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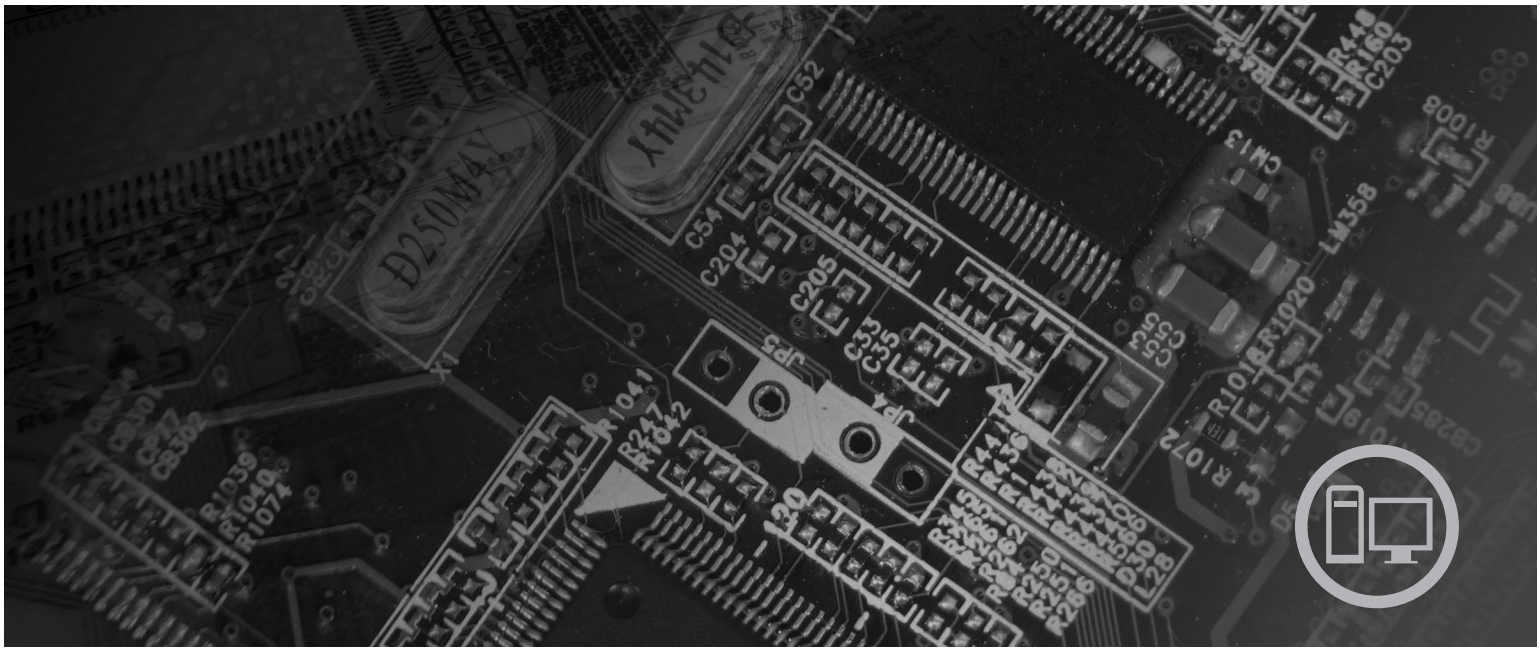
ThinkCentre
Hardware Installation and Replacement Guide



Machine Types 6176, 6179, 7064, 7094, 9349, 9356, 9357, 9439, 9488, 9702, 9708, 9709, 9789, 9851, 9948

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Note

Before using this information and the product it supports, be sure to read and understand the *Safety and Warranty Guide* for this product and "Notices," on page 53.

First Edition (February 2008)

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Chapter 1. Important safety information

CAUTION:
Before using this manual, it is important that you read and understand all the related safety information for this product. Refer to the *Safety and Warranty Guide* **that you received with this product for the latest safety information. Reading and understanding this safety information reduces the risk of personal injury and or damage to your product.**

If you no longer have a copy of the *Safety and Warranty Guide*, you can obtain one online from the Lenovo® Support Web site at:
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Chapter 2. Overview

This guide provides information about replacing Customer Replaceable Units (CRUs).

Note: Use only parts provided by Lenovo.

This guide contains instructions for installing or replacing the following parts:

- Front Bezel
- Battery
- Power supply
- Heat sink
- Primary hard disk drive
- Secondary hard disk drive
- Optical drive
- Diskette drive
- Memory modules
- PCI adapter
- Front fan assembly
- Rear fan assembly
- Keyboard
- Mouse

Additional information resources

If you have Internet access, the most up-to-date information for your computer is available from the World Wide Web.

You can find:

- CRU removal and installation information
- CRU removal and installation videos
- Publications
- Troubleshooting information
- Parts information
- Downloads and drivers
- Links to other useful sources of information
- Support phone list

To access this information, go to:
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Handling static-sensitive devices

Do not open the static-protective package containing the new part until the defective part has been removed from the computer and you are ready to install the new part. Static electricity, although harmless to you, can seriously damage computer components and parts.

When you handle parts 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 parts and other computer components carefully. Handle adapters, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts and other computer components.
- Before you replace a new part, touch the static-protective package containing the part 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 new part from the static-protective packaging, and install it directly in the computer without setting the part down. When this is not possible, place the static-protective package that the part came in on a smooth, level surface and place the part on it.
- Do not place the part on the computer cover or other metal surface.

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Locations

This chapter provides illustrations to help locate the various connectors, controls, and components of the computer.

Locating controls and connectors on the front of your computer

Figure 1 shows the location of the controls and connectors on the front of your computer.

Note: Not all computer models will have the following controls and connections.

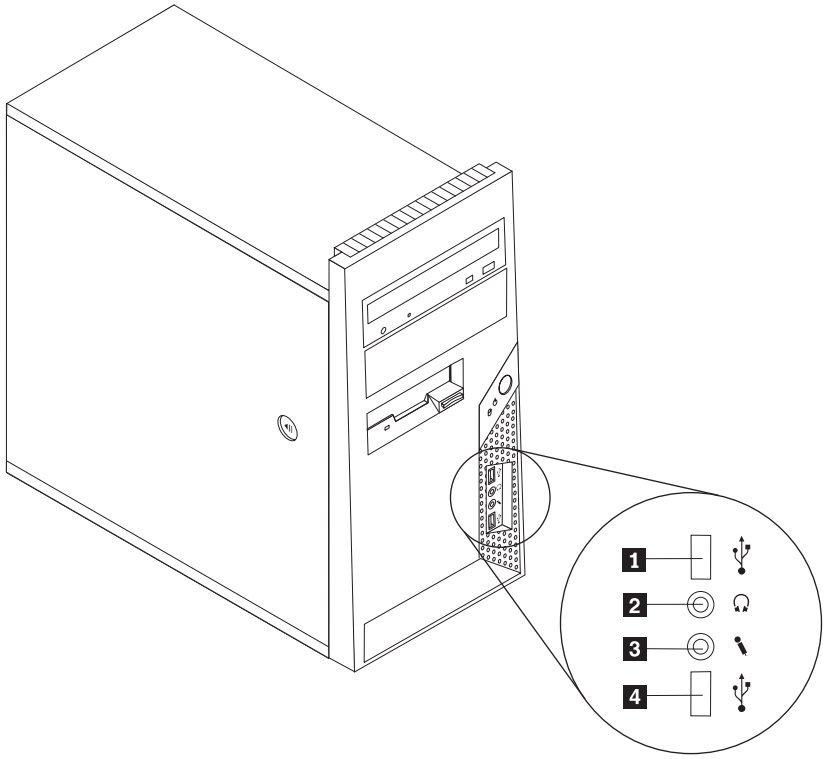

Figure 1. Controls and connectors

1	USB connector	3	Microphone connector
2	Headphone connector	4	USB connector

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Locating connectors on the rear of your computer

Figure 2 shows the location of connectors on the rear of your computer. Some connectors on the rear of your computer are color-coded to help you determine where to connect the cables on your computer.

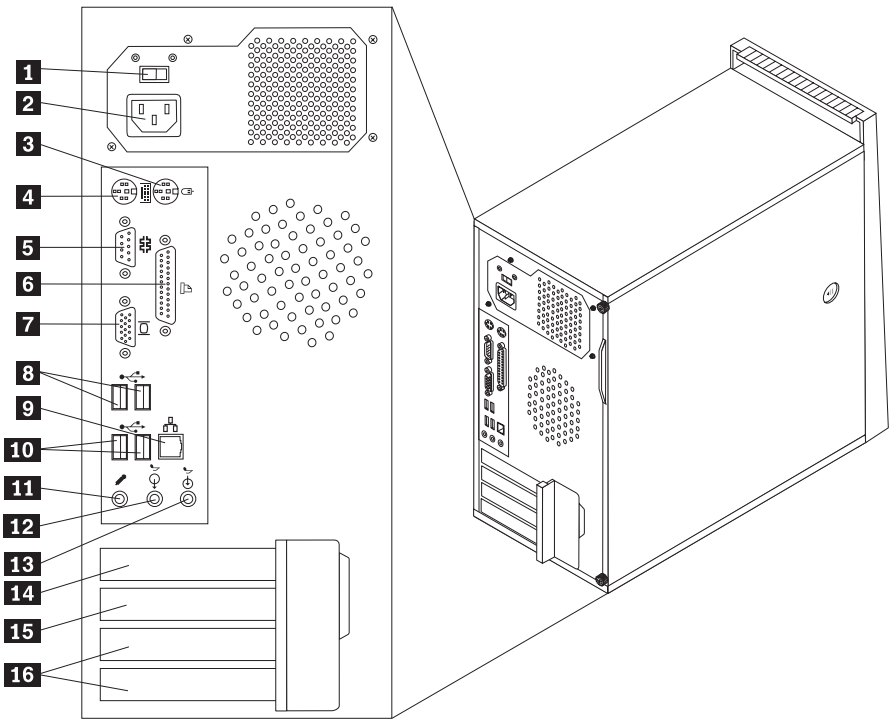

Figure 2. Rear connector locations

1	Voltage selection switch (some models)	9	Ethernet connector
2	Power connector	10	USB connectors (2)
3	Standard mouse connector	11	Microphone connector
4	Standard keyboard connector	12	Audio line out connector
5	Serial connector	13	Audio line in connector
6	Parallel connector	14	PCI Express x16 graphics adapter connector
7	VGA monitor connector	15	PCI Express x1 adapter connector
8	USB connectors (2)	16	PCI adapter connectors (2)

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Connector	Description
Standard mouse connector	Used to attach a mouse, trackball, or other pointing device that uses a standard mouse connector.
Standard keyboard connector	Used to attach a keyboard that uses a standard keyboard connector.
Serial connector	Used to attach an external modem, serial printer, or other devices that use a 9-pin serial connector.
Parallel connector	Used to attach a parallel printer, parallel scanner, or other devices that use a 25-pin parallel connector.
USB connectors	Used to attach a device that requires a Universal Serial Bus (USB) connection, such as a USB keyboard, USB mouse, USB scanner or USB printer. If you have more than six USB devices, you can purchase a USB hub, which you can use to connect additional USB devices.
Ethernet connector	Used to attach an Ethernet cable for a local area network (LAN). **Note:** To operate the computer within FCC Class B limits, use a Category 5 Ethernet cable.
Audio-line-out connector	Used to send audio signals from the computer to external devices, such as powered stereo speakers (speakers with built-in amplifiers), headphones, multimedia keyboards, or the audio line in connector on a stereo system or other external recording device.
Audio-line-in connector	Used to receive audio signals from an external audio device, such as a stereo system. When you attach an external audio device, a cable is connected between the audio line out connector of the device and the audio line in connector of the computer.

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Locating components

To open the computer cover, see “Removing the cover” on page 12.

Figure 3 shows the location of the various components in your computer.

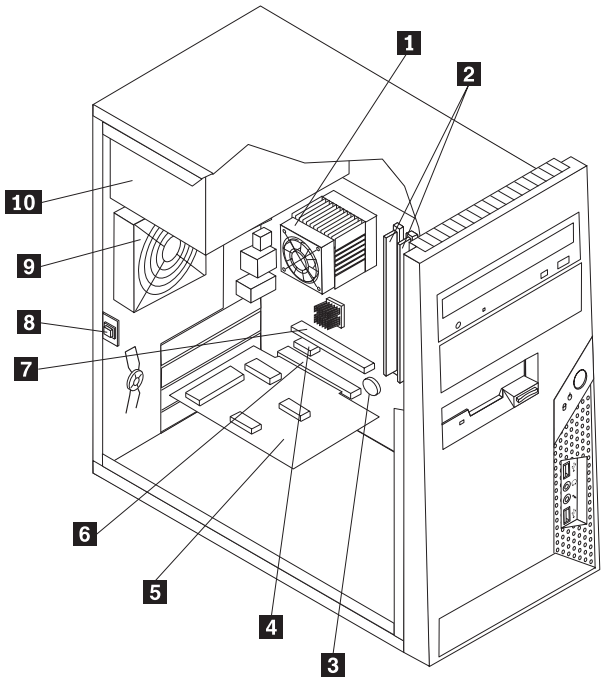

Figure 3. Component locations

1	Microprocessor fan and heat sink	6	PCI adapter connector
2	Memory modules (2)	7	PCI Express x16 graphics adapter connector
3	Battery	8	Cover presence (Intrusion) switch
4	PCI Express x1 adapter connector	9	Rear fan assembly
5	PCI adapter card	10	Power supply

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Identifying parts on the system board

Figure 4 shows the location of parts on the system board.

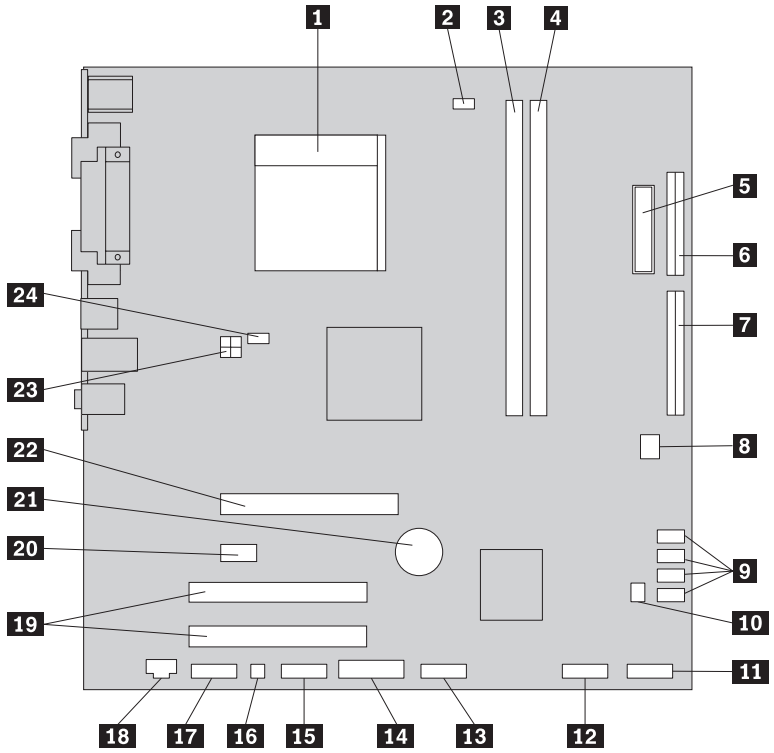

Figure 4. System board parts locations

1	Microprocessor and heat sink	13	Front USB connector
2	Microprocessor fan connector	14	TCM header connector
3	Memory connector 1	15	Serial (COM) connector
4	Memory connector 2	16	Internal speaker connector
5	Power connector	17	Front audio connector
6	Diskette drive connector	18	CD_IN connector
7	IDE connector	19	PCI adapter connectors (2)
8	Power fan connector	20	PCI Express x1 adapter connector
9	Serial ATA connectors (4)	21	Battery
10	Clear CMOS/Recovery jumper	22	PCI Express x16 graphics adapter connector
11	Front panel connector	23	12 V power connector
12	Front USB connector	24	System fan connector

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Chapter 3. Installing options and replacing hardware

This chapter provides an introduction to the features and options that are available for your computer. You can expand the capabilities of your computer by adding memory, adapters, or drives. When installing an option, use these instructions along with the instructions that come with the option.

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

Note: Use only parts provided by Lenovo.

Installing external options

External speakers, a printer, or a scanner can be connected to your computer. For some external options, you must install additional software in addition to making the physical connection. When adding an external option, see "Locating connectors on the rear of your computer" on page 6 and "Locating controls and connectors on the front of your computer" on page 5 to identify the required connector, and then use the instructions that are included with the option to help you make the connection and install any software or device drivers that are required for the option.

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Removing the cover

Important

Turn off the computer and wait 3 to 5 minutes to let the computer cool before removing the computer cover.

This section provides instructions on how to remove the computer cover.

1. Remove any media (diskettes, CDs, or tapes) from the drives, shut down your operating system, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect the cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. See "Locating controls and connectors on the front of your computer" on page 5 and "Locating connectors on the rear of your computer" on page 6.
4. Remove any locking devices, such as a cable lock that secures the computer cover.
5. If there are thumbscrews securing the cover, remove them.

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6. Press the cover-release button on the side of the cover and slide the computer cover to the rear to remove.

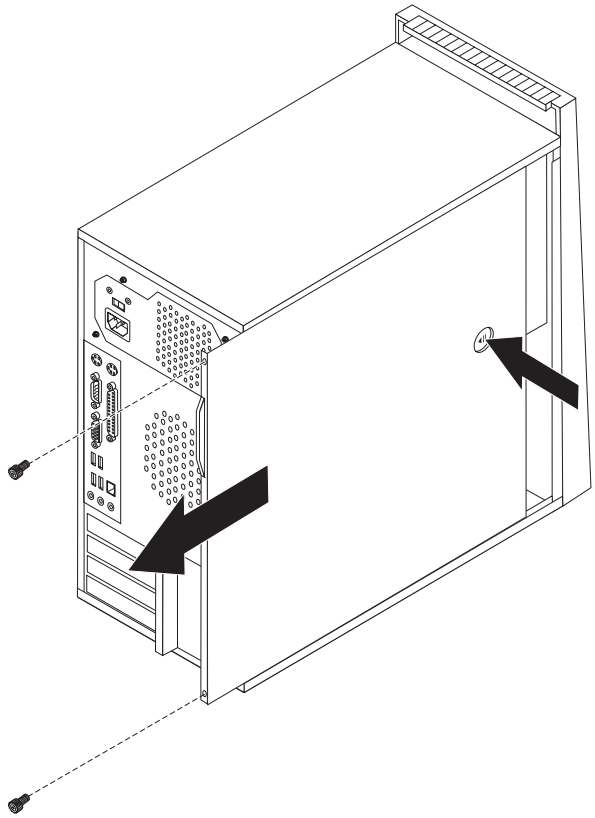

Figure 5. Removing the computer cover

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Removing and replacing the front bezel

This section provides instructions on how to remove and replace the front bezel.

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Remove the front bezel by releasing the three plastic tabs on the left side and pivoting the bezel outward. Carefully set the bezel to the side without disconnecting the power switch and LED assembly cable.

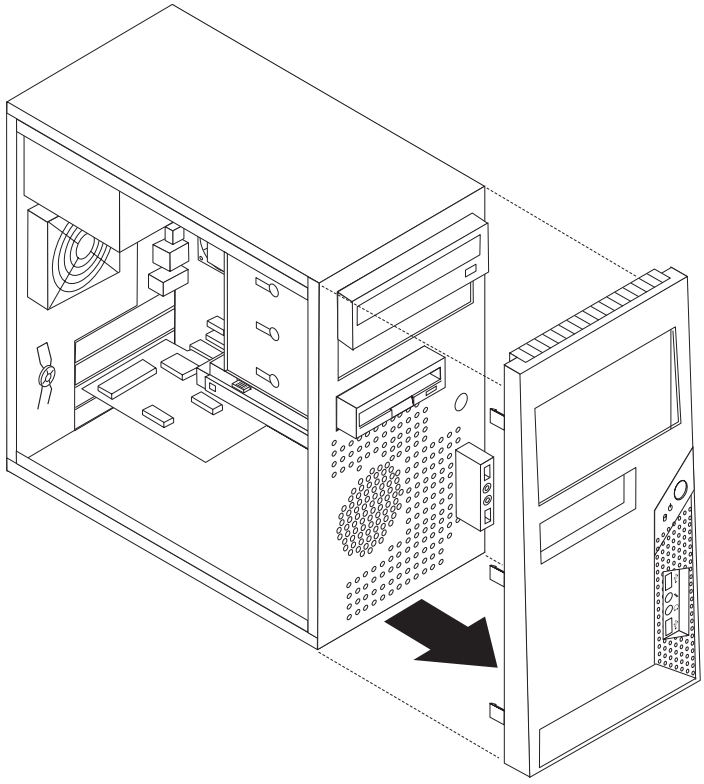

Figure 6. Removing the front bezel

3. To reinstall the bezel, align the plastic tabs on the right side of the bezel with the corresponding holes in the chassis, then pivot it inward until it snaps into position on the left side.
4. To complete the installation, go to Chapter 4, "Completing the parts replacement," on page 47.

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Installing internal options

Important
Read "Handling static-sensitive devices" on page 4 before removing the computer cover.

Installing a memory module

Your computer has two connectors for installing double data rate 2 dual inline memory modules (DDR2 DIMMs) that provide up to a maximum of 4.0 GB of system memory.

When installing memory modules, the following rules apply:

- Use 1.8 V, 240-pin double data rate 2 synchronous dynamic random access memory (DDR2 SDRAM).
- Use 512 MB, 1.0 GB, or 2.0 GB memory modules in any combination up to a maximum of 4.0 GB.

Note: Only DDR2 SDRAM DIMMs can be used.

To install a memory module:

1. Remove the computer cover. See "Removing the cover" on page 12.

   Note: For this procedure, it helps to lay the computer on its side.
2. Locate the memory connectors. See "Identifying parts on the system board" on page 9.
3. Open the retaining clips as shown.

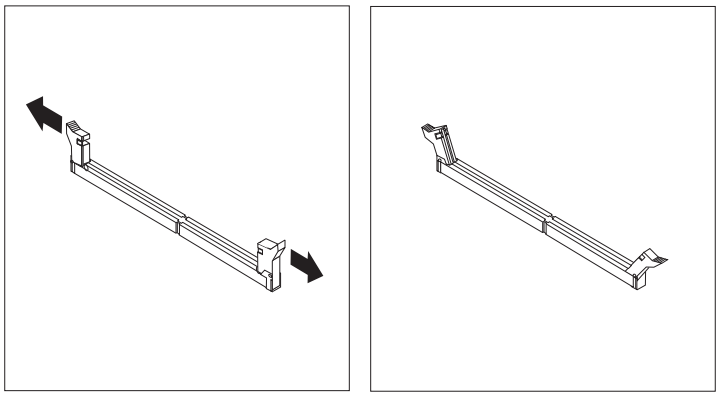

Figure 7. Opening the retainer clips

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4. Position the new memory module over the memory connector. Make sure the notch 1 on the memory module aligns correctly with the connector key 2 on the system board. Push the memory module straight down into the connector until the retaining clips close.

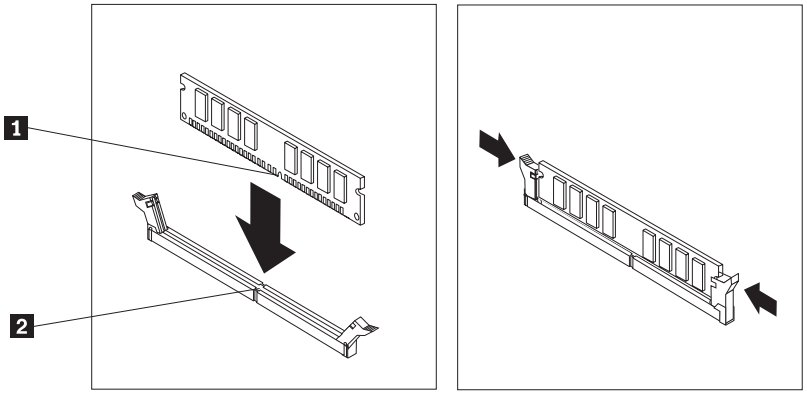

Figure 8. Installing the memory module

5. Go to Chapter 4, "Completing the parts replacement," on page 47.

Installing PCI adapters

This section provides information and instructions for installing PCI adapters. Your computer has two expansion connectors for PCI adapters, one for a PCI Express x16 graphics adapter, and one for a PCI Express x1 adapter.

To install a PCI adapter:

1. Remove the computer cover. See "Removing the cover" on page 12.

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2. At the rear of the computer, press the release button **1** to open the adapter latch **2** and remove the slot cover.

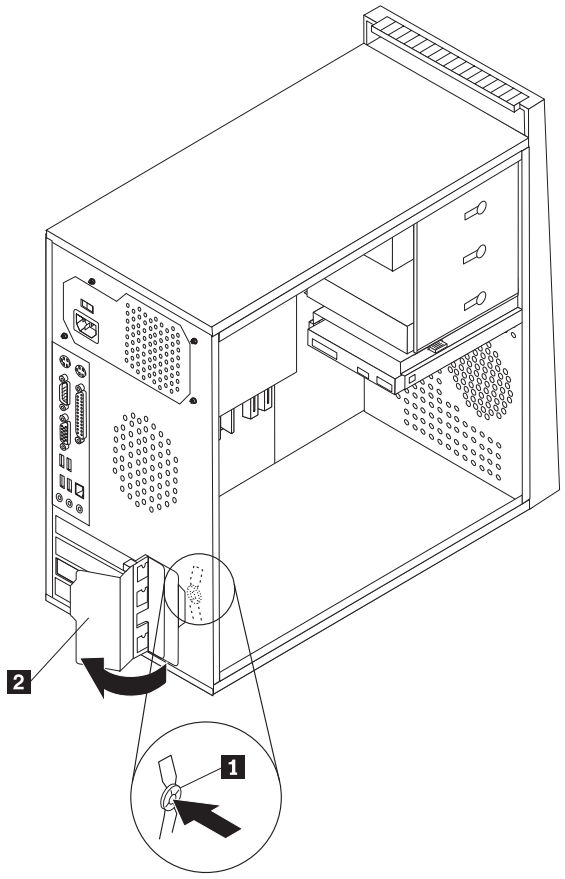

Figure 9. Opening the adapter latch

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3. Remove the adapter from its static-protective package.
4. Install the adapter into the appropriate connector on the system board.
5. Pivot the adapter latch to the closed position to secure the adapters.

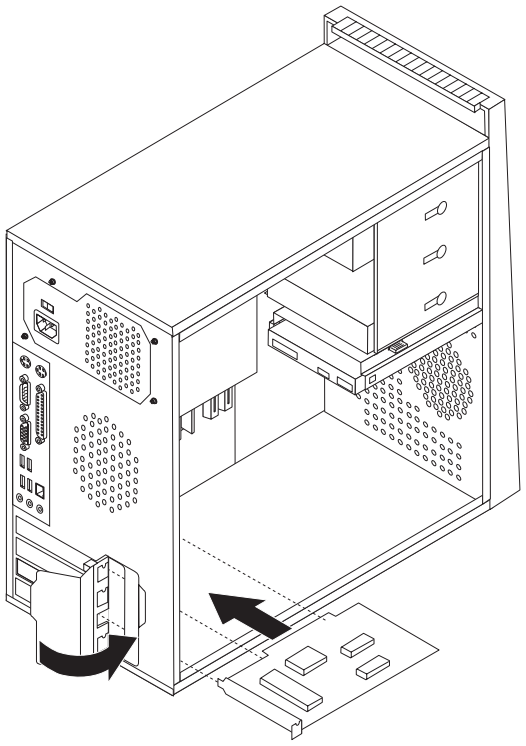

Figure 10. Closing the adapter latch

What to do next:

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 4, "Completing the parts replacement," on page 47.

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Installing internal drives

This section provides information and instructions for installing internal drives.

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

- Serial Advanced Technology Attachment (SATA) hard disk drives
- SATA optical drives, such as CD drives or DVD drives
- Removable media drives

Note: These types of drives are also referred to as integrated drive electronics (IDE) drives.

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

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

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Drive specifications

Your computer comes with the following factory-installed drives:

- An optical drive in bay 1 (some models)
- A 3.5-inch diskette disk drive in bay 3 (some models)
- A 3.5-inch primary hard drive in bay 4

Any bay that does not have a drive installed has a static shield and bay panel installed.

Figure 11 shows the location of the drive bays.

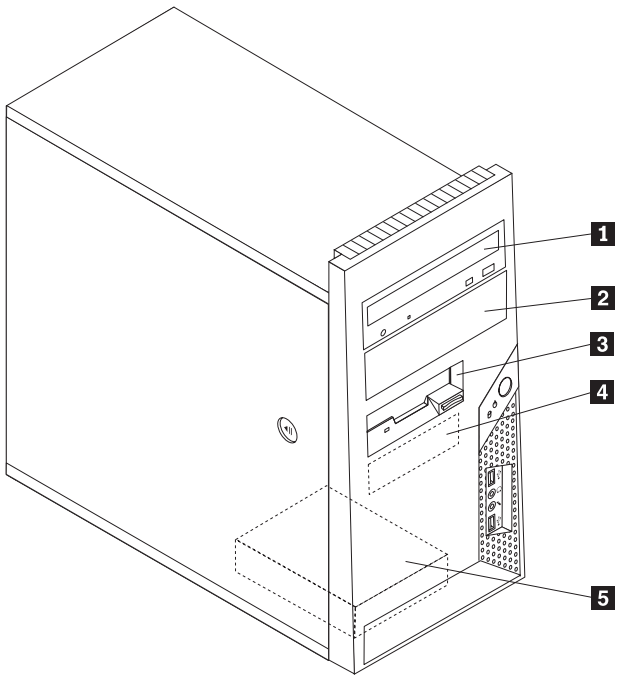

Figure 11. Drive bay locations

The following list describes the types and size of drives that you can install in each bay:

1 Bay 1 - Maximum height: 43.0 mm (1.7 in.)	• Optical drive such as CD drive or DVD drive (preinstalled in some models) • 5.25-inch hard disk drive • 3.5-inch hard disk drive (requires a Universal Adapter Bracket, 5.25 to 3.5-inch)*
2 Bay 2 - Maximum height: 43.0 mm (1.7 in.)	• Optical drive such as CD drive or DVD drive • 5.25-inch removable media drive • 3.5-inch hard disk drive (requires a Universal Adapter Bracket, 5.25 to 3.5-inch)*
3 Bay 3 - Maximum height: 25.8 mm (1.0 in.)	3.5-inch diskette drive (preinstalled in some models)
4 Bay 4 - Maximum height: 25.8 mm (1.0 in.)	3.5-inch primary SATA hard disk drive (preinstalled)
5 Bay 5 - Maximum height: 25.8 mm (1.0 in.)	3.5-inch secondary SATA hard disk drive (preinstalled in some models)

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* You can obtain a Universal Adapter Bracket, 5.25 to 3.5-inch from a local computer retailer or by contacting the Customer Support Center.

Installing a drive in bay 1 or bay 2

To install a drive in bay 1 or bay 2:

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Remove the front bezel. See "Removing and replacing the front bezel" on page 14.

   Note: Notice the spare retainer bracket **1** attached to the side of the upper drive cage.

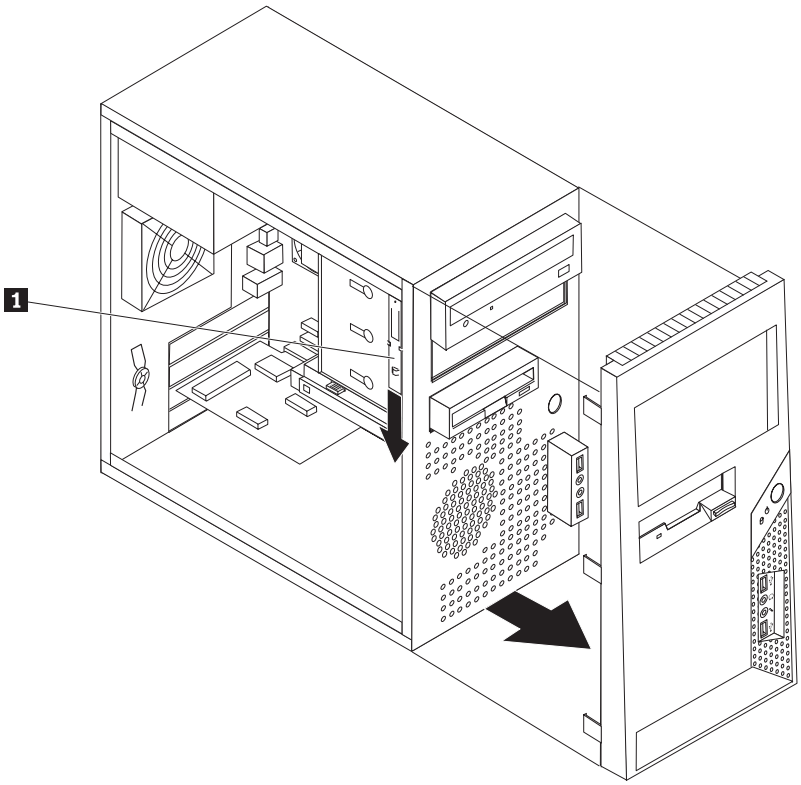

Figure 12. Locating the spare retainer bracket

3. Remove the metal static shield from the drive bay using your fingers to pull it outward.
4. If you are installing a drive with accessible media, such as an optical drive, remove the plastic panel in the bezel for bay 2 by squeezing the plastic tabs that secure the panel on the inside of the bezel.
5. Remove the retainer bracket from the upper driver cage by sliding it downward.

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6. For a 5.25-inch drive, install a retainer bracket on the side of the drive.

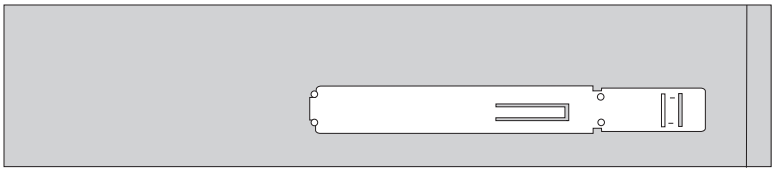

Figure 13. Installing a retainer bracket

7. For a 3.5-inch drive, you must use a Universal Adapter Bracket, 5.25 to 3.5-inch. You can obtain a Universal Adapter Bracket, 5.25 to 3.5-inch from a local computer retailer or by contacting the Customer Support Center. Install a retainer bracket on the side of the Universal adapter bracket.
8. Install the 5.25-inch drive or the adapter bracket and 3.5-inch drive into the bay.

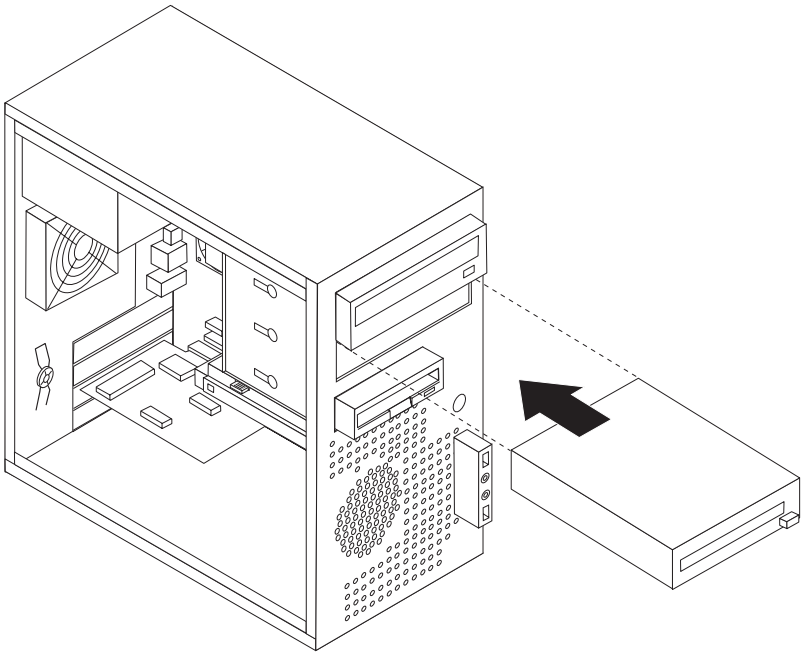

Figure 14. Installing a new drive

9. To reinstall the bezel, align the plastic tabs on the right side of the bezel with the corresponding holes in the chassis, then pivot it inward until it snaps into position on the left side.
10. Continue at "Connecting drives."

Connecting drives

The steps to connect a drive are different depending on the type of drive you are connecting. Use one of the following procedures for your drive connection.

Connecting a parallel ATA drive:

1. Locate the two-connector signal cable that comes with your computer or with the new drive.
2. Locate the IDE connector on the system board. See "Identifying parts on the system board" on page 9.

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3. Connect one end of the signal cable to the drive and the other to the IDE connector on the system board.
4. Locate the extra four-wire power connector labelled P4 and connect it to the drive.

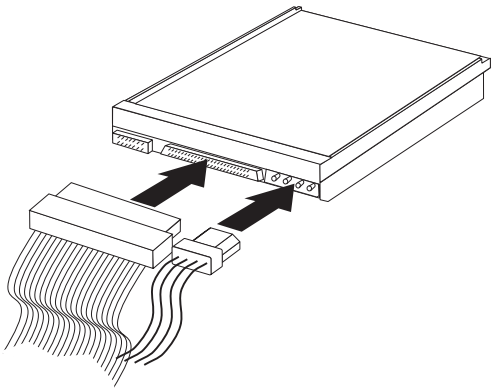

Figure 15. Connecting a parallel ATA drive

Connecting a serial ATA drive: A serial optical or hard disk drive can be connected to any available SATA connector.

1. Locate the signal cable that comes with the new drive.
2. Locate the available SATA connector on the system board. See "Identifying parts on the system board" on page 9.
3. Connect one end of the signal cable to the drive and the other to the available SATA connector on the system board.
4. Locate one of the extra five-wire power connectors and connect it to the drive.

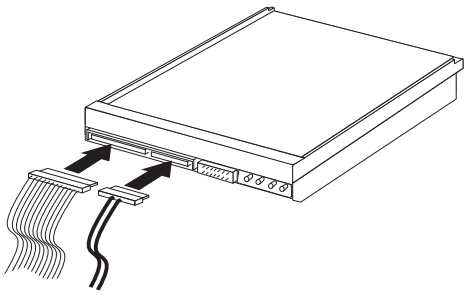

Figure 16. Connecting a serial ATA drive

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 4, "Completing the parts replacement," on page 47.

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Replacing the battery

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

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

Refer to the "Lithium battery notice" in the *Safety and Warranty Guide* for information about replacing and disposing of the battery.

To replace the battery:

1. Remove the computer cover. See “Removing the cover” on page 12.
2. Locate the battery. See “Identifying parts on the system board” on page 9.
3. Remove the old battery.

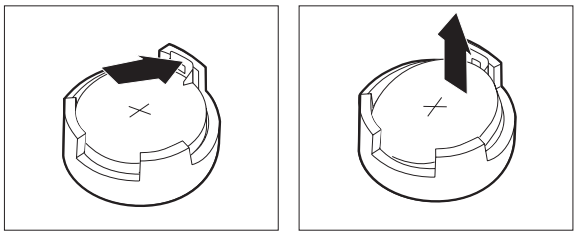

Figure 17. Battery removal

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4. Install the new battery.

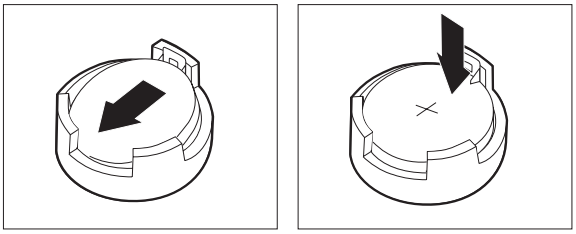

Figure 18. Battery installation

5. Replace the computer cover, and connect the cables. See Chapter 4, “Completing the parts replacement,” on page 47.

   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.
6. Turn on the computer and all attached devices.
7. Use the Setup Utility program to set the date and time and any passwords. See "Using the Setup Utility" in the *User Guide*.

Replacing the power supply assembly

Attention

Do not open your computer or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instruction on how to replace the power supply assembly.

1. Remove the computer cover. See “Removing the cover” on page 12.

   Note: For this procedure, it helps to lay the computer on its side.
2. Disconnect the power supply cables from the system board and from all drives. See “Identifying parts on the system board” on page 9.

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3. Remove the four screws at the rear of the chassis that secure the power supply.

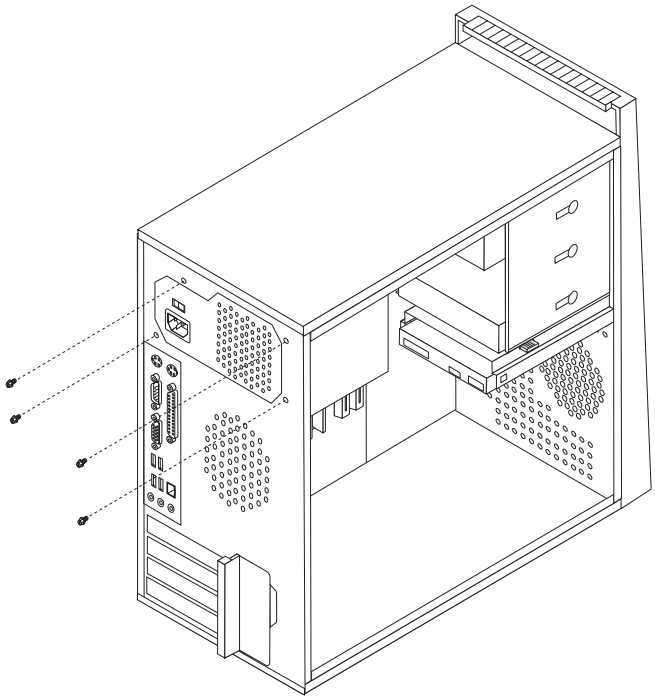

Figure 19. Removing the power-supply-retaining screws

4. Lift the power supply out of the chassis.
5. Install the new power supply into the chassis so that the screw holes in the power supply align with those in the chassis.
6. Install the four screws to secure the power supply.

   Note: Use only the screws provided by Lenovo.
7. Reconnect the power supply connectors to the system board.
8. Reconnect a power supply connector to each of the drives.
9. If your computer has a voltage-selection switch, ensure that you set the voltage-selection switch to match the voltage available at your electrical outlet. If necessary, use a ballpoint pen to slide the switch to a different position.
   - If the voltage supply range in your local country or region is 100–127 V ac, set the switch to 115 V.
   - If the voltage supply range is in your local country or region is 200–240 V ac, set the switch to 230 V.
10. Go to Chapter 4, "Completing the parts replacement," on page 47.

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Replacing the heat sink

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instructions on how to replace the heat sink.

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Lay the computer on its side.
3. Locate the heat sink. See "Identifying parts on the system board" on page 9.
4. Disconnect the heat sink and the fan assembly cable from the microprocessor fan connector on the system board.
5. Remove the four screws **1** securing the heat sink and fan assembly to the system board.

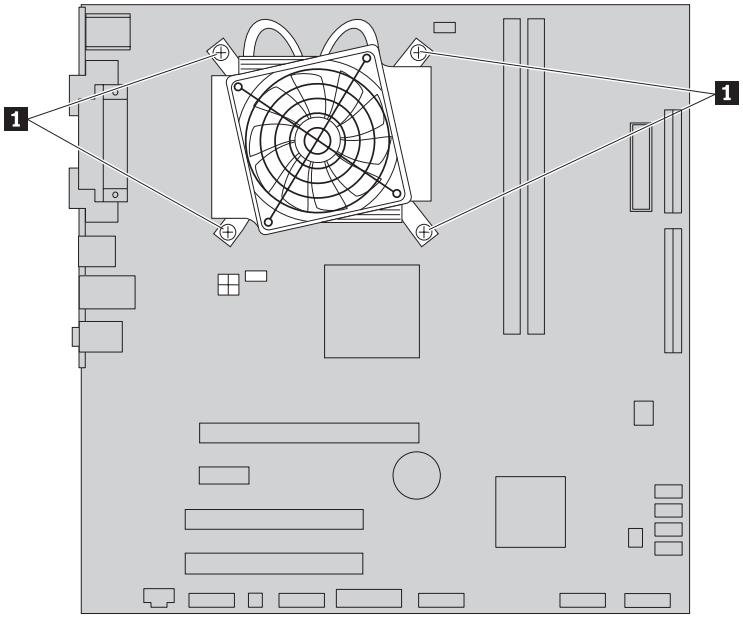

Figure 20. Removing the heat sink and fan assembly

Note: You might have to gently twist the heat sink to free it from the microprocessor.

6. Lift the failing heat sink and fan assembly off the system board.

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7. Position the new heat sink and fan assembly on the plastic retention bracket so that the four screws are aligned with the posts on the system board. Tighten the four screws **1** to secure the heat sink and fan assembly to the system board.

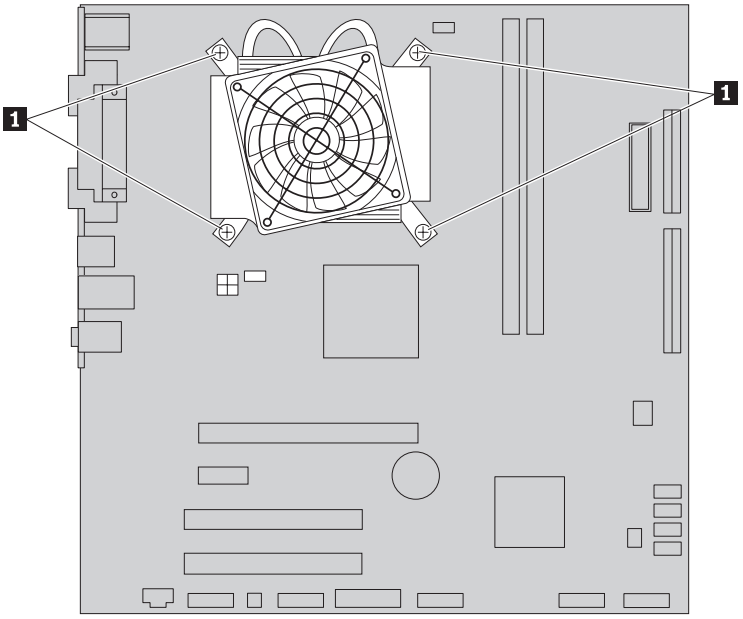

Figure 21. Replacing the heat sink and fan assembly

8. Connect the heat sink and the fan assembly cable to the microprocessor fan connector on the system board.
9. Go to Chapter 4, "Completing the parts replacement," on page 47.

Replacing the primary hard disk drive

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instructions on how to replace the primary hard disk drive.

Important

When you receive a new hard disk drive, you also receive a set of *Product Recovery discs*. The set of *Product Recovery discs* will enable you to restore the contents of the hard disk to the same state as when your computer was originally shipped from the factory. For more information on recovering factory-installed software, refer to "Recovering software" in your *User Guide*.

To replace the primary hard disk drive:

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Locate the primary hard disk drive. See "Drive specifications" on page 20.

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3. Disconnect the signal and power cables from the hard disk drive.
4. Press the blue release tab **1** down, slide the hard drive cage **2** back, and pivot it outward.

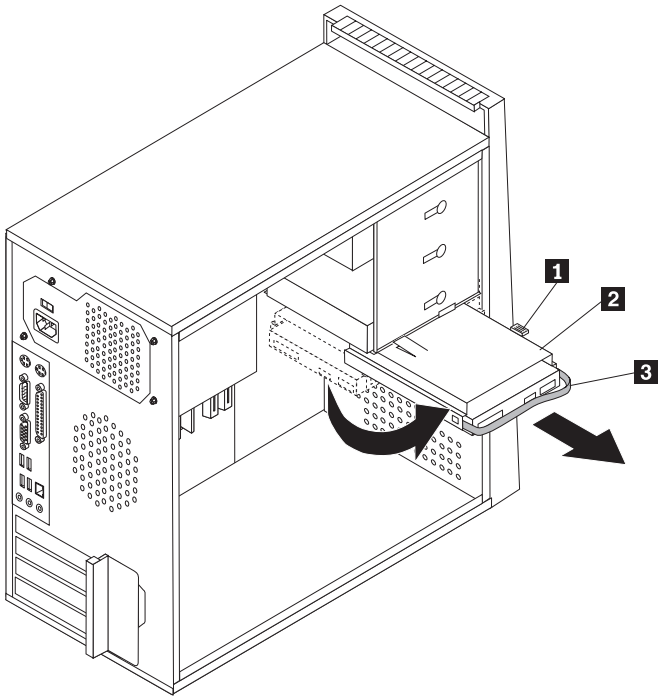

Figure 22. Removing the primary hard disk drive

5. Remove the hard drive cage from the chassis by simply sliding it outward.
6. Pull on the blue handle **3** to release and remove the hard disk drive from the drive cage.
7. Remove the hard disk drive from the blue plastic bracket by flexing the sides of the bracket enough to slide it free of the hard disk drive.

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8. To install the new hard disk drive into the blue bracket, flex the bracket and align the pins 1 through 4 on the bracket with the holes in the hard disk drive. Do not touch the circuit board 5 on the bottom of the hard disk drive.

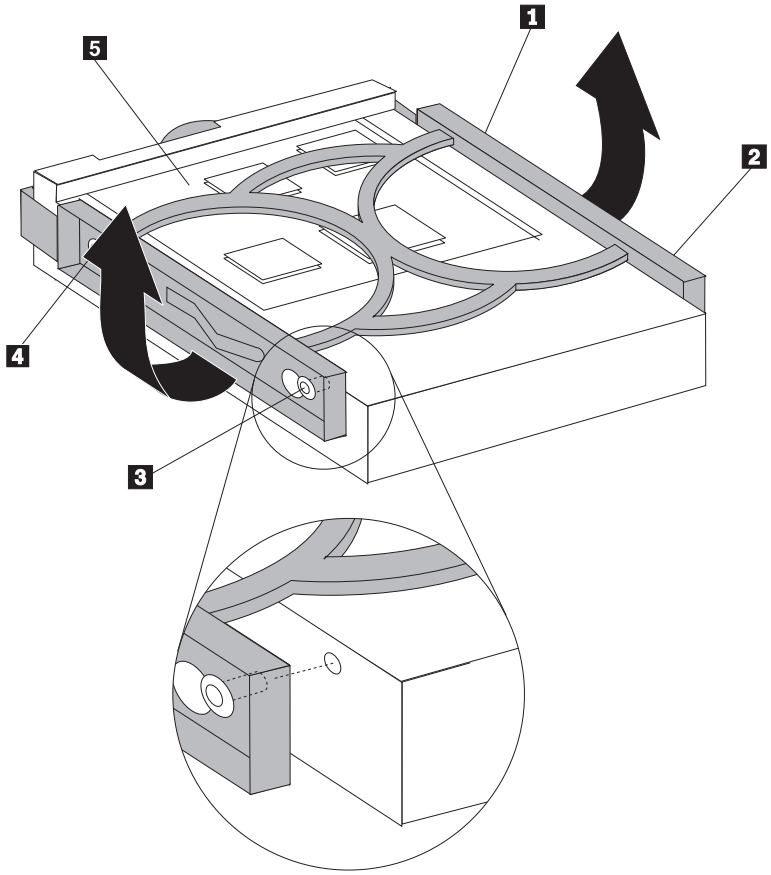

Figure 23. Installing the primary hard disk drive into bracket

9. Slide the new hard disk drive into the drive cage until it snaps into position.

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10. Align the drive cage pivot pin with the slot **1** in the upper drive cage and slide the hard drive cage into the chassis.
11. Connect the signal and power cables to the rear of the new hard disk drive.

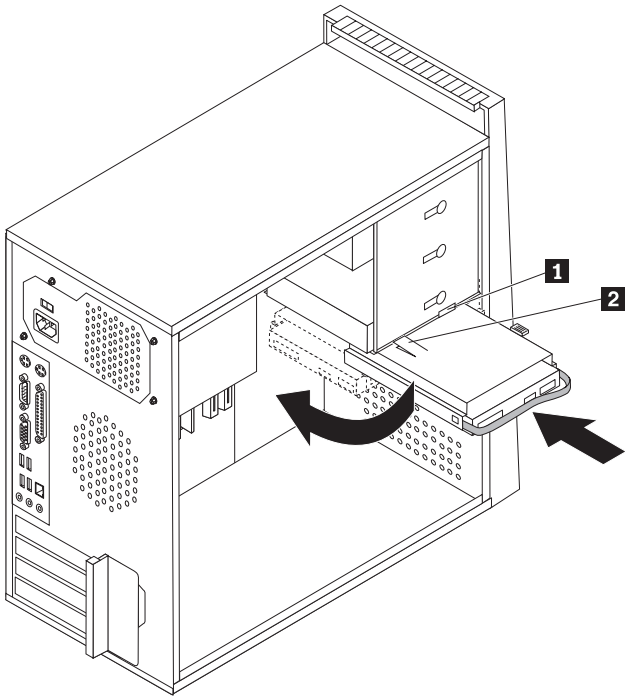

Figure 24. Installing the primary hard disk drive and bracket

12. Press down on the metal latch **2**, pivot the drive cage into place, and then slide it forward until it snaps into position.

    Note: There are two arrows, one on the upper drive cage and one on the hard disk drive cage. The arrows are aligned when the hard disk drive is in the proper position.
13. Go to Chapter 4, "Completing the parts replacement," on page 47.

Replacing the secondary hard disk drive

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

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This section provides instructions on how to replace the secondary hard disk drive.

Important

When you receive a new hard disk drive, you also receive a set of *Product Recovery discs*. The set of *Product Recovery discs* will enable you to restore the contents of the hard disk to the same state as when your computer was originally shipped from the factory. For more information on recovering factory-installed software, refer to "Recovering software" in your *User Guide*.

To replace the secondary hard disk drive:

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Locate the secondary hard disk drive. See "Drive specifications" on page 20.
3. Disconnect the signal and power cables from the hard disk drive.
4. Press the blue release button to release the hard drive cage from the chassis.

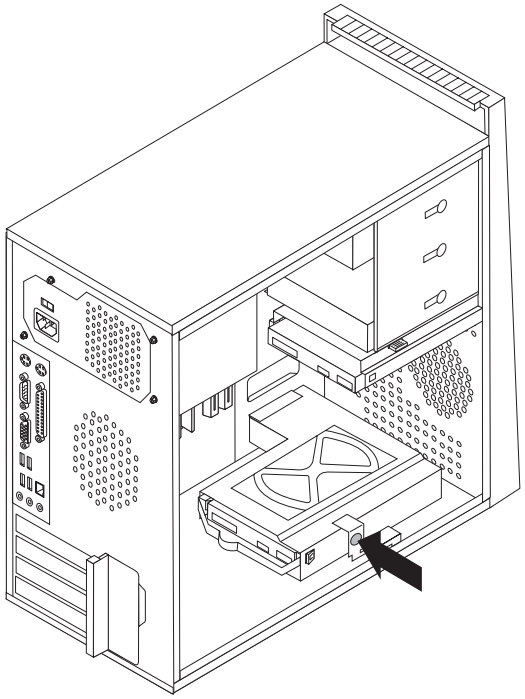

Figure 25. Removing secondary hard disk drive

5. Remove the hard drive cage from the chassis by simply sliding it outward.
6. Pull on the blue handle to release and remove the hard disk drive from the hard drive cage.
7. Remove the hard disk drive from the blue plastic bracket by flexing the sides of the bracket enough to slide it free of the hard disk drive.

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8. To install the new hard disk drive into the blue bracket, flex the bracket and align the pins **1** through **4** on the bracket with the holes in the hard disk drive. Do not touch the circuit board **5** on the bottom of the hard disk drive.

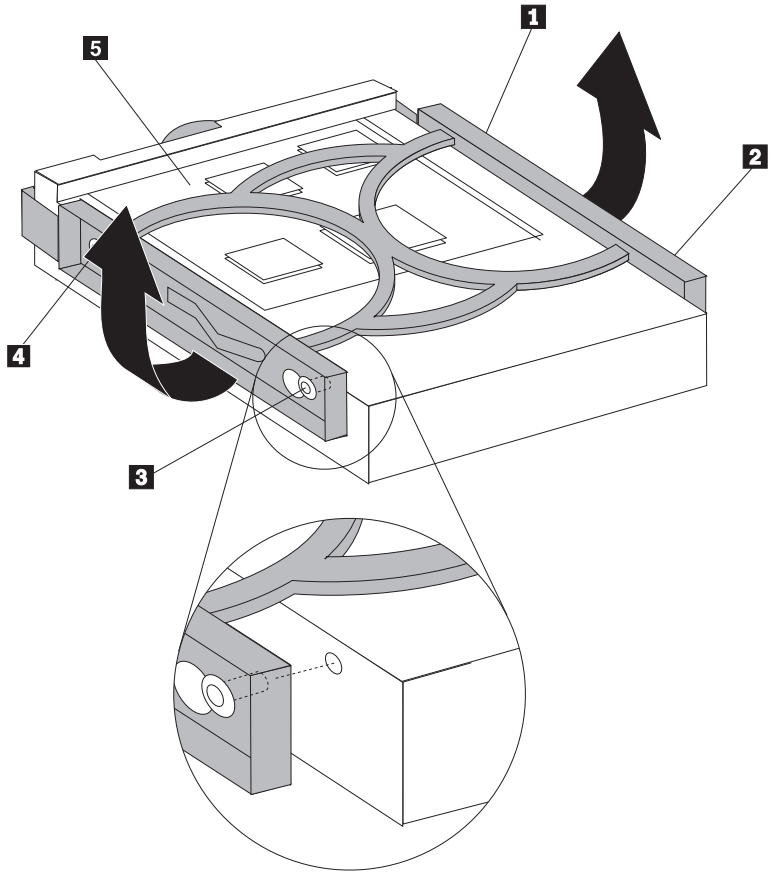

Figure 26. Installing the secondary hard disk drive into bracket

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9. Slide the new hard disk drive into the hard drive cage until it snaps into position
10. Install the hard drive cage into the chassis until it snaps into position underneath the metal tab. Make sure that the hard drive cage is secure in the chassis.

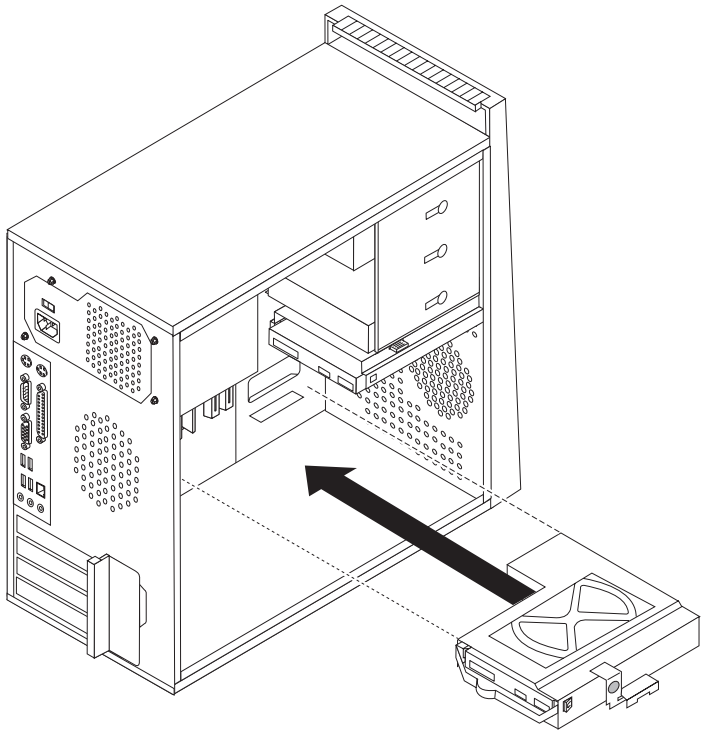

Figure 27. Installing the secondary hard disk drive and drive cage

11. Connect the signal and power cables to the rear of the new hard disk drive.
12. Go to Chapter 4, "Completing the parts replacement," on page 47.

Replacing an optical drive

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instructions on how to replace an optical drive.

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Disconnect the signal and power cables from the rear of the optical drive.

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3. Press the blue release button and remove the optical drive out the front of the computer.

   Note: There is a spare retainer bracket **1** attached to the side of the upper drive cage.

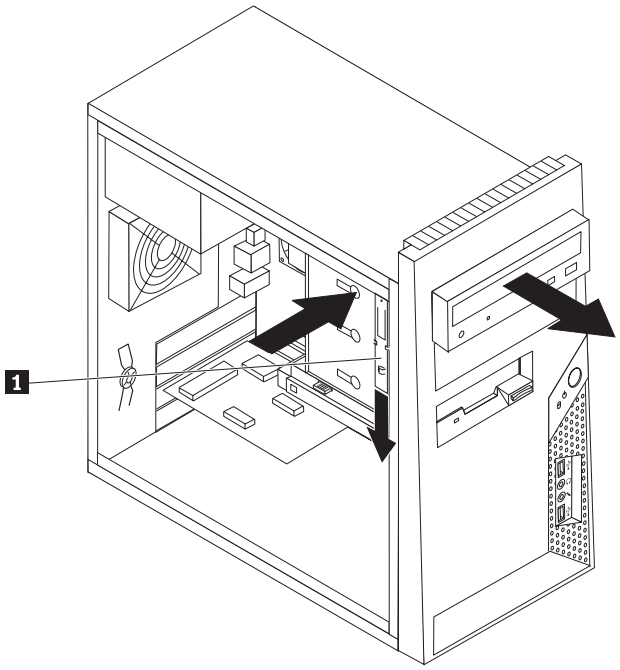

Figure 28. Removing the optical drive

4. Remove the retainer bracket from the drive being replaced and install it on the new drive.

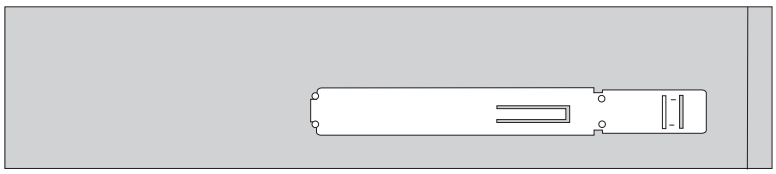

Figure 29. Retainer bracket for optical drive

5. Slide the new optical drive into the bay from the front until it snaps into position.
6. Connect the signal and power cables to the drive.
7. Go to Chapter 4, "Completing the parts replacement," on page 47.

Replacing the diskette drive

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

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This section provides instructions on how to replace the diskette drive.

1. Remove the computer cover. See “Removing the cover” on page 12.
2. Remove the front bezel. See “Removing and replacing the front bezel” on page 14.
3. Disconnect the signal and power cables from the rear of the diskette drive.
4. Press the release button and slide the diskette drive out the front of the computer.

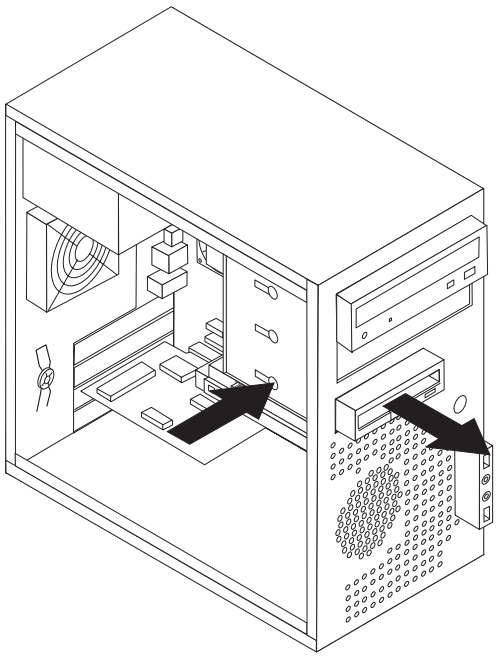

Figure 30. Removing the diskette drive

5. Remove the retainer bracket from the failing diskette drive and install it on the new diskette drive.

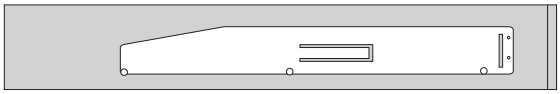

Figure 31. Retainer bracket for diskette drive

6. Slide the new diskette drive into the drive bay until it snaps into position.
7. Connect the flat cable to the new diskette drive.
8. Replace the front bezel.
9. Go to Chapter 4, “Completing the parts replacement,” on page 47.

Replacing a memory module

Attention

Do not open your computer or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

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This section provides instructions on how to replace a memory module.

Note: Your computer has support for two memory modules.

1. Remove the computer cover. See "Removing the cover" on page 12.

   Note: For this procedure, it helps to lay the computer on its side.
2. Locate the memory connectors. See "Identifying parts on the system board" on page 9.
3. Remove the memory module being replaced by opening the retaining clips as shown.

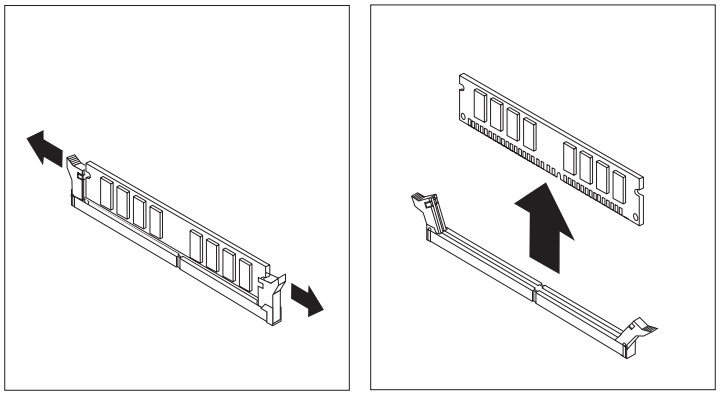

Figure 32. Removing the memory module

4. Position the replacement memory module over the memory connector. Make sure the notch **1** on the memory module aligns correctly with the connector key **2** on the system board. Push the memory module straight down into the connector until the retaining clips close.

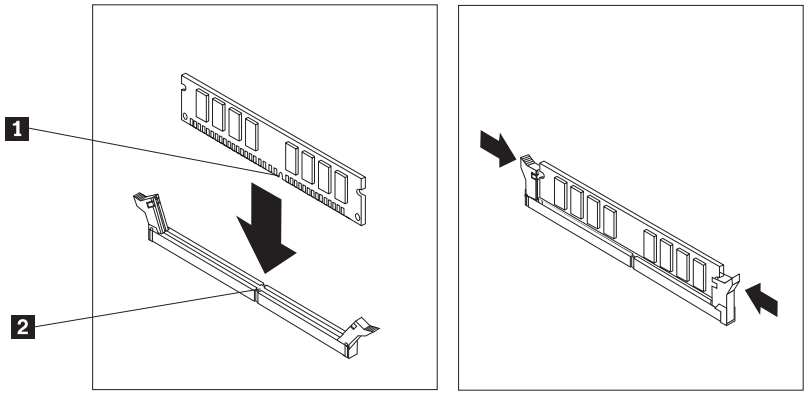

Figure 33. Installing the memory module

5. Go to Chapter 4, "Completing the parts replacement," on page 47.

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Replacing a PCI adapter

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instructions on how to replace a PCI adapter.

1. Remove the computer cover. See "Removing the cover" on page 12.
2. At the rear of the computer, press the release button **1** to open the adapter latch **2** and remove the adapter by pulling it straight out of the adapter connector.

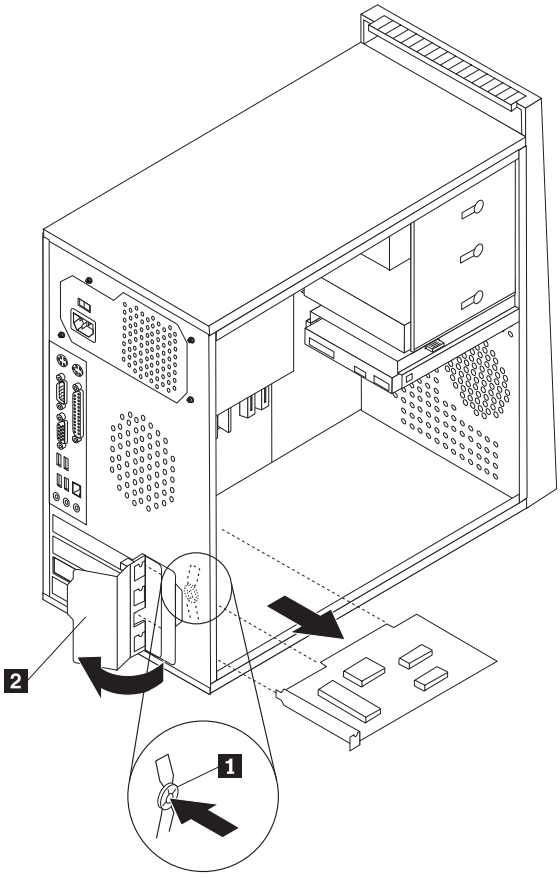

Figure 34. Removing the PCI adapter

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3. Remove the new adapter from its static-protective package.
4. Install the new adapter into the same adapter connector.

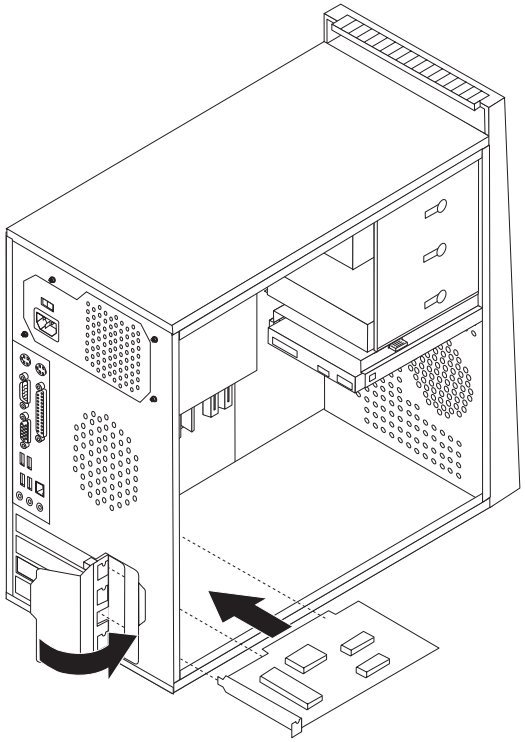

Figure 35. Install a new PCI adapter

5. Ensure the adapter is fully seated into the adapter connector.
6. At the rear of the computer, pivot the adapter latch to the closed position to secure the adapter.
7. Go to Chapter 4, "Completing the parts replacement," on page 47.

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Replacing the front fan assembly

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instructions on how to replace the front fan assembly.

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Remove the front bezel. See "Removing and replacing the front bezel" on page 14.
3. Disconnect the front fan assembly cable from the power fan connector on the system board. See "Identifying parts on the system board" on page 9.
4. The front fan assembly is attached to the chassis by four rubber mounts. Remove the front fan assembly by gently pulling it out of the chassis.

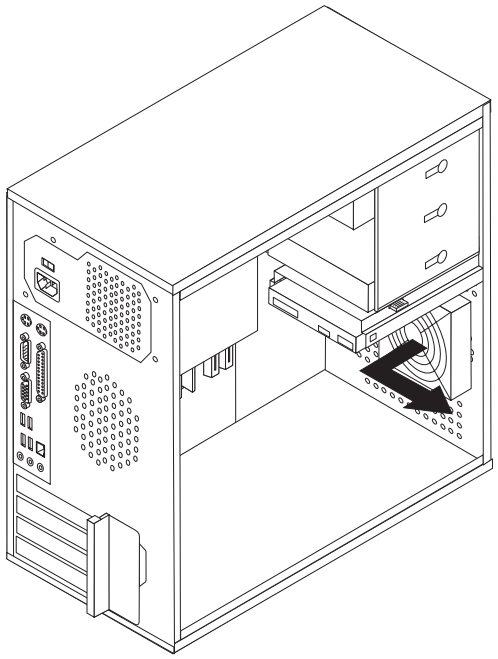

Figure 36. Removing the front fan assembly

5. Install the new front fan assembly by aligning the rubber mounts of the front fan assembly with the holes on the chassis and push the rubber mounts through the holes.

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6. Pull on the tips of the rubber mounts until the fan assembly is in place.

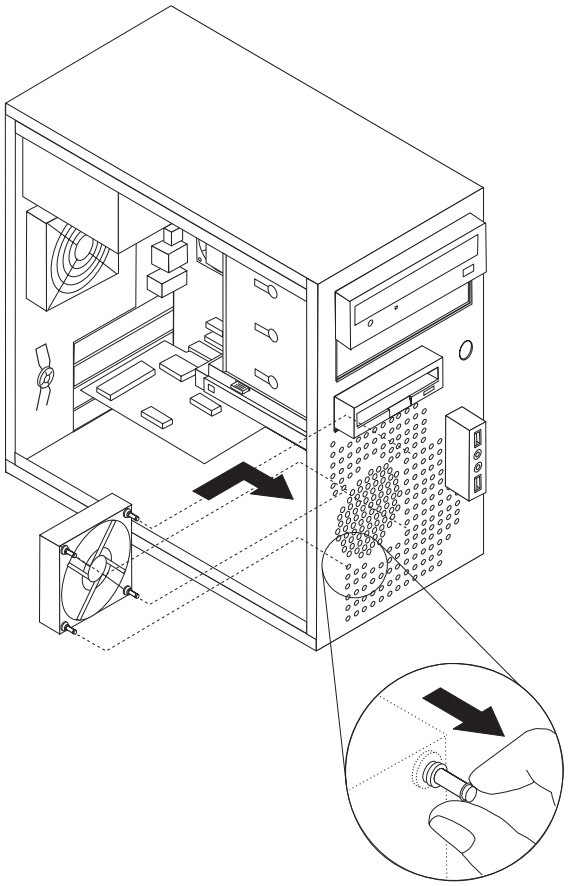

Figure 37. Installing the front fan assembly

7. Connect the front fan assembly cable to the power fan connector on the system board.
8. Go to Chapter 4, "Completing the parts replacement," on page 47.

Replacing the rear fan assembly

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instructions on how to replace the rear fan assembly.

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Locate the rear fan assembly. See "Locating components" on page 8.
3. Disconnect the rear fan assembly cable from the system fan connector on the system board. See "Identifying parts on the system board" on page 9.

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4. The rear fan assembly is attached to the chassis by four rubber mounts. Remove the rear fan assembly by gently pulling it out of the chassis.

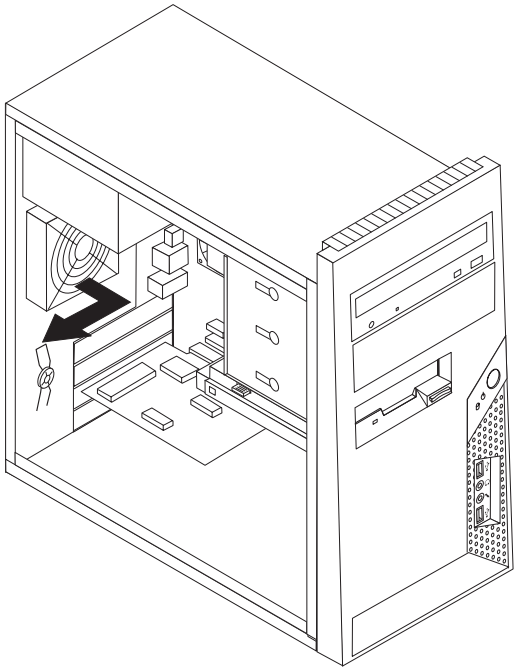

Figure 38. Removing the rear fan assembly

5. Install the new rear fan assembly by aligning the rubber mounts of the rear fan assembly with the holes on the chassis and push the rubber mounts through the holes.

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6. Pull on the tips of the rubber mounts until the fan assembly is in place.

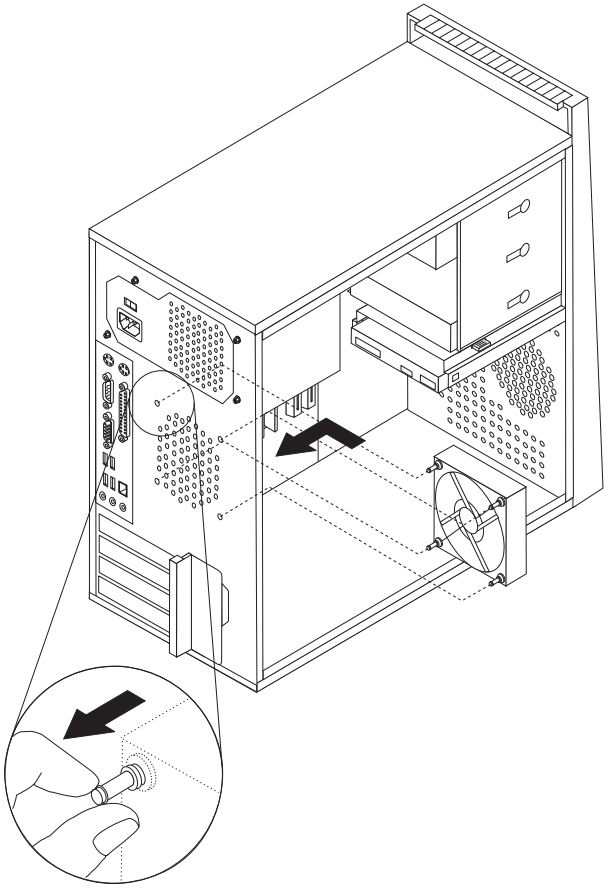

Figure 39. Replacing the rear fan assembly

7. Connect the rear fan assembly cable to the system fan connector on the system board.
8. Go to Chapter 4, "Completing the parts replacement," on page 47.

Replacing the keyboard

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instructions on how to replace a keyboard.

1. Remove any media (diskettes, CDs, or tapes) from the drives, shut down your operating system, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.

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3. Locate the keyboard connector.

   Note: Your keyboard might be connected to a standard keyboard connector **1** or a USB connector **2** . Depending on where your keyboard is connected, see "Locating connectors on the rear of your computer" on page 6 or "Locating controls and connectors on the front of your computer" on page 5.

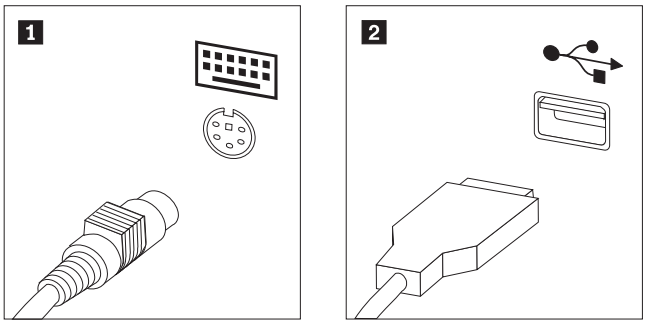

Figure 40. Keyboard connectors, standard and USB

4. Disconnect the failing keyboard cable from the computer.
5. Connect the new keyboard to the appropriate connector on the computer.
6. Go to Chapter 4, "Completing the parts replacement," on page 47.

Replacing the mouse

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer. To obtain a copy of the *Safety and Warranty Guide*, go to the Support Web site at http://www.lenovo.com/support.

This section provides instructions on how to replace a mouse.

1. Remove any media (diskettes, CDs, or tapes) from the drives, shut down your operating system, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.

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3. Locate the mouse connector.

   Note: Your mouse might be connected to a standard mouse connector **1** or a USB connector **2** . Depending on where your mouse is connected, see "Locating connectors on the rear of your computer" on page 6 or "Locating controls and connectors on the front of your computer" on page 5.

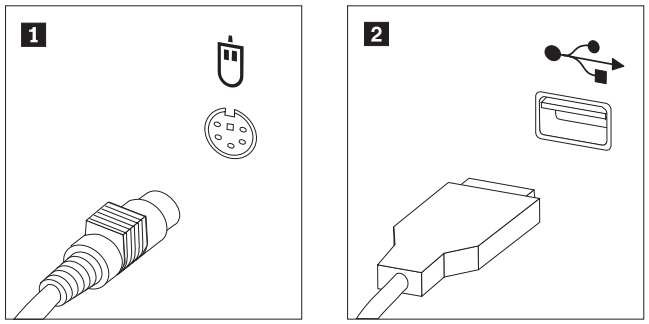

Figure 41. Mouse connectors, standard and USB

4. Disconnect the failing mouse cable from the computer.
5. Connect the new mouse to the appropriate connector on the computer.
6. Go to Chapter 4, "Completing the parts replacement," on page 47.

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Chapter 4. Completing the parts replacement

After replacing the parts, you need to close the cover and reconnect cables, including telephone lines and power cords. Also, depending on the part that was replaced, you might need to confirm the updated information in the Setup Utility program. Refer to "Using the Setup Utility program" in the *User Guide* for this product.

This section provides instruction on how to complete the parts replacement.

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer. See "Locating components" on page 8 for the location of various components.
2. Position the computer cover on the chassis so that the rail guides on the bottom of the computer cover engage the rails. Then, push the computer cover closed until it snaps into position.

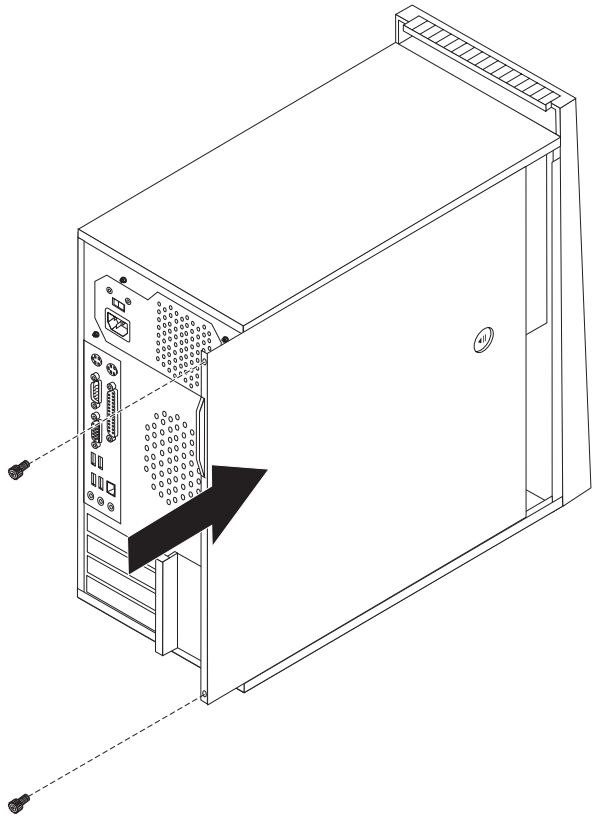

Figure 42. Replacing the computer cover

3. If the cover is secured with thumbscrews, install them.
4. If a cover lock is installed, lock the cover.
5. Reconnect the external cables and power cords to the computer. See "Locating connectors on the rear of your computer" on page 6.
6. To update your configuration, see "Using the Setup Utility program" in the *User Guide*.

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Note: In most areas of the world, Lenovo requires the return of the defective CRU. Information about this will come with the CRU or will come a few days after the CRU arrives.

Obtaining device drivers

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

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Chapter 5. Security features

To help prevent hardware theft and unauthorized access to your computer, several security lock options are available. In addition to a physical lock, unauthorized use of your computer can be prevented by a software lock that locks the keyboard until a correct password is typed in.

Make sure that any security cables that you install do not interfere with other computer cables.

Integrated cable lock

An integrated cable lock (sometimes referred to as the Kensington lock), can be used to secure your computer to a desk, table, or other non-permanent fixture. The cable lock attaches to a security slot at the rear of your computer and is operated with a key. See Figure 43. The cable lock also locks the buttons used to open the computer cover. This is the same type of lock used with many laptop computers. You can order a security cable directly from Lenovo. Go to http://www.lenovo.com/support/ and search on *Kensington*.

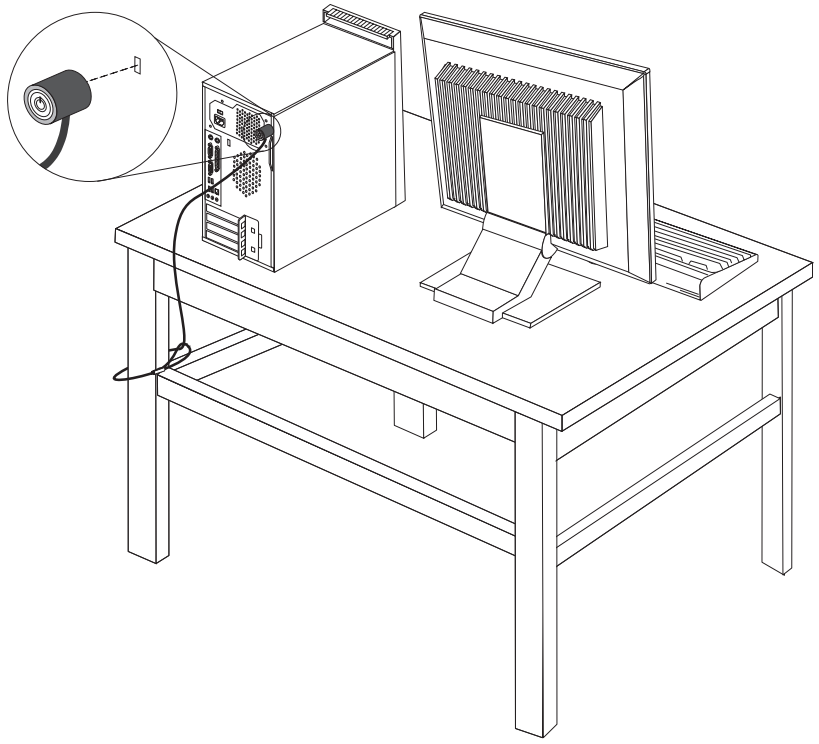

Figure 43. Integrated cable lock

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Padlock

Your computer is equipped with a padlock loop such that the cover cannot be removed when a padlock is installed.

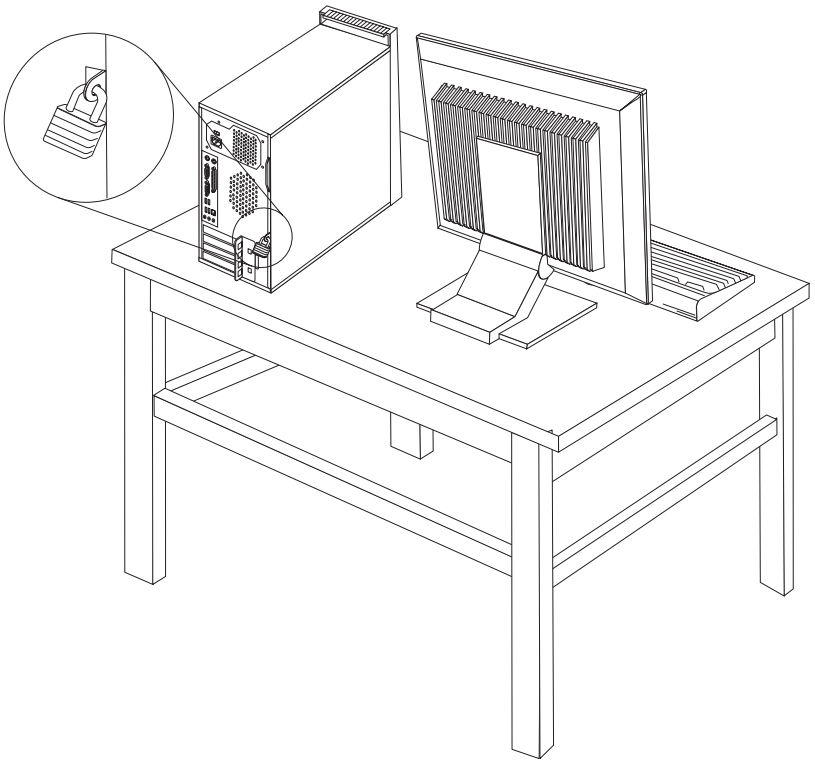

Figure 44. Installing a padlock

Password protection

To deter unauthorized use of your computer, you can use the Setup Utility program to set a password. When you turn on your computer, you are prompted to type the password to unlock the keyboard for normal use.

What to do next:

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 4, "Completing the parts replacement," on page 47.

Erasing a lost or forgotten password (clearing CMOS)

This section applies to lost or forgotten passwords. For more information about lost or forgotten passwords, go to the ThinkVantage® Productivity Center program.

To erase a forgotten password:

1. Remove the computer cover. See "Removing the cover" on page 12.
2. Locate the Clear CMOS/Recovery jumper on the system board. See "Identifying parts on the system board" on page 9.

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3. Move the jumper from the standard position (pins 1 and 2) to the maintenance or configure position (pins 2 and 3).
4. Replace the computer cover and connect the power cord. See Chapter 4, “Completing the parts replacement,” on page 47.
5. Restart the computer, leave it on for approximately 10 seconds. Turn off the computer by holding the power switch for approximately 5 seconds. The computer will turn off.
6. Repeat steps 1 through 2 on page 50.
7. Move the Clear CMOS/Recovery jumper back to the standard position (pins 1 and 2).
8. Replace the computer cover and connect the power cord. See Chapter 4, “Completing the parts replacement,” on page 47.

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