

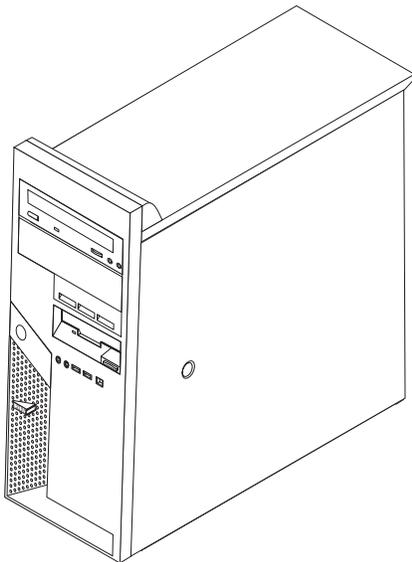
ThinkCentre™



Hardware Removal and Replacement Guide

Types 8143, 8144, 8146

Types 8422, 8423, 8427



ThinkCentre™



Hardware Removal and Replacement Guide

Types 8143, 8144, 8146

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Overview

This manual contains instructions for removing and replacing the following customer replacement units (CRUs):

- Power supply
- System board
- Microprocessor
- Hard disk drive
- Memory

Information resources

The *Quick Reference* that comes with your computer provides information for setting up your computer, starting the operating system, troubleshooting, and notices.

Access IBM provides a link to more information about your computer. Click **Start** → **Access IBM**.

If you have Internet access, the most up-to-date manuals for your computer are available from the World Wide Web. To access this information, point your browser to:

<http://www.ibm.com/pc/support>

Type your machine type and model number in the **Quick Path** field, and click **Go**.

Tools required

To install some options in your computer, you might need a flat-blade or Phillips screwdriver. Additional tools might be needed for certain options. See the instructions that come with the option.

Handling static-sensitive devices

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

When you add an option, do *not* open the static-protective package containing the option until you are instructed to do so.

When you handle options 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 components carefully. Handle adapters and memory modules by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.

- When you install a new option, touch the static-protective package containing the option 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 option and install it directly in the computer without setting the option down. When this is not possible, place the static-protective package that the option came in on a smooth, level surface and place the option on it.
- Do not place the option on the computer cover or other metal surface.

Replacing customer replaceable units (CRUs)

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. If you no longer have this copy of the *Quick Reference*, you can obtain one online from the IBM Web site at <http://www.ibm.com/pc/support>.

Removing the cover

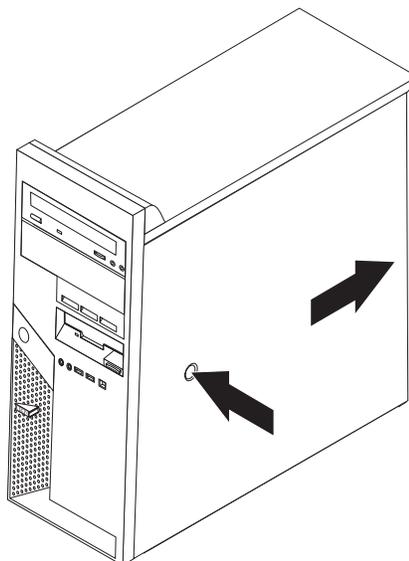
Important



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

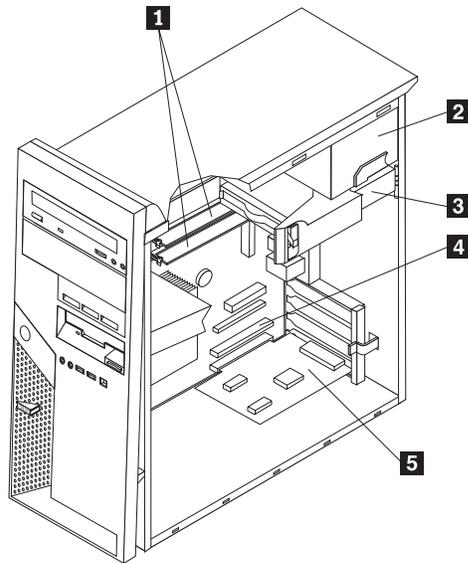
To remove the cover:

1. Shut down your operating system, remove any media (diskettes, CDs, or tapes) from the drives, and turn off all attached devices and the computer.
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 or Kensington lock that secure the cover.
5. Press the cover-release button on the right side cover, slide the cover to the rear, and lift off.



Locating components

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

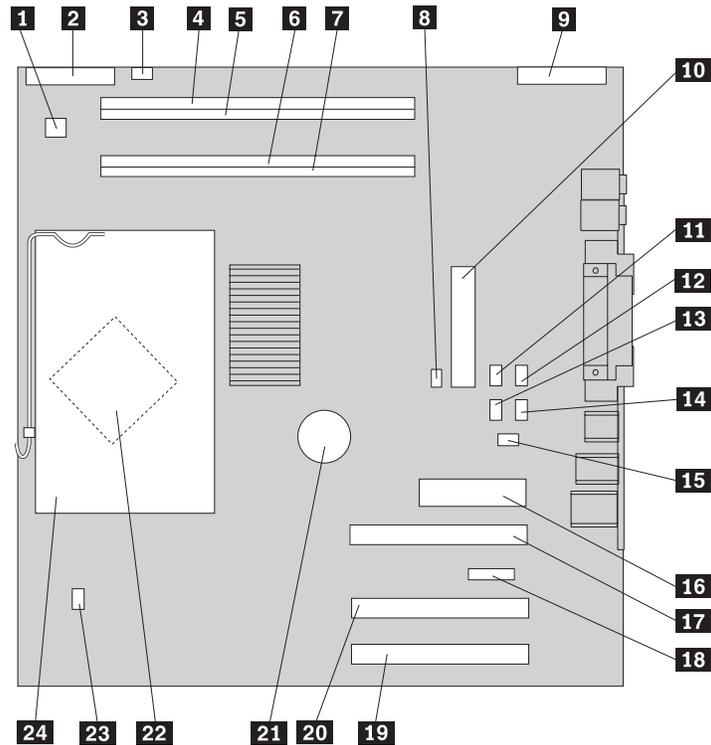


- 1** DIMMs
- 2** Power supply
- 3** Hard disk drive
- 4** PCI slot
- 5** Optional PCI adapter

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 that are IBM-installed or that you can install later.

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



- | | | | |
|-----------|----------------------------|-----------|---|
| 1 | 12V power connector | 14 | SATA 1 IDE connector (primary hard drive) |
| 2 | Diskette drive connector | 15 | Cover presence switch connector |
| 3 | Speaker connector | 16 | Power supply connector |
| 4 | DIMM connector 4 | 17 | PCI Express x1 slot |
| 5 | DIMM connector 3 | 18 | PCI Express x16 graphics slot |
| 6 | DIMM connector 2 | 19 | PCI slot |
| 7 | DIMM connector 1 | 20 | PCI slot |
| 8 | Clear CMOS/Recovery jumper | 21 | Battery |
| 9 | Front Panel connector | 22 | Microprocessor |
| 10 | PATA IDE connector | 23 | Microprocessor fan connector |
| 11 | SATA 4 IDE connector | 24 | Microprocessor heat sink |
| 12 | SATA 3 IDE connector | | |
| 13 | SATA 2 IDE connector | | |

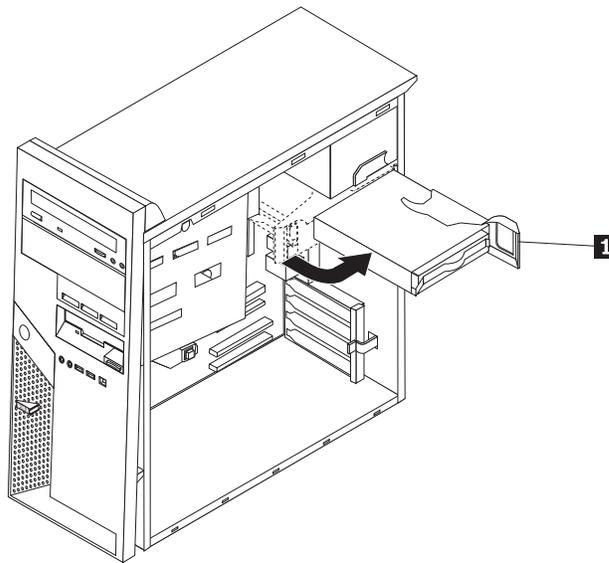
Removing and replacing the power supply

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. If you no longer have this copy of the *Quick Reference*, you can obtain one online from the IBM Web site at <http://www.ibm.com/pc/support>.

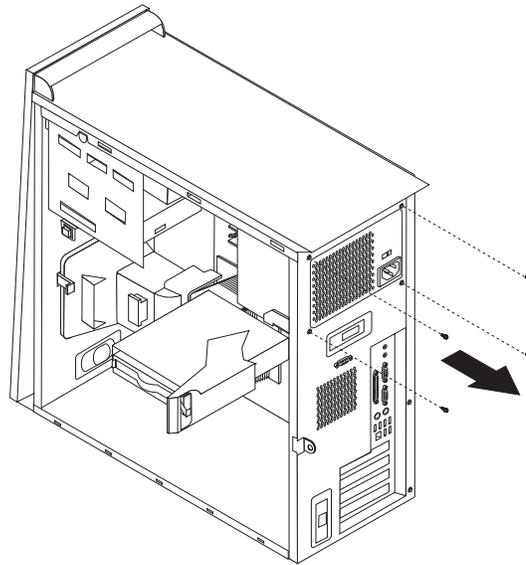
To remove and replace the power supply, you will need a flat-blade screwdriver.

1. Remove the cover. See "Removing the cover" on page 1.
2. Press the release lever and rotate the hard disk drive outward using the blue handle **1** to allow access to the power supply cable connections.

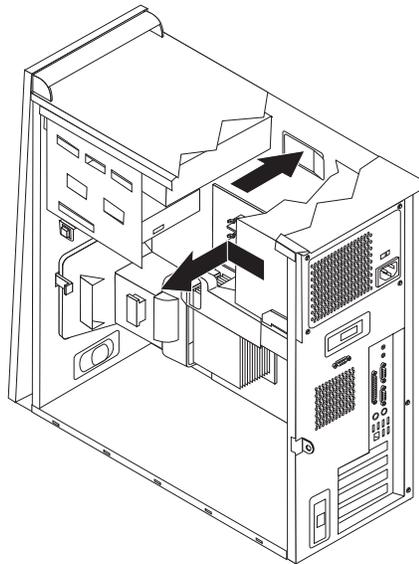


Note: As you disconnect power supply cables, note the location of each connector.

3. Disconnect the power supply cable connected to each of the drives.
4. Disconnect the power supply cables connected to the system board.
5. Remove the screws at the rear of the chassis that secure the power supply.



6. Press inward on the metal retainer and remove the power supply from the computer.



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

Note: Use only the screws provided by IBM.

8. Install and tighten the four screws at the rear of the chassis that secure the power supply.
9. Reconnect the power supply connectors to the system board.
10. Reconnect the power supply connector to each of the drives.
11. Rotate the hard disk drive inward until it is latched into position.
12. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
13. To finish the installation, see “Completing the installation” on page 18.

Removing and replacing the system board assembly

Attention

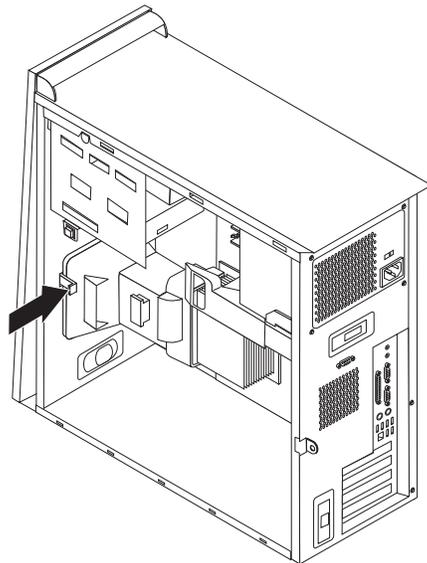
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer. If you no longer have this copy of the *Quick Reference*, you can obtain one online from the IBM Web site at <http://www.ibm.com/pc/support>.

To remove and replace the system board assembly, do the following:

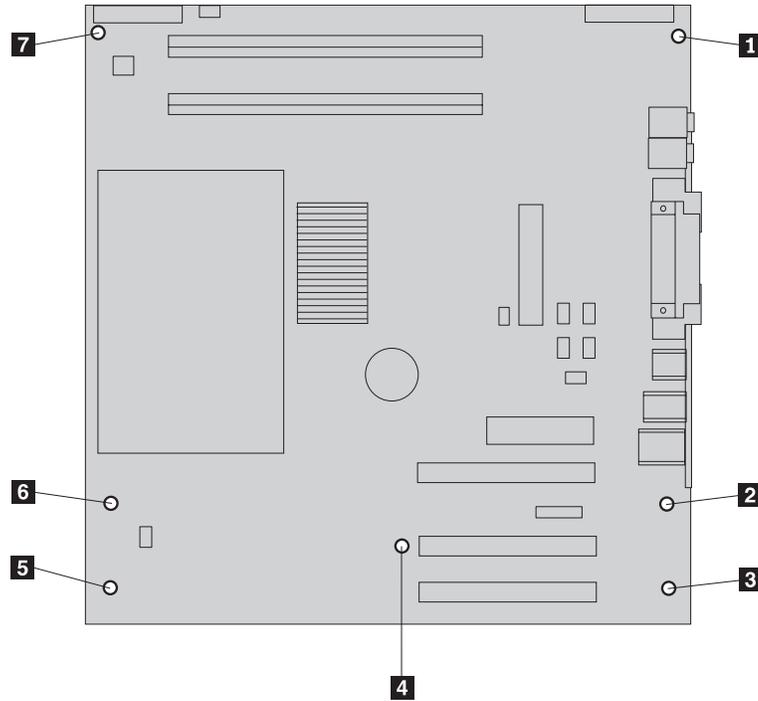
1. Turn off the computer and allow it to cool to for one hour.
2. Remove the cover. See "Removing the cover" on page 1.
3. Lay the computer on its side.
4. Carefully take note of the location of all cable connections on the system board. It will be necessary to reconnect them properly when installing a new system board assembly.

Note: Take note of the cable routing. It is important to route the cables the same way when installing a new system board.

5. Disconnect all cables connected to the system board. See "Identifying parts on the system board" on page 3 to locate cables.
6. Remove the air baffle by pressing on the tab and pulling the air baffle up.

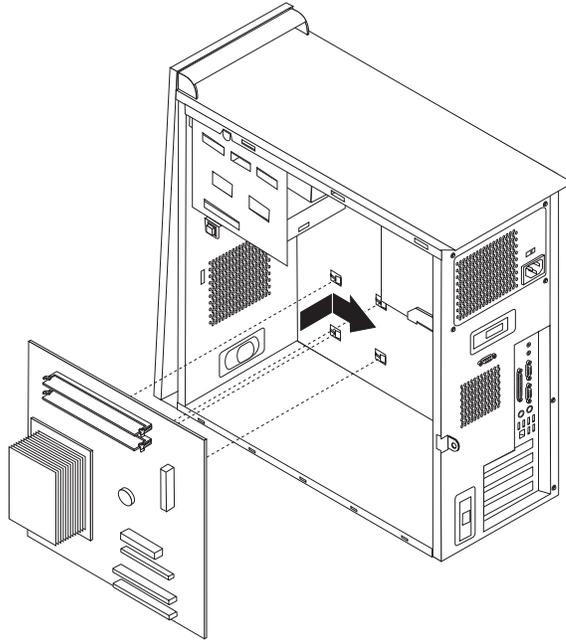


7. Remove the screws **1** through **7**, and remove the system board.



8. Place the old system board next to the new system board on a clean, flat surface.
9. Remove the microprocessor from the old system board to the new system board. See "Removing and replacing the microprocessor" on page 9. Return here after installing the microprocessor.
10. Remove all adapter cards from the old system board. See "Removing and Installing adapters" on page 15.
11. Remove all memory from the old system board to the new system board. See "Removing and replacing memory" on page 15.
12. Install the new system board assembly into the computer chassis by aligning the four slots on the metal plate on the bottom of the system board with the

tabs in the chassis.



Important

If the metal plate is not aligned correctly when you install the screws, you might damage the system board.

13. Align the seven screw holes, and install the screws.
14. Install all adapter cards to the new system board. See “Removing and Installing adapters” on page 15.
15. Install the air baffle by aligning the tabs to the holes in the chassis. Be sure to route the cable through the notch on the side of the air baffle.
16. Reconnect all cables that were disconnected from the system board. Make sure all cables are routed correctly. See “Identifying parts on the system board” on page 3 for cable locations.
17. To finish the installation, see “Completing the installation” on page 18.

Removing and 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. If you no longer have this copy of the *Quick Reference*, you can obtain one online from the IBM Web site at <http://www.ibm.com/pc/support>.

Important

Shut down and 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.

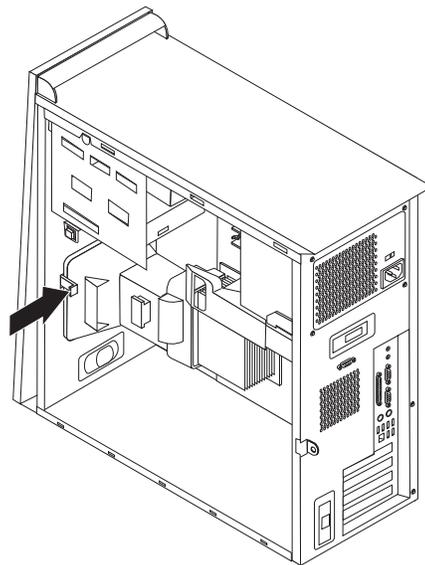
When you receive a new microprocessor, you will also receive a new heat sink and vacuum pen. You must replace the heat sink as well as the microprocessor. If you use the old heat sink with the new microprocessor, your computer could overheat and shut down sporadically.

Important

Avoid handling the microprocessor with your hands, and avoid contact with the microprocessor contacts. Use the vacuum pen to remove and install the microprocessor. If you must touch the microprocessor, touch only the sides.

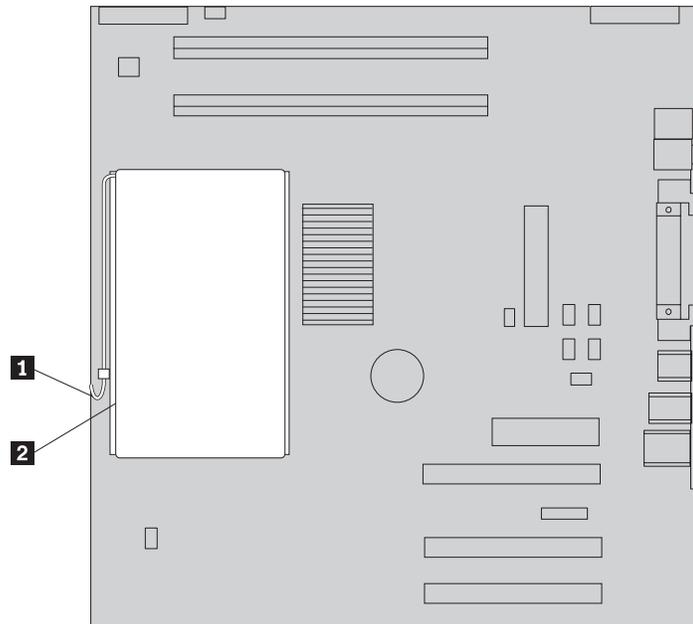
To remove the microprocessor, do the following:

1. Turn off the computer and allow it to cool to for one hour.
2. Open the cover. See "Removing the cover" on page 1.
3. Lay the computer on its side.
4. Remove the air baffle by pressing on the tab and pulling the air baffle up.



5. Disconnect the fan cable from the system board. Note the cable location on the system board.

6. Release the lever **1** securing the microprocessor heat sink **2**.



7. Remove the heat sink:

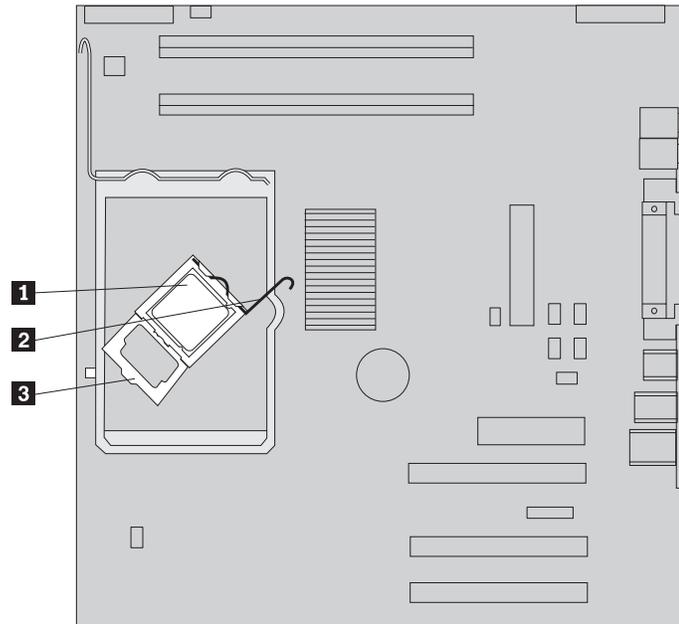
- If you are replacing the microprocessor with a new one, use the new heat sink.

Note

If you use the old heat sink with the new microprocessor, your computer could overheat and shut down sporadically.

- If you are not replacing the microprocessor, 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.

8. Release the lever **2** holding the microprocessor **1**, and rotate the microprocessor retainer **3** to the open position.



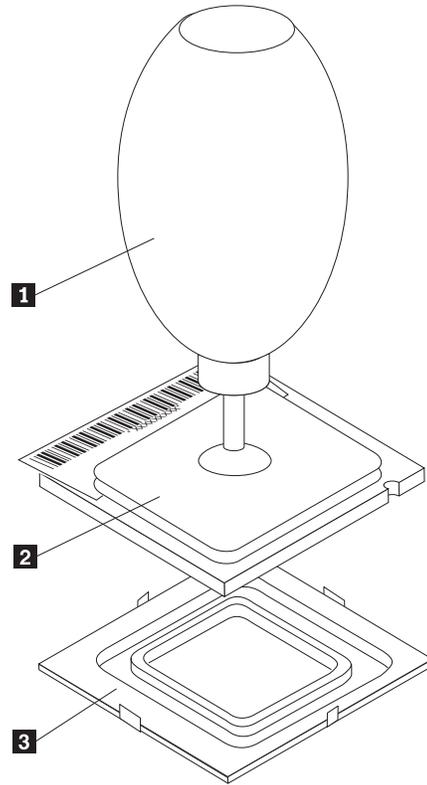
9. Do one of the following:

Attention

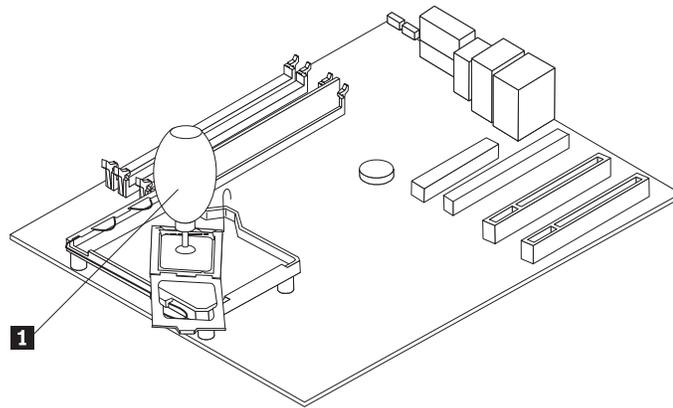
Do not touch the gold contacts on the bottom of the microprocessor. If you must touch the microprocessor, touch only the sides.

- If you are replacing the microprocessor **2**, loosen the black cover **3**, but do not remove it. Use the vacuum pen to pick up the new microprocessor **1**, and remove the black cover that protects the contacts on the

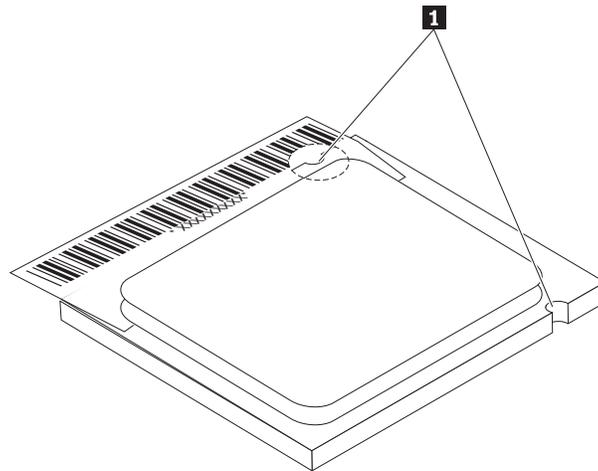
microprocessor. Place the black cover on the old microprocessor.



- If you are installing a microprocessor from the old system board to a new system board, use the vacuum pen **1** to pick up the microprocessor.



10. Notice of the orientation of the notches **1** in the microprocessor. This is important when reinstalling the microprocessor on the system board.

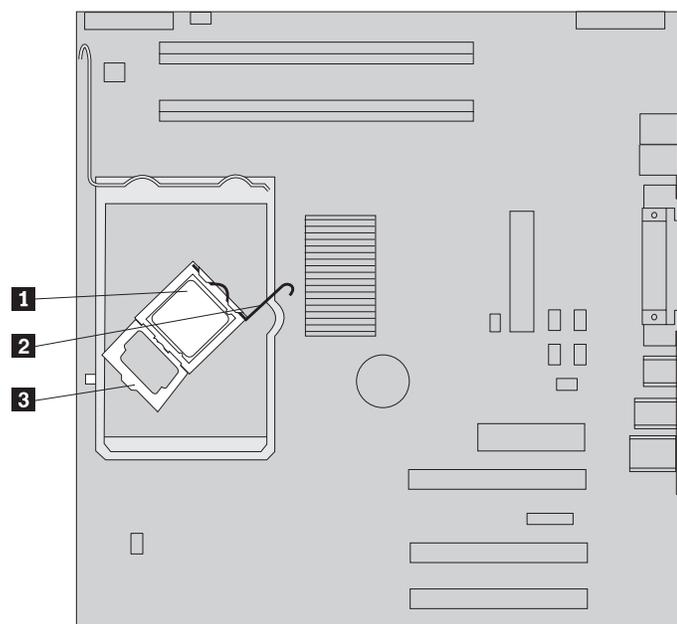


11. Align the notches **1** on the microprocessor with the tabs on the microprocessor socket.
12. Install the microprocessor by inserting it straight down into the socket.

Important

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

13. Rotate the retaining plate **3**, and close the lever to secure the microprocessor **1** in place. Be sure to engage the retainer tab **3** when locking the microprocessor.
- If you are replacing the system board, a black cover will cover the retaining plate. When you lock the microprocessor in place, remove the this cover. Place this cover on the retaining plate on the old system board.



14. Do one of the following:

- If you have replaced the microprocessor, place the new heat sink on the microprocessor, and lower the handle in the locked position.

Note

If you use the old heat sink with the new microprocessor, your computer could over heat and shut down sporadically.

- If you are replacing the system board only, install the original heat sink on the microprocessor, and lower the handle in the locked position. Return to the system board procedure.
15. Install the air baffle by aligning the tabs to the holes in the chassis. Be sure to route the cable through the notch on the side of the air baffle.
 16. Connect the fan cable on the system board.
 17. Do one of the following:
 - If you are replacing only the microprocessor, see “Completing the installation” on page 18.
 - If you are installing a new system board, return to the system board procedure.

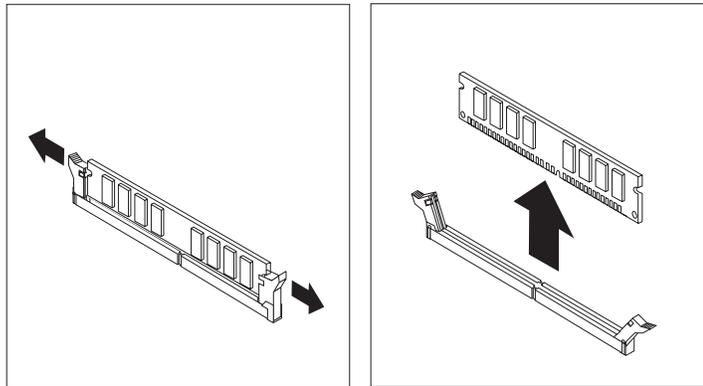
Removing and replacing memory

Attention

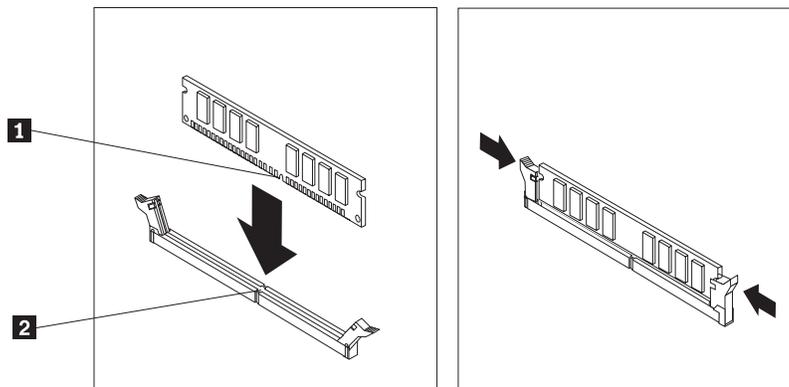
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To remove and replace memory:

1. Remove the cover. See “Removing the cover” on page 1
2. Locate the DIMM connectors. See “Locating components” on page 2.
3. Open the retaining clips.



4. Make sure the DIMM notch **1** aligns correctly with the connector key **2** on the system board. Push or insert the DIMM straight down into the connector until the retaining clips close.



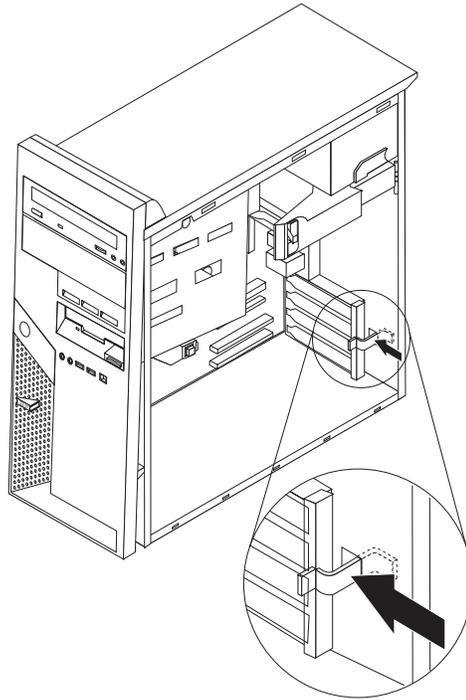
5. To finish the installation, see “Completing the installation” on page 18.

Removing and Installing adapters

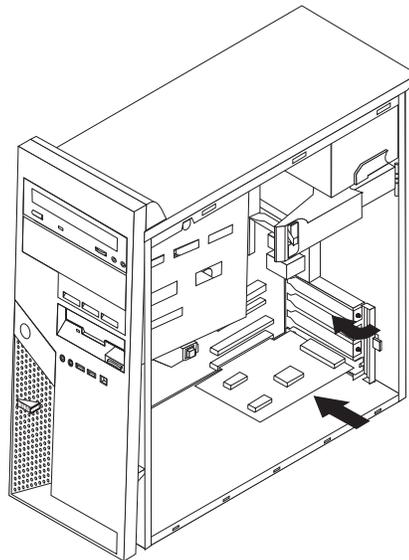
To remove an adapter:

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

2. Unlatch the adapter-slot-cover latch and remove the slot cover for the appropriate expansion slot.



3. Remove the adapter from the old system board.
4. Install the adapter into the appropriate slot on the new system board.
5. Close the adapter-slot-cover latch.



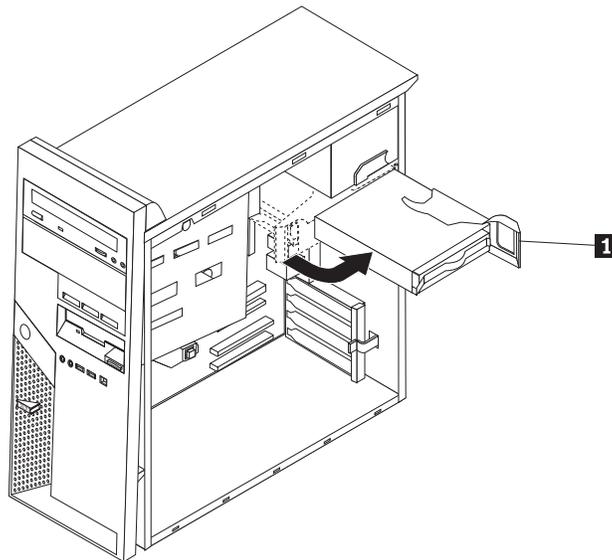
6. Return to the system board procedure.

Removing and replacing a hard disk drive

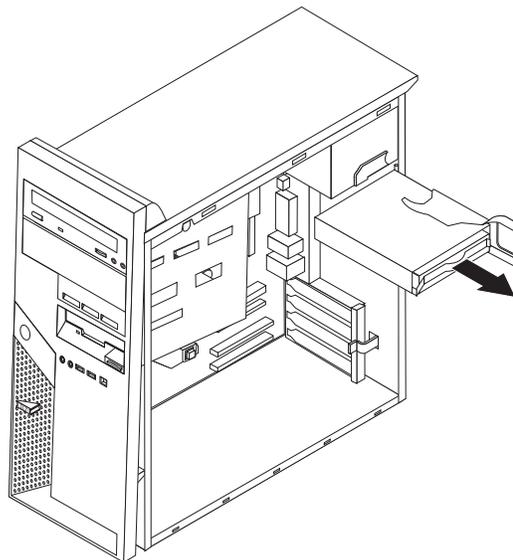
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1. Remove the cover. See "Removing the cover" on page 1.
2. Rotate the drive bay assembly using the handle **1** to gain access to the cable connections.



3. Disconnect the signal and power cables from the hard disk drive.
4. Slide the hard disk drive out by pulling the blue handle.



5. Remove the drive from the blue bracket by flexing the bracket.

6. Insert the new hard disk drive, and place the bracket into the slot.
7. Connect the power and signal cables.
8. Press the blue tab to rotate and snap the drive into the computer. Be careful not to crimp the cables.
9. Depending on the type of drive you are installing, go to “Connecting a parallel ATA hard disk drive” or “Connecting a serial ATA hard disk drive.”

Connecting a parallel ATA hard disk drive

1. Locate the PATA IDE connector on the system board and the three-connector signal cable. See “Identifying parts on the system board” on page 3.
2. Connect one end the signal cable to the drive and other to the PATA IDE connector on the system board.
3. Connect the power connector to the drive.
4. To complete the installation, see “Completing the installation.”

Connecting a serial ATA hard disk drive

A serial hard disk drive can be connected to any available SATA IDE connector.

1. Locate the signal cable that comes with the new drive.
2. Locate an available SATA IDE connector on the system board. See “Identifying parts on the system board” on page 3.
3. Connect one end of the signal cable to the drive and the other to an available SATA IDE connector on the system board.
4. Connect the power connector to the drive.
5. To complete the installation, see “Completing the installation.”

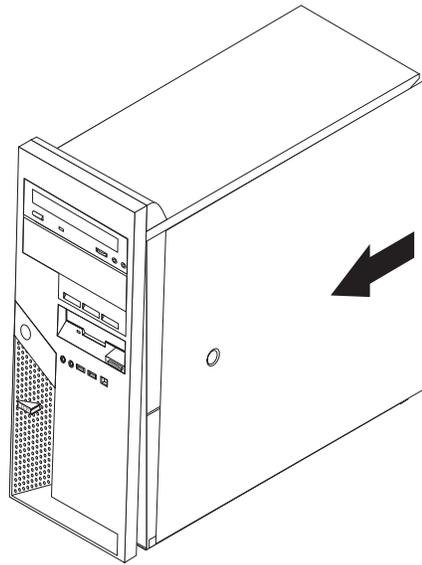
Completing the installation

After replacing the hardware, you need to install any removed parts, replace the cover, and reconnect any cables, including telephone lines and power cords. Also, depending on the CRU that was replaced, you might need to confirm the updated information in the IBM Setup Utility program.

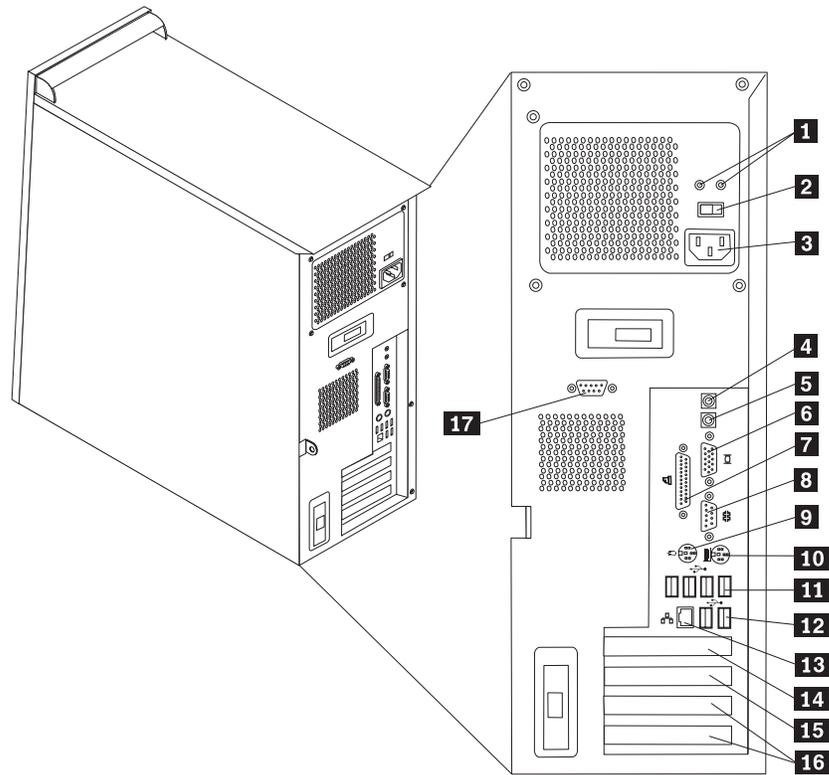
To replace the cover and connect cables to your computer:

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 2 for location of components.
2. Clear any cables that might impede the replacement of the cover.

3. Position the cover on the chassis so that the rail guides on the bottom of the cover engage the rails and push the cover closed until it latches.



4. Reconnect the external cables and the power cord to the computer.



- | | | | |
|----------|--------------------------|-----------|--|
| 1 | Diagnostic LEDs | 10 | PS/2 mouse connector |
| 2 | Voltage selection switch | 11 | USB connectors |
| 3 | Power connector | 12 | Ethernet connector |
| 4 | Audio line out connector | 13 | USB connectors |
| 5 | Audio line in connector | 14 | PCI Express x16 slot |
| 6 | VGA monitor connector | 15 | PCI Express x1 slot |
| 7 | Parallel connector | 16 | PCI slots |
| 8 | Serial connector (COM 1) | 17 | Serial connector (COM 2) (some models) |
| 9 | PS/2 keyboard connector | | |



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