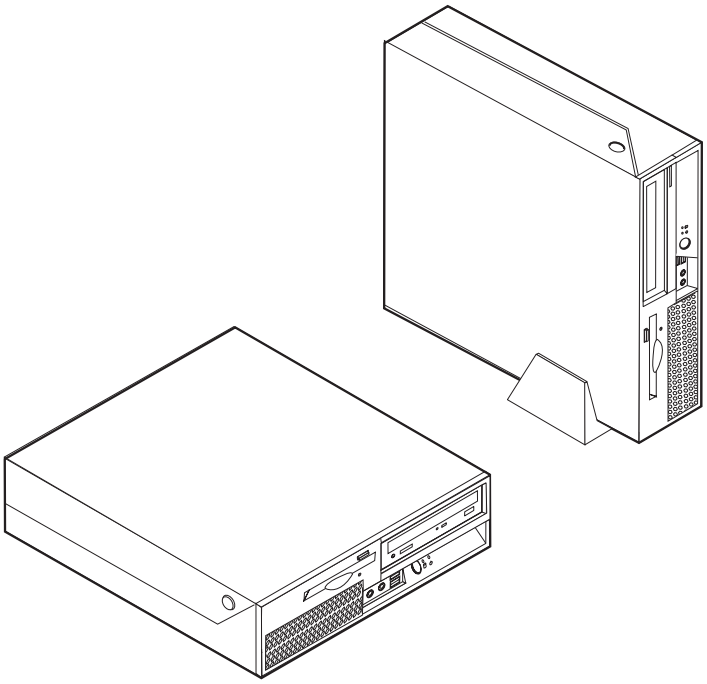
ThinkCentre

Hardware Replacement Guide
Types 8289, 8298, 8328
Types 8341, 8344, 8382



ThinkCentre

Hardware Replacement Guide
Types 8289, 8298, 8328
Types 8341, 8344, 8382

First Edition (November 2005)

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Overview

This guide is intended to be used by customers who are replacing Customer Replaceable Units (CRUs) as well as trained service personnel who are replacing Field Replacement Units (FRUs). In this guide, CRUs and FRUs will often be referred to as parts.

This guide does not include procedures for all parts. It is expected that cables, switches, and certain mechanical parts can be replaced by trained service personnel without the need for step-by-step procedures.

Note: Use only the parts provided by Lenovo™.

This guide contains instructions for replacing the following parts:

- Power supply
- System board
- Microprocessor
- Memory modules
- Adapter
- Hard disk drive
- Optical drive
- Diskette drive
- Fan
- Keyboard
- Mouse
- Internal speaker

Safety information for replacing CRUs

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer. If you no longer have this copy of the *Quick Reference*, you can obtain one online from the Support Web site at http://www.lenovo.com/think/support.

Safety information for replacing FRUs

Do not attempt any repair before reading the "Important safety information" in the *Hardware Maintenance Manual* (HMM) for the computer. You can find the *HMM* on the Support Web site at http://www.lenovo.com/think/support.

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 the following information:

- CRU removal and installation information
- Publications
- Troubleshooting information

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- Parts information
- Downloads and drivers
- Links to other useful sources of information
- Support phone list

To access this information, point your browser to:
http://www.lenovo.com/think/support

Tools required

To replace some parts in your computer, you might need a flat-blade or Phillips screwdriver. Additional tools might be needed for certain parts.

Handling static-sensitive devices

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

When you are replacing a part, 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.

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

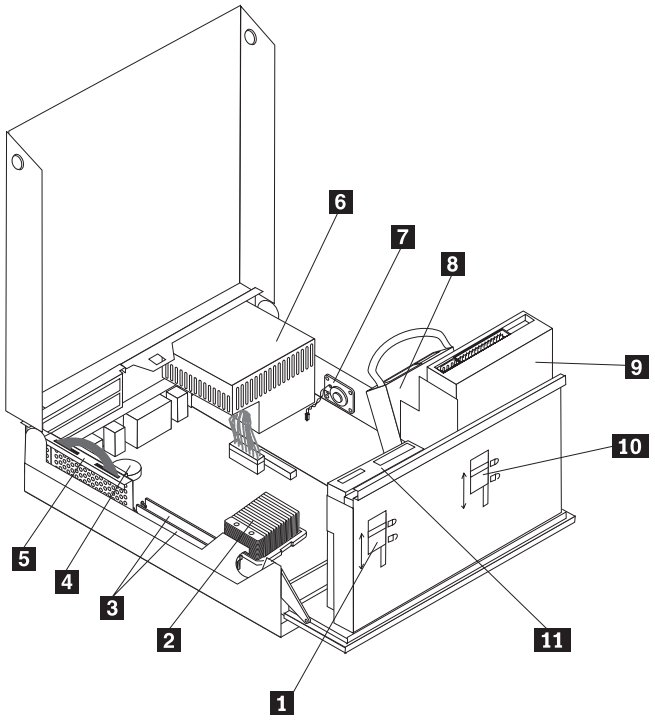
- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle parts and other computer components carefully. Handle adapters, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts 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.

Chapter 1. Locations

This chapter provides illustrations to help locate the various connectors, controls, and components of the computer. To open the computer cover, see "Opening the cover" on page 5.

Locating components

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



1 Diskette drive lock
2 Microprocessor and heat sink
3 Memory connectors (2)
4 Battery
5 PCI riser assembly
6 Power supply
7 Internal speaker
8 Hard disk drive
9 Optical drive (such as a CD or DVD drive)
10 Optical drive lock
11 Diskette drive

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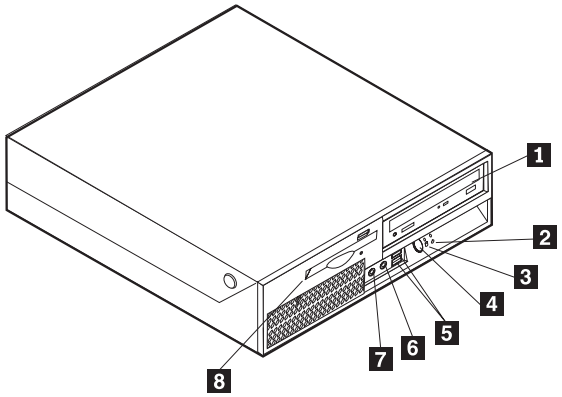
Locating controls and connectors on the front of your computer

The following illustration shows locations of the controls and connectors on the front of your computer.

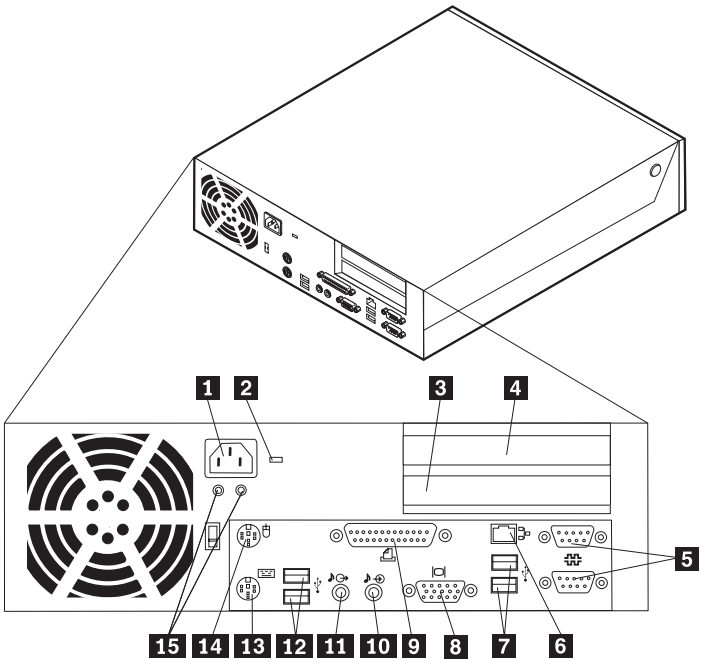
Note: Not all computer models will have the following controls and connections.



1	Optical drive or second hard disk drive (some models)	5	USB connectors (2)
2	Hard disk drive activity indicator	6	Microphone connector
3	Power-on indicator	7	Headphone connector
4	Power button	8	Diskette drive (some models)

Locating connectors on the rear of your computer

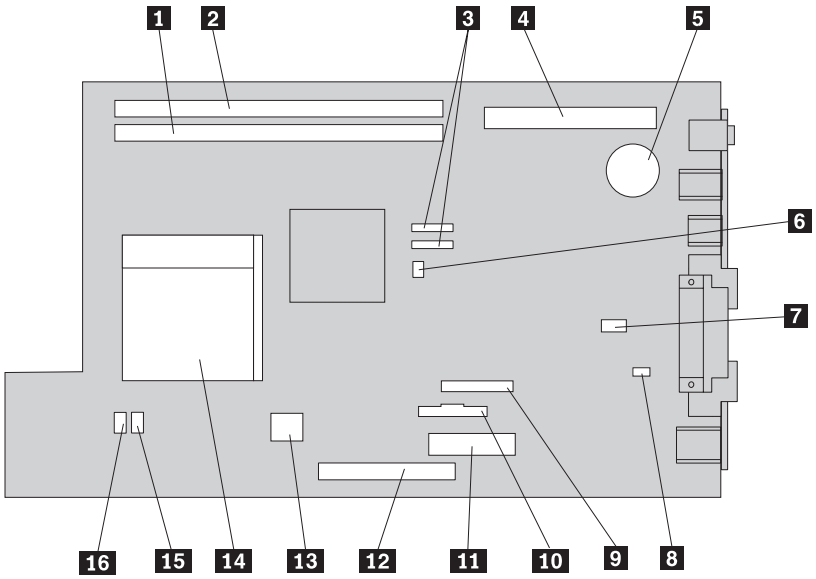
The following illustration shows locations of connectors on the rear of your computer.



1	Power cord connector	9	Parallel connector
2	Cable lock (Kensington) latch	10	Audio line-in connector
3	PCI Express (x1) adapter connector	11	Audio line-out connector
4	PCI adapter connector	12	USB connectors (2)
5	Serial connectors (2)	13	Standard keyboard connector
6	Ethernet connector	14	Standard mouse connector
7	USB connectors (2)	15	Power supply diagnostic LEDs
8	VGA monitor connector		

Identifying parts on the system board

The following illustration shows the locations of parts on the system board.



1	Memory connector 1	9	Diskette drive connector
2	Memory connector 2	10	Front panel connector
3	SATA IDE connectors (2)	11	Power supply connector
4	PCI riser connector	12	PATA primary IDE connector
5	Battery	13	12V power connector
6	Clear CMOS/Recovery jumper	14	Microprocessor
7	Fan connector 3	15	Fan connector 2
8	Internal speaker connector	16	Fan connector 1

Chapter 2. Replacing hardware

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

Note: Use only parts provided by Lenovo.

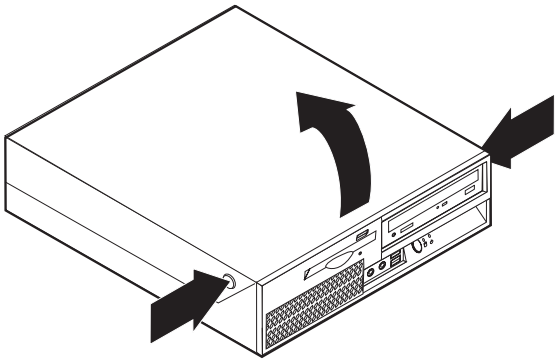
Opening the cover

Important

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

To open the computer cover:

1. Remove any media (diskettes, CDs, or tapes) from the drives, shut down your operating system, 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 2 and "Locating connectors on the rear of your computer" on page 3.
4. Remove the floor stand, if attached.
5. Remove any locking devices, such as a cable lock, that secure the computer cover.
6. Press inward on the two buttons and pivot the top cover upward.



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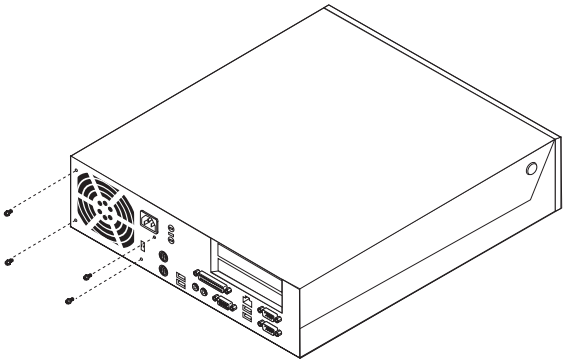
Replacing the power supply

Attention

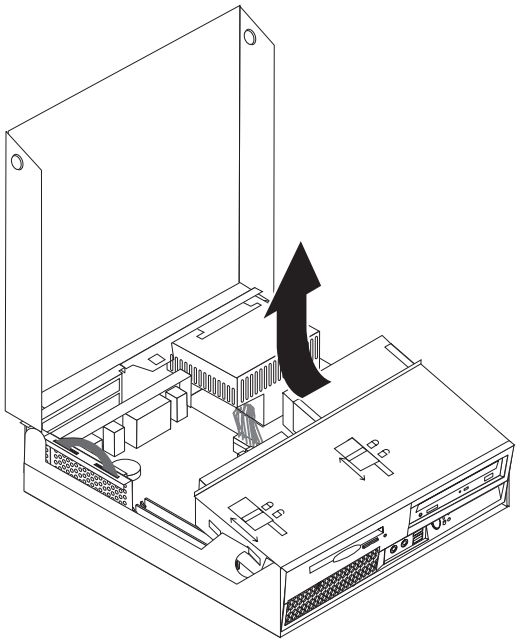
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

To replace the power supply:

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



2. Open the computer cover. See the "Opening the cover" on page 5.
3. Pivot the drive bay assembly upward to gain access to the cable connections.

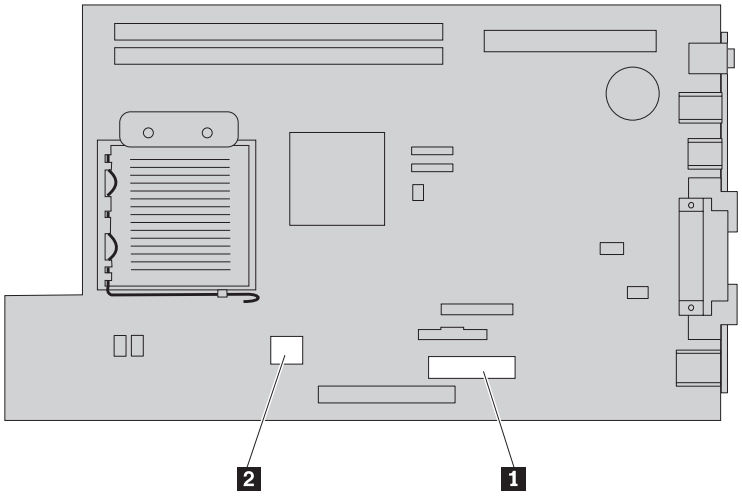


4. Locate the power supply. See "Locating components" on page 1.

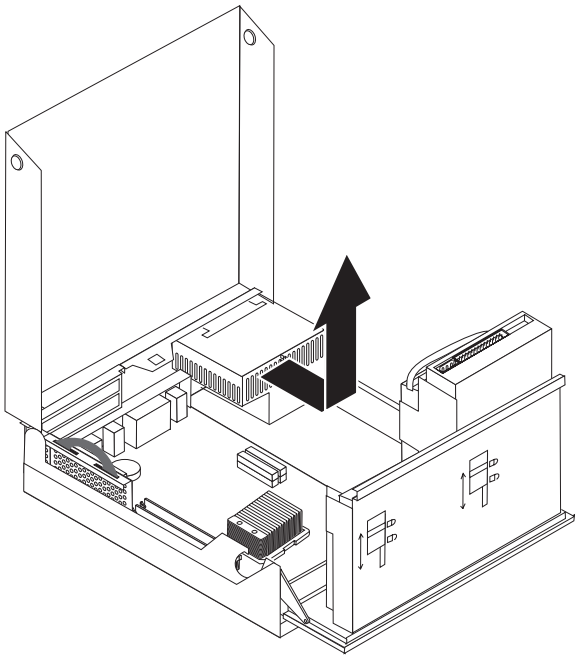
Important

Note the cable routing. It is important to route the cables the same way after you install the new power supply assembly.

5. Disconnect the power supply cables from the hard disk drive and optical drive.
6. Disconnect the power supply cables **1** and **2** from the system board connectors and from all drives.



7. Remove the power supply cables from the cable clips and ties.
8. Slide the power supply forward and remove from the computer.



9. Install the new power supply into the chassis so that the screw holes in the power supply assembly align with those in the chassis.

   Note: Use only the screws provided by Lenovo.
10. Install and tighten the assembly screws into the rear of the chassis.
11. Reconnect the power supply connectors to the hard disk drive and optical drive.
12. Reconnect the power supply cables to the system board.
13. Go to "Completing the CRU replacement" on page 32.

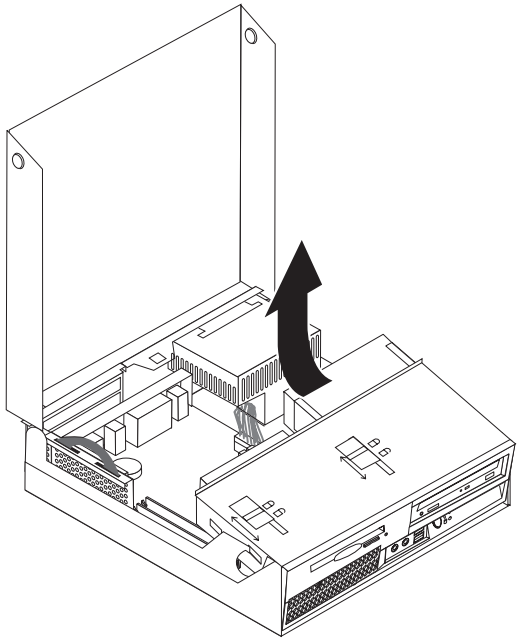
Replacing the system board assembly

Attention

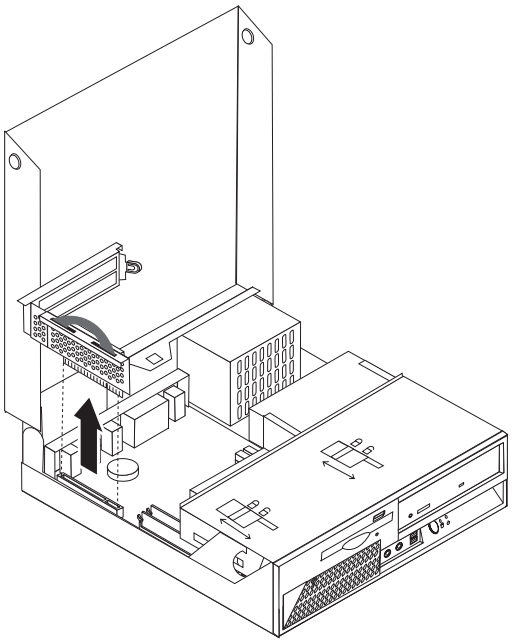
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

To replace the system board assembly:

1. Turn off the computer and allow the computer to cool for one hour.
2. Open the computer cover. See "Opening the cover" on page 5.
3. Pivot the drive bay assembly upward to gain access to the system board.



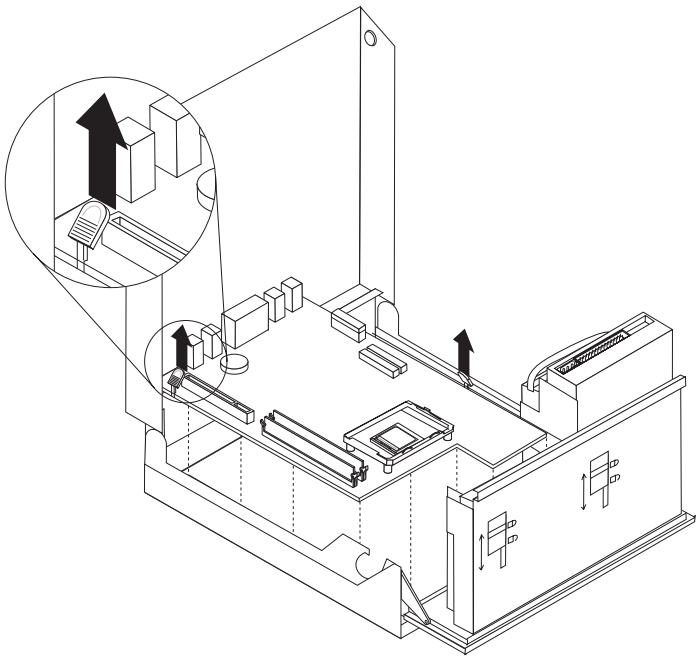
4. While holding the rear of the computer chassis down, pull upward on the handle provided to remove the PCI riser assembly and any adapters that are currently installed.



5. Disconnect the cables connected to the system board. See “Identifying parts on the system board” on page 4.

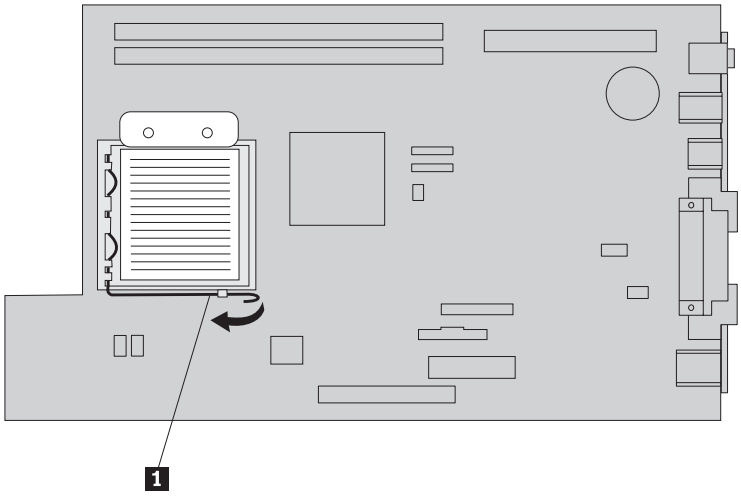
> **Important**
> Note the cable routing. It is important to route the cables the same way after you install the new system board.

6. Using the two blue handles provided, lift the system board assembly out of the computer.

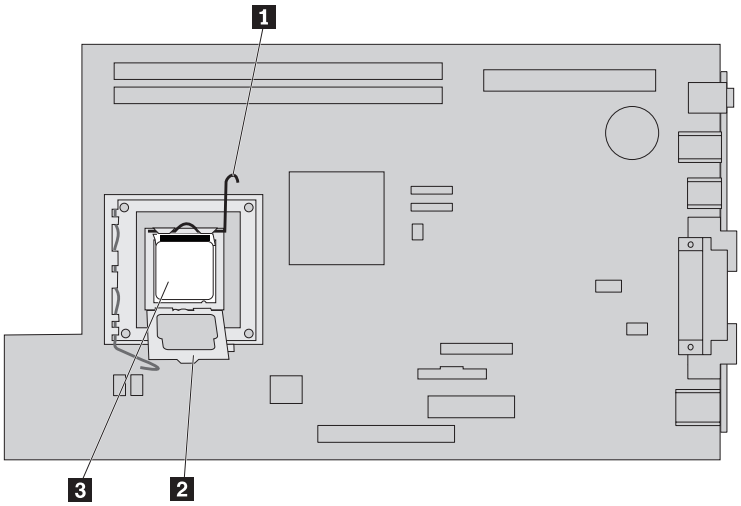


Note: You will have to tilt the system board assembly and move it around the edge of the power supply assembly to remove it from the computer.

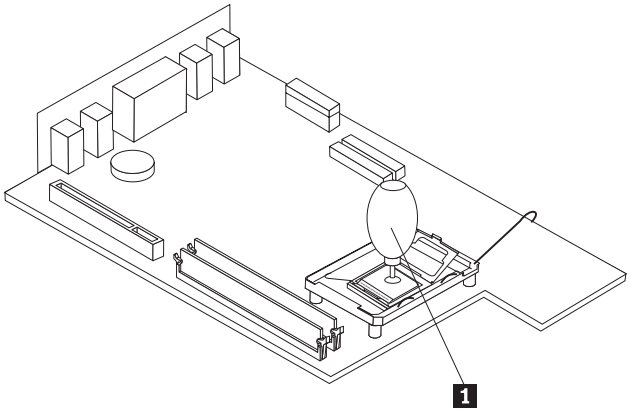
7. Place the defective system board next to the new system board on a clean, flat surface.
8. Release the lever 1 holding the microprocessor heat sink.



9. Remove the heat sink from the system board.
10. Release the lever 1 for the microprocessor retainer 2 securing the microprocessor 3 and pivot the retainer upward to the open position.



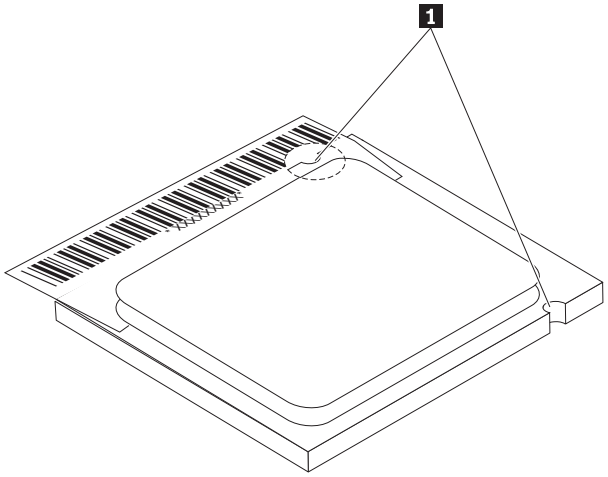
11. Use the vacuum pen 1 to lift the microprocessor straight up and out of the socket.



Important

Do not touch the gold contacts on the bottom of the microprocessor. Use the vacuum pen provided to remove and install the microprocessor. If you must touch the microprocessor, touch only the sides.

a. Note the orientation of the notches 1 on the microprocessor. This is important when installing the microprocessor on the new system board.



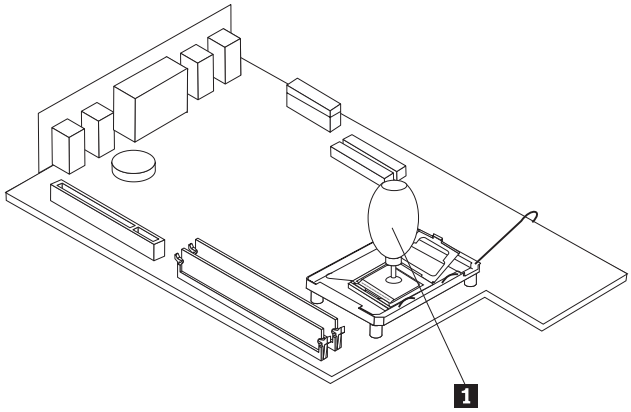
b. Do not drop anything on the socket while it is open. Keep all contacts as clean as possible.

12. On the new system board, release the lever securing the microprocessor retainer and then pivot the retainer until it is fully open.
13. Position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket on the new system board.

Important

To avoid damaging the microprocessor, do not tilt the microprocessor when installing it into the microprocessor socket.

14. Use the vacuum pen **1** to lower the microprocessor straight down into the microprocessor socket.



15. Lower the microprocessor retainer and secure it with the lever.

    Note: There will be a black plastic cover on the microprocessor retainer to protect the socket on the new system board. When you lock the microprocessor in position, remove the black plastic cover. Place the black plastic cover on the microprocessor retainer of the defective system board.
16. Install and secure the heat sink on the microprocessor.
17. Remove the memory modules from the defective system board, and install them on the new system board. See to "Replacing a memory module" on page 17. Return here after installing the memory modules and continue to the next step.
18. Install the new system board assembly into the computer chassis by aligning the tabs on the rear of the system board with the slots in the rear of the computer chassis. Slide the system board toward the rear of the chassis.
19. Reconnect the cables that were disconnected from the system board. Make sure all cables are routed correctly. See "Identifying parts on the system board" on page 4.
20. Reinstall the PCI riser assembly and adapters.
21. Go to "Completing the CRU replacement" on page 32.

Replacing the microprocessor

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

This section provides instructions on how to replace the microprocessor.

Important

Turn off your computer for at least one hour before removing the microprocessor to allow the thermal interface between the microprocessor and the heat sink time to cool down.

Important

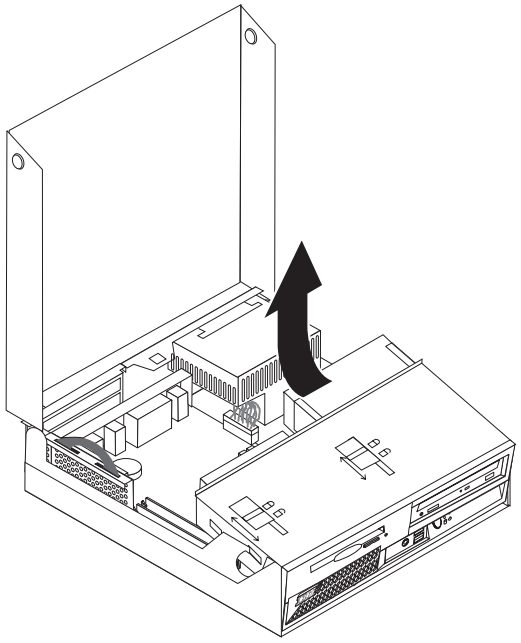
When you receive a new microprocessor, you will also receive a new heat sink and vacuum pen. You must use the new heat sink with the new microprocessor. If you use the old heat sink with the new microprocessor, your computer might overheat causing intermittent problems.

Important

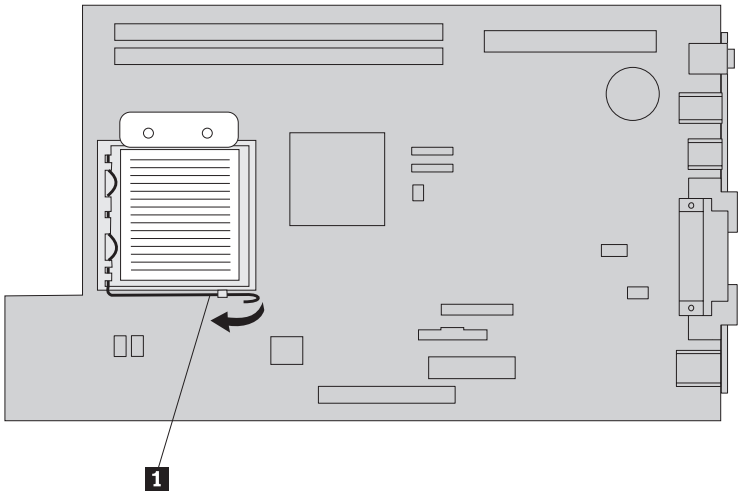
Do not touch the gold contacts on the bottom of the microprocessor. Use the vacuum pen provided to remove and install the microprocessor. If you must touch the microprocessor, touch only the sides.

To replace the microprocessor:

1. Open the computer cover. See "Opening the cover" on page 5.
2. Pivot the drive bay assembly upward to gain access to the microprocessor.



3. Release the lever 1 holding the microprocessor heat sink.

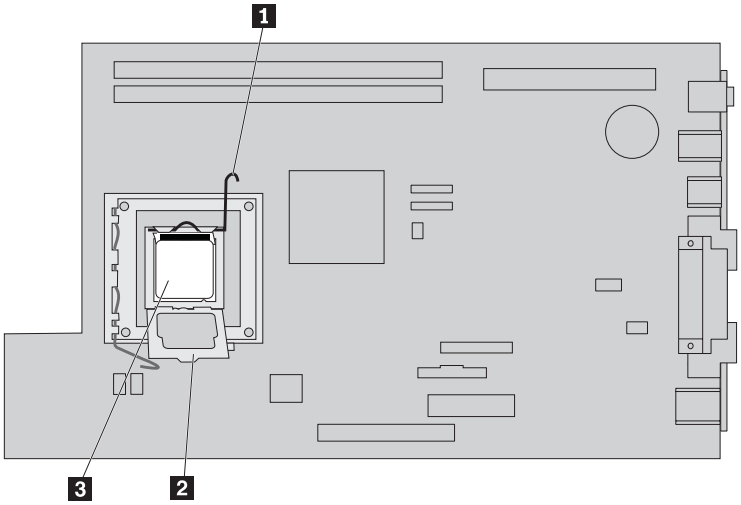


4. Remove the heat sink from the system board.

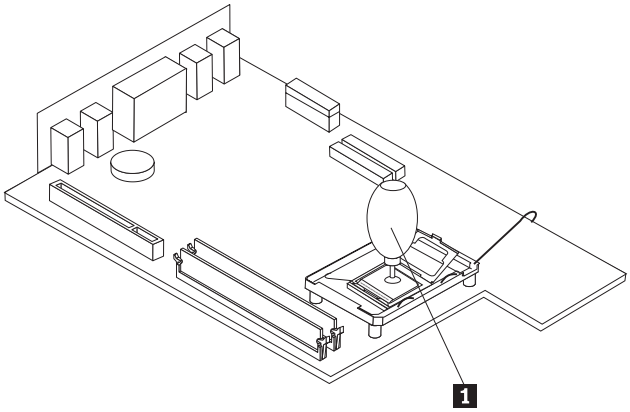
Important

Do not use the old heat sink with the a new microprocessor. If you use the old heat sink with the new microprocessor, your computer might overheat causing intermittent problems.

5. Release the lever 1 for the microprocessor retainer 2 securing the microprocessor 3 and pivot the retainer upward until it is fully open.



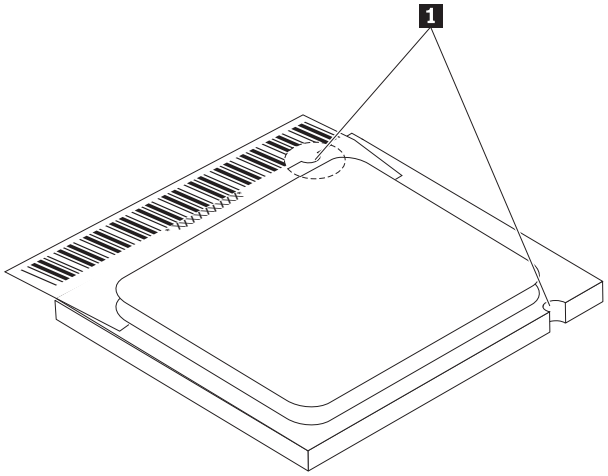
6. Use the vacuum pen **1** to lift the microprocessor straight up and out of the socket.



Important

Do not touch the gold contacts on the bottom of the microprocessor. If you must touch the microprocessor, touch only the sides.

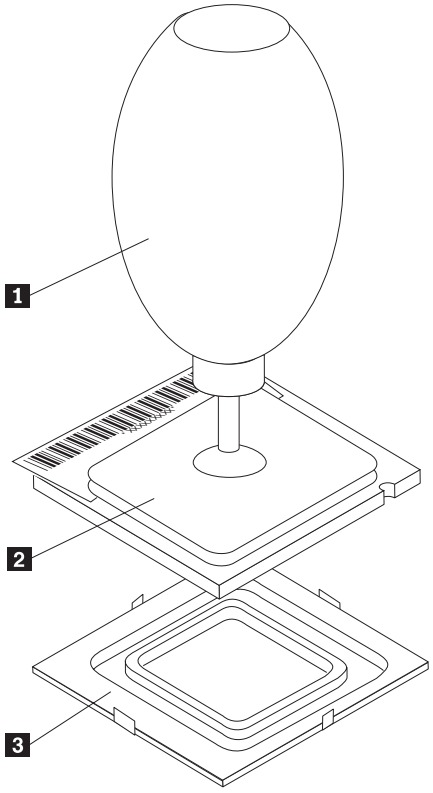
a. Note the orientation of the notches **1** on the microprocessor. This is important when reinstalling the microprocessor on the system board.



b. Do not drop anything on the socket while it is open. Keep all contacts as clean as possible.

7. Make sure that the lever on the microprocessor retainer is fully open.

8. Loosen the black cover 3 that protect the gold contacts on the new microprocessor 2, but do not remove the black cover. Use the vacuum pen 1 to pick up the microprocessor, and then completely remove the black cover.

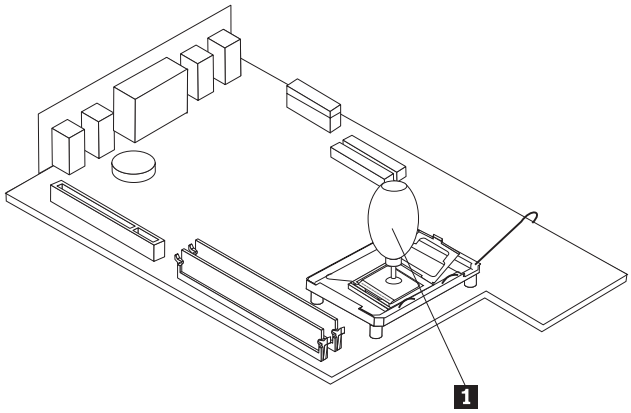


9. Position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

Important

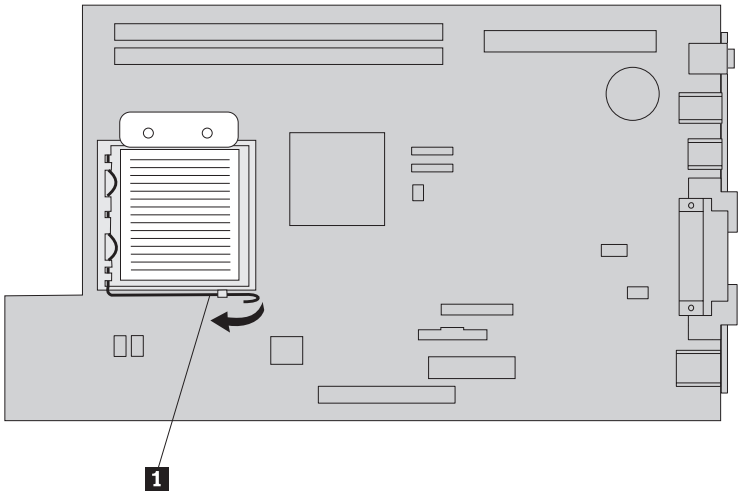
To avoid damaging the microprocessor contacts, do not tilt the microprocessor when installing it into the socket.

10. Use the vacuum pen 1 to lower the microprocessor straight down into the microprocessor socket.



11. Lower the microprocessor retainer and lower the lever to secure the retainer.

12. Place the new heat sink into position and lower the lever **1** to secure the heat sink.



13. Go to "Completing the CRU replacement" on page 32.

Replacing a memory module

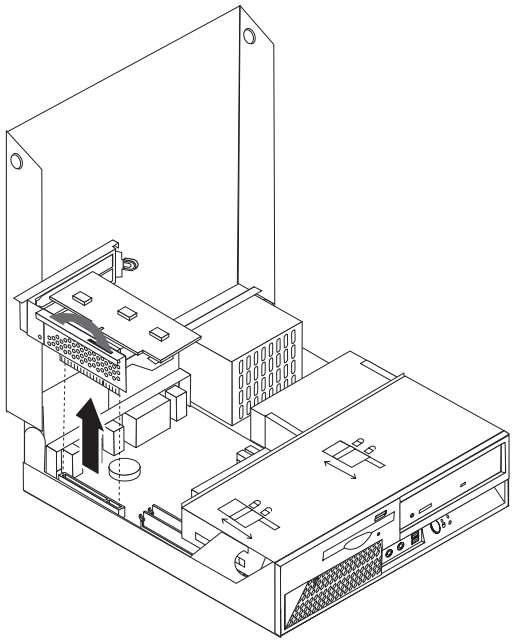
Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

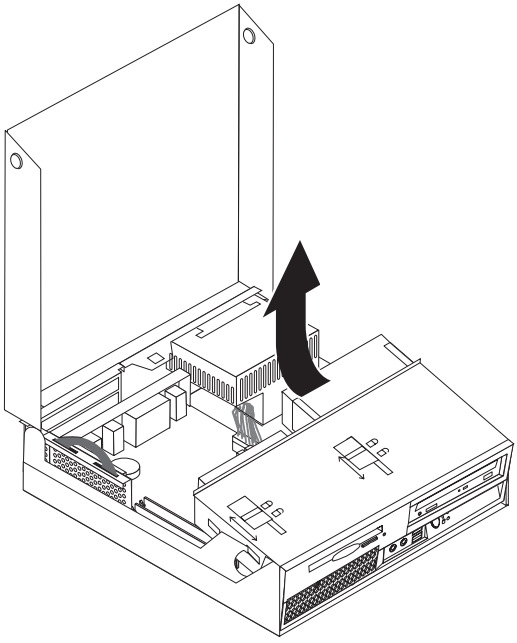
To replace the memory modules:

1. Open the computer cover. See "Opening the cover" on page 5.

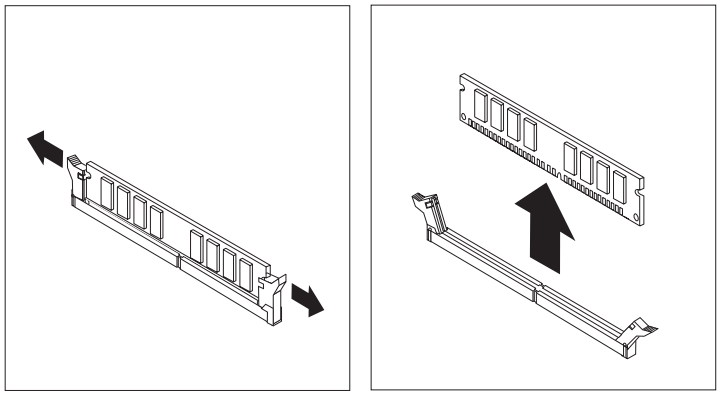
2. While holding the rear of the computer chassis down, pull upward on the handle provided to remove the PCI riser assembly and any adapters that are currently installed.



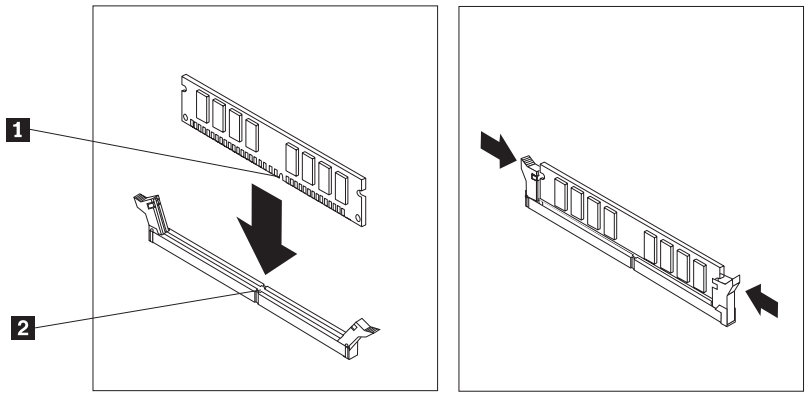
3. Pivot the drive bay assembly upward to gain access to the memory module.



4. Locate the memory connectors. See “Identifying parts on the system board” on page 4.
5. Remove the memory module being replaced by opening the retaining clips as shown.



6. 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.



7. Reinstall the PCI riser assembly and adapters.
8. Go to “Completing the CRU replacement” on page 32.

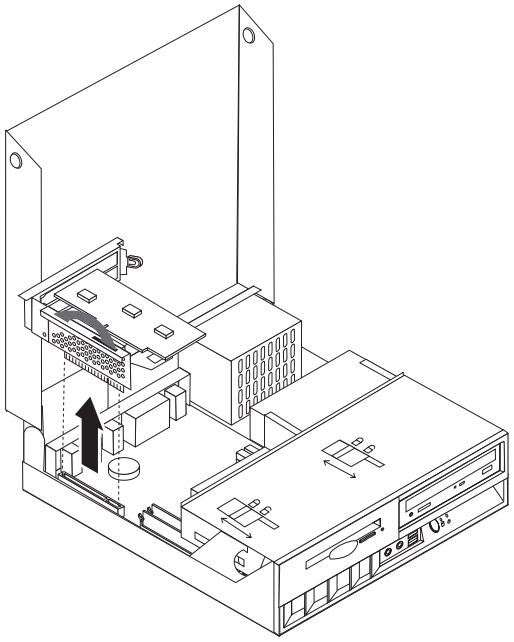
Replacing an adapter

Attention

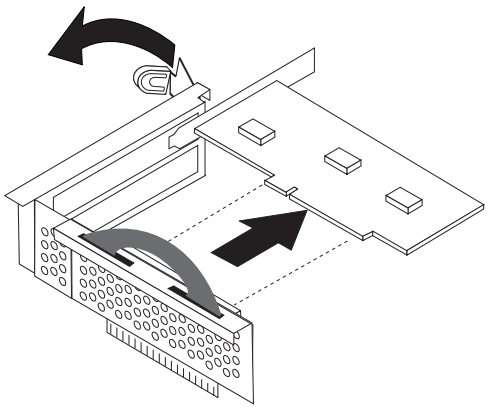
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

To replace the adapter:

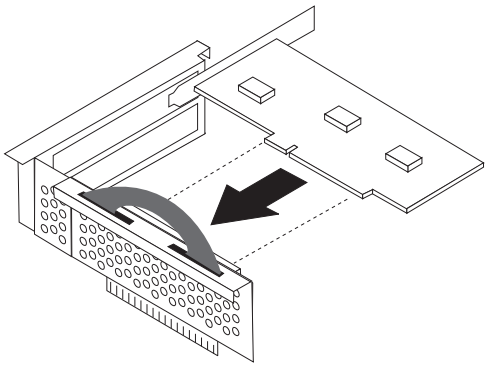
1. Open the computer cover. See "Opening the cover" on page 5.
2. While holding the left rear of the computer chassis down, pull upward on the handle provided to remove the PCI riser assembly including any adapters that are already installed.



3. Pivot the adapter latch to release the adapter.



4. Remove the adapter being replaced from the PCI riser.
5. Remove the new adapter from its static-protective package.
6. Install the new adapter into the appropriate connector into the PCI riser.



7. Ensure the adapter is fully seated into the adapter connector.
8. Pivot the adapter latch to the closed position to secure the adapters.
9. Reinstall the PCI riser and adapters.
10. Go to “Completing the CRU replacement” on page 32.

Replacing a hard disk drive

Attention

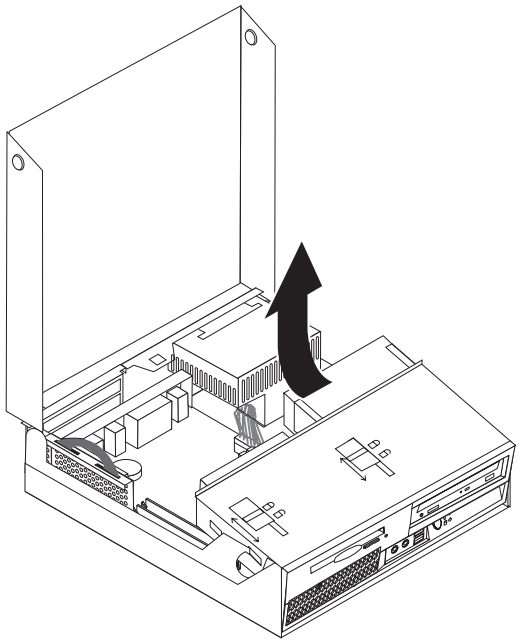
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

Important

When you receive a new hard disk drive, you also receive a set of *Product Recovery CDs*. The set of *Product Recovery CDs* 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 *Quick Reference*.

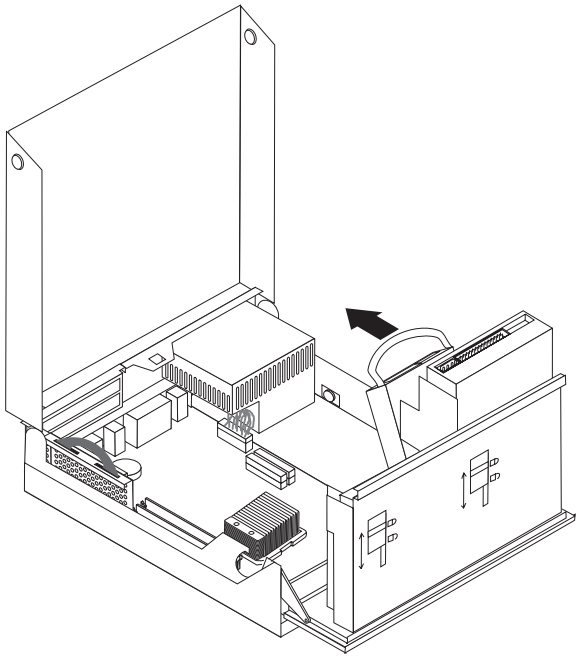
To replace the hard disk drive:

1. Open the computer cover. See "Opening the cover" on page 5.
2. Pivot the drive bay assembly upward to gain access to the cable connections.



3. If an optical drive is installed, disconnect the signal cable from the drive to access the hard disk drive cables.

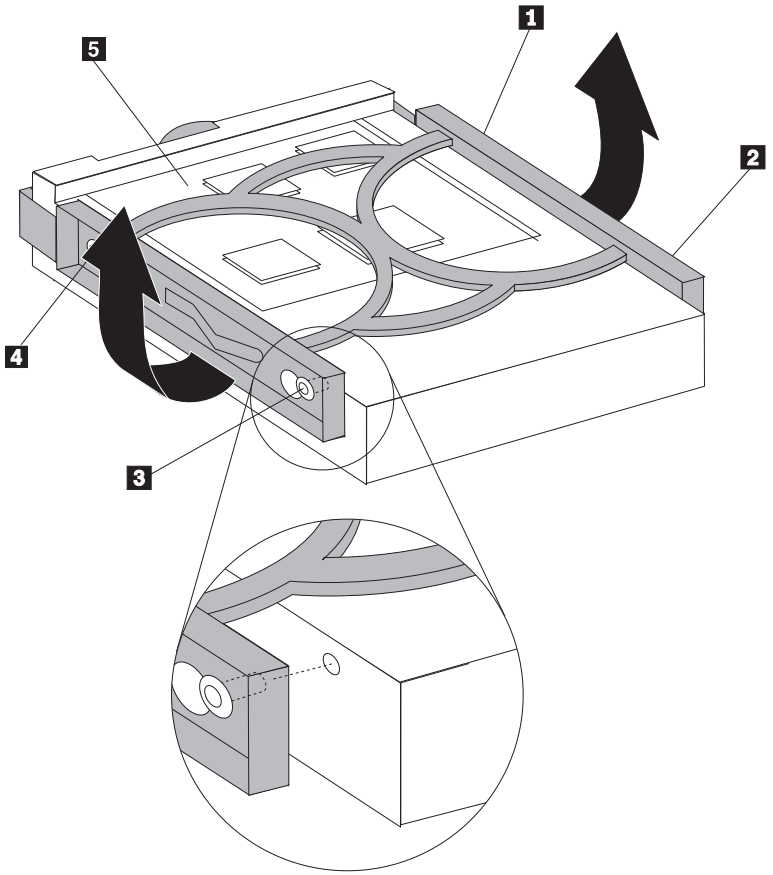
4. Disconnect the signal and power cables from the rear of the hard disk drive.
5. Pivot the hard disk drive and bracket to the rear, then pull the hard disk drive out of the hard drive bay by pulling on the blue handle.



6. Remove the defective hard disk drive from the bracket by flexing the bracket.

   Note: Make sure you notice the orientation of the hard disk drive in the blue bracket.

7. Install the new 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.



8. Insert the new hard disk drive and bracket into the hard disk drive bay and snap into position.
9. Pivot the drive and bracket towards the front of the computer and snap it into position.
10. Connect the signal and power cables to the drive.
11. Go to "Completing the CRU replacement" on page 32.

Replacing an optical drive

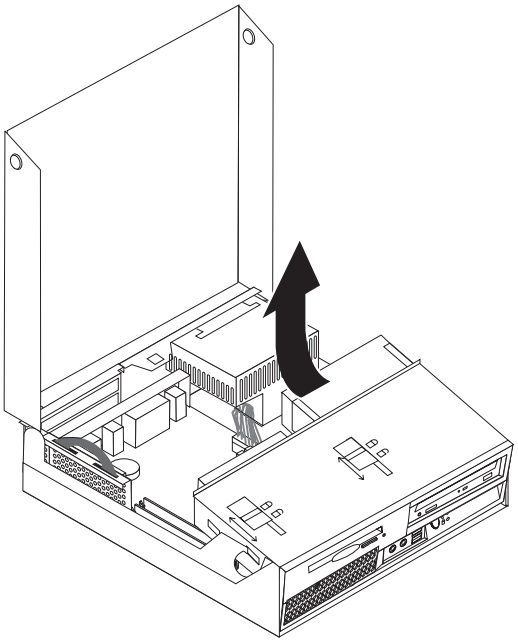
Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

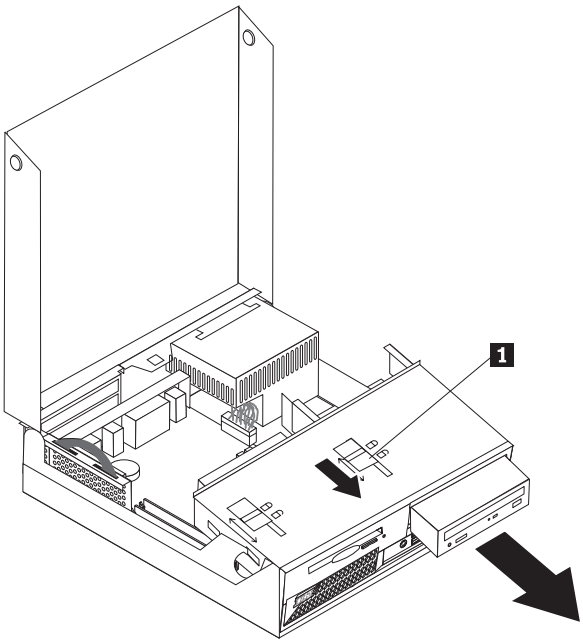
To replace the optical drive:

1. Open the computer cover. See "Opening the cover" on page 5.

2. Pivot the drive bay assembly upward to gain access to the cable connections.



3. Disconnect the signal and power cables from the rear of the optical drive.
4. Slide the optical drive lock **1** to the unlocked position.



5. Open the door at the front of the optical drive and slide it out the front of the computer.
6. Install the new optical drive into the bay.
7. Slide the optical drive lock to the locked position.
8. Place the master/slave jumper on the drive in the same position as on the drive being replaced.
9. Connect the signal and power cables to the rear of the optical drive.
10. Go to “Completing the CRU replacement” on page 32.

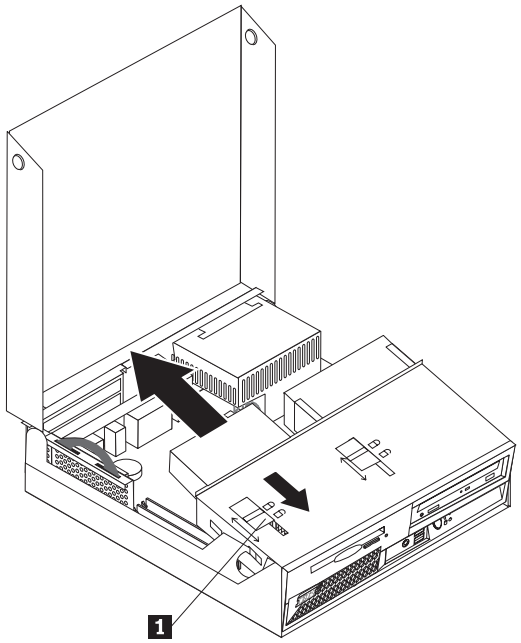
Replacing the diskette drive

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

To replace the diskette drive:

1. Open the computer cover. See "Opening the cover" on page 5.
2. Slide the diskette drive lock **1** to the unlocked position.



3. Pivot the drive bay assembly upward to give access to the diskette drive.
4. Slide the drive towards the rear of the computer and remove the drive.
5. Disconnect the flat cable from the failing drive.
6. Connect the flat cable to the new drive.
7. Install the new drive from the rear of the drive bay assembly and lock the drive into position.
8. Go to "Completing the CRU replacement" on page 32.

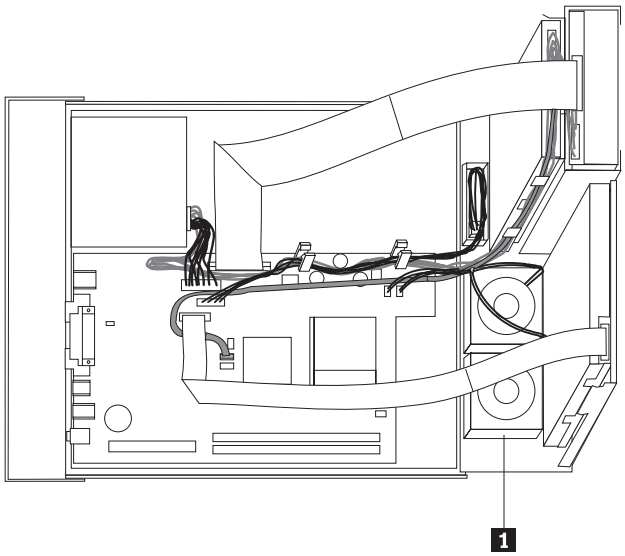
Replacing the fan assembly

Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

To replace the fan assembly:

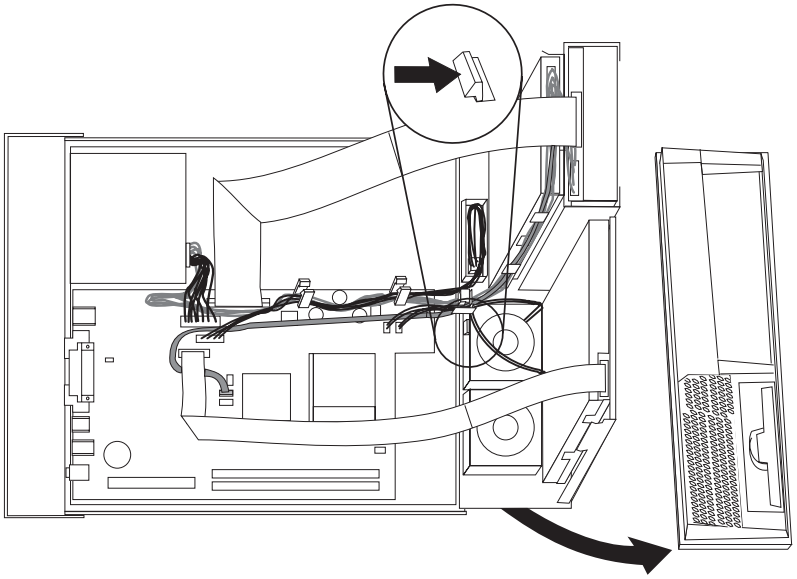
1. Open the computer cover. See "Opening the cover" on page 5.
2. Rotate the drive bay assembly upward to gain access to the fan assembly **1** .



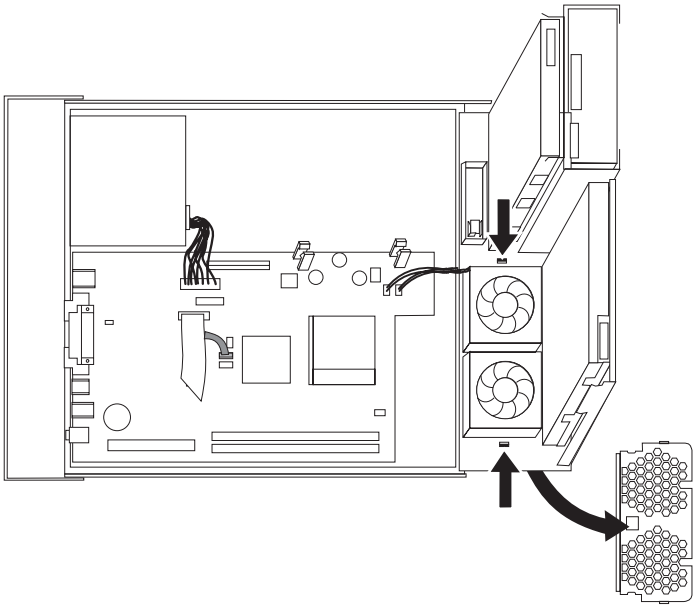
3. Disconnect fan assembly cable from the system board. See "Identifying parts on the system board" on page 4.

   Note: Make sure you note the location of the fan cable when you disconnect it from the system board.

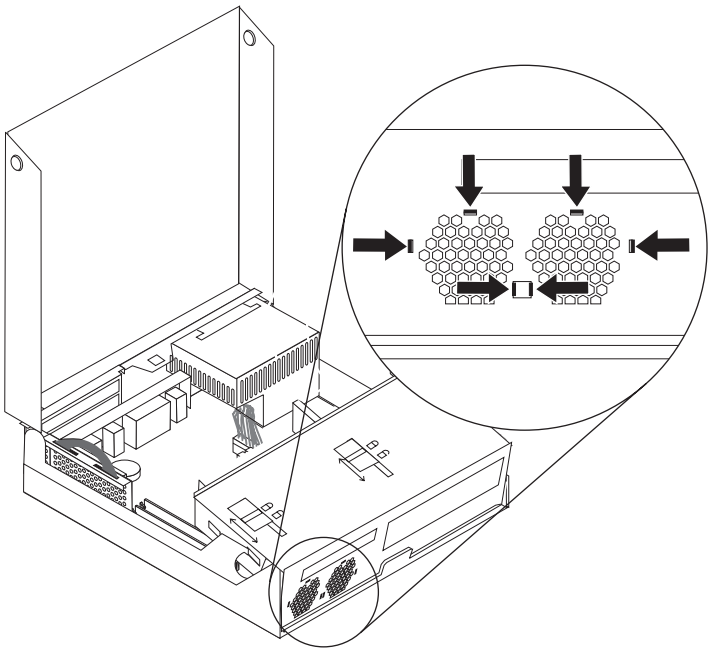
4. Remove the front bezel by releasing the tab as shown.



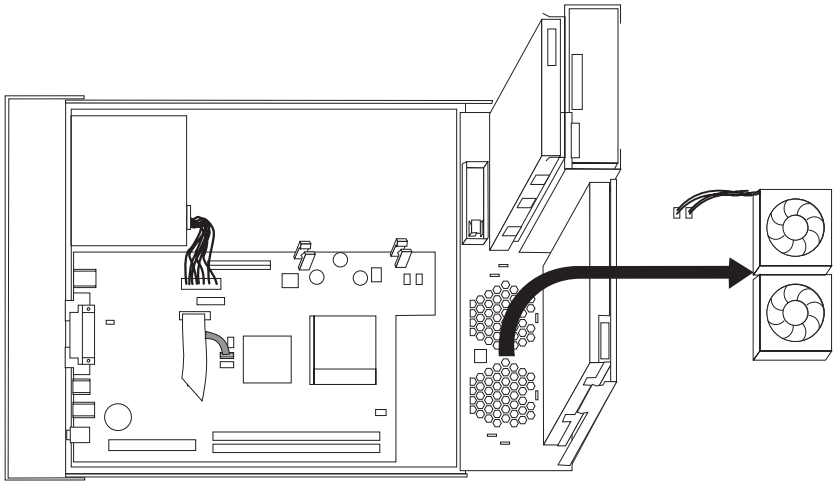
5. Remove the plastic insert behind the bezel by releasing the tabs as shown.



6. Release the tabs as shown holding the fan assembly.



7. Remove the fan assembly.



8. Install the new fan assembly and connect the fan cable to the system board.
9. Reinstall the plastic insert.
10. Reinstall the front bezel.
11. Go to “Completing the CRU replacement” on page 32.

Replacing the keyboard

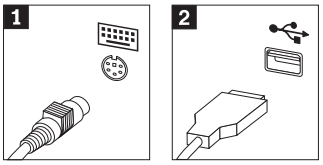
Attention

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

To replace the 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.
3. Locate the connector for the keyboard. See "Locating connectors on the rear of your computer" on page 3 and "Locating controls and connectors on the front of your computer" on page 2.

   Note: Your keyboard might be connected to the standard keyboard connector **1** at the rear of the computer or to a USB connector **2** at either the front or rear of the computer.

4. Disconnect the failing keyboard cable from the computer and connect the new keyboard cable to the same connector.
5. Go to "Completing the CRU replacement" on page 32.

Replacing the mouse

Attention

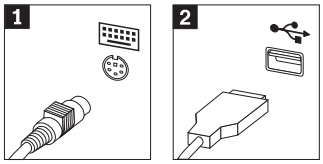
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

To replace the 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.

3. Locate the connector for the mouse. See “Locating controls and connectors on the front of your computer” on page 2 and “Locating connectors on the rear of your computer” on page 3.

   Note: Your mouse might be connected to the standard mouse connector **1** at the rear of the computer or to a USB connector **2** at either the front or rear of the computer.



4. Disconnect the failing mouse cable from the computer.
5. Connect the new mouse cable to the connector.
6. Go to “Completing the CRU replacement” on page 32.

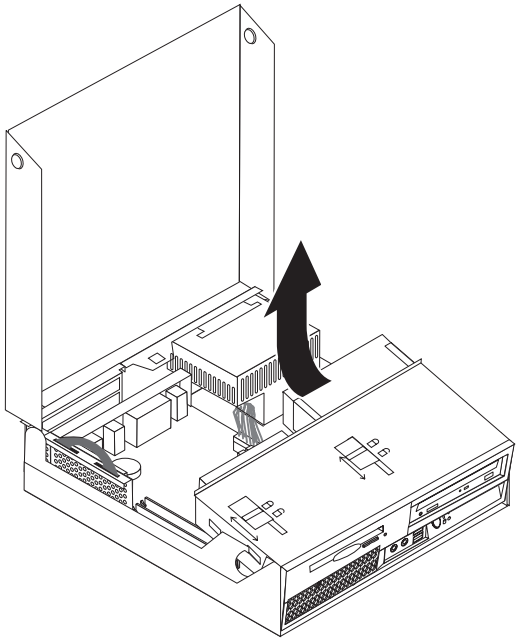
Replacing the internal speaker

Attention

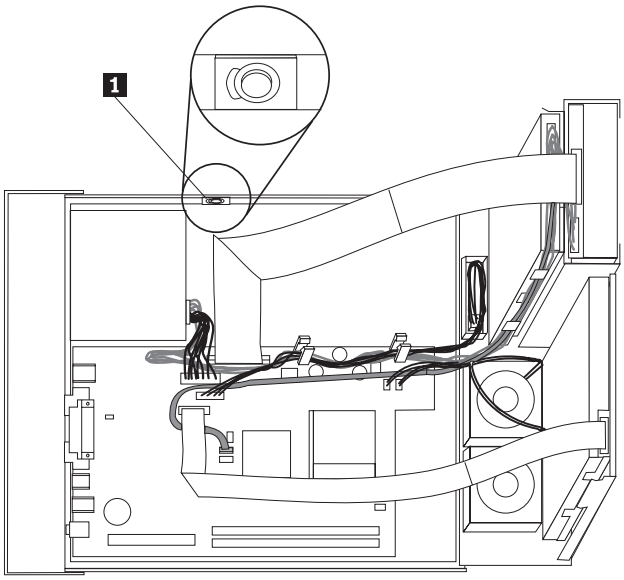
Do not open your computer or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or the *HMM*, go to the Support Web site at http://www.lenovo.com/think/support.

To replace the internal speaker:

1. Open the computer cover. See “Opening the cover” on page 5.
2. Pivot the drive bay assembly upward to gain access to the speaker.



3. Locate the speaker **1** See “Locating components” on page 1.



4. Disconnect the speaker cable from the system board. See “Identifying parts on the system board” on page 4.

   Note: Make sure you note the location of the speaker cable when you disconnect it from the system board.
5. Remove the speaker by sliding it upward and out of the retaining bracket.

   Note: You may need to slightly flex the side of the computer to help in removing the speaker.
6. Install the new speaker.
7. Connect the speaker cable to the system board. See “Identifying parts on the system board” on page 4.
8. Go to “Completing the CRU replacement.”

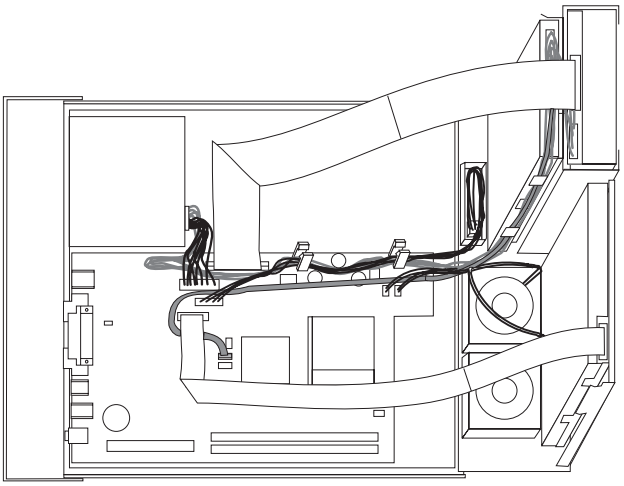
Completing the CRU replacement

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. See ″Starting the Setup Utility″ in your *Quick Reference*.

To complete the part installation:

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 1 for the location of various components.

2. Make sure that the cables are routed correctly before lowering the drive bay assembly.



3. Lower the drive bay assembly and position the drive locks to the locked position. Otherwise, you cannot close the computer cover.
4. Close the computer cover.
5. If a cover lock is installed, lock the cover.
6. If your computer is being placed in the vertical position, attach the floor stand.
7. Reconnect the external cables and power cords to the computer. See "Locating connectors on the rear of your computer" on page 3.
8. If you are replacing the system board or microprocessor, you must update (flash) the BIOS. See "Updating (flashing) BIOS from a diskette or CD-ROM."
9. To update your configuration, see "Starting the Setup Utility" in the *Quick Reference*.

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.

Updating (flashing) BIOS from a diskette or CD-ROM

Important

Start the Setup Utility program to view your system information. See "Starting the Setup Utility" in your *Quick Reference* or the *Hardware Maintenance Manual*. If the serial number and the machine type/model listed on the Main menu do not match what is printed on the label of your computer, you must update (flash) the BIOS to change the serial number and the machine type/model.

To update (flash) the BIOS from a diskette or CD-ROM, do the following:

1. Insert a system program update (flash) diskette or CD into the diskette drive or optical drive. System program updates are available at http://www.lenovo.com/think/support on the World Wide Web.
2. Turn on the computer. If it is on already, you must turn it off and back on again. The update begins.
3. When you are prompted to select a language, press the number on your keyboard that corresponds to the language and then press Enter.

4. When prompted to change the serial number, press Y.
5. Type in the seven character serial number of your computer and then press Enter.
6. When prompted to change the machine type/model, press Y.
7. Type in the seven character machine type/model of your computer and then press Enter.
8. Follow the instructions on the screen to complete the update.

Appendix. Notices

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