

## Hardware Replacement Guide

Types 6491, 8013, 8702, 8706

Types 8716, 8970, 8972, 8976

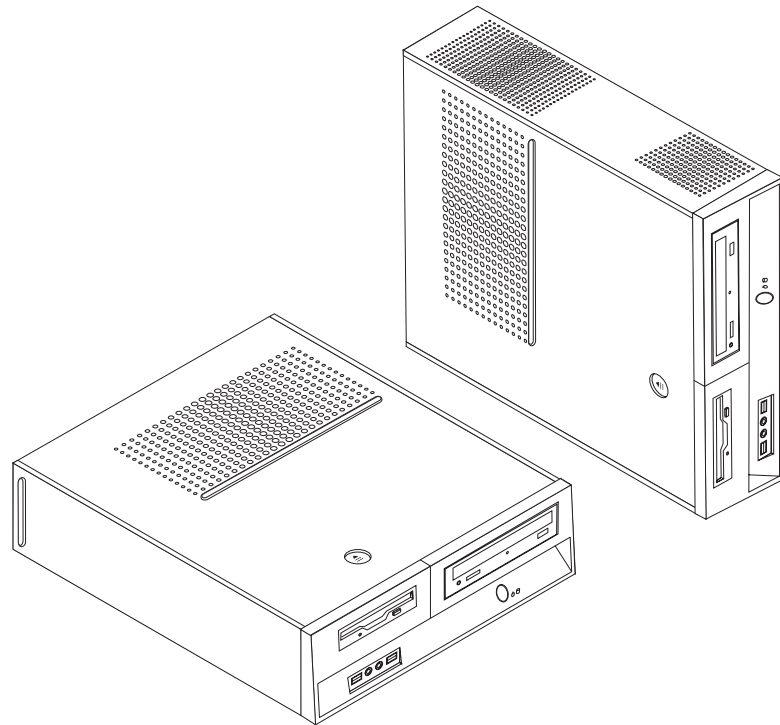
Types 8980, 8982, 8986, 8992

Types 8994, 9266, 9276, 9278

Types 9282, 9286, 9288, 9374

Types 9378, 9380, 9384, 9628

Types 9632, 9647, 9649, 9695





**ThinkCentre**

# Hardware Replacement Guide

**Third Edition (February 2007)**

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## Overview

This guide is intended to be used by customers who are replacing Customer Replaceable Units (CRUs).

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™.**

- Hard disk drive
- Diskette drive
- Optical drive
- Heat sink and fan assembly
- System fan assembly
- Memory module
- PCI adapter card
- Keyboard
- Mouse

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## Safety information

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>.

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## 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>

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## Tools required

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

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## 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.



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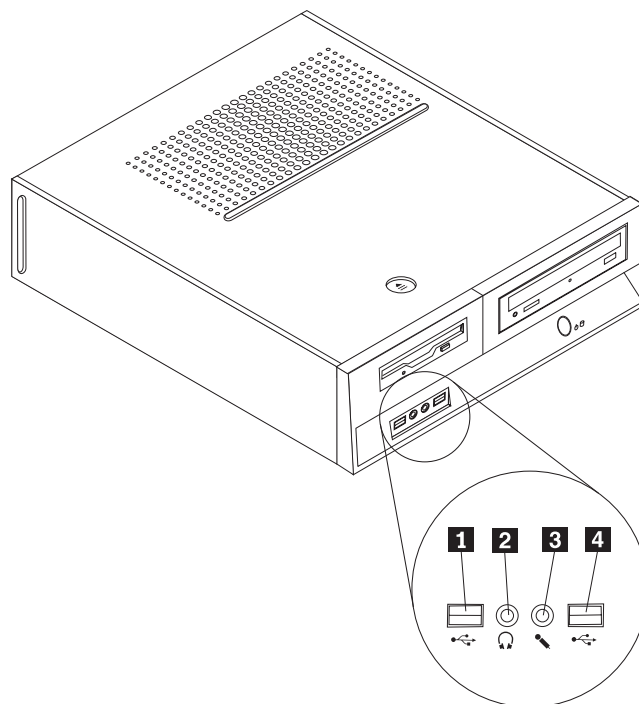
## Chapter 1. Locations

This chapter provides illustrations to help locate the various connectors, controls and components of the computer. To remove the computer cover, see “Removing the cover” on page 7.

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### Locating the connectors on the front of your computer

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

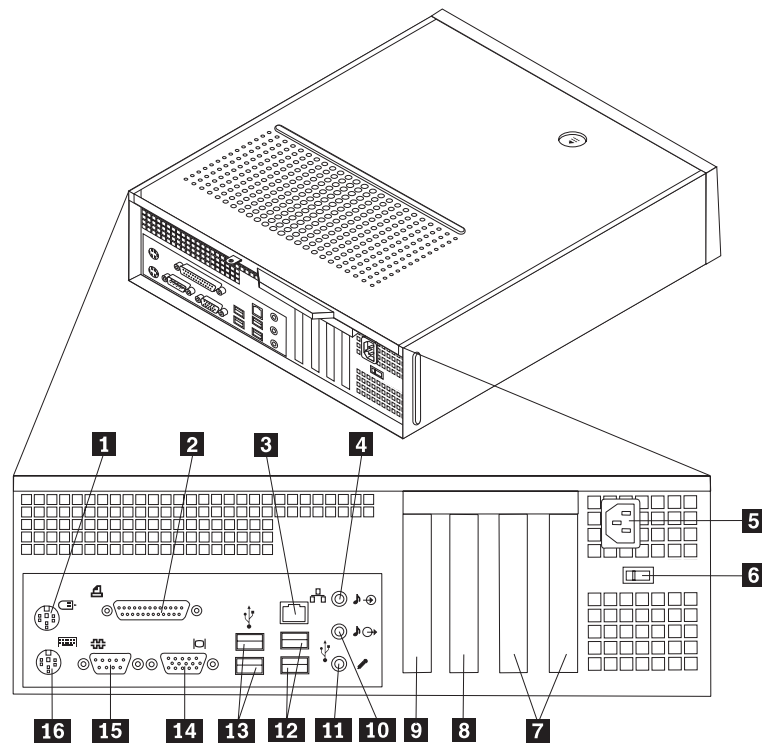


- 1** USB connector
- 2** Headphone connector

- 3** Microphone connector
- 4** USB connector

## Locating the connectors on the rear of your computer

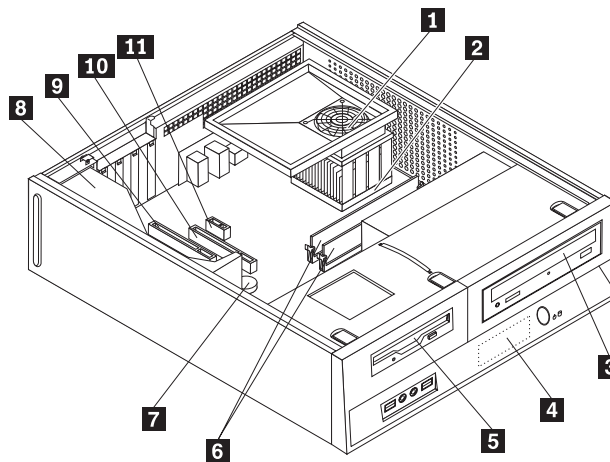
The following illustration shows the location of connectors on the rear of the computer.



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

## Locating components

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

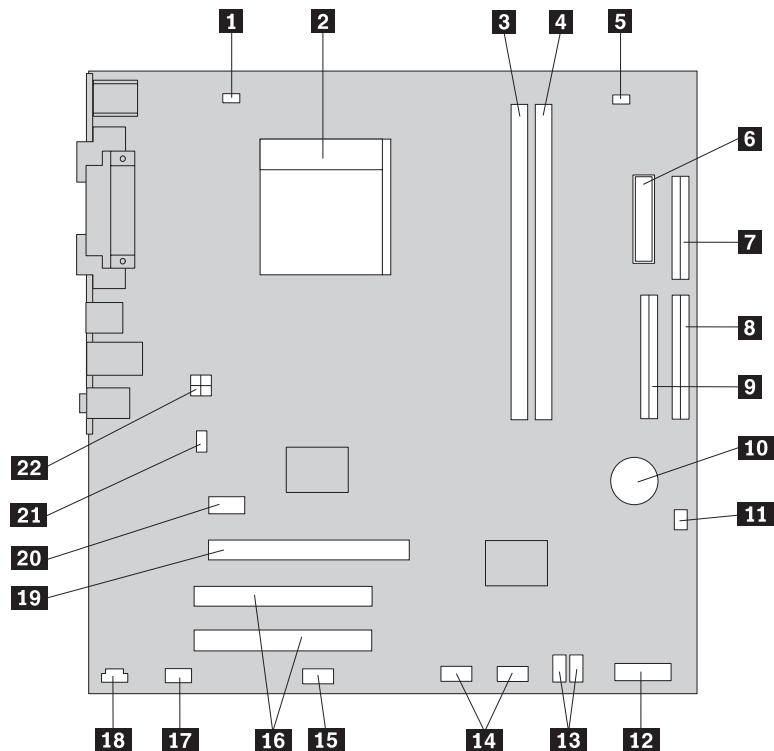


- |          |                                |           |  |
|----------|--------------------------------|-----------|--|
| <b>1</b> | Fan plenum, fan, and heat sink | <b>7</b>  | Battery  |
| <b>2</b> | Microprocessor                 | <b>8</b>  | Power supply   |
| <b>3</b> | Optical drive                  | <b>9</b>  | PCI adapter connector  |
| <b>4</b> | Hard disk drive                | <b>10</b> | PCI Express x16 graphics adapter or<br>PCI Express x1 adapter connector<br>(some models) |
| <b>5</b> | Diskette drive                 | <b>11</b> | PCI Express x1 adapter or PCI<br>Express x16 graphics adapter<br>connector (some models) |
| <b>6</b> | Memory modules (2)             |           |  |

## Identifying parts on the system board

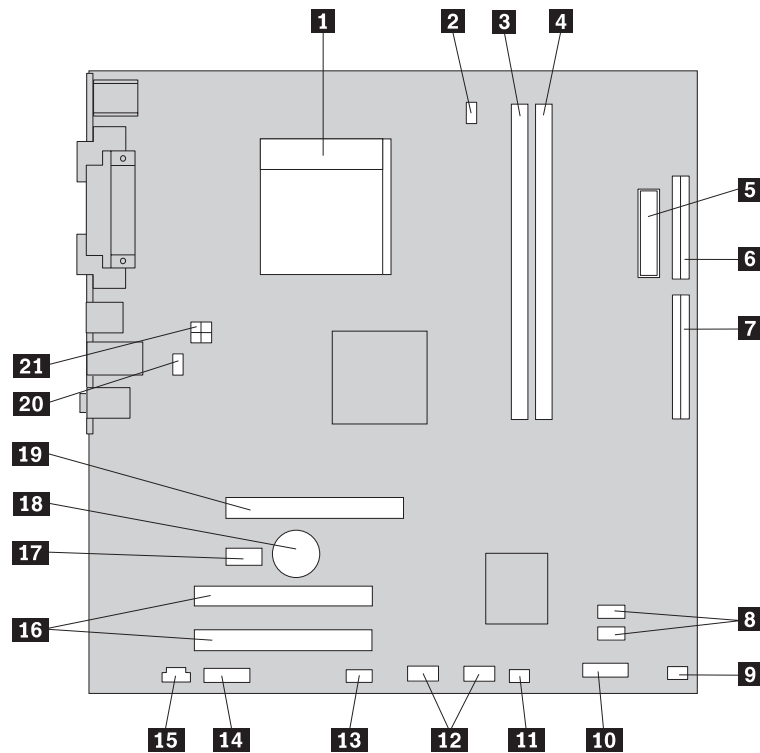
The system board (sometimes called the planar or motherboard) is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices.

The following illustration shows the locations of parts on the system board for some computer models.



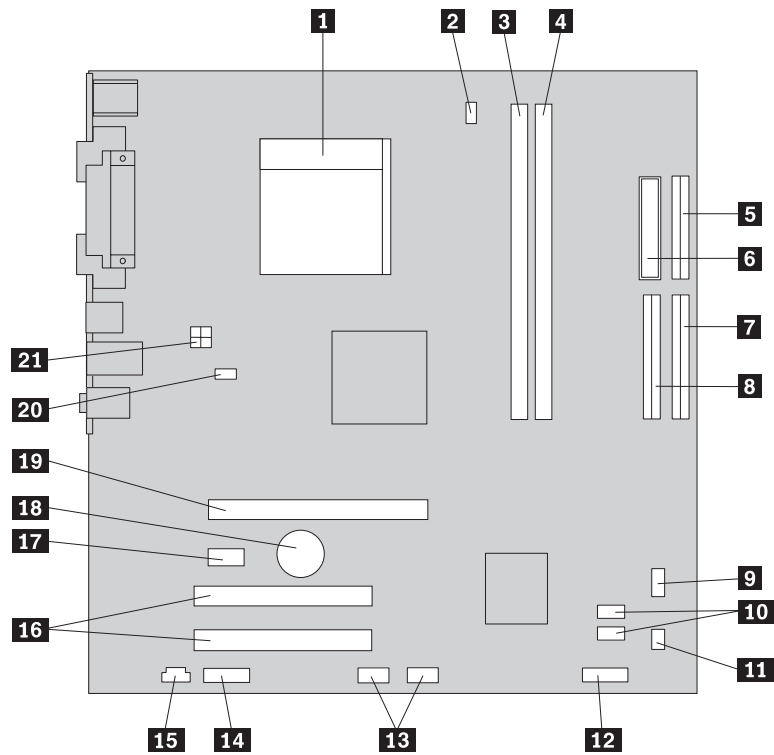
- |           |                              |           |  |
|-----------|------------------------------|-----------|--|
| <b>1</b>  | Microprocessor fan connector | <b>12</b> | Front panel connector                      |
| <b>2</b>  | Microprocessor and heat sink | <b>13</b> | SATA IDE connectors (2)                    |
| <b>3</b>  | Memory connector 1           | <b>14</b> | Front USB connectors (2)                   |
| <b>4</b>  | Memory connector 2           | <b>15</b> | Serial (COM) connector                     |
| <b>5</b>  | Clear CMOS/Recovery jumper   | <b>16</b> | PCI adapter connectors                     |
| <b>6</b>  | Power connector              | <b>17</b> | Front audio connector                      |
| <b>7</b>  | Diskette drive connector     | <b>18</b> | CD-IN connector                            |
| <b>8</b>  | IDE connector 1              | <b>19</b> | PCI Express x16 graphics adapter connector |
| <b>9</b>  | IDE connector 2              | <b>20</b> | PCI Express x1 adapter connector           |
| <b>10</b> | Battery                      | <b>21</b> | System fan connector                       |
| <b>11</b> | Power fan connector          | <b>22</b> | 12v power connector                        |

The following illustration shows the locations of parts on the system board for some computer models.



- |           |                              |           |  |
|-----------|------------------------------|-----------|--|
| <b>1</b>  | Microprocessor and heat sink | <b>12</b> | Front USB connectors (2)                   |
| <b>2</b>  | Microprocessor fan connector | <b>13</b> | Serial (COM) connector                     |
| <b>3</b>  | Memory connector 1           | <b>14</b> | Front audio connector                      |
| <b>4</b>  | Memory connector 2           | <b>15</b> | CD-IN connector                            |
| <b>5</b>  | Power connector              | <b>16</b> | PCI adapter connectors (2)                 |
| <b>6</b>  | Diskette drive connector     | <b>17</b> | PCI Express x1 adapter connector           |
| <b>7</b>  | IDE connector                | <b>18</b> | Battery                                    |
| <b>8</b>  | SATA IDE connectors (2)      | <b>19</b> | PCI Express x16 graphics adapter connector |
| <b>9</b>  | Power fan connector          | <b>20</b> | System fan connector                       |
| <b>10</b> | Front panel connector        | <b>21</b> | 12v power connector                        |
| <b>11</b> | Clear CMOS/Recovery jumper   |           |  |

The following illustration shows the locations of parts on the system board for some computer models.



- |           |                              |           |  |
|-----------|------------------------------|-----------|--|
| <b>1</b>  | Microprocessor and heat sink | <b>12</b> | Front panel connector                      |
| <b>2</b>  | Microprocessor fan connector | <b>13</b> | Front USB connectors (2)                   |
| <b>3</b>  | Memory connector 1           | <b>14</b> | Front audio connector                      |
| <b>4</b>  | Memory connector 2           | <b>15</b> | CD-IN connector                            |
| <b>5</b>  | Diskette drive connector     | <b>16</b> | PCI adapter connectors                     |
| <b>6</b>  | Power connector              | <b>17</b> | PCI Express x1 adapter connector           |
| <b>7</b>  | IDE connector 1              | <b>18</b> | Battery                                    |
| <b>8</b>  | IDE connector 2              | <b>19</b> | PCI Express x16 graphics adapter connector |
| <b>9</b>  | Power fan connector          | <b>20</b> | System fan connector                       |
| <b>10</b> | SATA IDE connectors (2)      | <b>21</b> | 12v power connector                        |
| <b>11</b> | Clear CMOS/Recovery jumper   |           |  |

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## 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 for the computer. To obtain copies of the *Safety and Warranty Guide*, go to <http://www.lenovo.com/support>.

**Note:** Use only the parts provided by Lenovo.

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## Removing the cover

### Important

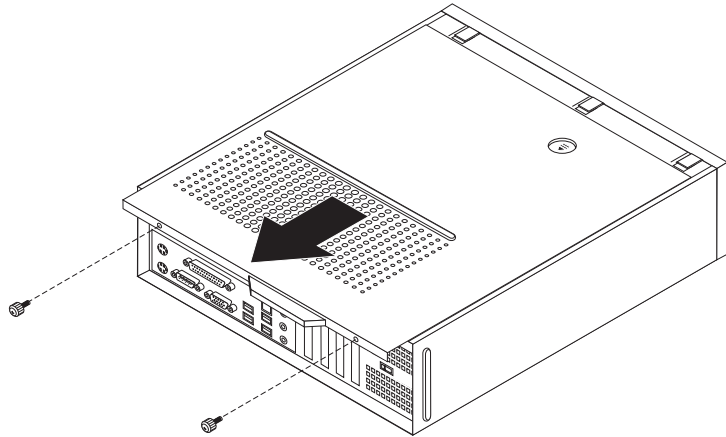


**Turn off your computer and wait 3 to 5 minutes to let the computer cool before removing the computer cover.**

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.
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 any locking devices such as a padlock that secure the cover.

5. Press the cover-release button on the top of the computer cover, slide the cover to the rear, and remove it. If your computer has screws to secure the computer cover, remove the screws, and then remove the cover.



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## 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 for the computer. To obtain copies of the *Safety and Warranty Guide*, go to <http://www.lenovo.com/support>.

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

### Important

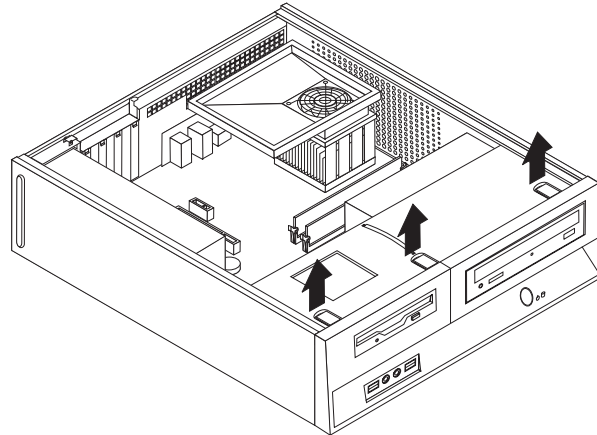
When you receive a new hard disk drive, you also receive a set of *Product Recovery discs*. The set of *Product Recovery discs* will enable you to restore the contents of the hard disk to the same state as when your computer was originally shipped from the factory. For more information on recovering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

To replace the hard disk drive, do the following:

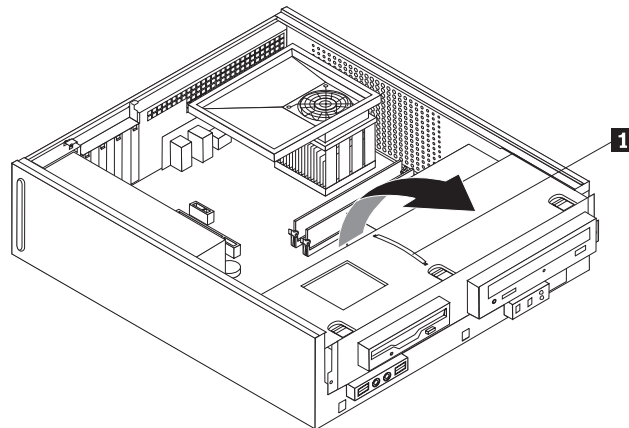
1. Remove the computer cover. See “Removing the cover” on page 7.



2. Remove the front bezel by releasing the three tabs and pivoting the bezel forward to remove completely.

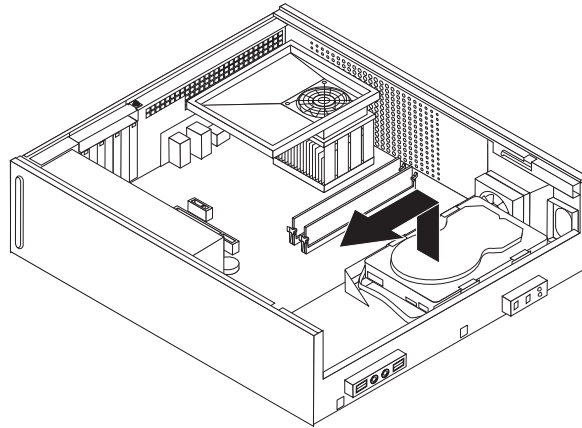


3. Slide the drive bay assembly forward until the drive bay assembly is aligned with the two slots on the sides of the chassis and remove the drive cables from the system board. Then pull upward on the handle **1** on the drive bay assembly to remove it completely from the computer.

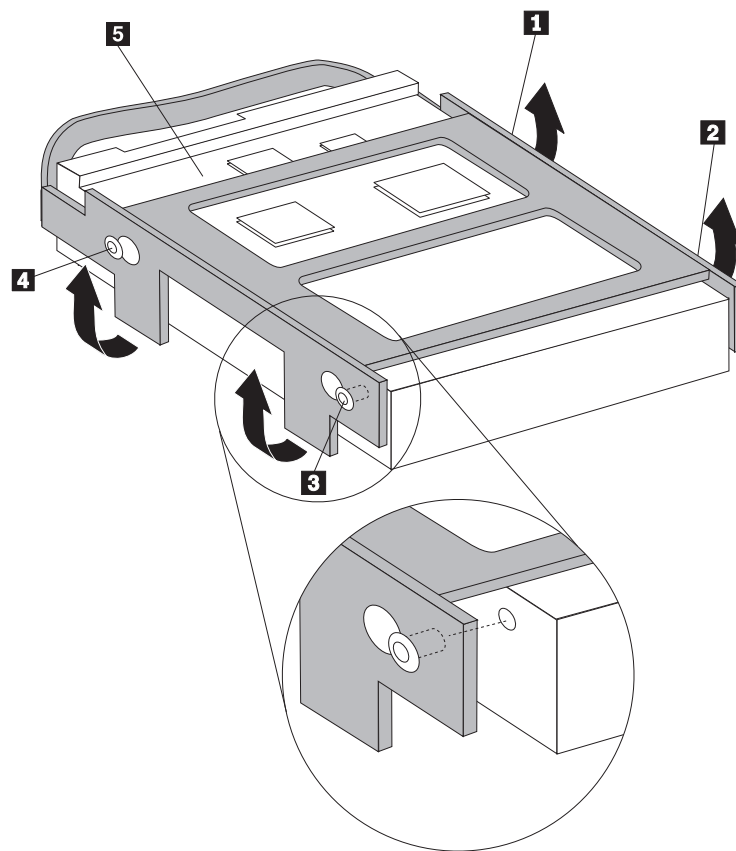


4. Disconnect the signal and power cables from the rear of the hard disk drive.

5. Use the blue handle to pivot the hard disk drive and bracket upward, slide the hard drive to the left until it is free of the retaining clips in the bottom of the chassis, and then completely remove it from the chassis.



6. 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.



7. Position the hard disk drive and bracket so that it engages the retaining clips in the bottom of the chassis when you slide the bracket to the right.
8. Slide the hard disk drive and bracket to the right until it snaps into position.
9. Connect the signal and power cables to the rear of the hard disk drive.
10. Align the drive bay assembly with the two slots and rails on the sides of the chassis, reconnect the drive cables on the system board, and then slide the drive bay assembly towards the rear of the chassis until it snaps into position.

11. Reinstall the front bezel.
12. Go to “Completing the parts replacement” on page 24.

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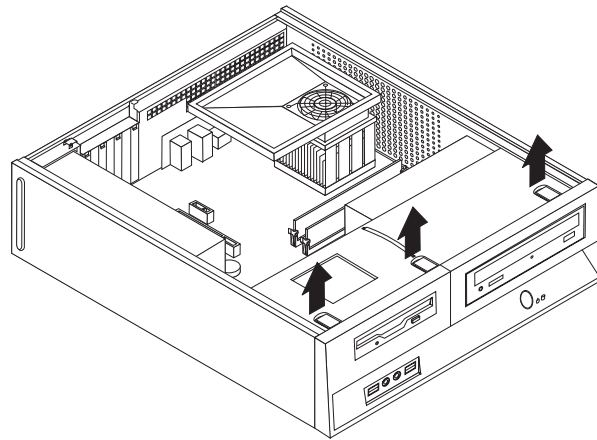
## Replacing the diskette drive

### Attention

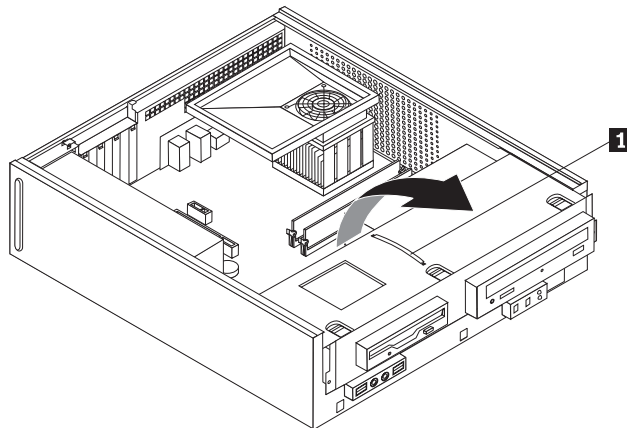
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This section provides instructions on how to replace the diskette drive.

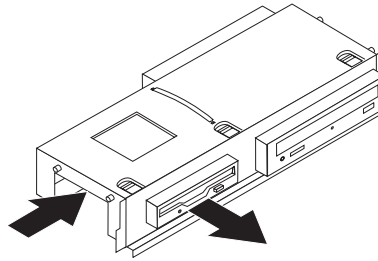
1. Remove the computer cover. See “Removing the cover” on page 7.
2. Remove the front bezel by releasing the three tabs and pivoting the bezel forward to remove completely.



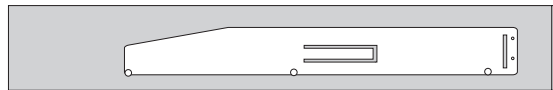
3. Slide the drive bay assembly forward until the drive bay assembly is aligned with the two slots on the sides of the chassis and remove the drive cables from the system board. Then pull upward on the handle **1** on the drive bay assembly to remove it completely from the computer.



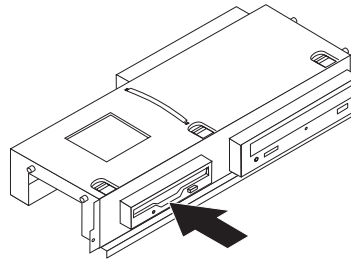
4. Release the diskette drive by pressing inward on the blue retainer at the side of the drive.
5. Remove the failing diskette drive by sliding it out the front of the drive bay assembly.



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



7. Install the new diskette drive into the drive bay from the front until it snaps into position.



8. Align the drive bay assembly with the two slots and rails on the sides of the chassis, reconnect the drive cables on the system board, and then slide the drive bay assembly towards the rear of the chassis until it snaps into position.
9. Reinstall the front bezel.
10. Go to "Completing the parts replacement" on page 24.

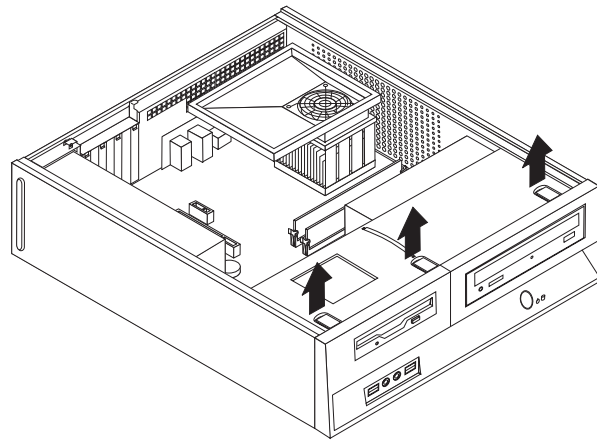
## Replacing an optical drive

### Attention

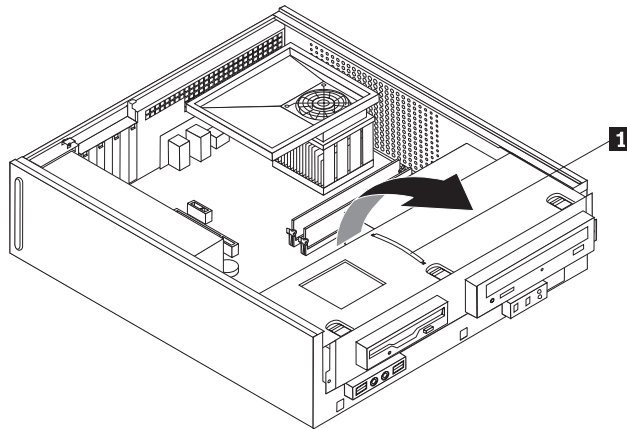
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This section provides instructions on how to replace the optical drive.

1. Remove the computer cover. See “Removing the cover” on page 7.
2. Remove the front bezel by releasing the three tabs and pivoting the bezel forward to remove completely.

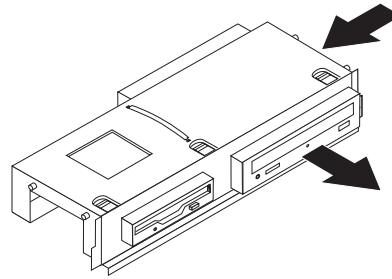


3. Slide the drive bay assembly forward until the drive bay assembly is aligned with the two slots on the sides of the chassis and remove the drive cables from the system board. Then pull upward on the handle **1** on the drive bay assembly to remove it completely from the computer.

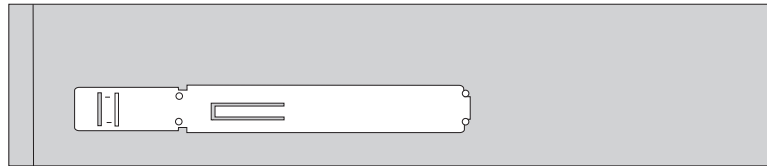


4. Release the optical drive by pressing inward on the blue retainer at the side of the drive.

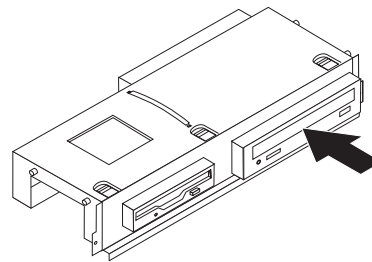
- Slide the optical drive being replaced out the front of the drive bay assembly.



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



- Install the new optical drive into the bay until it snaps into position.



- Align the drive bay assembly with the two slots and rails on the sides of the chassis, reconnect the drive cables on the system board, and then slide the drive bay assembly towards the rear of the chassis until it snaps into position.
- Reinstall the front bezel.
- Go to “Completing the parts replacement” on page 24.

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## Replacing the heat sink and fan assembly

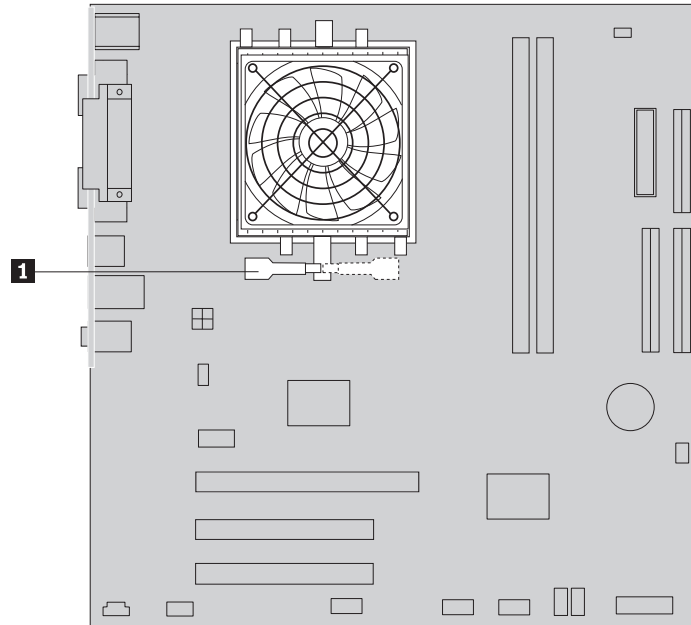
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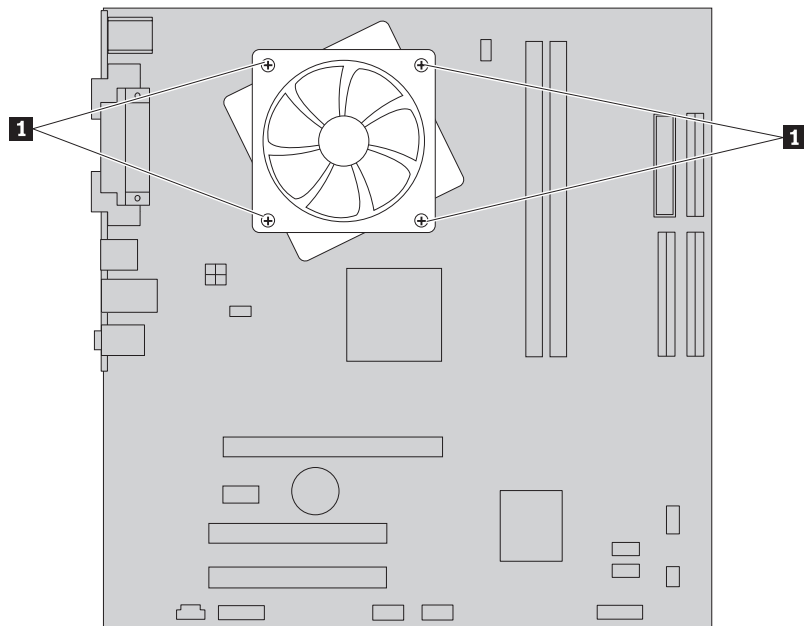
This section provides instructions on how to replace the heat sink and fan assembly.

- Remove the computer cover. See “Removing the cover” on page 7.
- Disconnect the microprocessor fan cable from the system board. See “Identifying parts on the system board” on page 4.

3. Remove the fan plenum from the heat sink and fan assembly. See “Locating components” on page 3.
4. Depending on which heat sink you are removing, do one of the following:
  - a. Pivot the handle **1** to release the heat sink clamp and then disengage the clamp from the plastic retention bracket.



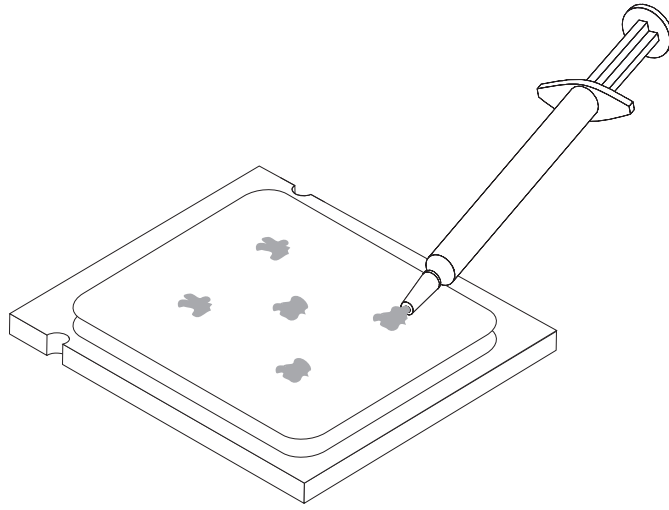
- b. Remove the four screws **1** securing the heat sink and fan assembly to the system board.



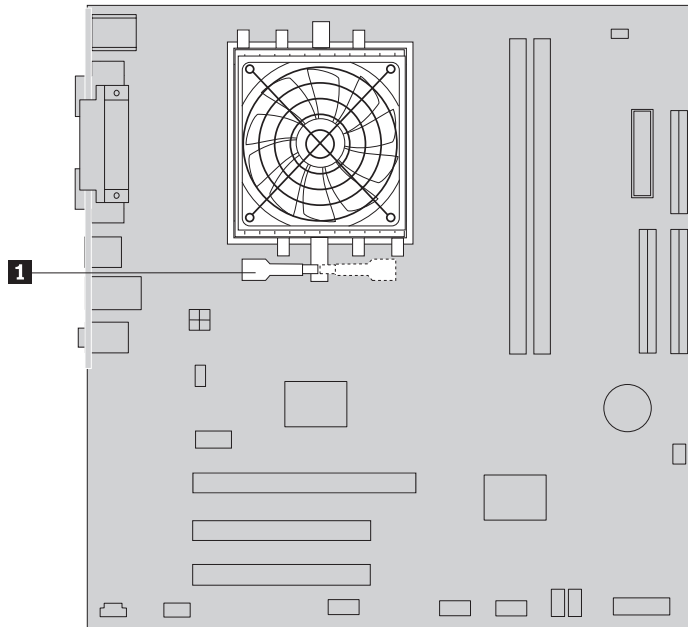
**Note:** You might have to gently twist the heat sink to free it from the microprocessor.

5. Lift the heat sink and fan assembly off the system board.

6. 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).

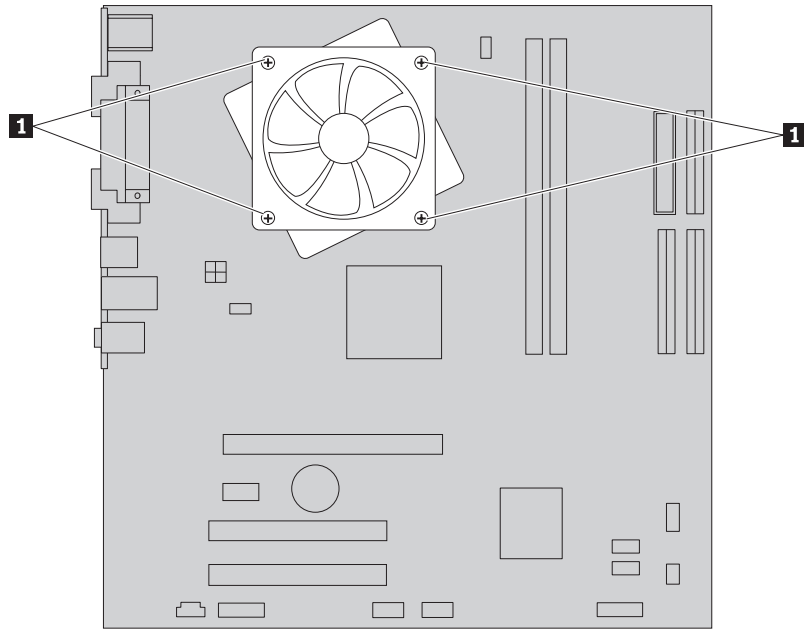


7. Depending on which heat sink you are installing, do one of the following:
  - a. Position the new heat sink on the microprocessor socket and then position the clamp on the plastic retention bracket. Pivot the handle **1** to clamp the heat sink to the plastic retention bracket.





- b. Position the new heat sink 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 the heat sink and fan assembly to the system board.



8. Connect the microprocessor fan cable to the microprocessor fan connector on the system board.
9. Go to “Completing the parts replacement” on page 24.

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## Replacing the system fan assembly

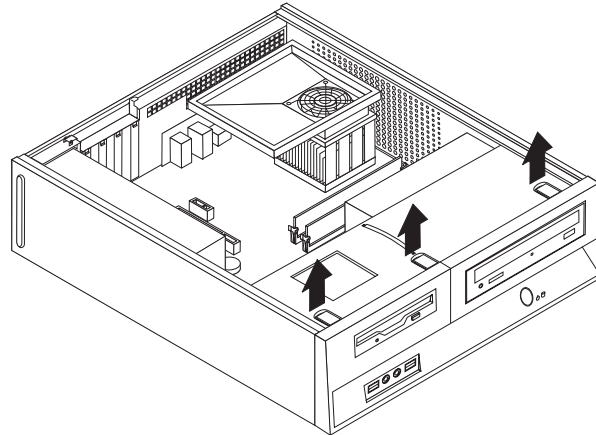
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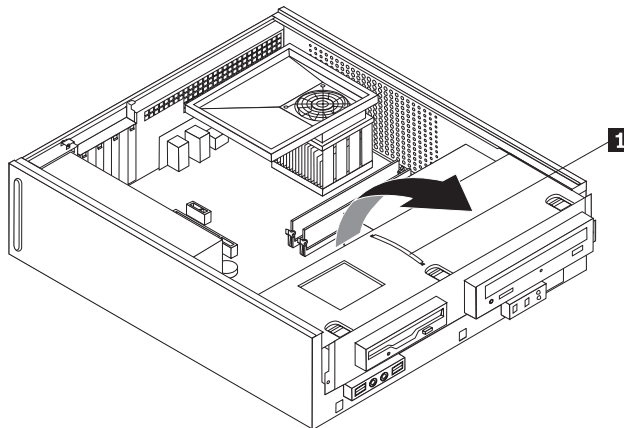
This section provides instructions on how to replace the system fan assembly.

1. Remove the computer cover. See “Removing the cover” on page 7.

2. Remove the front bezel by releasing the three tabs and pivoting the bezel forward to remove completely.

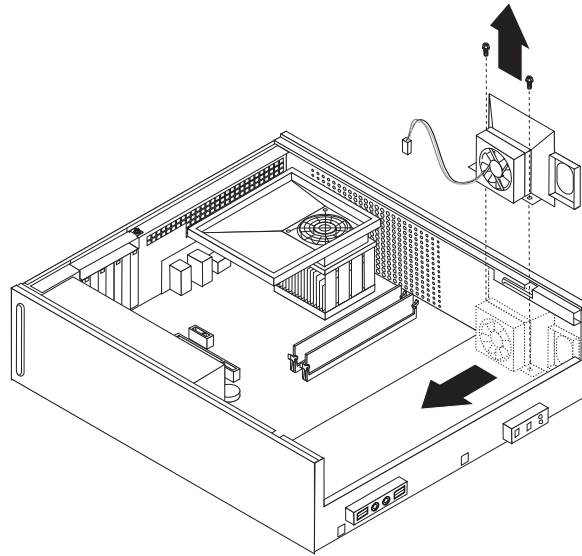


3. Slide the drive bay assembly forward until the drive bay assembly is aligned with the two slots on the sides of the chassis and remove the drive cables from the system board. Then pull upward on the handle **1** on the drive bay assembly to remove it completely from the computer.



4. Disconnect the system fan cable from the system board. See “Identifying parts on the system board” on page 4.
5. Remove the hard disk drive. See “Replacing the hard disk drive” on page 8.
6. Remove the two screws securing the system fan assembly.

7. Remove the system fan assembly by pulling the bracket outward and lifting it up from the system board to remove completely.



8. Install the new system fan assembly and install the two screws that secure the fan assembly.
9. Connect the system fan cable to the system fan connector on the system board.
10. Replace the hard disk drive.
11. Align the drive bay assembly with the two slots and rails on the sides of the chassis, reconnect the drive cables on the system board, and then slide the drive bay assembly towards the rear of the chassis until it snaps into position.
12. Reinstall the front bezel.
13. Go to “Completing the parts replacement” on page 24.

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## Replacing a memory module

### Attention

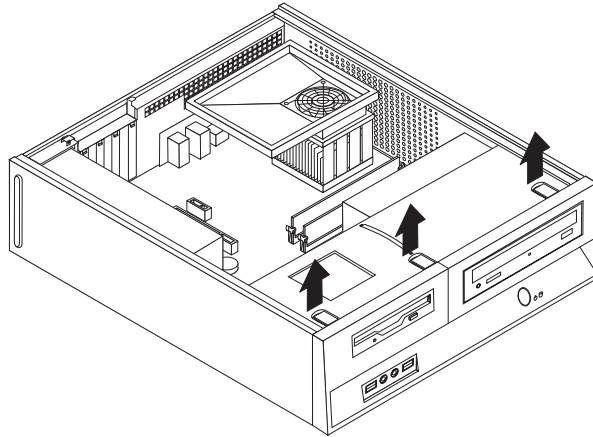
Do not open your computer or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer for the computer. To obtain copies of the *Safety and Warranty Guide*, go to <http://www.lenovo.com/support>.

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

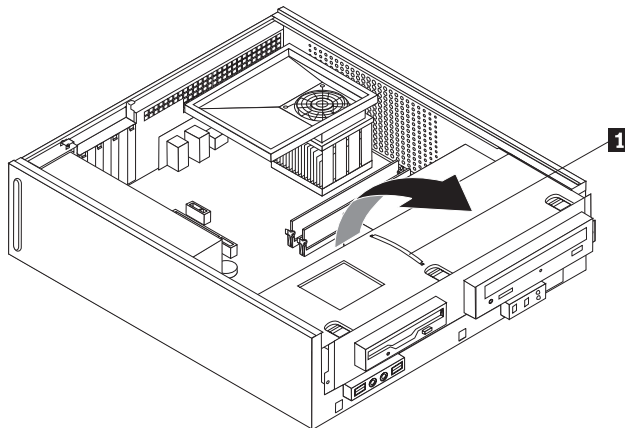
**Note:** Your computer has support for two memory modules.

1. Remove the computer cover. See “Removing the cover” on page 7.

2. Remove the front bezel by releasing the three tabs and pivoting the bezel forward to remove completely.

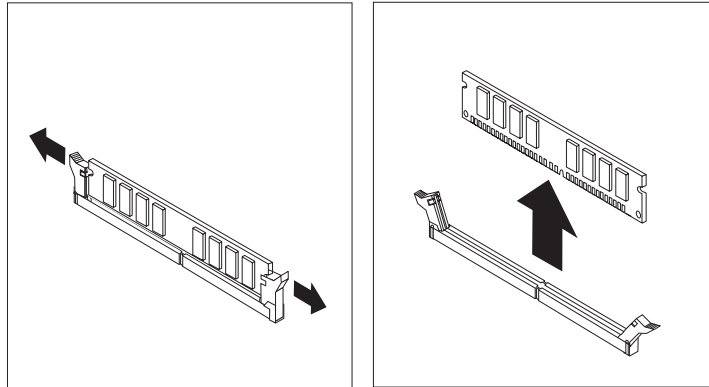


3. Slide the drive bay assembly forward until the drive bay assembly is aligned with the two slots on the sides of the chassis and remove the drive cables from the system board. Then pull upward on the handle **1** on the drive bay assembly to remove it completely from the computer.

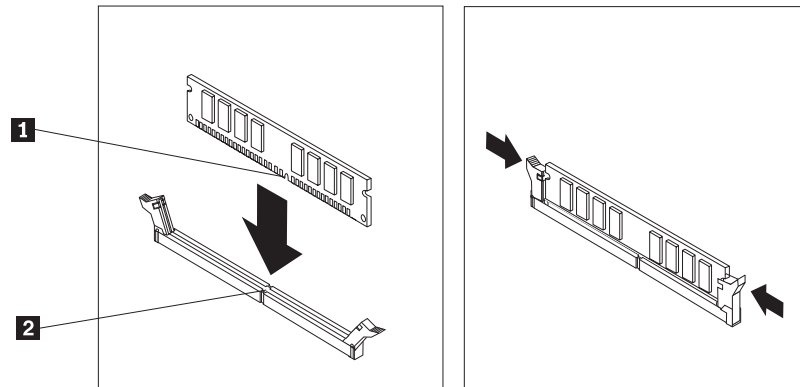


4. Remove any parts that might prevent access to the memory connectors.

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. Align the drive bay assembly with the two slots and rails on the sides of the chassis, reconnect the drive cables on the system board, and then slide the drive bay assembly towards the rear of the chassis until it snaps into position.
8. Reinstall the front bezel.
9. Go to “Completing the parts replacement” on page 24.

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## Replacing a PCI adapter

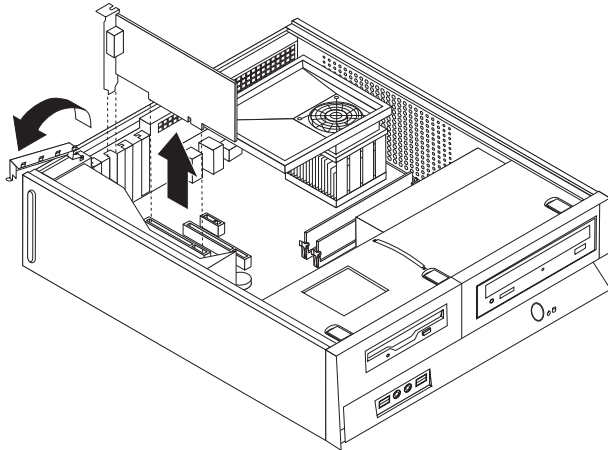
### Attention

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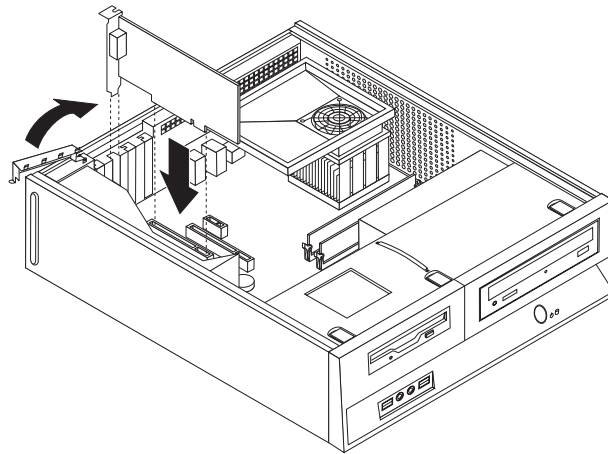
This section provides instructions on how to replace a PCI adapter.

1. Remove the computer cover. See “Removing the cover” on page 7.

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



3. Remove the new adapter from its static-protective package.
4. Install the new adapter into the appropriate connector on the system and close the adapter latch.



5. Go to “Completing the parts replacement” on page 24.

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## Replacing a keyboard

### Attention

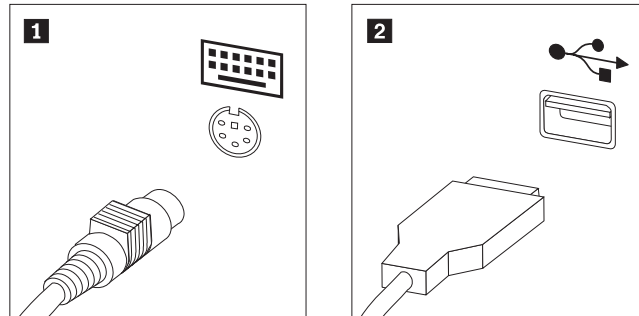
Do not open your computer or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer for the computer. To obtain copies of the *Safety and Warranty Guide*, go to <http://www.lenovo.com/support>.

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.
2. Unplug all power cords from electrical outlets.

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 the connectors on the rear of your computer” on page 2 or “Locating the connectors on the front of your computer” on page 1.



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 24.

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## Replacing a mouse

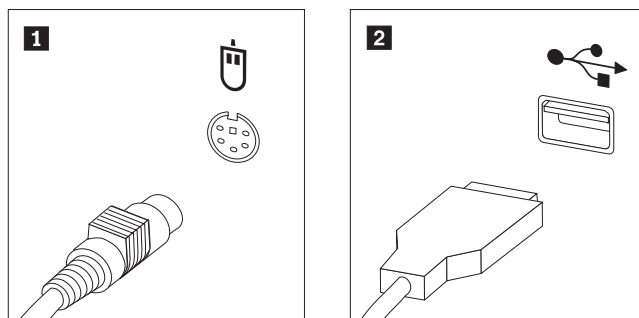
### Attention

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 for the computer. To obtain copies of the *Safety and Warranty Guide*, go to <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.
2. Unplug all power cords from electrical outlets.
3. Locate the mouse connector.

**Note:** Your mouse might be connected to a standard mouse connector **1** or a USB connector **2** in the front or rear of your computer. See “Locating the connectors on the rear of your computer” on page 2 or “Locating the connectors on the front of your computer” on page 1.



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.”

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## Completing the parts replacement

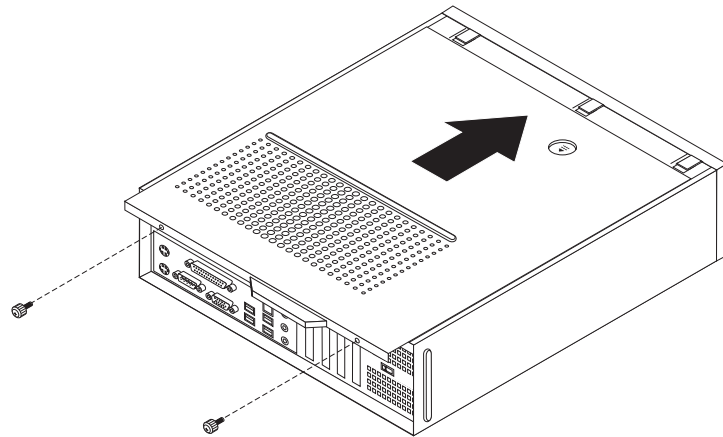
After working with parts, you need to replace the computer cover and reconnect any cables, including telephone lines and power cords. Also, depending on the part that was replaced, you might need to confirm the updated information in the Setup Utility program.

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 computer cover.

### Important

Correctly route all power supply cables to avoid interference with the drive bay assembly. Keep cables clear of the hinges and sides of the computer chassis.

3. Position the computer cover on the chassis so that the rail guides on the sides of the cover engage the rails and push the cover to the closed position until it snaps into position. If your computer has screws to secure the computer cover, install the screws.



4. Install any locking devices such as a padlock 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. To update the configuration, see “Using the Setup Utility” in the *User Guide* that was included with 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.



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