A
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Installing and Removing DIMMS

To install DIMMs:

1 Turn off your computer and remove the back and side panels (see "Accessing the Inside of Your Computer" on page 6-5).

2 Hold the DIMM above the socket.

3 Install the DIMM vertically into the socket. Apply equal pressure on each end of the DIMM.

> **DIMMs are keyed so they cannot be inserted the wrong way. If you cannot insert a DIMM into a socket, make sure you are not trying to insert the DIMM backward.**

4 Make sure the clamps on both sides of the socket have locked the DIMM into place. The DIMM should be standing straight up.

Figure 6-5. Installing DIMMs

To remove DIMMs:

1 Turn off your computer and remove the back and side panels (see "Accessing the Inside of Your Computer" on page 6-5).

2 Gently push down the tab securing the DIMM in the socket. The DIMM pops out of the socket.

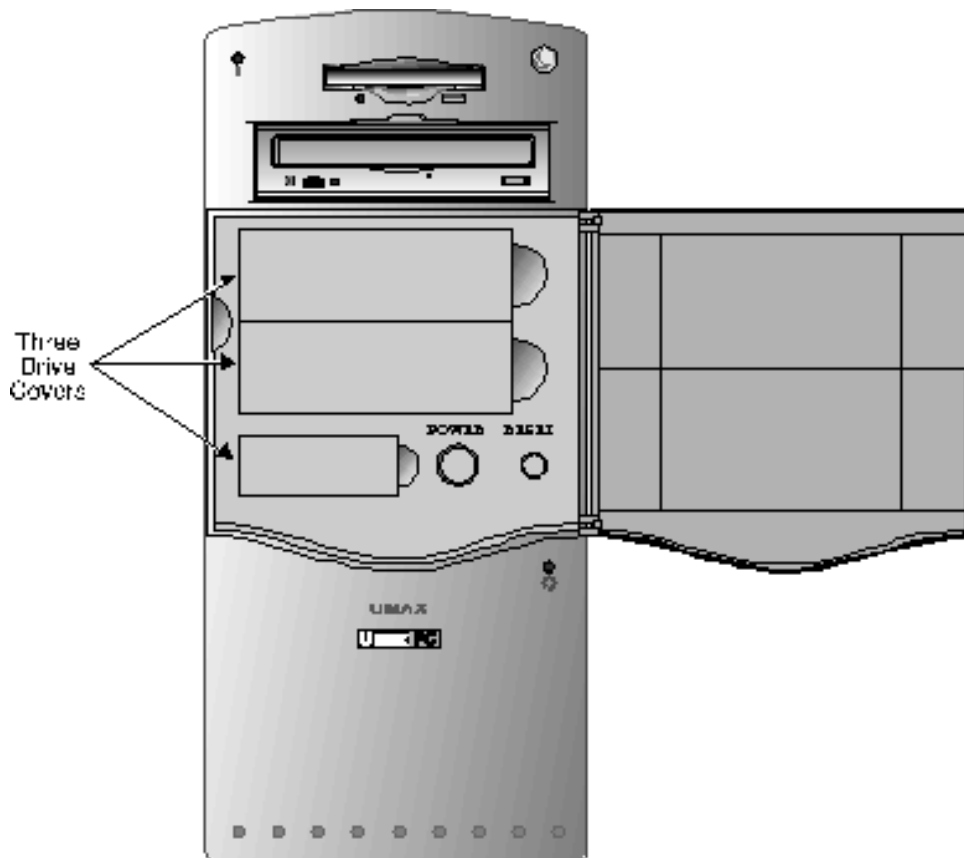**3** Lift the DIMM straight up from the socket and remove it gently.

> **Never forcibly remove a DIMM, and never try to remove a DIMM without first releasing it from the socket. Otherwise, you may break the DIMM and the socket.**

Installing a New Hard Drive

To install a new hard drive:

1 Turn off your computer and remove the back and side panels (see "Accessing the Inside of Your Computer" on page 6-5).

2 Face the front of the computer.

3 Open the front panel door and locate the plastic drive covers (see Figure 6-6). Each of these drive covers has a notch along the right side, which you can use to remove the cover.
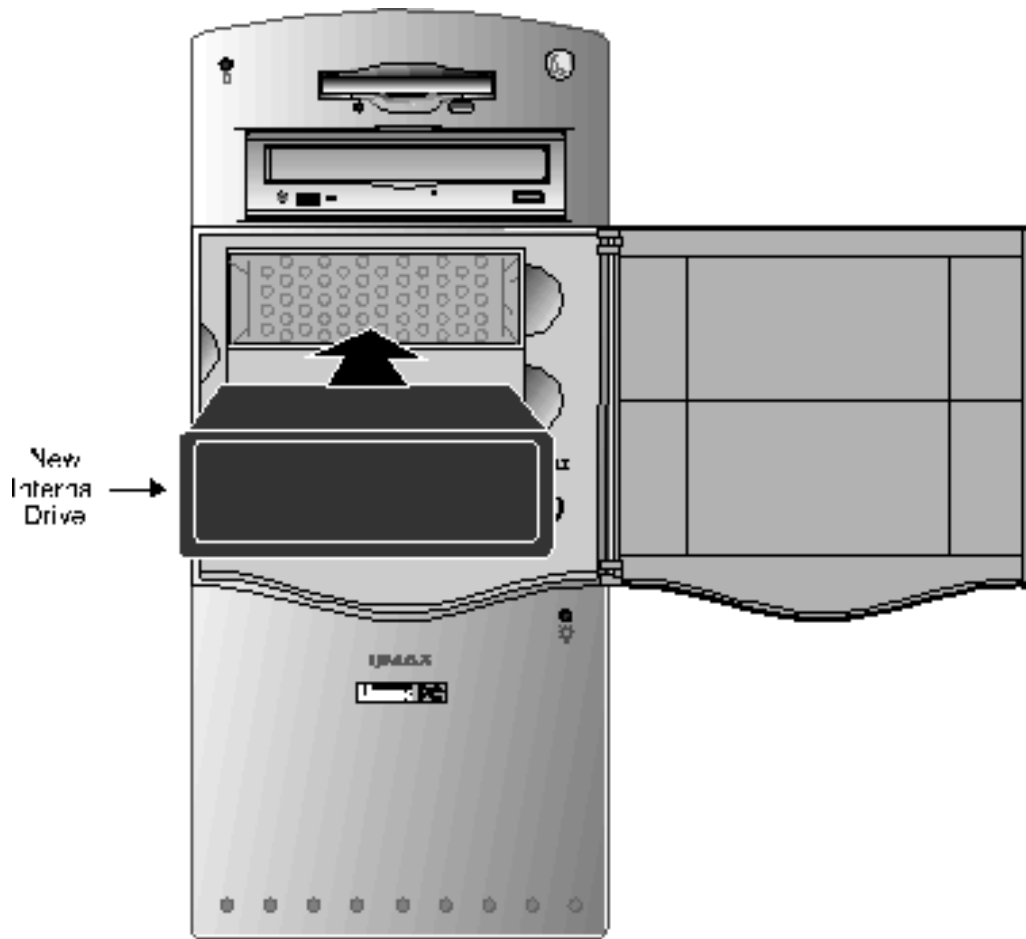
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Figure 6-6. Three Drive Covers

4 Place a finger in the notch and gently remove the plastic drive cover where you want to install the drive. Set the plastic cover aside for now. You will need it later, after you install the new drive.

5 A metal plate appears behind the plastic drive cover. This plate is secured by two soft metal hinges. Gently move the metal plate back and forth until it comes loose, then set it aside.

6 Configure one of the drives as the master and the other as the slave. Typically, the boot drive is configured as the master. The selection of master/slave typically is done using a jumper on the drive. Refer to the
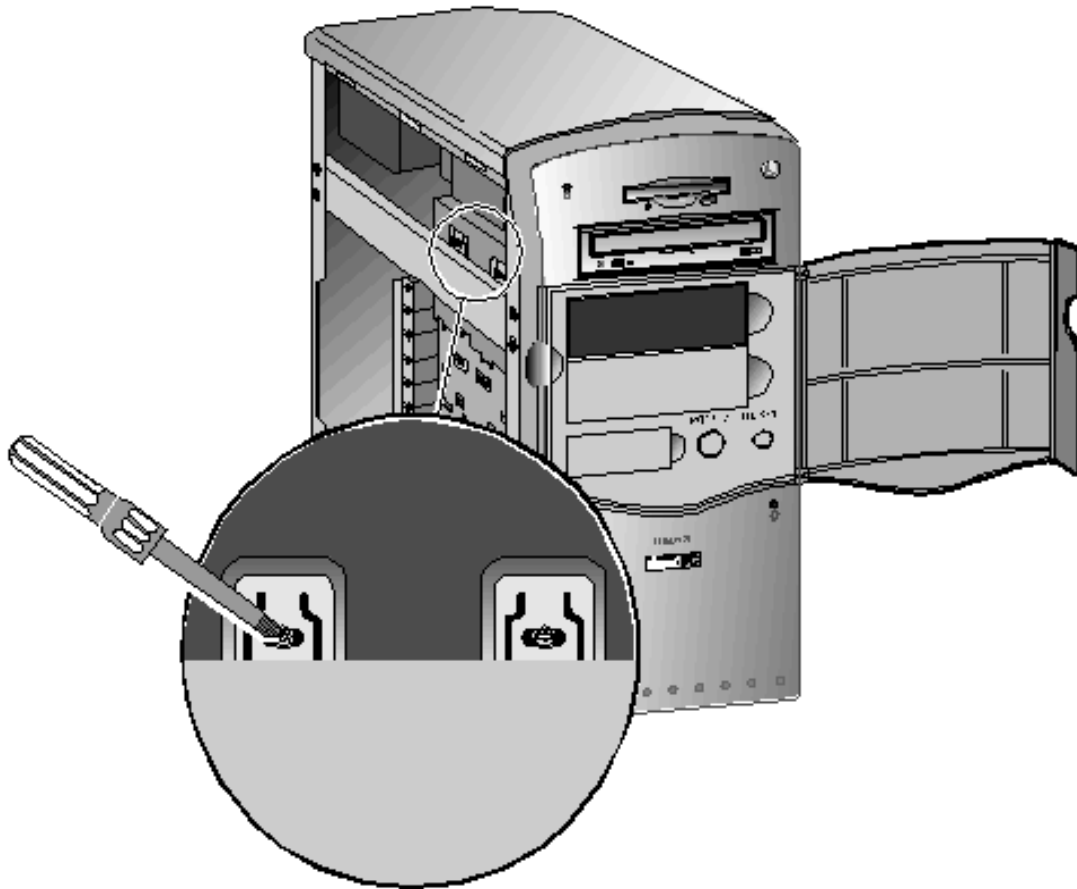
manual that came with the new drive and the one installed in your computer for more information.

7 Hold the new drive so its metallic sides are facing up and its IDE and power connectors are facing toward the inside of the system unit. Then slide the internal drive between the hard drive supporting brackets. See Figure 6-7.

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Figure 6-7. Installing a New Internal Drive

8 Use two screws to secure the new hard drive to the bracket (see Figure 6-8).

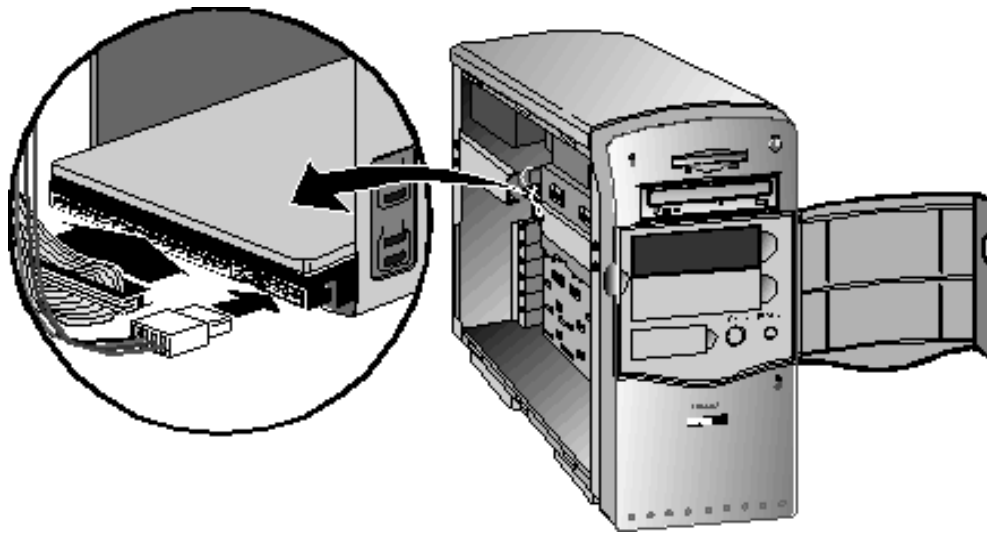**Figure 6-8. Securing the Drive to the Bracket**

9 Replace the plastic cover you removed in step 4.

10 Connect one end of the 40-pin ribbon cable from the IDE controller to the back of the new drive (see Figure 6-9).

11   Connect the 4-pin cable from the power supply to the back of the new drive (see Figure 6-9).

> **The IDE and power supply cables are keyed so you cannot connect them incorrectly. If you are unable to attach the cable connectors to the new drive, turn the connectors around and try again.**

Figure 6-9. Connecting IDE and Power Cables to a New Drive

12   Replace the side and back panels.

13   Reconnect the power cable and any cables you removed earlier.

14   Turn on your computer.

15   Initialize and format the new drive according to the instructions in the manual that came with the new drive.

Installing a Second CD-ROM Drive

To install a second CD-ROM drive:

1 Perform steps 1 through 6 under "Installing a New Hard Drive" on page 6-13.

2 Insert the new CD-ROM drive in an available 5 1/4-inch drive bay below the first CD-ROM drive. See Figure 6-3 on page 6-8.

3 Use two screws to secure the new CD-ROM drive to the bracket (see Figure 6-8).

4 Connect the 40-pin ribbon cable from the IDE controller to the back of the new CD-ROM drive (see Figure 6-9).

5 Connect the 4-pin cable from the power supply to the back of the new CD-ROM drive (see Figure 6-9).

> **The IDE and power supply cables are keyed so you cannot connect them incorrectly. If you are unable to attach the cable connectors to the new drive, turn the connectors around and try again.**

6 Replace the side and back panels.

7 Reconnect the power cable and any cables you removed earlier.

8 Turn on your computer.

Installing and Removing Expansion Cards

Your system board provides ISA and PCI slots for Plug and Play (PnP) and non-PnP (*legacy*) expansion cards. Refer to the system board manual that came with your computer to find out the number of ISA and PCI slots on the system board and their location. For more information about PnP, refer to See "Plug-and-Play Technology" on page 6-21.

Installing a PnP Expansion Card

To install a PnP expansion card:

1 Turn off your computer and remove the back and side panels (see "Accessing the Inside of Your Computer" on page 6-5).

2 Locate an available PCI expansion slot.

3 Remove the screw securing the slot cover to the back panel. Keep the screw nearby. (You will need it to secure the card after it is installed). You may also want to keep the slot cover in case you remove the expansion card at a later time.

4 Apply even pressure to both ends of the card as you insert it into the expansion slot. When the card is seated in the slot, gently press down firmly to secure it in the slot.

5 Use the screw you removed in step 3 to secure the card to the back panel.

6 Attach any cables to the expansion card, as described in the manual that came with the card.

7 Replace the side and back panels.

8 Reconnect the power cable and any cables you removed earlier.

9 Turn on your computer. Your computer automatically configures the expansion card.

10 Follow any on-screen prompts to complete the installation procedure.

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Installing a Legacy Expansion Card

To install a legacy expansion card:

1 Turn off your computer and remove the back and side panels (see "Accessing the Inside of Your Computer" on page 6-5).

2 Set any switches or jumpers to configure the expansion card, as described in the manual that came with the card.

3 Locate an available ISA expansion slot.

4 Remove the screw securing the slot cover to the back panel. Keep the screw nearby. (You will need it to secure the card after you have installed it.) You may also want to keep the slot cover in case you remove the expansion card at a later time.

5 Apply even pressure to both ends of the card as you insert it into the expansion slot. When the card is seated in the slot, gently press down firmly to secure it in the slot.

6 Use the screw you removed in step 4 to secure the card to the back panel.

7 Attach any cables to the expansion card, as described in the manual that came with the card.

8 Replace the side and back panels.

9 Reconnect the power cable and any cables you removed earlier.

10 Turn on your computer.

11 Install any software required by the legacy expansion card, as described in the manual that came with the card.

Plug-and-Play Technology

Your computer uses Plug-and-Play (PnP) technology. PnP is a hardware and software standard that allows compatible computer systems to automatically configure expansion cards and other devices.

Overview

Before PnP became a standard, a computer user had to configure peripherals before they could be installed in the computer. Many times, this meant the user had to use *jumpers* or *dual in-line package (DIP) switches* to configure the device to make sure it did not conflict with other devices already installed in or attached to the computer. Frequently, this was a slow, methodical, and frustrating exercise.

After the card was configured, the user would install it in the computer, turn on the computer, hope that the configuration selected would work. If it didn't, the user would have to turn off the computer again, remove the card, and repeat the whole process. It was not untypical for a user to repeat this sequence multiple times, until a working configuration could be found.

This procedure was exacerbated by the fact that it was difficult, if not impossible to ascertain the configurations of the other cards installed in the computer. Therefore, finding a working configuration for a new card was often times a guessing game.

Today, the PnP standard relieves computer users from this burden. If you install a PnP device in your computer, or attach a PnP device to your computer, your job is complete after you install or attach the device. Your computer does the rest! When you power-on the computer, it recognizes that a new device has been installed or attached, and automatically assigns the appropriate system resources, such as *interrupt requests* (IRQs) and *direct memory access* (DMA) channels, to the device.

Each time you turn on your computer, it checks all the PnP devices installed in and attached to it to find out what resources they need. Then it assigns resources to the devices so that there are no conflicts. A new device creates no special problems for your PnP computer, because it can reassign any system resources as needed.

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Backward Compatibility

A PnP system can use devices that were designed before the Plug and Play standard was developed. However, the configuration of these "legacy" devices cannot be automatically determined by a PNP computer. Therefore, legacy devices typically include software that allows them to be used in PnP computers.

To install legacy devices in your computer, use the procedure described under "Installing a Legacy Expansion Card" on page 6-20.