

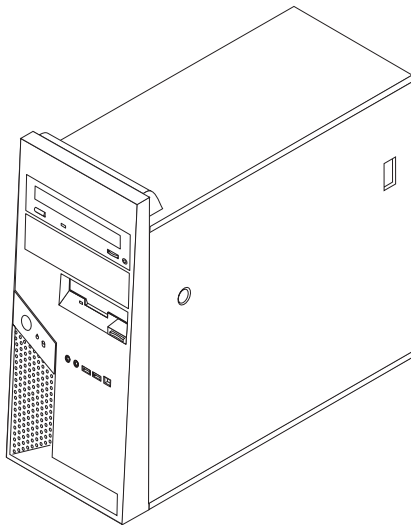
ThinkCentre™



Hardware Replacement Guide

Types 8122, 8123, 8124

Types 8131, 8137, 8138



ThinkCentre™



Hardware Replacement Guide

Types 8122, 8123, 8124

Types 8131, 8137, 8138

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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 guide CRUs and FRUs will often be referred to as parts.

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

Note: Use only the parts provided by IBM.

This guide contains procedures for replacing the following parts:

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

Safety information for replacing CRUs

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

Safety information for replacing FRUs

Do not attempt any repair before reading the “Important safety information” in the *Hardware Maintenance Manual (HMM)* for the computer. You can find the HMM on the World Wide Web at <http://www.ibm.com/pc/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
- Publications
- Troubleshooting information
- Parts information
- Downloads and drivers
- Links to other useful sources of information

To access this information, go to <http://www.ibm.com/pc/support>.

Tools required

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

Handling static-sensitive devices

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

When you are replacing a part, do *not* open the static-protective package containing the new part until the defective part has been removed from the computer and you are ready to install the new part.

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

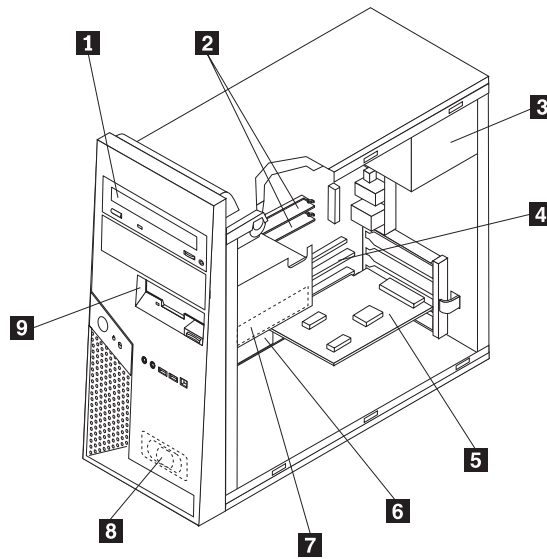
- Limit your movement. Movement can cause static-electricity to build up around you.
- Always handle parts and other computer components carefully. Handle adapters, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts and other computer components.
- Before you replace a new part, touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the new part from the static-protective packaging, and install it directly in the computer without setting the part down. When this is not possible, place the static-protective package that the part came in on a smooth, level surface and place the part on it.
- Do not place the part on the computer cover or other metal surface.

Chapter 1. Locations

This chapter provides illustrations to help locate the various connectors, controls and components of the computer. To remove the computer cover, see “Removing the computer cover” on page 5.

Locating components

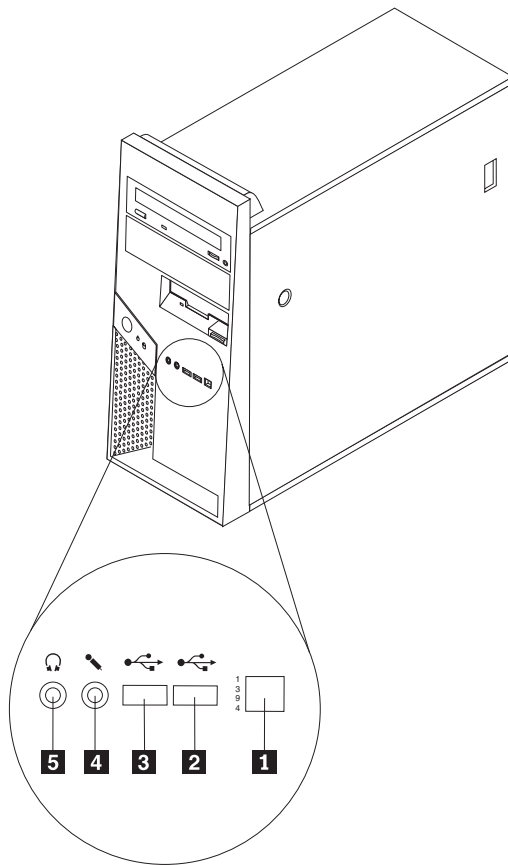
The following illustration will help you locate the various components in your computer.



- | | | | |
|----------|-----------------------|----------|---|
| 1 | Optical drive | 6 | System board |
| 2 | Memory modules | 7 | Lower drive cage (diskette drive and hard disk drive) |
| 3 | Power supply | 8 | Internal speaker |
| 4 | PCI adapter connector | 9 | Diskette drive |
| 5 | Optional PCI adapter | | |

Locating controls and connectors on the front of the computer

This section shows the various external connectors on the computer to which you can attach external devices.

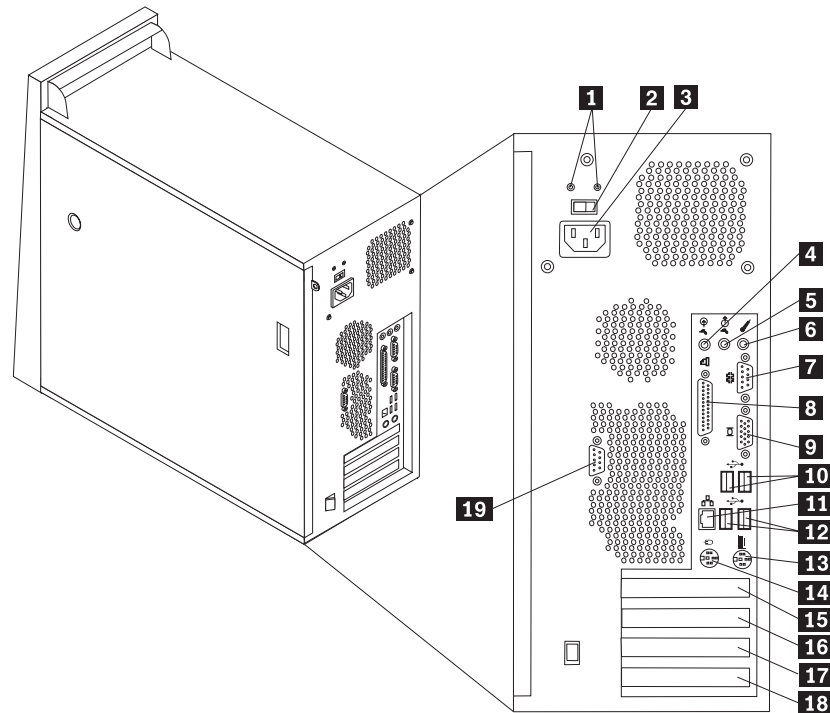


- 1** IEEE 1394 connector (some models)
- 2** USB connector
- 3** USB connector

- 4** Microphone connector
- 5** Headphone connector

Locating connectors on the rear of the computer

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

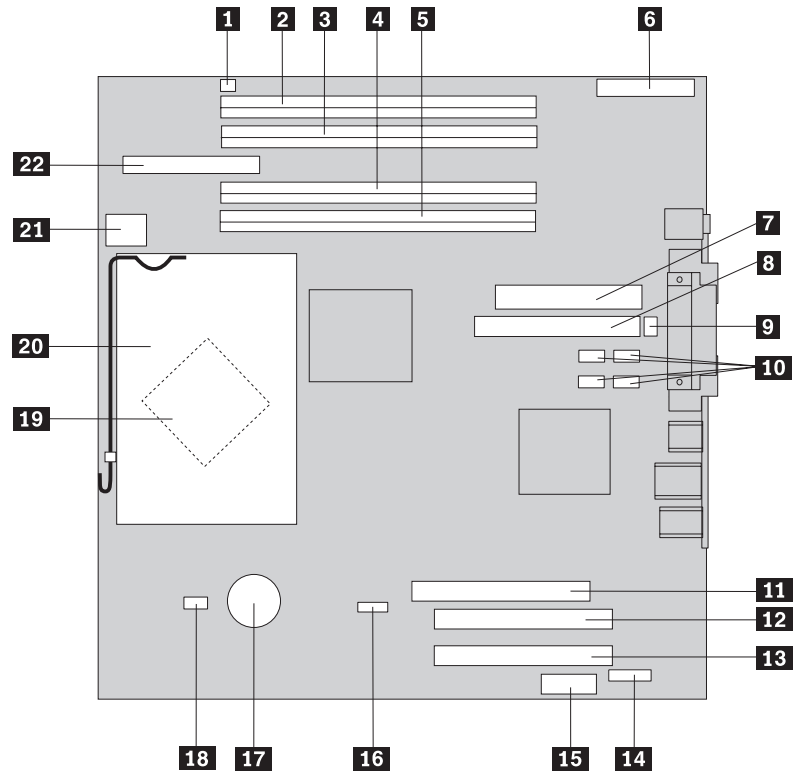


- | | | | |
|-----------|------------------------------|-----------|---|
| 1 | Power supply diagnostic LEDs | 11 | Ethernet connector |
| 2 | Voltage selection switch | 12 | USB connectors (2) |
| 3 | Power connector | 13 | Standard keyboard connector |
| 4 | Audio line in connector | 14 | Standard mouse connector |
| 5 | Audio line out connector | 15 | PCI Express x16 adapter connector (some models) |
| 6 | Microphone connector | 16 | PCI adapter connector |
| 7 | Serial connector (COM 1) | 17 | PCI adapter connector |
| 8 | Parallel connector | 18 | PCI Express x1 adapter connector |
| 9 | VGA monitor connector | 19 | Serial connector (COM 2) (some models) |
| 10 | USB connectors (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.



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

Chapter 2. Replacing hardware

Attention:

Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to <http://www.ibm.com/pc/support>.

Note: Use only the parts provided by IBM.

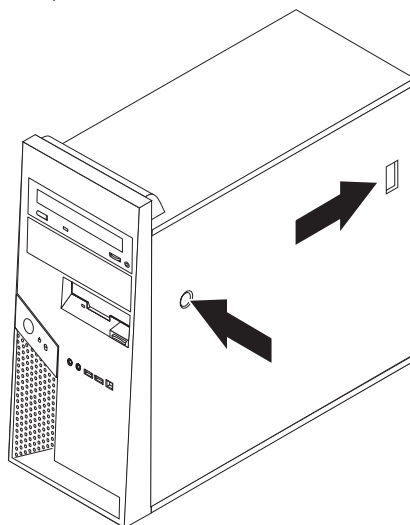
Removing the computer cover

Important



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

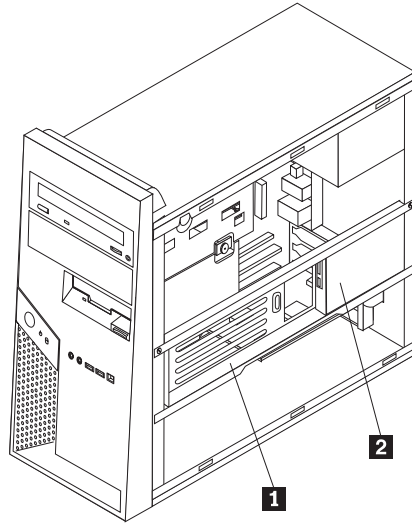
1. Remove any media (diskettes, CDs, or tapes) from the drives, shut down your operating system, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. See “Locating controls and connectors on the front of the computer” on page 2 and “Locating connectors on the rear of the computer” on page 3.
4. Remove any locking devices such as a padlock or Kensington lock that secure the computer cover.
5. Press the cover-release button on the right side cover, slide the cover to the rear, and remove.



6. Some models have an optional hard disk drive mounting bracket **1** installed. When this bracket is installed, access to some of the CRUs or FRUs inside the chassis is restricted.

Note: There appears to be two drive bays in the bracket. However, due to thermal restrictions, only the bay **2** at the rear of the chassis can be used to install a hard disk drive.

See “Pivoting or removing the optional hard disk drive mounting bracket” on page 7.

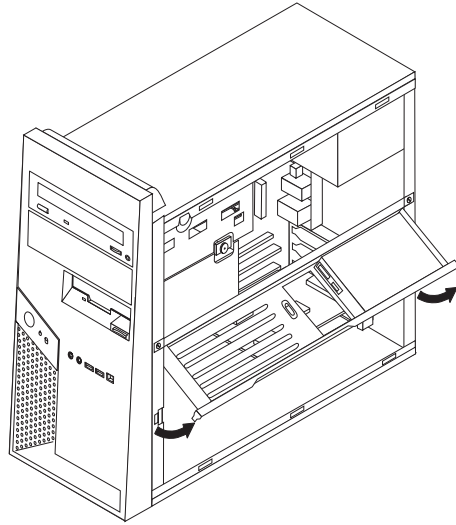


To replace the computer cover, see “Completing the installation” on page 33.

Pivoting or removing the optional hard disk drive mounting bracket

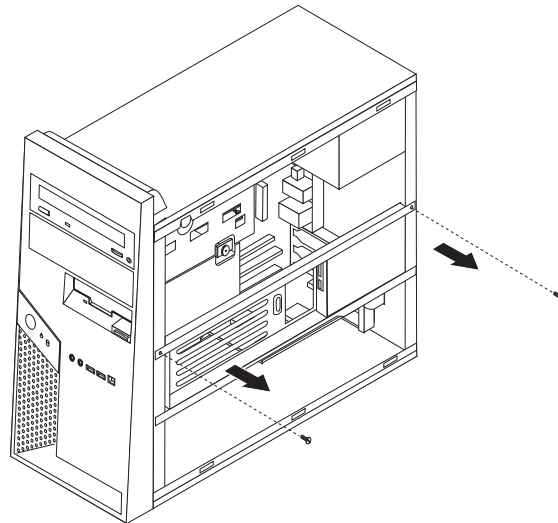
The optional hard disk drive mounting bracket can easily be pivoted upward or removed if necessary to enable replacement of some CRUs and FRUs.

To pivot the optional hard disk drive bracket upward, pull outward at the bottom of the bracket.



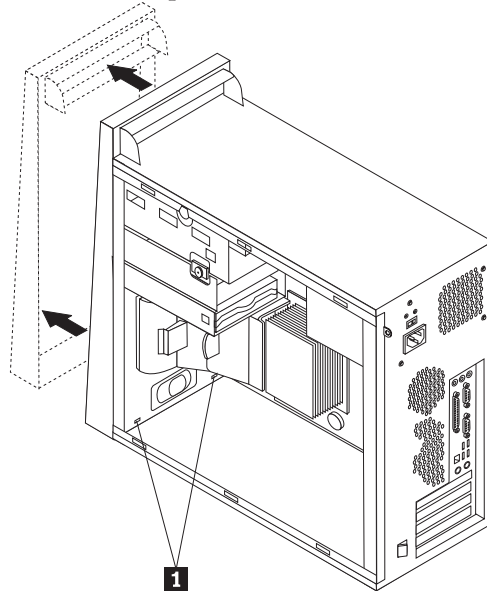
Note: You might have to disconnect the cables attached to the optional hard disk drive.

If it is necessary to remove the optional hard disk drive mounting bracket, disconnect the cables attached to the optional hard disk drive, remove the two screws, and lift the bracket out of the chassis.



Removing and replacing the front bezel

1. Remove the computer cover. See “Removing the computer cover” on page 5.
2. To release the front bezel from the chassis, press downward on the two plastic tabs **1** and push the bezel outward as shown.



3. To reinstall the bezel, align the plastic tabs **1** on the bottom of the bezel with the corresponding holes in the chassis, then snap it into position at the bottom and top of the chassis.
4. Go to “Completing the installation” on page 33.

Replacing the power supply

Attention:

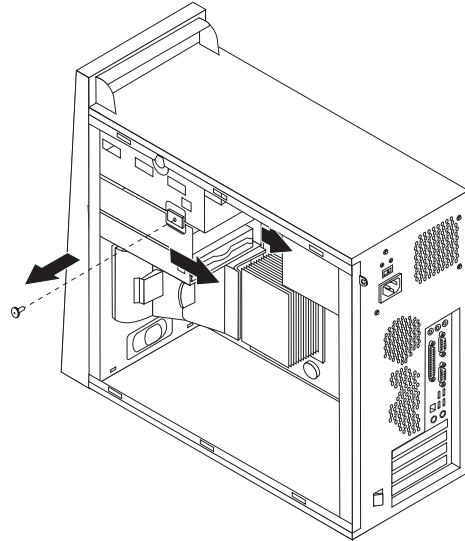
Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to <http://www.ibm.com/pc/support>.

Note: You will need a phillips screwdriver.

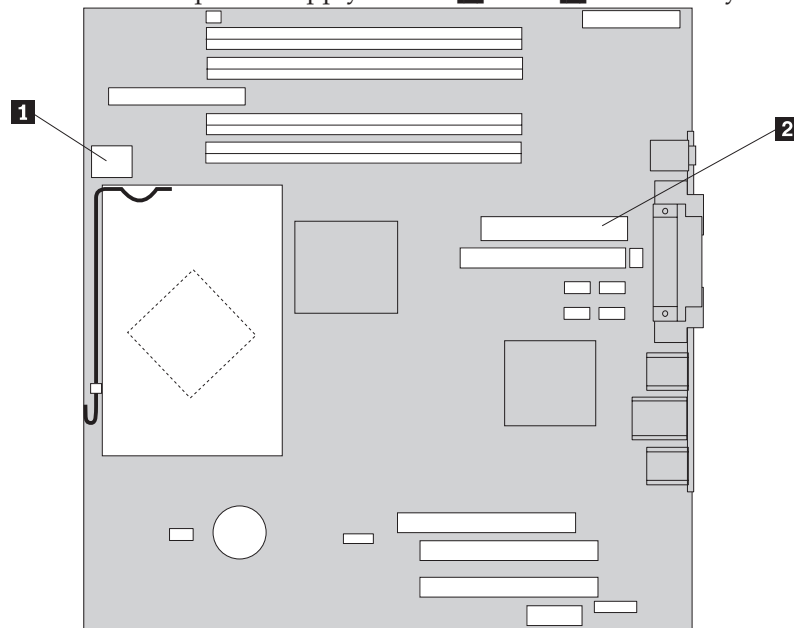
1. Remove the computer cover. See “Removing the computer cover” on page 5.

Note: For this procedure, it helps to lay the computer on its side.

2. To access the 12 V power connector, remove the lower drive cage thumb-screw and slide the lower drive cage toward the rear and out of the bay. Place the drive cage out of your way without disconnecting the drive signal cables.

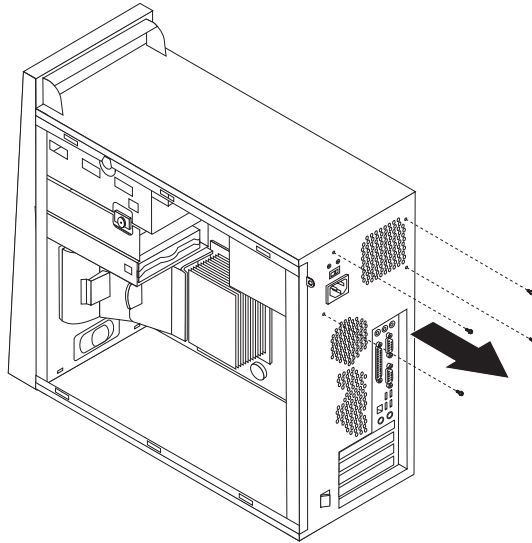


3. Disconnect the power supply cables **1** and **2** from the system board.

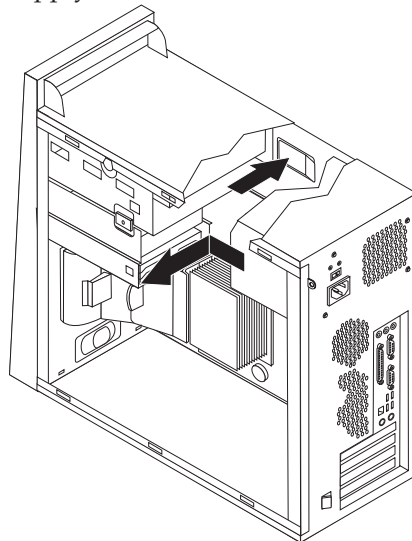


4. Disconnect the power cable from each of the drives. Note the location of each cable that is disconnected.

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



6. Press inward on the metal retainer inside the chassis and slide the power supply toward the front of the chassis and lift it out of the chassis as shown.

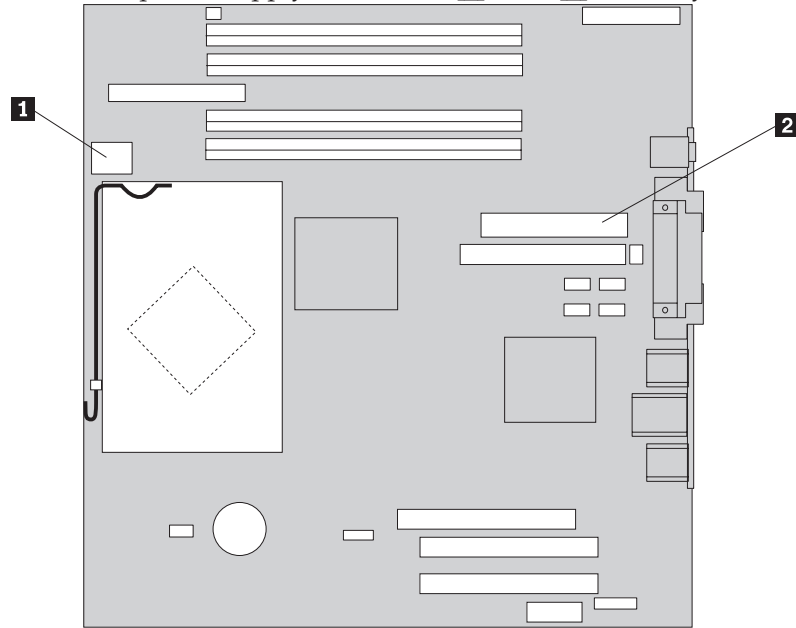


7. Install the new power supply into the chassis so that the screw holes in the power supply align with those in the chassis.

Note: Use only the screws provided with the new power supply.

8. Install and tighten the four screws that secure the power supply.

9. Reconnect power supply connectors **1** and **2** to the system board.



10. Reinstall the lower drive cage and secure it with the thumb-screw.
11. Reconnect a power supply connector to each of the drives.
12. Go to “Completing the installation” on page 33.

Replacing the system board assembly

Attention:

Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to <http://www.ibm.com/pc/support>.

1. Turn off the computer and allow it to cool for one hour.
2. Remove the computer cover. See “Removing the computer cover” on page 5.

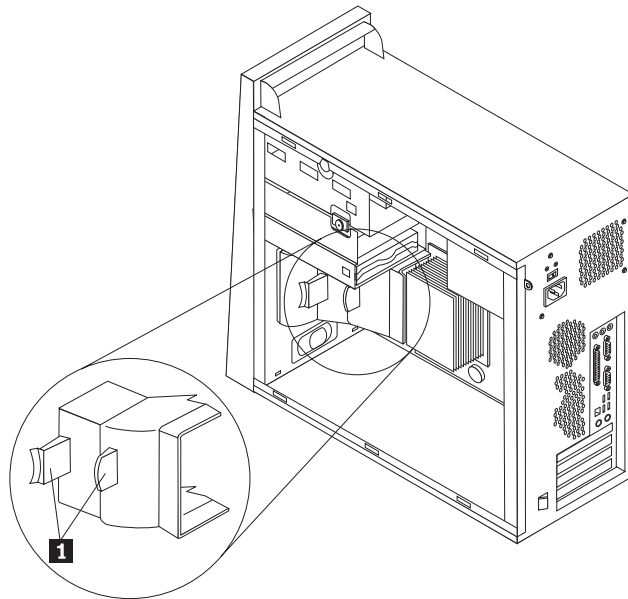
Note: For this procedure, it helps to lay the computer on its side.

3. Carefully note the location of all cable connections on the system board. It will be necessary to reconnect them correctly after you install the new system board assembly. See “Identifying parts on the system board” on page 4 to locate the cables.

Important

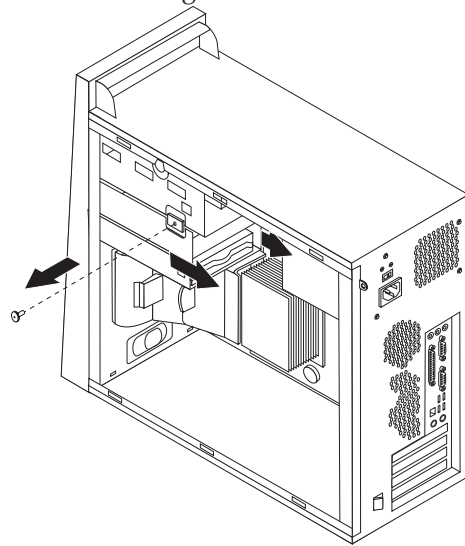
Note the cable routing. It is important to route the cables the same way after you install the new system board.

4. Remove the air baffle by squeezing the two tabs **1** together and pulling it out of the chassis.

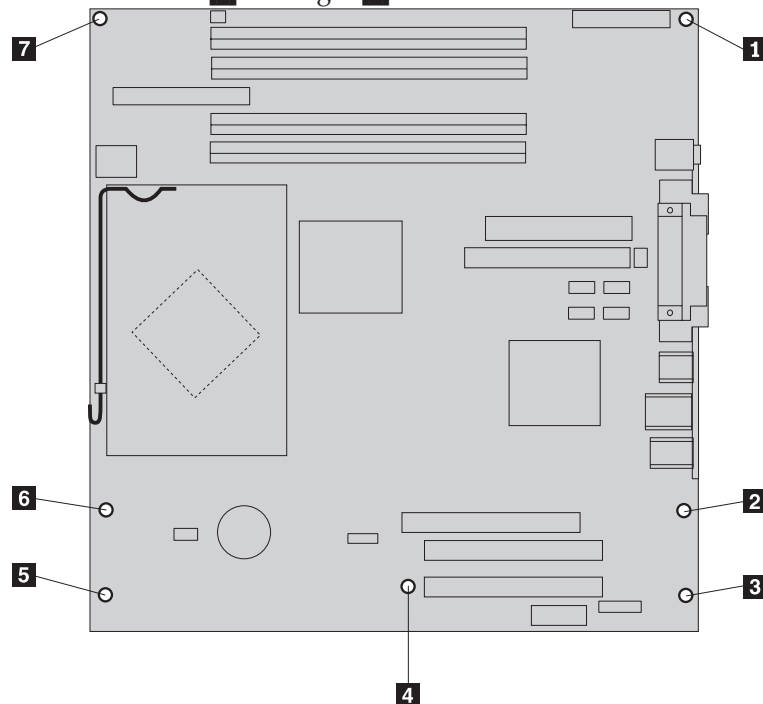


5. Remove any PCI adapter cards. See “Replacing an adapter” on page 26.

6. Remove the lower drive cage by removing the thumb-screw and sliding the lower drive cage toward the rear of the computer.

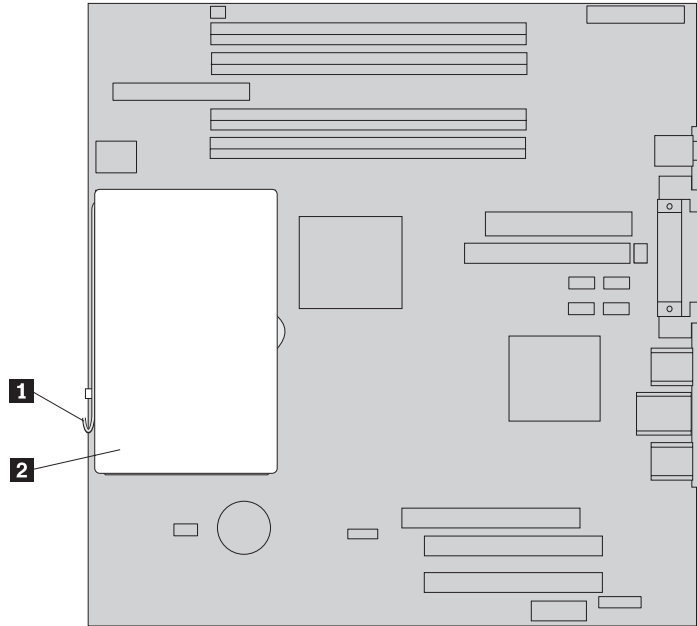


7. Disconnect the cables attached to the drives in the lower drive cage and set the drive cage to the side.
8. Disconnect all cables connected to the system board. See “Identifying parts on the system board” on page 4.
9. Remove screws **1** through **7**.

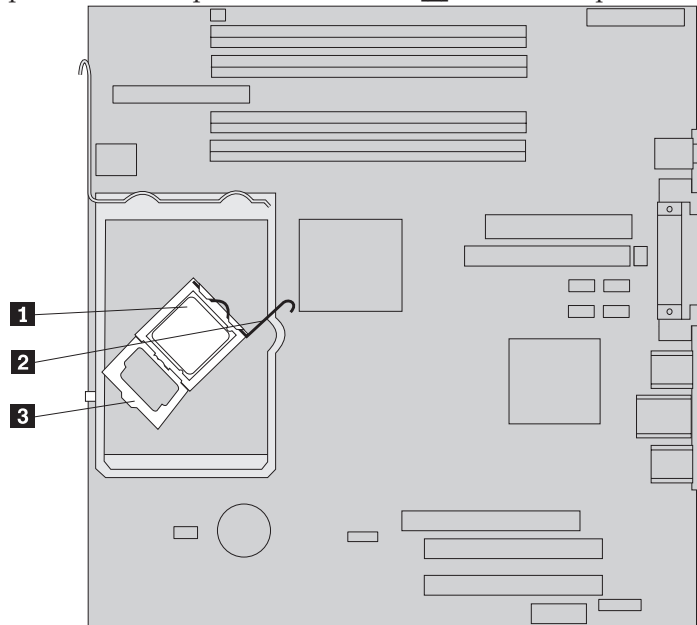


10. Slide the system board toward the front of the computer to disengage it from the mounting tabs and lift it out.
11. Place the defective system board next to the new system board on a clean, flat surface.
12. Remove all memory modules from the defective system board and install them in the same connector on the new system board. See “Replacing a memory module” on page 25. Return here after installing the memory modules on the new system board.

13. Release and pivot lever **1** upward. Remove the heat sink **2** from the system board by carefully lifting it up and off the mounting bracket. Place the heat sink on its side on a clean, flat surface so the thermal material on the bottom of the heat sink does not touch the surface and become contaminated.



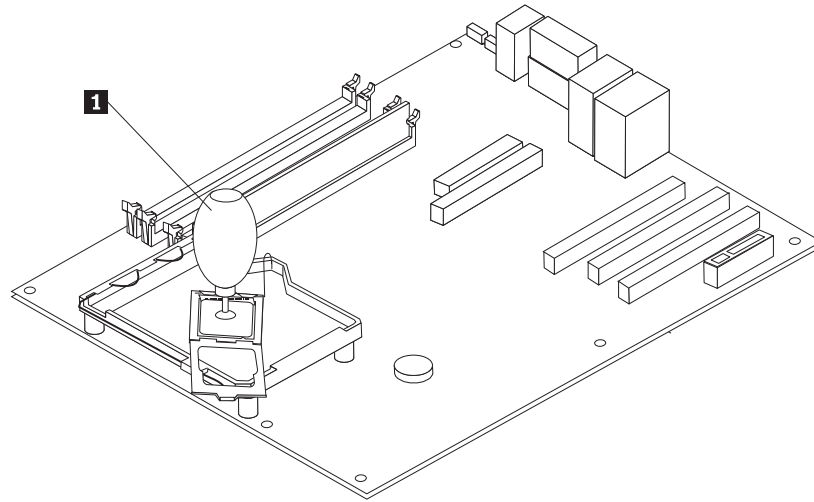
14. Release and pivot locking lever **2** securing the microprocessor **1**, then pivot the microprocessor retainer **3** until it is open.



15. Using the vacuum pen **1**, remove the microprocessor from the system board socket by lifting it straight up and out of the socket.

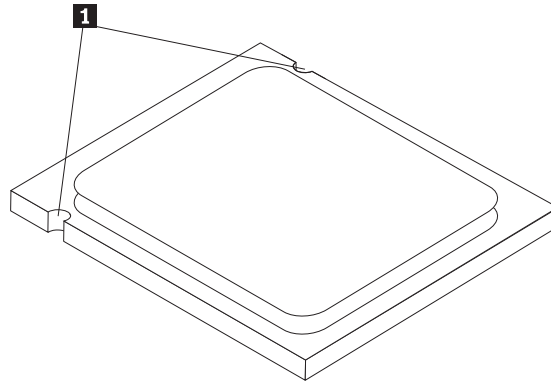
Important

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



Notes:

- a. Notice of 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.

16. On the new system board, release and pivot the locking lever, then pivot the microprocessor retainer until it is open.

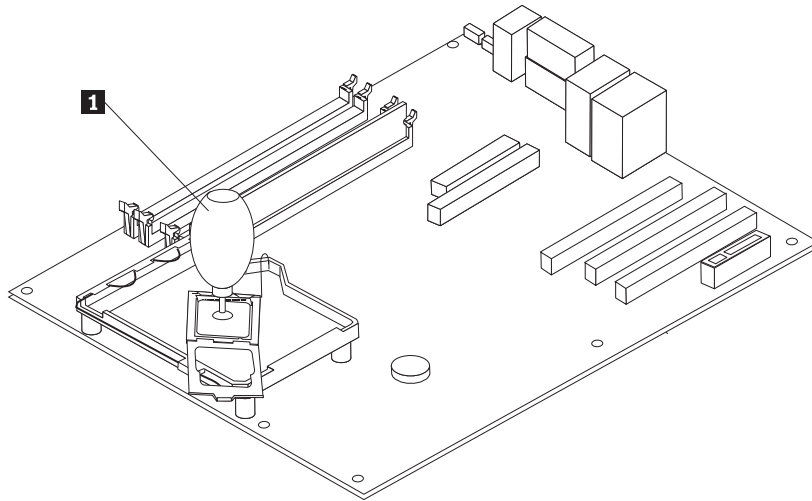
Note: There will be a black protective cover on the retainer to protect the microprocessor socket. As you close the microprocessor retainer, remove the cover. Place the black protective cover on the microprocessor retainer of the defective system board.

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

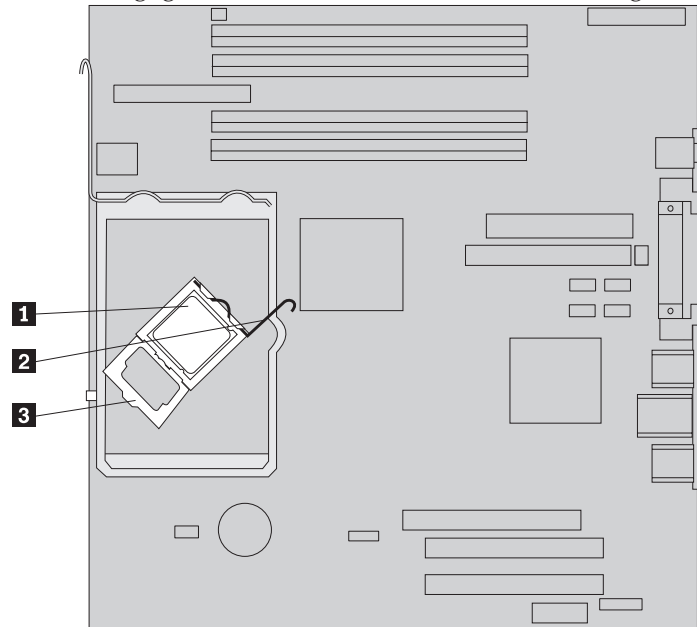
Important

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

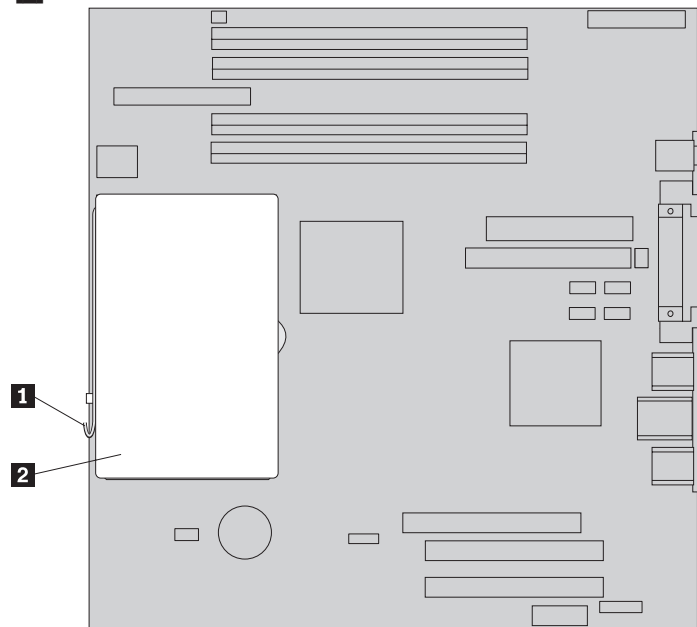
18. Using the vacuum pen **1**, lower the microprocessor straight down into the microprocessor socket.



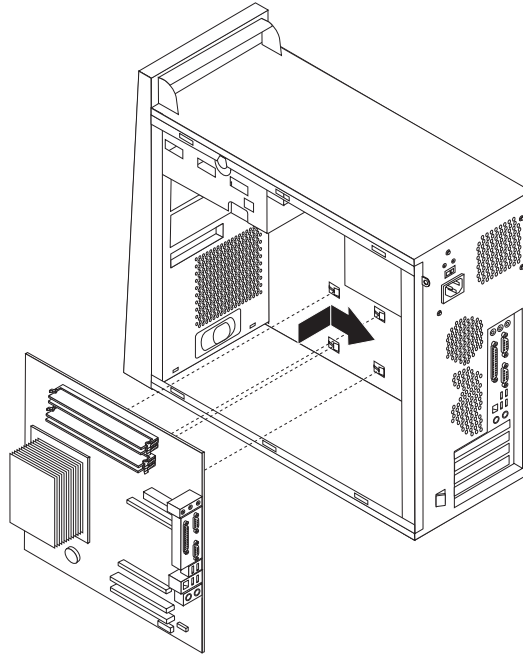
19. Pivot the microprocessor retainer **3** to the closed position and rotate the locking lever **2** to secure the microprocessor **1**. Make sure the locking lever is engaged with the retainer tab when securing the microprocessor.



20. Align the beveled corners of the heat sink and the mounting bracket. Then position the heat sink **2** on the heat sink mounting bracket. Lower the lever **1** to secure the heat sink.



21. Install the new system board assembly into the computer chassis by aligning the four slots in the metal plate on the bottom of the system board with the tabs in the chassis. Then slide the system board toward the rear of the chassis.



Important

Make sure to correctly align the metal plate on the bottom of the system board with the tabs in the chassis. Otherwise, the system board might be damaged when you install the screws.

22. Align the seven screw holes, and install the screws.
23. Reinstall all adapter cards. See “Replacing an adapter” on page 26.
24. 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 4 for cable locations.
25. Reinstall the lower drive cage and secure it with the thumb screw.
26. Reconnect the signal and power cables to the drives in the lower drive cage.
27. Reinstall the air baffle.
28. Go to “Completing the installation” on page 33.

Replacing the microprocessor

Attention:

Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to <http://www.ibm.com/pc/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

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

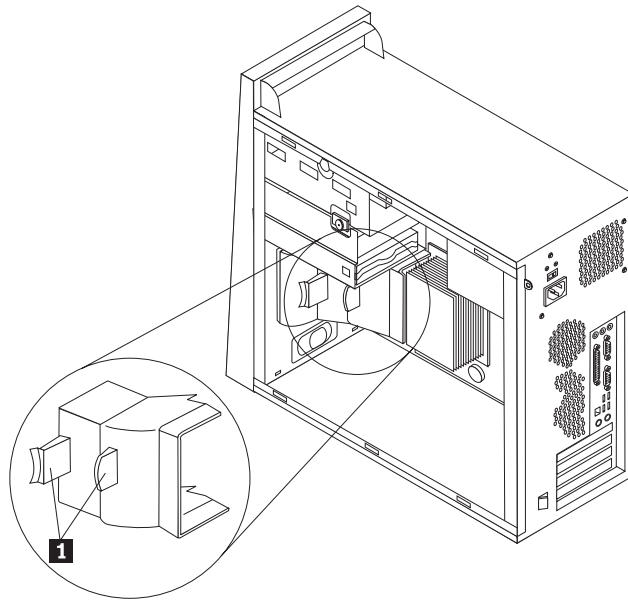
Important

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

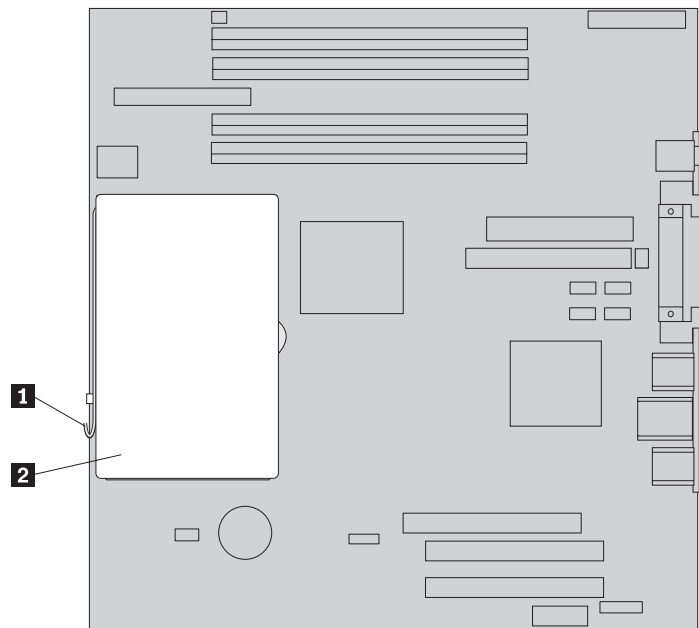
1. Remove the computer cover. See “Removing the computer cover” on page 5.

Note: For this procedure, it helps to lay the computer on its side.

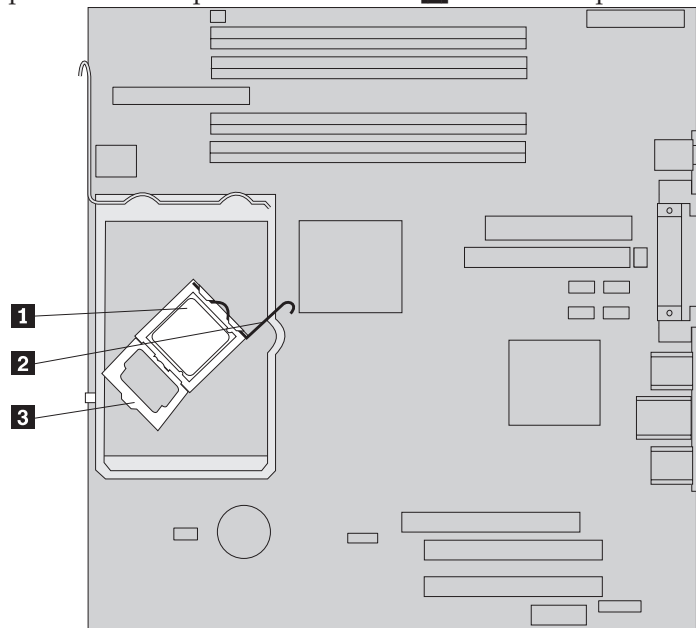
2. Remove the air baffle by squeezing the tabs **1** together and pulling it out of the chassis.



3. Release and pivot lever **1** upward. Remove the heat sink **2** from the system board by carefully lifting it up and off the mounting bracket.



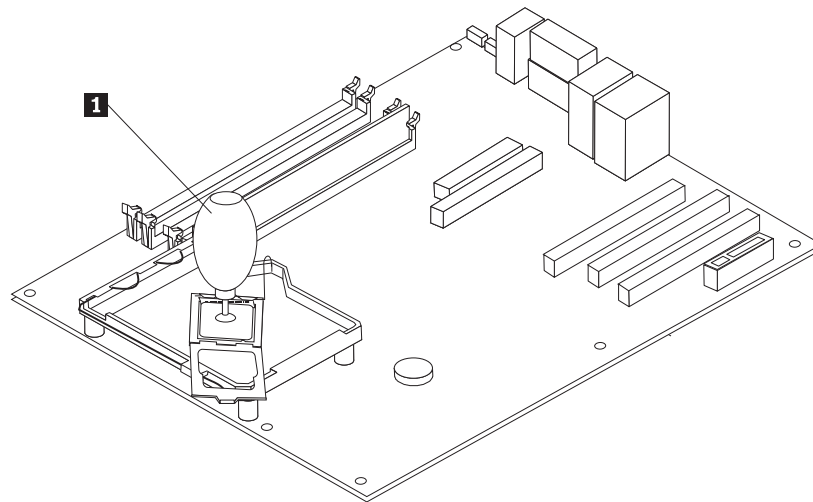
4. Release and pivot locking lever **2** securing the microprocessor **1**, then pivot the microprocessor retainer **3** until it is open.



5. Using the vacuum pen **1**, remove the microprocessor from the system board socket by lifting it straight up and out of the socket.

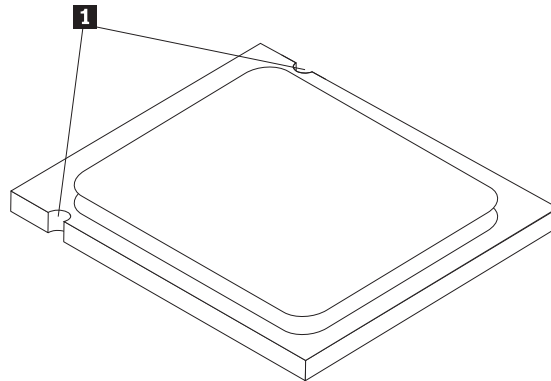
Important

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

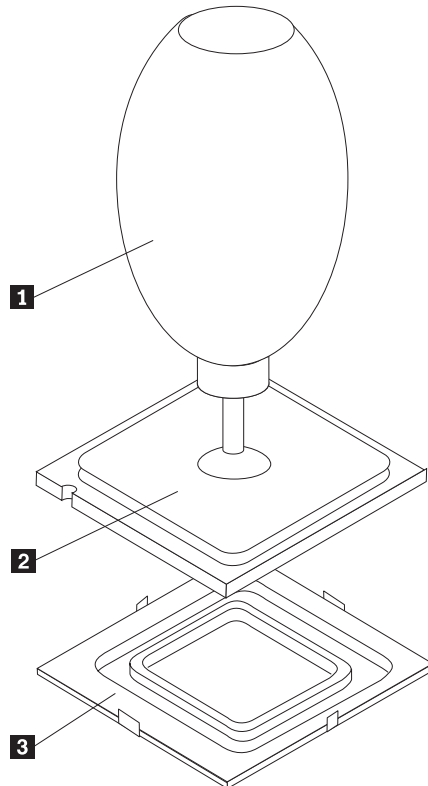


Notes:

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



- b. Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.
6. Make sure that the microprocessor retainer is fully open.
7. Loosen the protective cover **3** that protects the gold contacts on the new microprocessor **2** but do not remove it. Use the vacuum pen **1** to pick up the microprocessor then completely remove the cover.

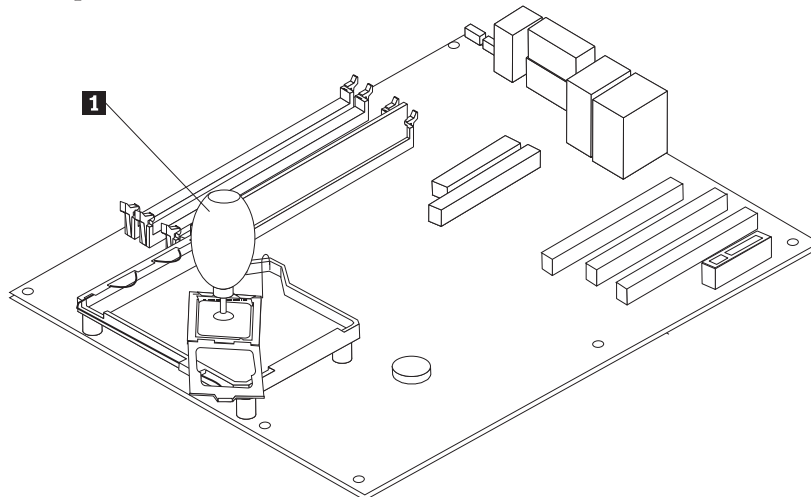


8. Position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

Important

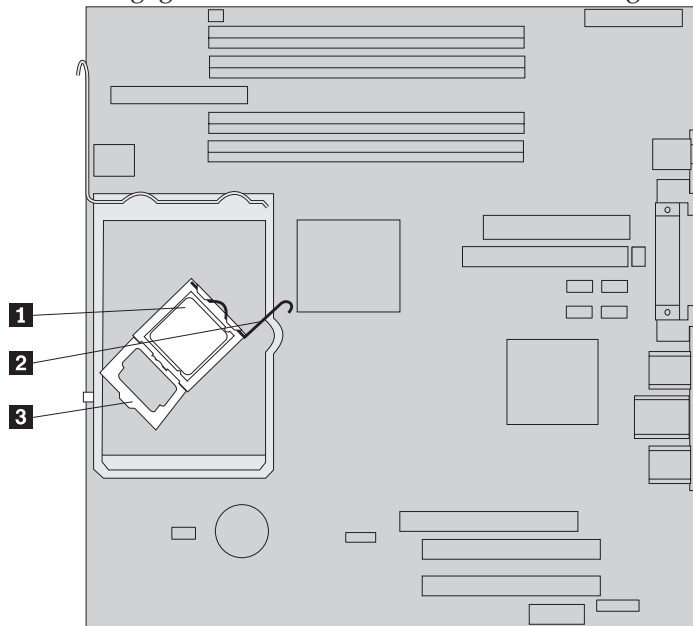
To avoid damaging the microprocessor contacts, do not tilt the microprocessor when installing it into the socket.

9. Using the vacuum pen **1**, lower the microprocessor straight down into the microprocessor socket.

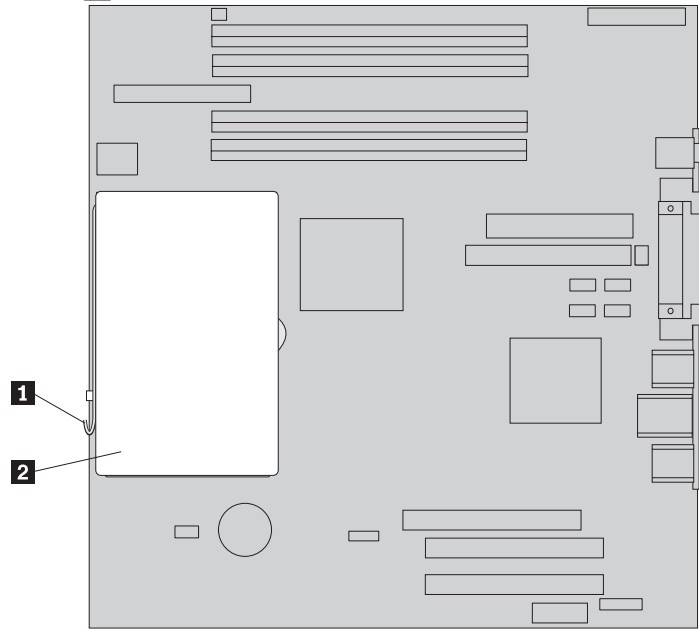


Note: Install the black protective cover that was removed from the new microprocessor onto the defective microprocessor after the installation is complete.

10. Pivot the microprocessor retainer **3** to the closed position and pivot the locking lever **2** to secure the microprocessor **1**. Make sure the locking lever is engaged with the retainer tab when securing the microprocessor.



11. Align the beveled corners of the new heat sink and the mounting bracket. Then position the heat sink **2** on the heat sink mounting bracket. Lower the lever **1** to secure the heat sink.



12. Reinstall the air baffle.
13. Go to "Completing the installation" on page 33.

Replacing a memory module

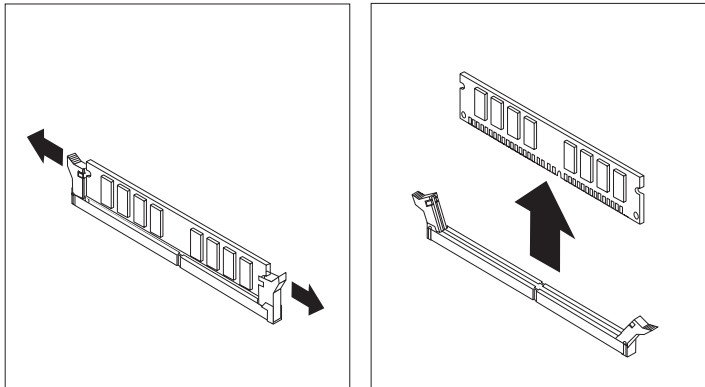
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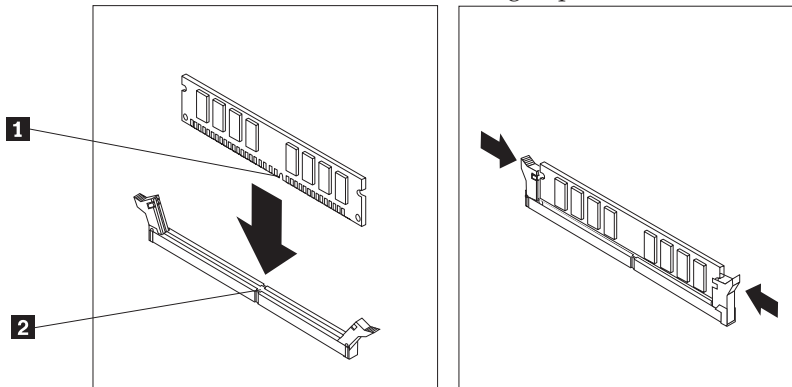
1. Remove the computer cover. See “Removing the computer cover” on page 5.

Note: For this procedure, it helps to lay the computer on its side.

2. Locate the memory module connectors. See “Locating components” on page 1.
3. Open the retaining clips, and lift the memory module out of its connector.



4. Ensure that the notch on the new memory module **1** aligns correctly with the connector key **2** on the system board. Push the memory module straight down into the connector until the retaining clips close.



5. Go to “Completing the installation” on page 33.

Replacing an adapter

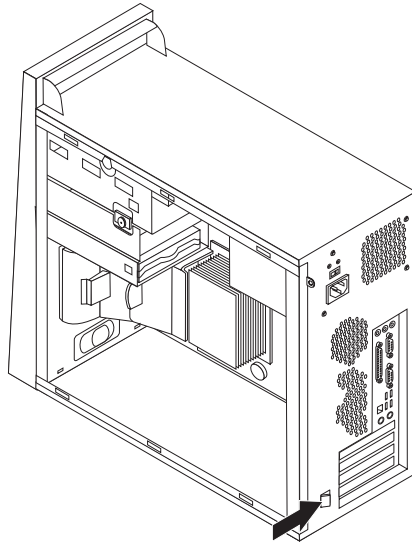
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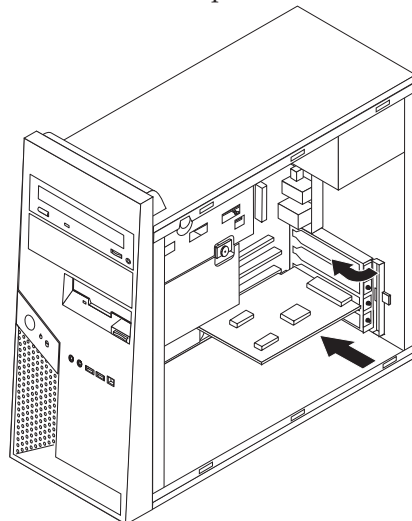
1. Remove the computer cover. See “Removing the computer cover” on page 5.

Note: For this procedure, it helps to lay the computer on its side.

2. At the rear of the computer, push the blue adapter latch as indicated and pivot it to the open position.



3. Remove the adapter by pulling it straight out of the adapter connector.
4. Install the new adapter into the same adapter connector. Ensure the adapter is fully seated into the adapter connector.
5. At the rear of the computer, pivot the blue adapter latch to the closed position to secure the adapters.



6. Go to “Completing the installation” on page 33.

Replacing the hard disk drive

Attention:

Do not remove the computer cover or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or HMM, go to <http://www.ibm.com/pc/support>.

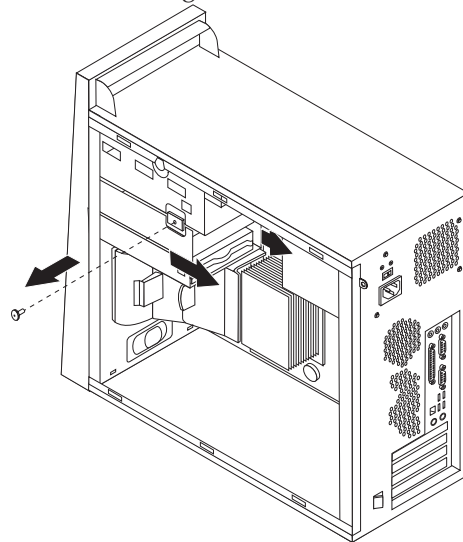
Important

When you receive a new hard disk drive, you will also receive a *Product Recovery CD*. The *Product Recovery CD* 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 the *Quick Reference*.

1. Remove the computer cover. See "Removing the computer cover" on page 5.

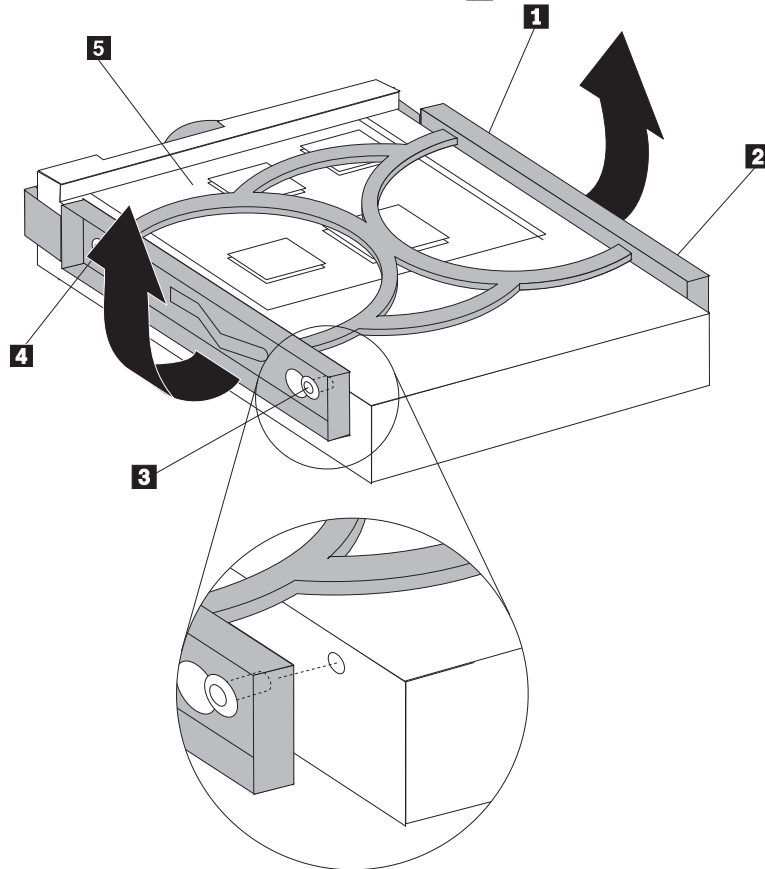
Note: For this procedure, it helps to lay the computer on its side.

2. Remove the lower drive cage by removing the thumb-screw and sliding the lower drive cage toward the rear of the computer.



3. Disconnect the signal and power cables from the hard disk drive.
4. Remove the hard disk drive from the lower drive cage by pulling the blue handle.
5. Remove the defective hard disk drive from the blue bracket by flexing the bracket.

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 lower drive cage with its circuit board side facing downward.
8. Connect the power and signal cables to the new hard disk drive. See “Identifying parts on the system board” on page 4.
9. Reinstall the lower drive cage and secure it with the thumb screw.
10. Go to “Completing the installation” on page 33.

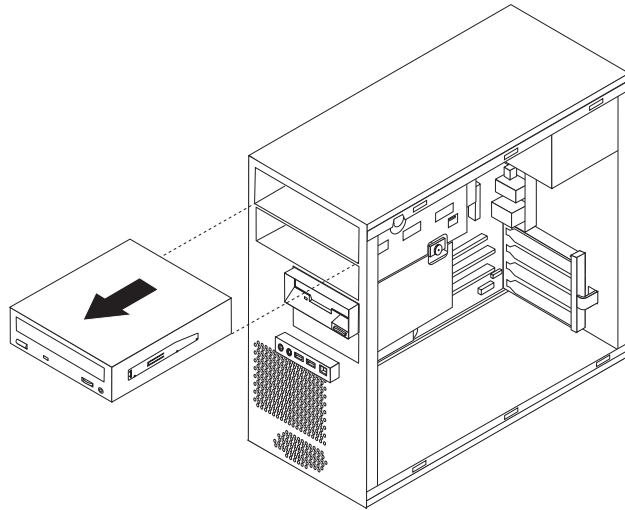
Replacing an optical drive

Attention:

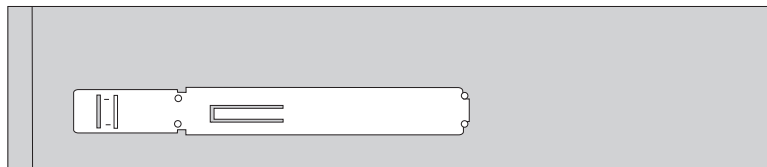
Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to <http://www.ibm.com/pc/support>.

1. Remove the computer cover. See “Removing the computer cover” on page 5.
Note: For this procedure, it helps to lay the computer on its side.
2. Remove the front bezel. See “Removing and replacing the front bezel” on page 8.
Note: Some optical drives can be removed without first removing the front bezel.

3. Disconnect the signal and power cables from the rear of the optical drive.
4. Release the optical disk drive by pressing on the blue retainer lever at the side of the drive and removing it from the front of the computer.



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



6. Slide the new optical drive into the bay from the front until it snaps into position.
7. Reconnect the signal and power cables to the drive.
8. Reinstall the front bezel. See “Removing and replacing the front bezel” on page 8.
9. To complete the installation, go to “Completing the installation” on page 33.

Replacing the diskette drive

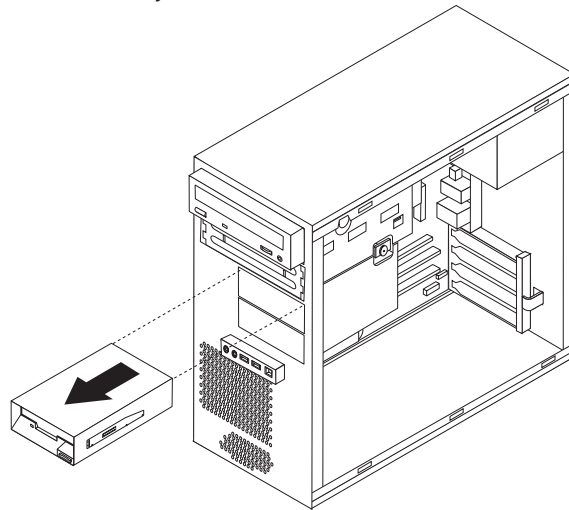
Attention:

Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to <http://www.ibm.com/pc/support>.

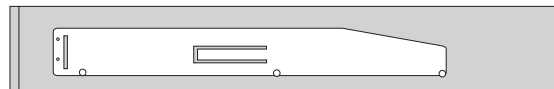
1. Remove the computer cover. See “Removing the computer cover” on page 5.
2. Remove the front bezel. See “Removing and replacing the front bezel” on page 8.

Note: For this procedure, it helps to lay the computer on its side.

3. Disconnect the signal and power cables from the rear of the diskette drive.
4. Release the diskette drive by pressing on the blue retainer lever at the side of the drive bay and slide it out the front of the computer.



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



6. Slide the new diskette drive into the lower drive cage until it snaps into position.
7. Reconnect the signal and power cables to the drive.
8. To install the bezel, align the tabs on the bottom of the bezel with the corresponding holes in the chassis. Pivot the bezel until it snaps into position at the bottom and top of the chassis.
9. Go to “Completing the installation” on page 33.

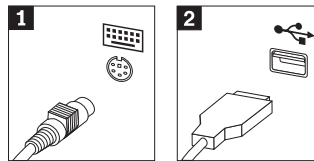
Replacing the keyboard

Attention:

Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to <http://www.ibm.com/pc/support>.

1. Remove any media (diskettes, CDs, or tapes) from the drives, shut down the computer, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Locate the connector for the keyboard. See “Locating connectors on the rear of the computer” on page 3 and “Locating controls and connectors on the front of the computer” on page 2.

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



the computer.

4. Disconnect the failing keyboard cable from the computer and connect the new keyboard cable to the appropriate connector.
5. Go to “Completing the installation” on page 33.

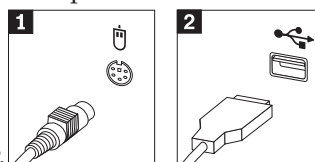
Replacing the mouse

Attention:

Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to <http://www.ibm.com/pc/support>.

1. Remove any media (diskettes, CDs, or tapes) from the drives, shut down the computer, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Locate the connector for the mouse. See “Locating connectors on the rear of the computer” on page 3 and “Locating controls and connectors on the front of the computer” on page 2.

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



computer.

4. Disconnect the failing mouse cable from the computer and connect the new mouse cable to the appropriate connector.
5. Go to “Completing the installation” on page 33.

Replacing the internal speaker

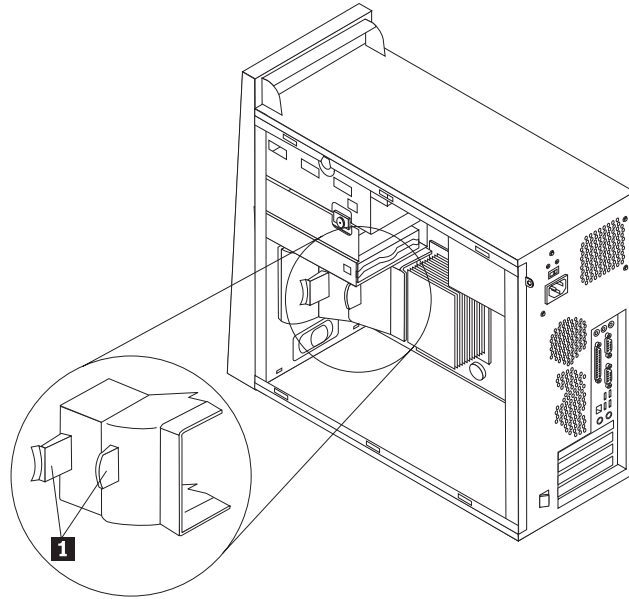
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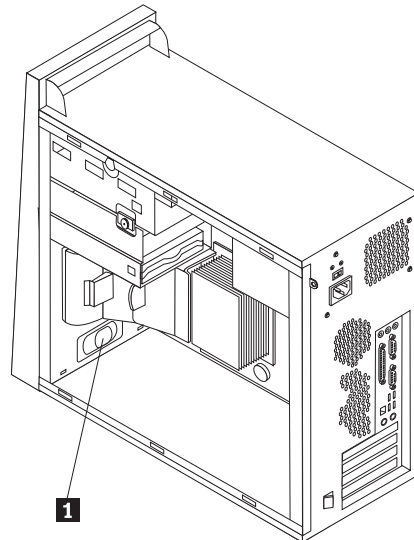
1. Remove the computer cover. See “Removing the computer cover” on page 5.

Note: For this procedure, it helps to lay the computer on its side.

2. Remove the air baffle by squeezing the two tabs **1** together and pulling it out of the chassis.



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



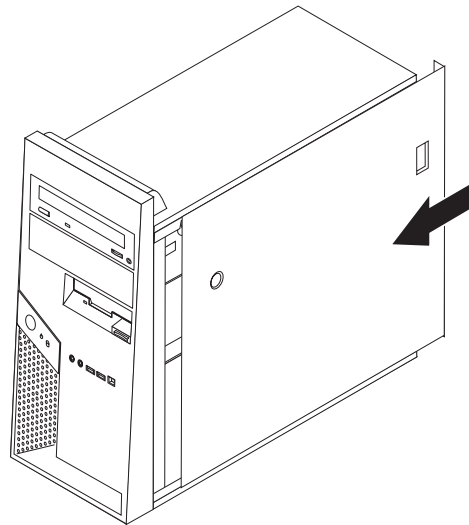
6. Position the bottom of the new speaker into the metal tabs and pivot the top of the speaker inward until it snaps into position.
7. Reconnect the speaker cable to the system board. See “Identifying parts on the system board” on page 4.
8. Reinstall the air baffle.
9. Go to “Completing the installation” on page 33.

Completing the installation

After replacing a failed part, you need to install any other removed parts, install 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. See "Starting the Setup Utility" in your *Quick Reference* or in the *Hardware Maintenance Manual*.

To complete the installation:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer. See "Locating components" on page 1 for the location of the various components.
2. If this computer has an optional hard disk drive mounting bracket and it was either pivoted upward or removed, place it back into position and reconnect any cables that were disconnected from the optional hard disk drive. See "Pivoting or removing the optional hard disk drive mounting bracket" on page 7.
3. Clear any cables that might impede the replacement of the computer cover.
4. Position the computer cover on the chassis so that the rail guides on the bottom of the computer cover engage the rails. Then, push the computer cover closed until it latches.



5. Reconnect the external cables. Plug the power cord into the computer then into a properly grounded power receptacle. See "Locating controls and connectors on the front of the computer" on page 2 and "Locating connectors on the rear of the computer" on page 3.
6. If you are replacing the system board you must update (flash) the BIOS. See "Updating (flashing) BIOS from a diskette or CD-ROM."
7. To update your configuration, see "Starting the Setup Utility" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual*.

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

Important

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

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

1. Insert a system program update (flash) diskette or CD-ROM into the appropriate drive. System program updates are available at <http://www.ibm.com/pc/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 which corresponds to the language then press Enter.
4. When prompted to change the serial number, press Y.
5. Type in the seven character serial number of your computer 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 then press Enter.
8. Follow the instructions on the screen to complete the update.



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