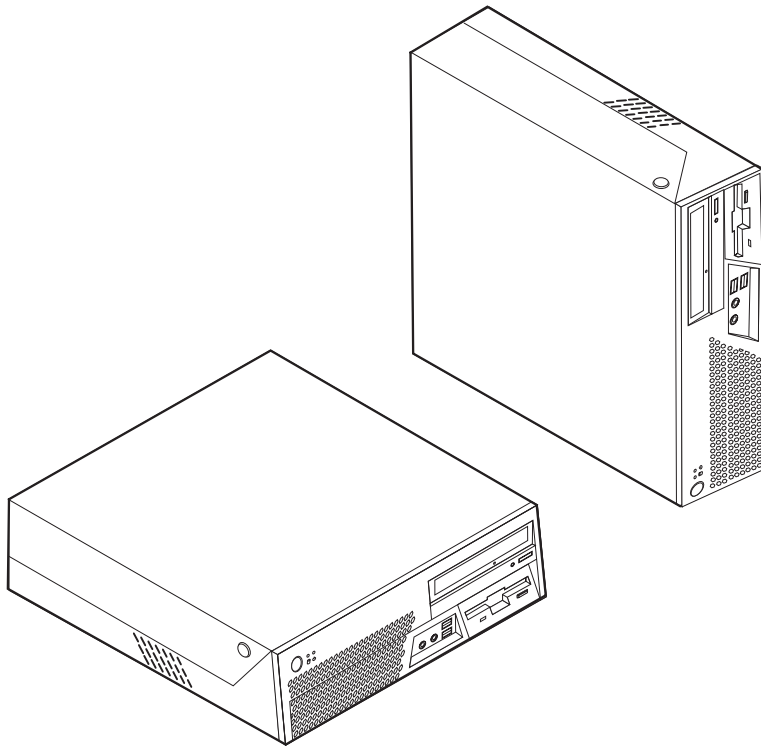


ThinkCentre

Hardware Replacement Guide

Types 8011, 8793, 8797, 8801
Types 8805, 8810, 8814



ThinkCentre

Hardware Replacement Guide

Types 8011, 8793, 8797, 8801

Types 8805, 8810, 8814

First Edition (July 2006)

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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 Replaceable Units (FRUs). In this document, CRUs and FRUs will 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.

This guide contains instructions for replacing the following parts:

Note: Use only the parts provided by Lenovo™.

- Power supply
- System board
- Microprocessor
- Hard disk drive
- Diskette drive
- Optical drive
- Memory module
- PCI adapter card
- Internal speaker
- Keyboard
- Mouse

Safety information for customers

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 World Wide Web at <http://www.lenovo.com/support>.

Safety information for service personnel

Do not open your computer or attempt any repair before reading the “Important safety information” in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain a copy of the *HMM*, go to the World Wide Web at <http://www.lenovo.com/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 instructions
- 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, point your browser to <http://www.lenovo.com/support>

Tools required

To replace some parts in your computer, you might need a flat-blade or Phillips screwdriver.

Handling static-sensitive devices

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

When 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:

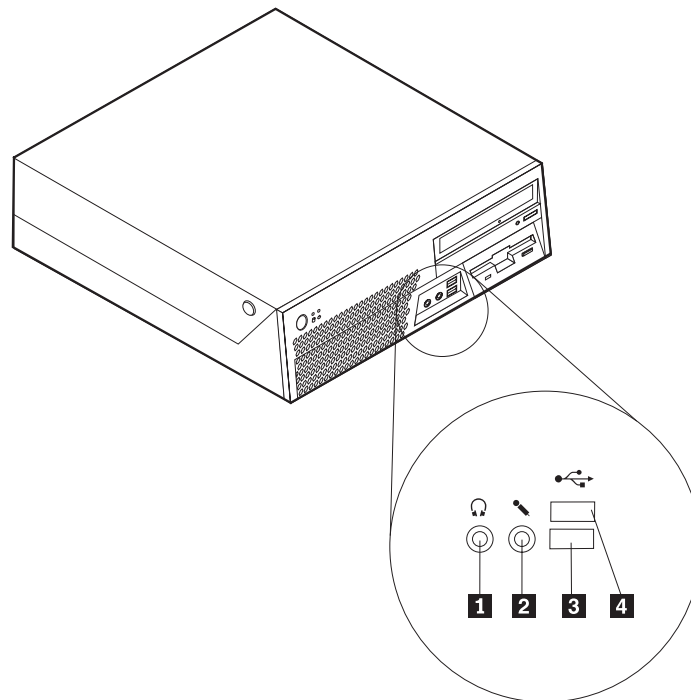
- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle parts and other computer components carefully. Handle adapters, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts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

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

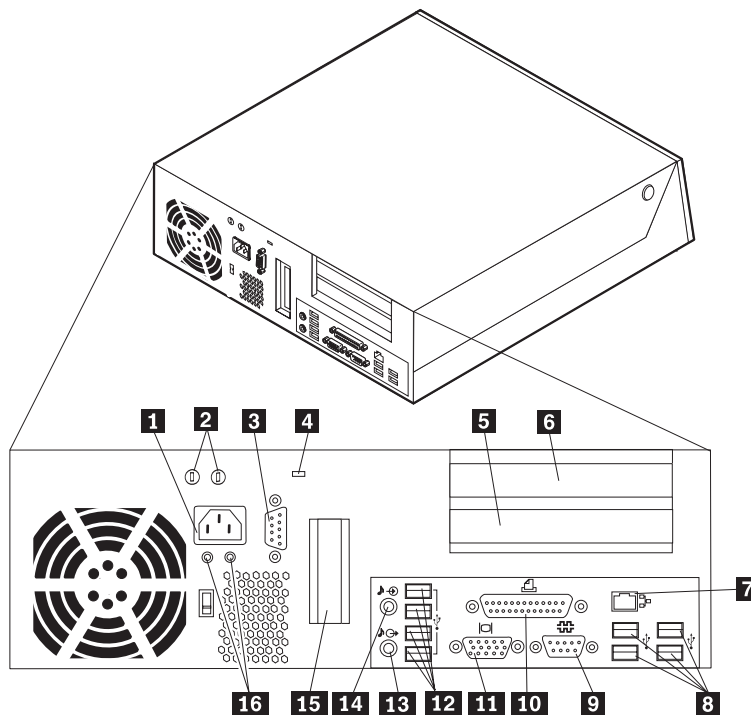


1 Headphone connector
2 Microphone connector

3 USB connector
4 USB connector

Locating the connectors on the rear of your computer

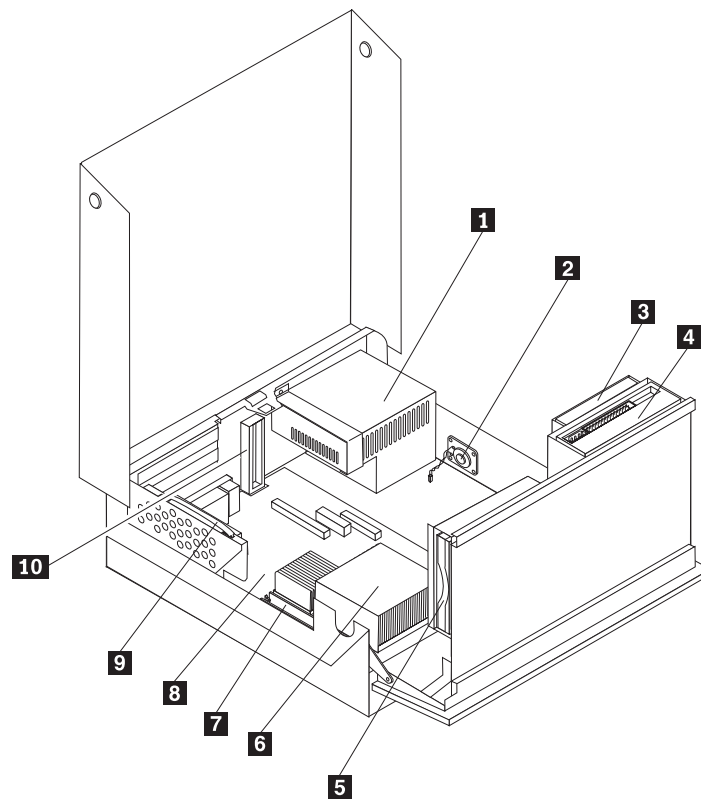
The following illustration shows the location of connectors on the rear of the computer.



- | | | | |
|----------|---------------------------------------|-----------|--|
| 1 | Power cord connector | 9 | Serial connector (COM1) |
| 2 | Rope clip holes | 10 | Parallel connector |
| 3 | Serial connector (COM2) (some models) | 11 | VGA monitor connector |
| 4 | Cable lock latch | 12 | USB connectors (4) |
| 5 | PCI adapter connector | 13 | Audio line out connector |
| 6 | PCI adapter connector | 14 | Audio line in connector |
| 7 | Ethernet connector | 15 | PCI Express x16 graphics adapter connector (some models) |
| 8 | USB connectors (4) | 16 | Diagnostic LEDs |

Locating components

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

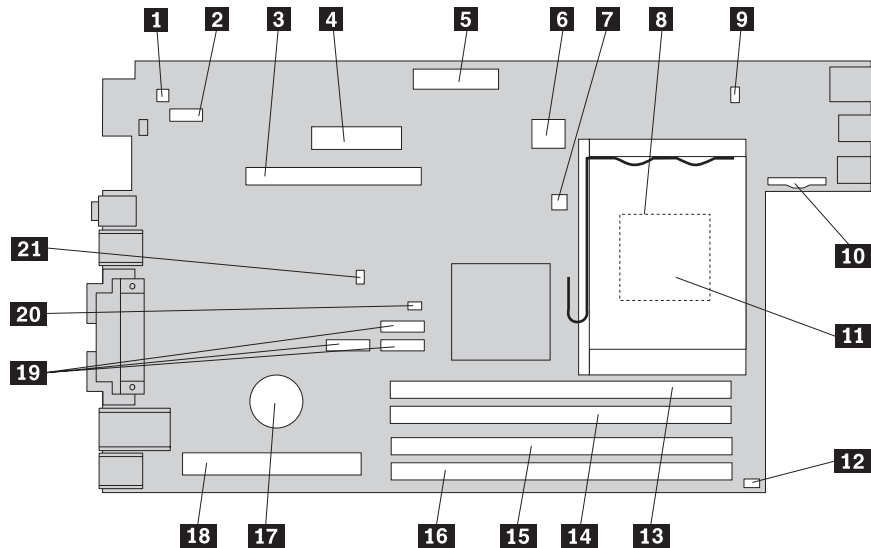


- | | | | |
|----------|-----------------------|-----------|---|
| 1 | Power supply assembly | 6 | Microprocessor and heat sink |
| 2 | Internal speaker | 7 | Memory module |
| 3 | Diskette drive | 8 | System board |
| 4 | Optical drive | 9 | PCI riser assembly |
| 5 | Hard disk drive | 10 | PCI Express x16 graphics adapter connector (some models) |

Identifying parts on the system board

The system board (sometimes called the planar or motherboard) is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices.

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



- | | | | |
|-----------|--|-----------|---------------------------------|
| 1 | Internal speaker connector | 12 | Fan connector 2 |
| 2 | Serial connector 2 (COM2) | 13 | Memory connector 1 |
| 3 | PCI Express x16 graphics adapter connector | 14 | Memory connector 2 |
| 4 | Power connector | 15 | Memory connector 3 |
| 5 | Diskette drive connector | 16 | Memory connector 4 |
| 6 | 12v power connector | 17 | Battery |
| 7 | Temperature sensor connector | 18 | PCI riser connector |
| 8 | Microprocessor heat sink | 19 | SATA connectors |
| 9 | Fan connector 1 | 20 | Clear CMOS/Recovery jumper |
| 10 | Front panel connector | 21 | Cover presence switch connector |
| 11 | Microprocessor | | |

Chapter 2. Replacing hardware

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 or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and warranty guide* or *HMM*, go to <http://www.lenovo.com/support>.

Note: Use only the parts provided by Lenovo.

Opening the cover

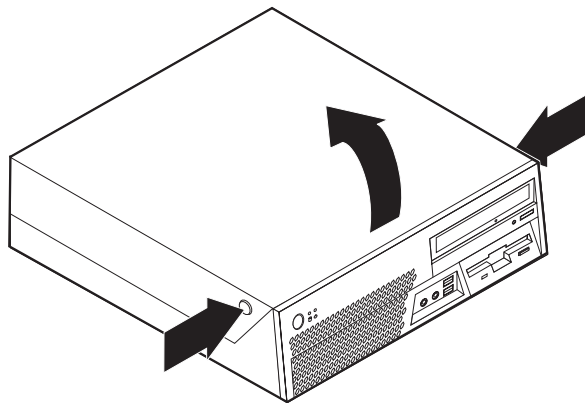
Important



Turn off your 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, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer.
4. Remove the floor stand, if attached.
5. Remove any locking devices such as a cable lock that secure the cover.
6. Press the buttons on the sides of the computer and pivot the cover upward to open the computer as shown.



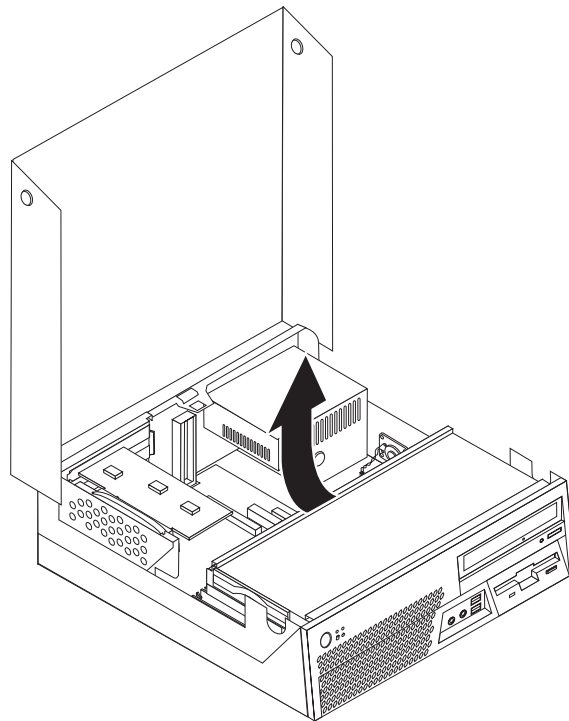
Replacing the power supply

Attention

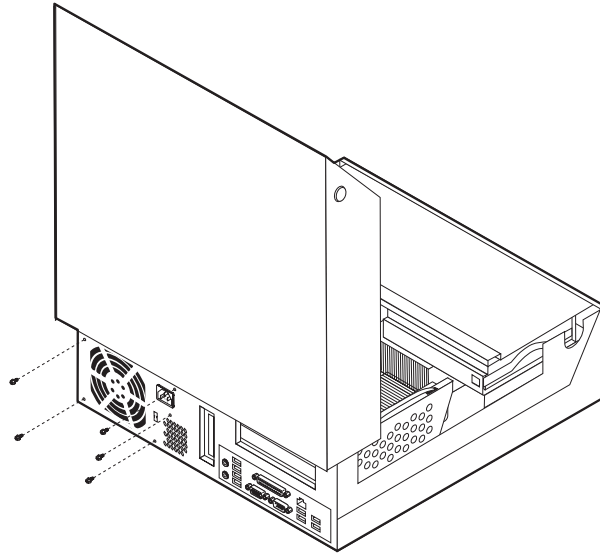
Do not open your computer or attempt any repair before reading the “Important safety information” in the *Safety and warranty guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and warranty guide* or *HMM*, go to <http://www.lenovo.com/support>.

This section provides instructions for replacing the power supply.

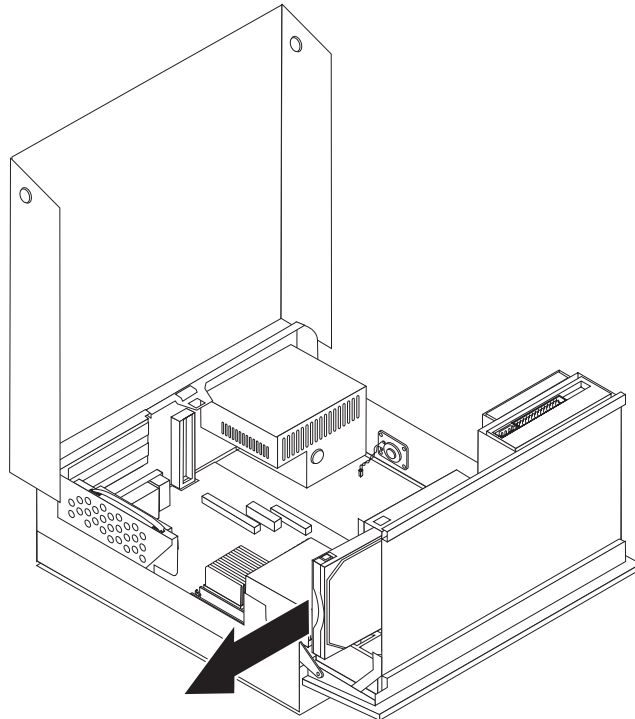
1. Open the computer cover. See “Opening the cover” on page 5.
2. Pivot the drive bay assembly upward to gain access to the power supply.



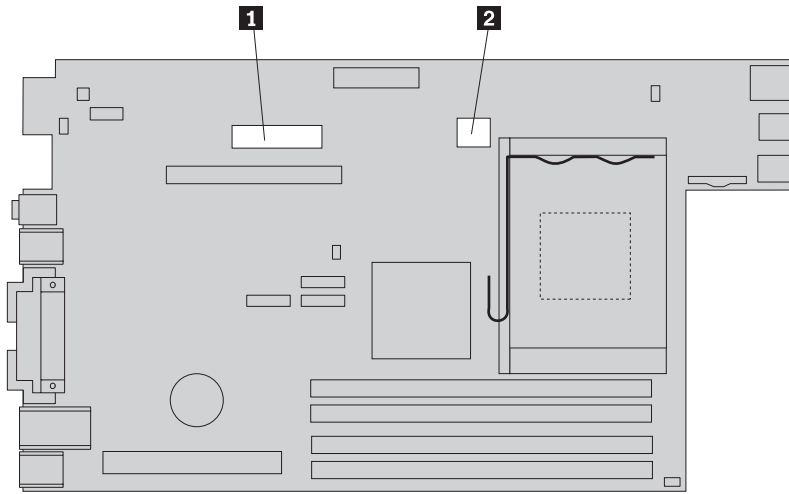
3. Remove the five screws at the rear of the chassis securing the power supply.



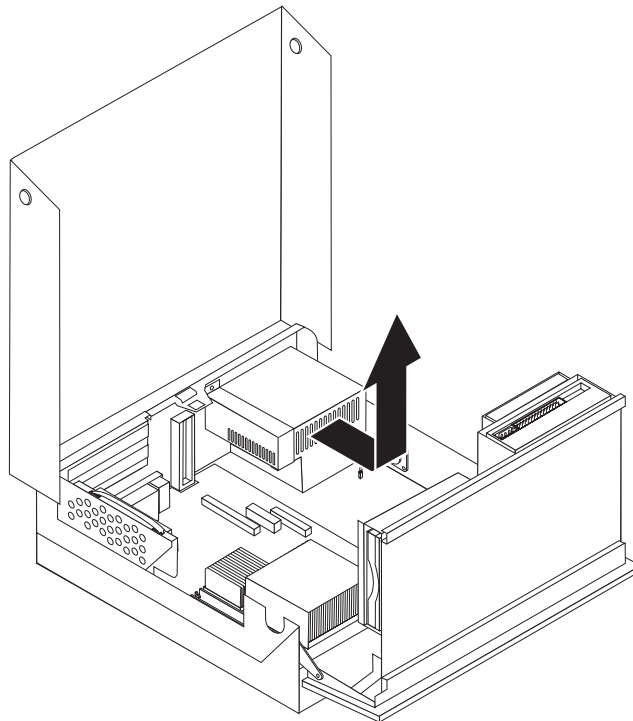
4. Pull the blue handle to slide the hard disk drive out the side of the drive bay far enough to disconnect the signal and power cables from the rear of the hard disk drive.



5. Disconnect the power supply cables from the system board connectors **1** and **2** .



6. Remove the holding bracket from the power supply and remove the power supply from the computer.



Note: It might be necessary to remove some cable ties to free the power supply cables.

7. Install the new power supply assembly 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.

8. Position the power supply holding bracket on the power supply.
9. Install and tighten the five screws at the rear of the chassis to secure the power supply assembly and the holding bracket.
10. Reconnect all the power supply cables to the drives and the system board.

11. Go to “Completing the parts replacement” on page 36.

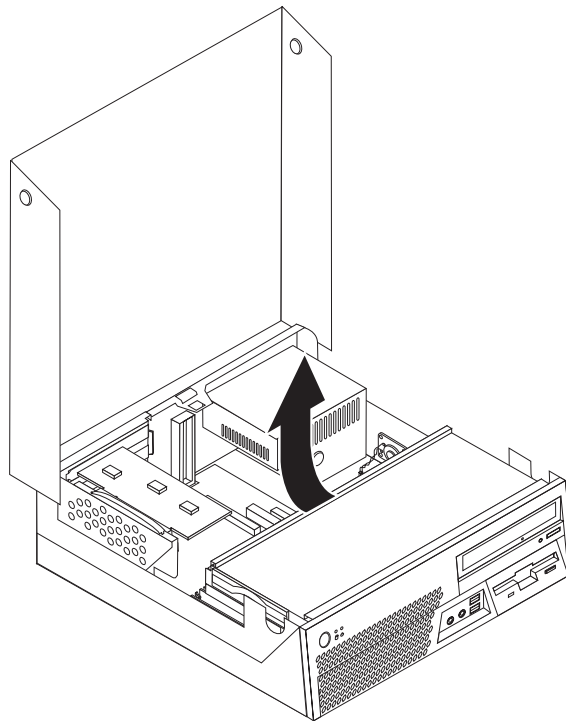
Replacing the system board

Attention

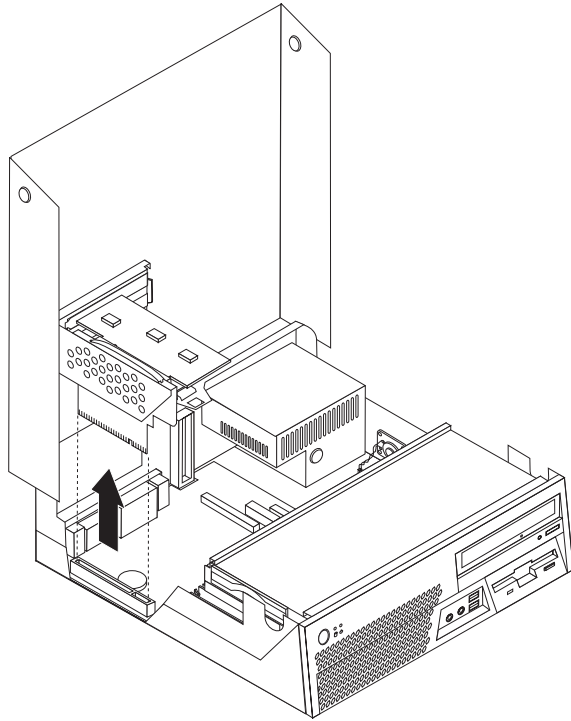
Do not open your computer or attempt any repair before reading the “Important safety information” in the *Safety and warranty guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and warranty guide* or *HMM*, go to <http://www.lenovo.com/support>.

This section provides instructions for replacing the system board.

1. Turn off the computer and allow it 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.

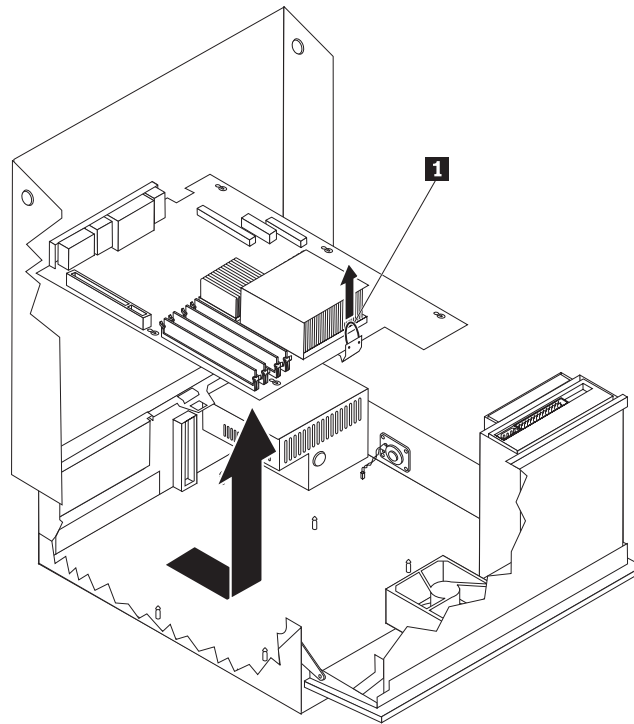


4. Pull upward on the blue handle to remove the PCI riser from the computer.



5. Carefully take note of the location of all cable connections on the system board. It will be necessary to reconnect them properly when installing a new system board.
6. Disconnect all cables connected to the system board. See “Identifying parts on the system board” on page 4.

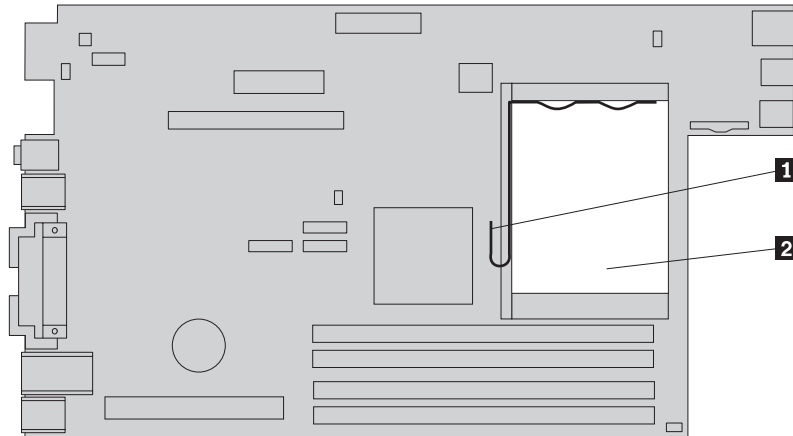
7. Pull upward on the blue handle **1** to release the system board from the front latch while sliding the system board toward the front of the chassis.



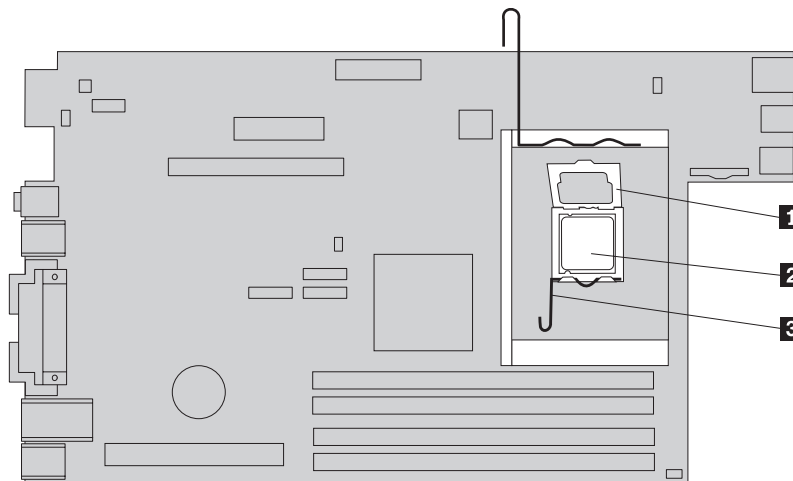
8. Tilt the front end of the system board upward and carefully remove it from the chassis.
9. Place the failing system board next to the new system board on a clean, flat surface.
10. Remove all memory modules from the failing system board and install them in the same connectors on the new system board. See “Replacing a memory module” on page 27. Return here after installing the memory modules on the new system board.

11. Make sure that the heat sink is cool enough to handle safely.
12. Remove the heat sink **2** from the failing system board by pivoting the lever **1** securing the heat sink until it is fully in the up position. Carefully lift the heat sink off of the failing system board.

Note: Place the heat sink on its side on a clean, flat surface so the thermal interface on the bottom of the heat sink does not touch the surface and become contaminated.



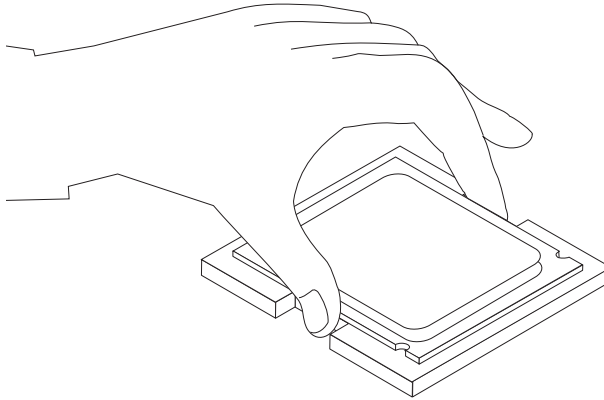
13. To remove the microprocessor from the failing system board, release the lever **3** securing the microprocessor **2** then pivot the microprocessor retainer **1** until it is fully open.



Important

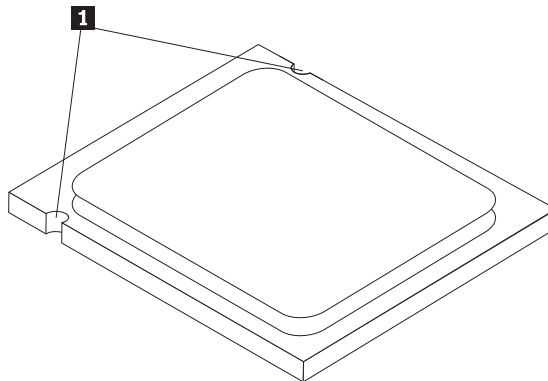
Touch only the sides of the microprocessor. Do not touch the gold contacts on the bottom.

14. Lift the microprocessor straight up and out of the socket.



Notes:

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



- b. Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.
15. On the new system board, release the lever securing the microprocessor retainer and then pivot the retainer until it is fully open.

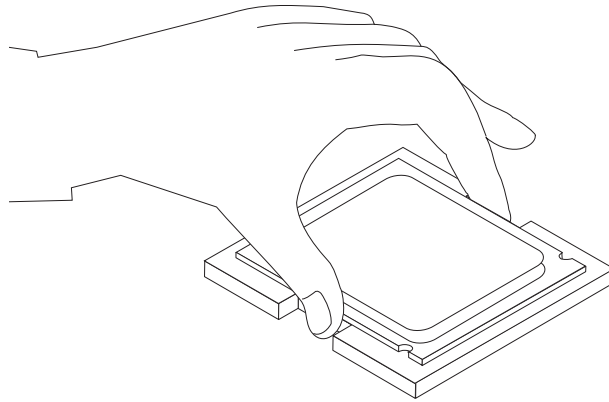
Note: There will be a black plastic cover on the microprocessor retainer to protect the socket on the new system board. Remove the black plastic cover and place it on the microprocessor socket of the failing system board.

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

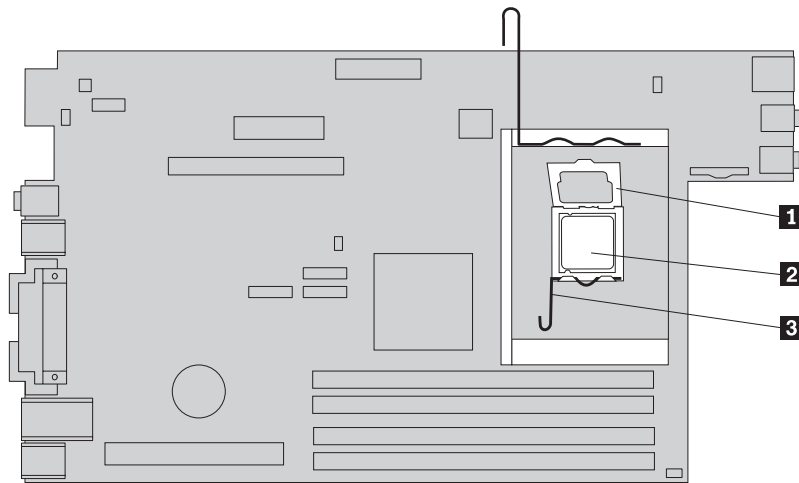
Important

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

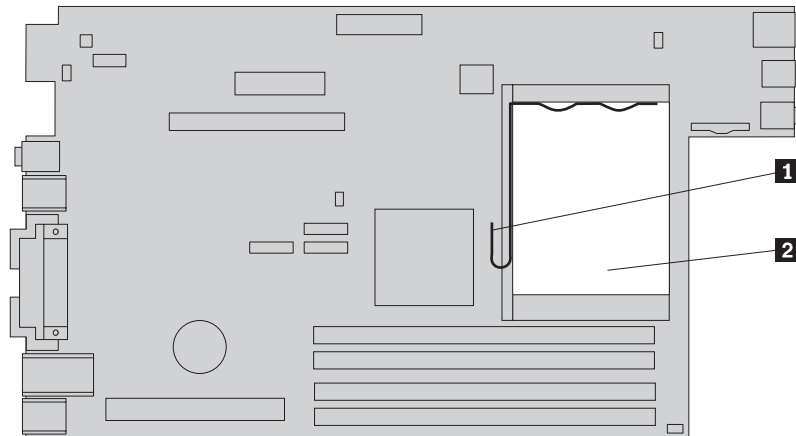
17. Lower the microprocessor straight down into the system board socket of the new system board.



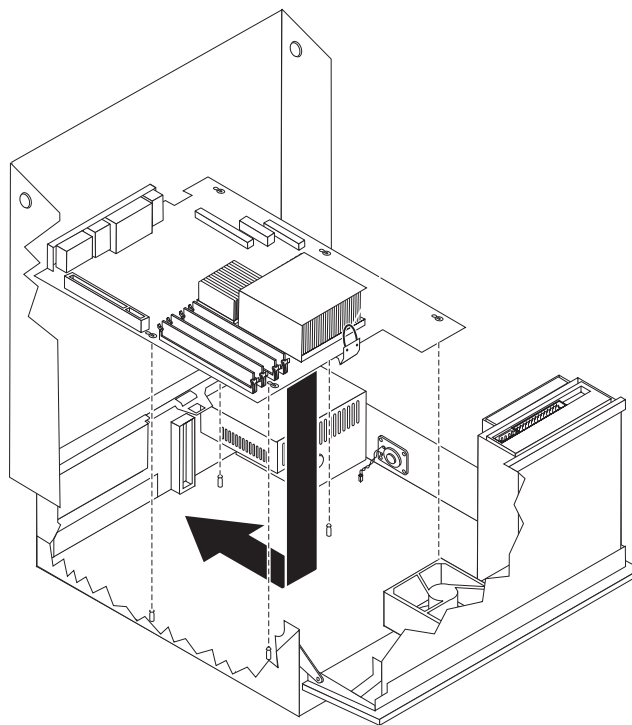
18. Lower the microprocessor retainer **1** and then lower the lever **3** to secure the retainer. Make sure the lever is securely locked into position.



19. Place the heat sink **2** into position and lower the lever **1** to secure the heat sink.



20. To install the new system board, position it so that the slots in the new system board are aligned with the pins on the chassis.
21. When all the pins are properly aligned, slide the system board toward the rear of the chassis until the front latch snaps into position.



22. Reconnect all cables that were disconnected from the system board. See "Identifying parts on the system board" on page 4.
23. Reinstall the PCI riser that was removed. See "Replacing a PCI adapter" on page 29.
24. Go to "Completing the parts replacement" on page 36.

Replacing the microprocessor

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 or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and warranty guide* or *HMM*, go to <http://www.lenovo.com/support>.

Important

Leave your computer turned off 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.

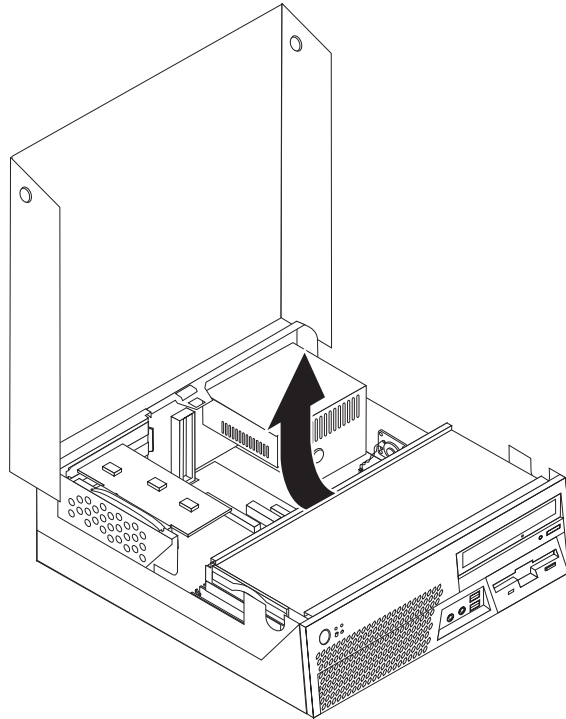
Important

Touch only the sides of the microprocessor. Do not touch the gold contacts on the bottom.

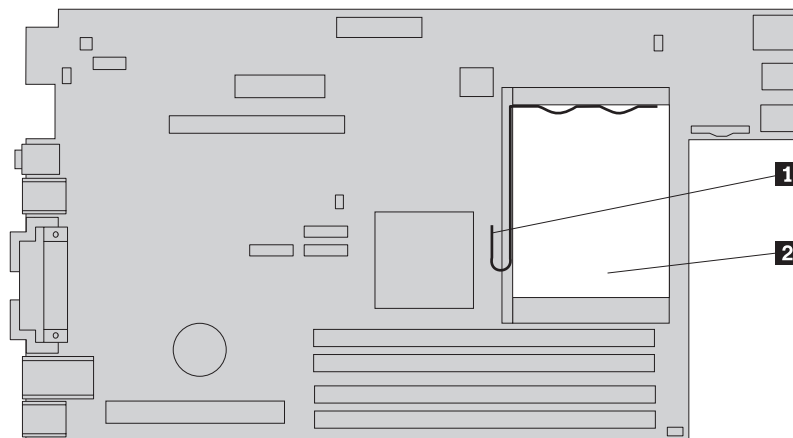
This section provides instructions for replacing the microprocessor.

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

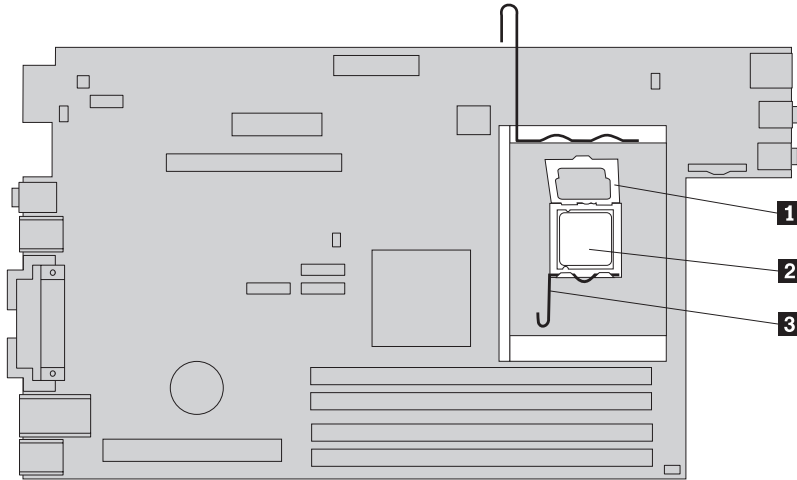
- Pivot the drive bay assembly upward to gain access to the system board.



- Make sure that the heat sink is cool enough to handle safely.
- Remove the heat sink **2** from the system board by pivoting the lever **1** securing the heat sink until it is fully in the up position. Carefully lift the heat sink off of the system board.



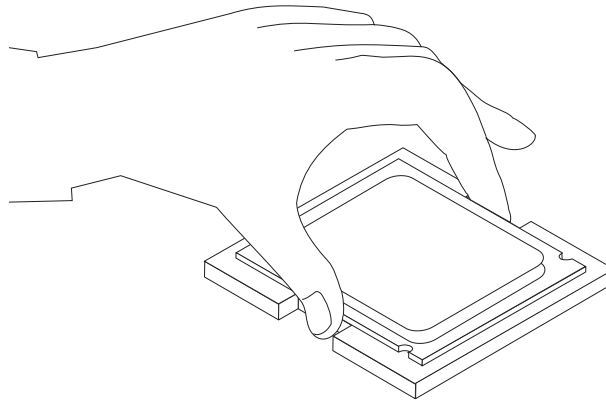
5. Release the lever **3** securing the microprocessor **2** then pivot the microprocessor retainer **1** until it is fully open.



Important

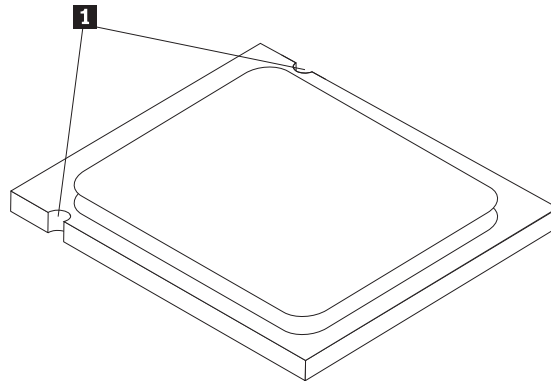
Touch only the sides of the microprocessor. Do not touch the gold contacts on the bottom.

6. Lift the microprocessor straight up and out of the socket.

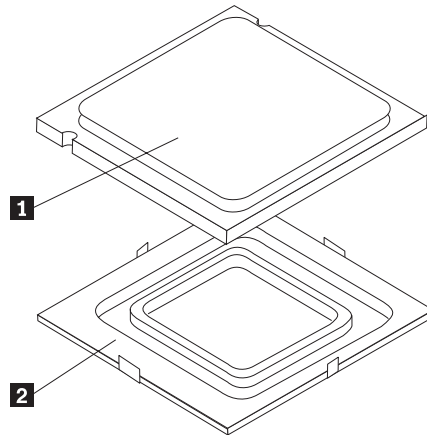


Notes:

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



- b. Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.
7. Make sure that the lever on the microprocessor retainer is fully open.
8. Holding the microprocessor with your fingers, remove the protective cover **2** that protects the gold contacts on the new microprocessor **1**.

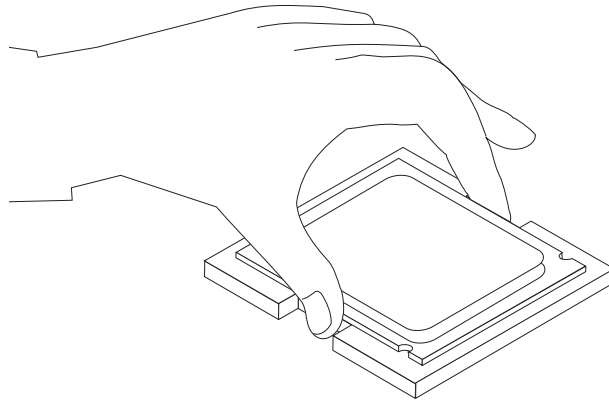


9. Position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

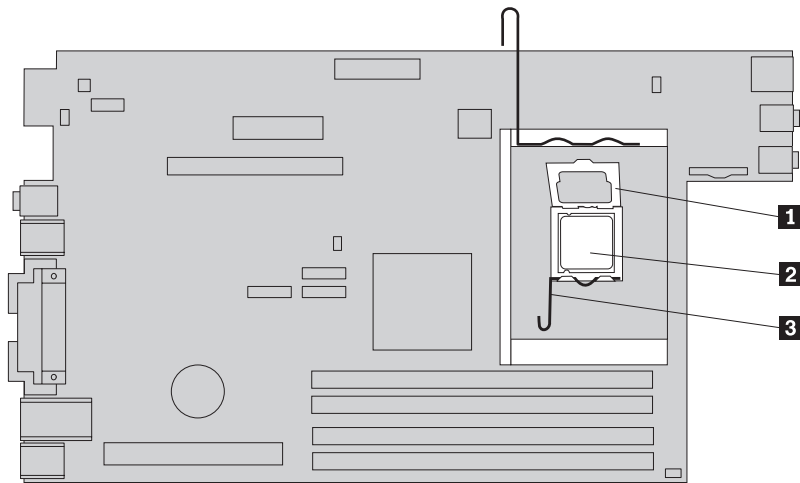
Important

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

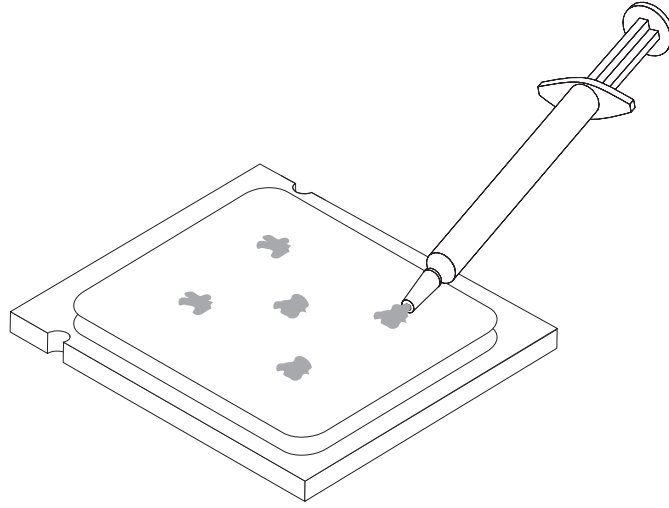
10. Lower the microprocessor straight down into the system board socket of the new system board.



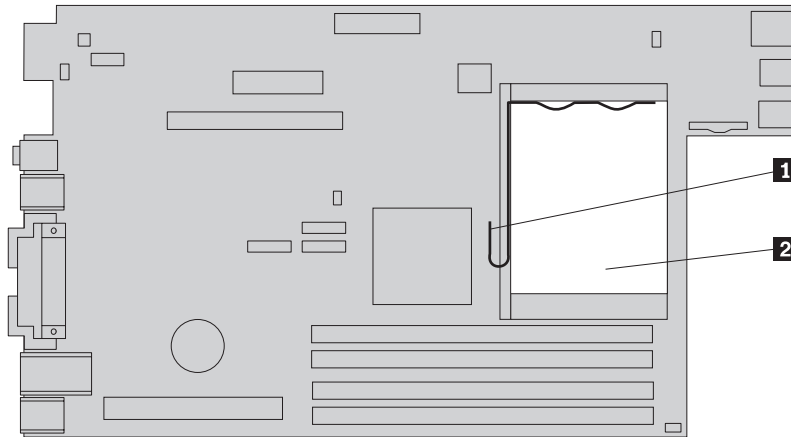
11. Lower the microprocessor retainer **1** and then lower the lever **3** to secure the retainer. Make sure the lever is securely locked into position.



12. Use the thermal grease syringe to place five drops of grease on the top of the microprocessor. Each drop of grease should be 0.03ml (3 tick marks on the grease syringe).



13. Place the **new** heat sink **2** into position and lower the lever **1** to secure the heat sink.



14. Go to "Completing the parts replacement" on page 36.

Replacing the 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 or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and warranty guide* or *HMM*, go to <http://www.lenovo.com/support>.

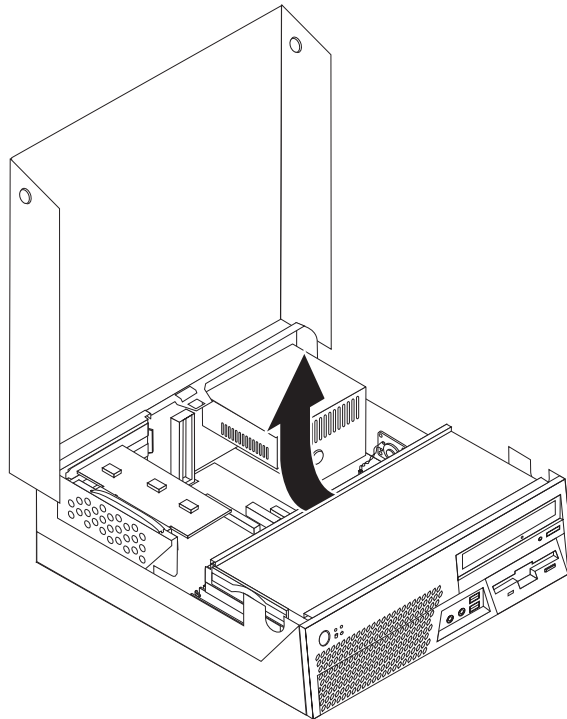
This section provides instructions for replacing the hard disk drive.

Important

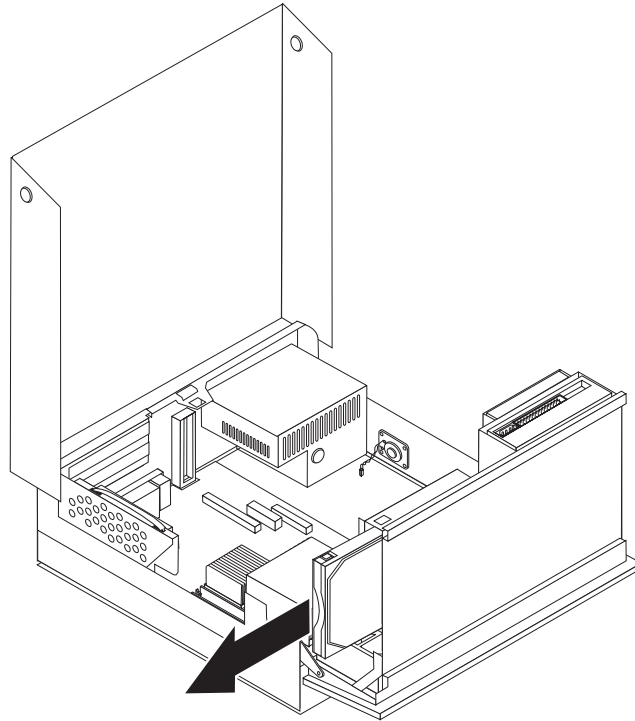
When you receive a new hard disk drive, you also receive a set of *Product Recovery CDs*. The set of *Product Recovery CDs* will enable you to restore the contents of the hard disk to the same state as when your computer was originally shipped from the factory. For more information on recovering factory-installed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

To replace a hard disk drive, do the following:

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

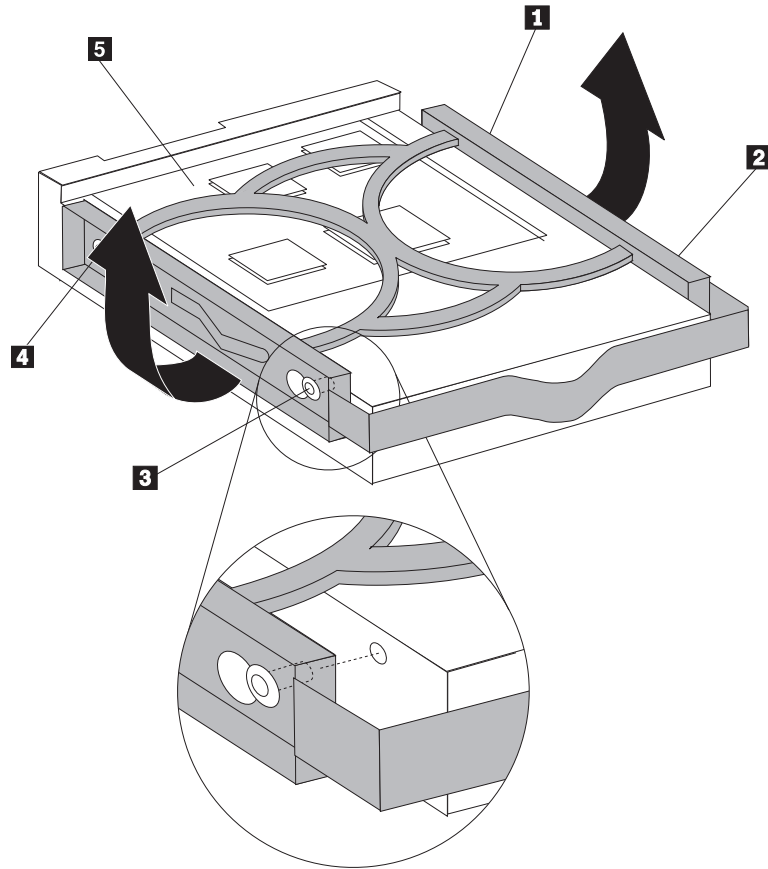


3. Pull the blue handle to slide the failing hard disk drive out the side of the drive bay far enough to disconnect the signal and power cables from the rear of the hard disk drive.
4. Completely remove the hard disk drive from the drive bay.



5. Remove the failing hard disk drive from the blue bracket by flexing the bracket enough to slide the drive out.

6. 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.



7. Insert the new hard disk drive into the drive bay far enough to connect the signal and power cables to the rear of the new hard disk drive.
8. Completely slide the new hard disk drive into the drive bay until the drive locks into position.
9. Go to "Completing the parts replacement" on page 36.

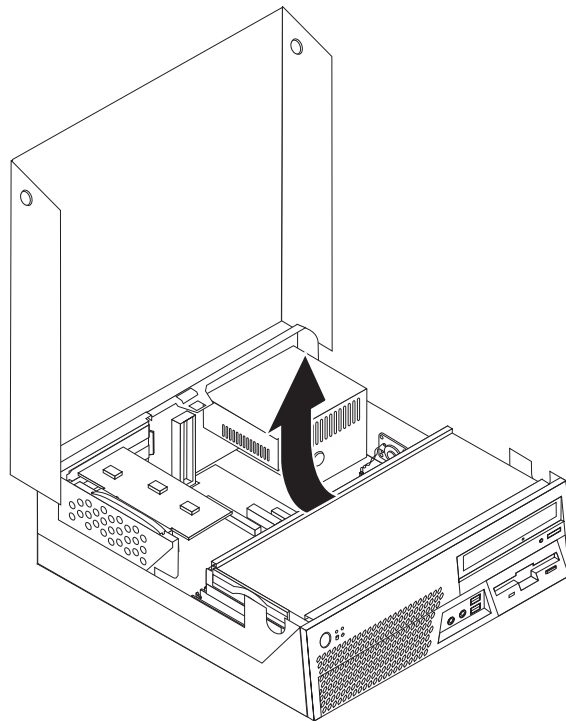
Replacing the diskette drive

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 or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and warranty guide* or *HMM*, go to <http://www.lenovo.com/support>.

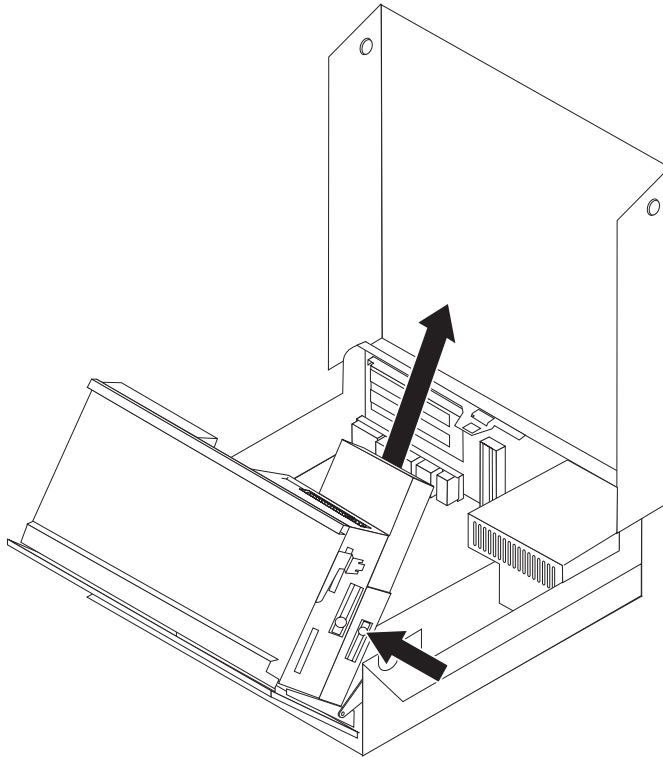
This section provides instructions for replacing the diskette drive.

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

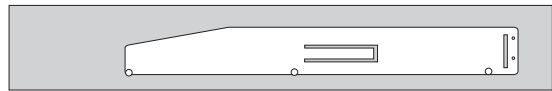


3. Disconnect the signal and power cables from the rear of the diskette drive.
4. Release the diskette drive by pressing inward on the blue retainer at the side of the drive.

5. Remove the diskette drive by sliding the drive out the rear of the drive bay.



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



7. Install the new diskette drive into the bay from the rear until the drive snaps into position.
8. Connect the signal and power cables to the new diskette drive.
9. Go to “Completing the parts replacement” on page 36.

Replacing the optical drive

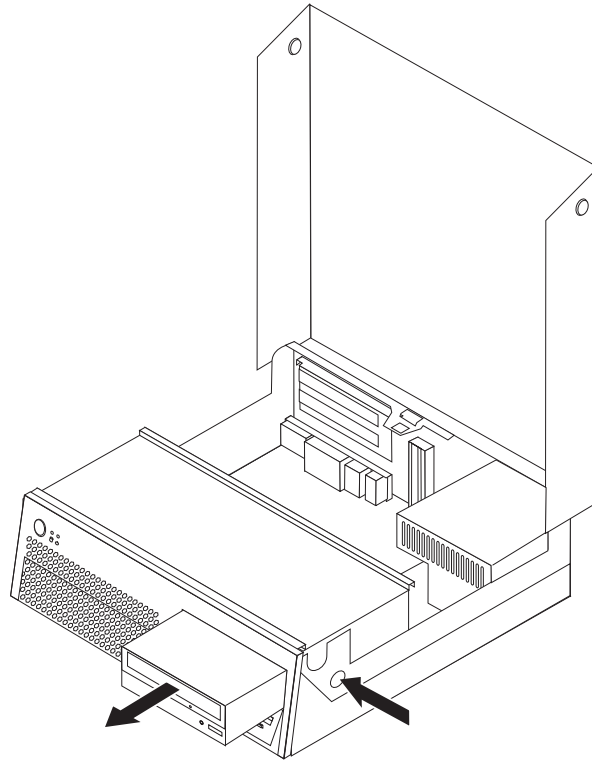
Attention

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 or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and warranty guide* or *HMM*, go to <http://www.lenovo.com/support>.

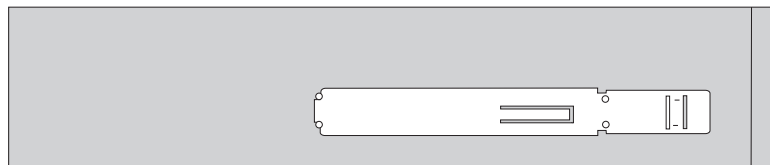
This section provides instructions for replacing an optical drive.

1. Open the computer cover. See “Opening the cover” on page 5.
2. Disconnect the signal and power cables from the rear of the optical drive.
3. Release the optical drive by pressing inward on the blue retainer at the side of the chassis.

4. Remove the optical drive by sliding it out the front of the drive bay.



5. Make sure the drive that you are installing is set correctly as either a master or a slave device.
Refer to the documentation that comes with your drive for master/slave jumper information.
6. Remove the retainer bracket from the failing optical drive and install it on the new optical drive.



7. Install the new optical drive into the bay until the drive locks into position.
8. Connect the signal and power cables to the new optical drive.
9. Go to “Completing the parts replacement” on page 36.

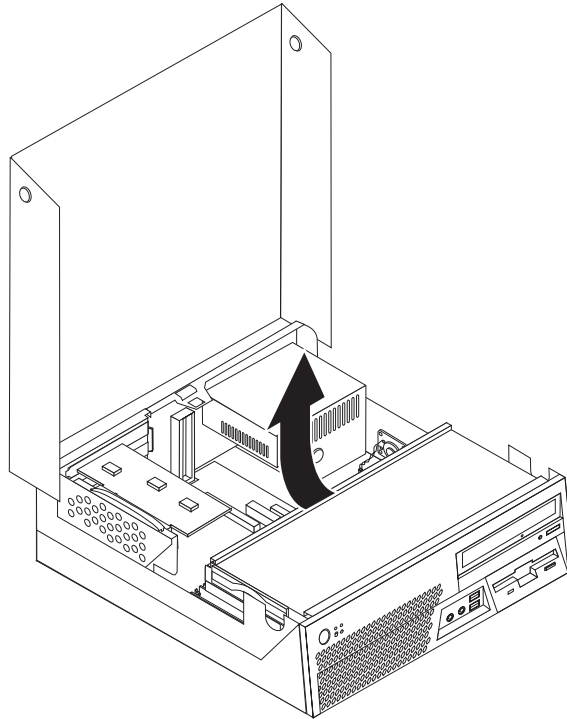
Replacing a memory module

Attention

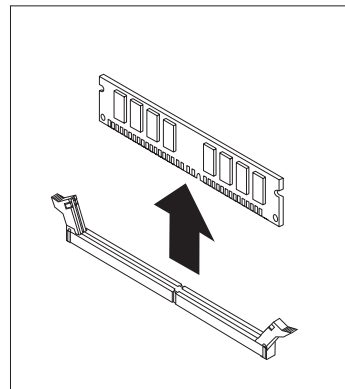
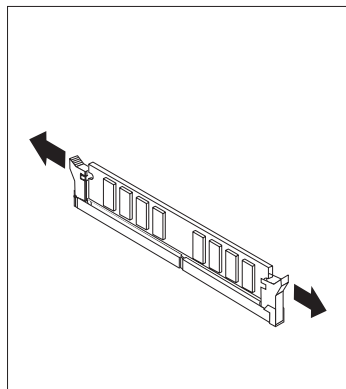
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This section provides instructions for replacing a memory module.

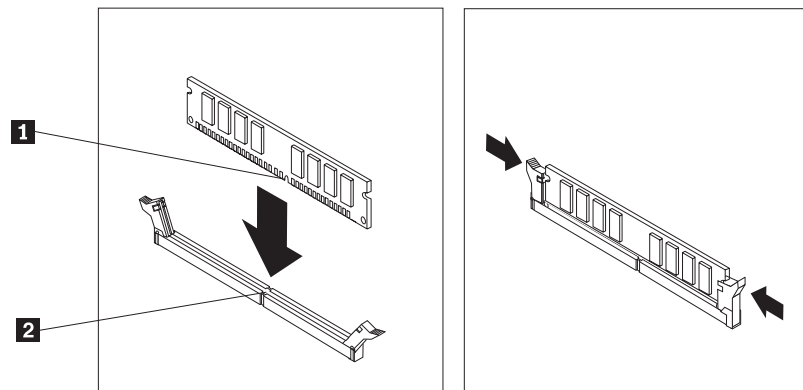
1. Open the computer cover. See “Opening the cover” on page 5.
2. Pivot the drive bay assembly upward to gain access to the system board.



3. Remove any parts that might prevent access to the memory connectors.
4. Remove the PCI riser. See “Replacing a PCI adapter” on page 29.
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 that 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 memory connector until the retaining clips close.



7. Go to “Completing the parts replacement” on page 36.

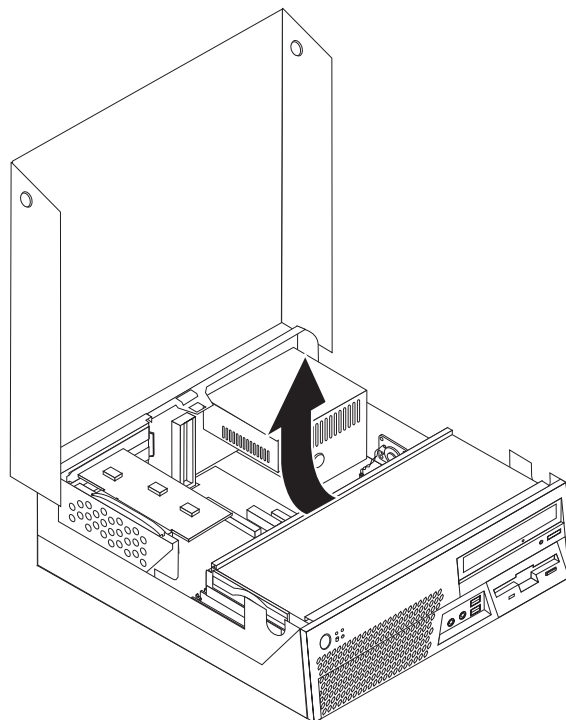
Replacing a PCI adapter

Attention

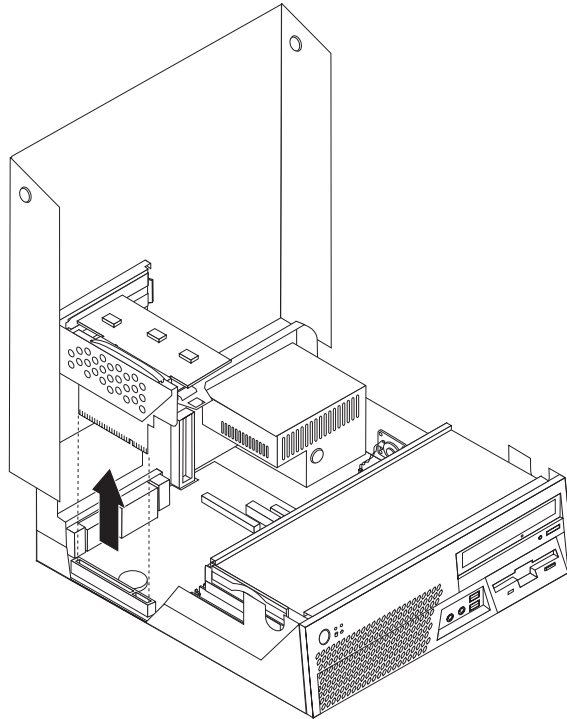
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This section provides instructions for replacing a PCI adapter.

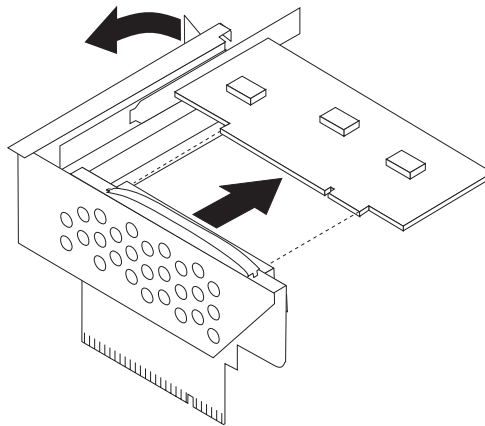
1. Open the computer cover. See “Opening the cover” on page 5.
2. Pivot the drive bay assembly upward to gain access to the system board.



3. Pull upward on the blue handle to remove the PCI riser from the computer.

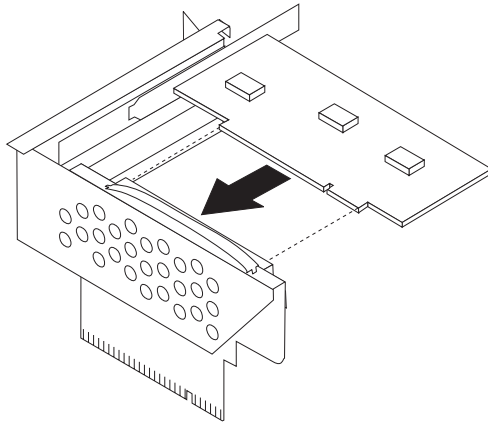


4. Open the adapter latch and remove the failing adapter.



5. Remove the new adapter from its static-protective package.

6. Install the new adapter into the expansion connector in the PCI riser.



7. Close the adapter latch to retain the adapter.
8. Reinstall the PCI riser into the system board.
9. Go to “Completing the parts replacement” on page 36.

Replacing the internal speaker

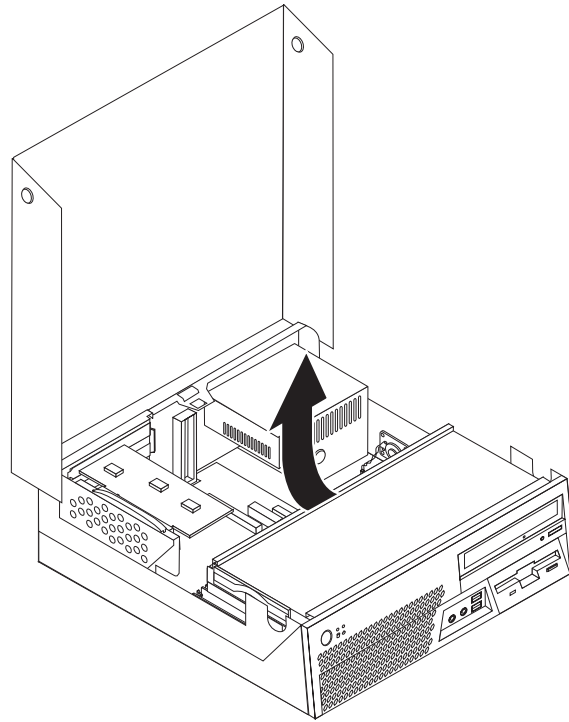
Attention

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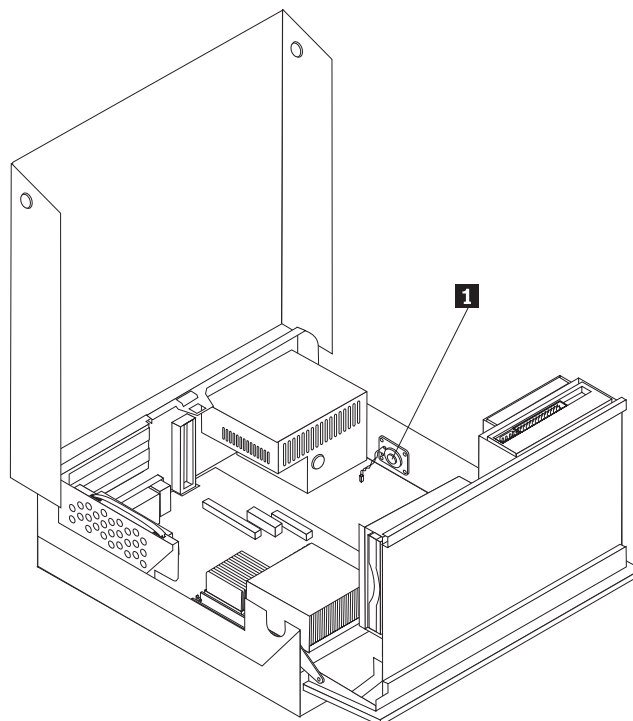
This section provides instructions for replacing the internal speaker.

1. Open the computer cover. See “Opening the cover” on page 5.

2. Pivot the drive bay assembly upward to gain access to the internal speaker connector.



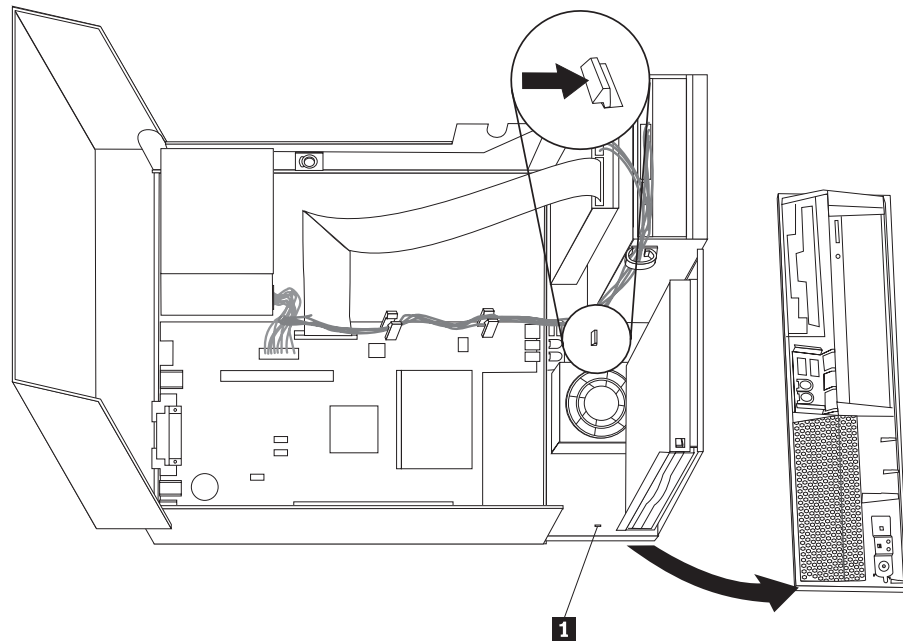
3. Locate the internal speaker connector on the system board. See “Identifying parts on the system board” on page 4.
4. Disconnect the internal speaker cable from the system board.
5. Slide the internal speaker **1** upward until the speaker is released from the metal tabs that secure it at the bottom. Then pivot the bottom of the internal speaker outward and remove the speaker from the chassis.



6. Position the bottom of the new internal speaker into the metal tabs and then pivot the top of the internal speaker inward until the speaker snaps into position.
7. Connect the internal speaker cable to the system board. See “Identifying parts on the system board” on page 4.
8. Go to “Completing the parts replacement” on page 36.

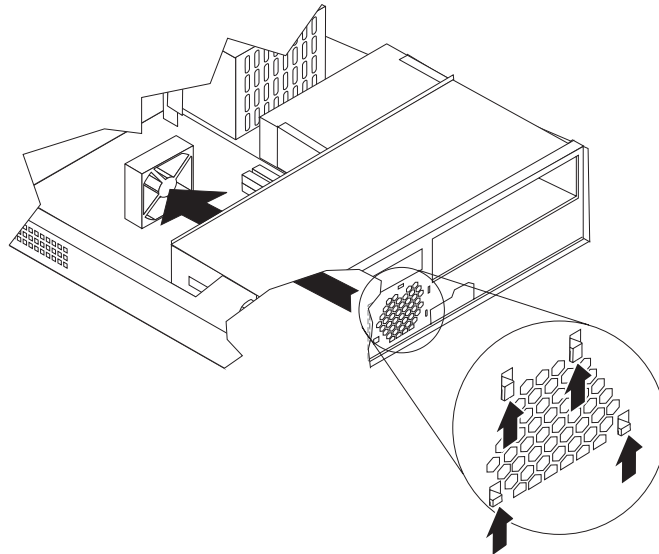
Replacing the fan assembly

1. Turn off the computer and disconnect the power cord from the electrical outlet and from the computer.
2. Open the computer cover. See “Opening the cover” on page 5.
3. Rotate the drive bay assembly upward to gain access to the fan assembly.
4. Locate the fan connector on the system board and disconnect the fan cable. See “Identifying parts on the system board” on page 4.
5. Remove the front bezel by releasing the tab as shown and pivoting it outward from the bottom.
6. Remove the plastic insert behind the bezel by releasing the tab **1**.



7. Remove the plastic fan shroud on top of the fan by flexing the plastic enough to release it from the metal tabs.

8. Remove the fan assembly by releasing the tabs as shown.



9. Install the new fan assembly and connect the fan cable to the system board.
10. Install the plastic fan shroud on top of the fan.
11. Reinstall the plastic insert behind the bezel.
12. Reinstall the front bezel by first inserting the bezel tabs at the top of the chassis and then snapping it into place at the sides and center.
13. Lower the drive bay assembly.
14. Go to “Completing the parts replacement” on page 36.

Replacing a keyboard

Attention

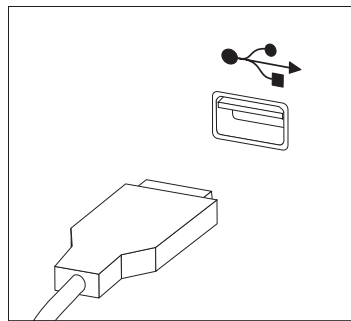
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This section provides instructions for replacing a keyboard.

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

3. Locate the keyboard connector.

Note: Your keyboard is connected to one of the USB connectors in the front or the rear of the computer.



4. Disconnect the failing keyboard cable from the computer.
5. Connect the new keyboard to the appropriate connector on the computer.
6. Go to “Completing the parts replacement” on page 36.

Replacing a mouse

Attention

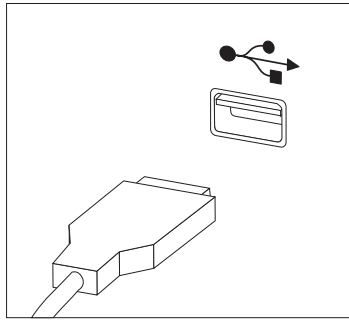
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This section provides instructions for replacing a mouse.

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

3. Locate the mouse connector.

Note: Your mouse is connected to one of the USB connectors in the front or rear of the computer.



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

Completing the parts replacement

After working with parts, you need to replace the computer cover and reconnect any 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.

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
2. Reposition any cables that might impede the replacement of the cover.

Attention

Cables can become damaged if they are not correctly routed as you lower the drive bay assembly and close the cover. Make sure that all cables are correctly routed and are not pinched as the drive bay assembly is lowered and the cover is closed.

3. Lower the drive bay assembly and close the computer cover.
4. Install any locking devices such as a cable lock as necessary.
5. Reconnect the external cables and power cords to the computer. See “Locating the connectors on the rear of your computer” on page 2.
6. If your computer is being placed in the vertical position, attach the floor stand.
7. 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” on page 37.
8. To update the configuration, see “Using the Setup Utility” in the *User guide* for your computer.

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 “Using the Setup Utility” in your *User guide*. 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-ROM into the diskette drive or optical drive. System program updates are available at <http://www.lenovo.com/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.

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