ThinkCentre™

Hardware Replacement Guide
Types 8104, 8105, 8106, 8107
Types 8108, 8109, 8117, 8118
Types 8119, 8120, 8121

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First Edition (April 2005)

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Overview

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

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

This guide contains instructions for replacing the following parts:

Note: Use only parts provided by IBM.

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

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. To obtain a copy of the *Quick Reference* go to the World Wide Web at http://www.ibm.com/pc/support/.

Safety information for replacing FRUs

Do not open your computer or attempt any repair before reading the "Important safety information" in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain a copy of the *HMM*, go to the World Wide Web at http://www.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
- CRU removal and installation videos
- Publications
- Troubleshooting information
- Parts information

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- Downloads and drivers
- Links to other useful sources of information

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

Tools required

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

Handling static-sensitive devices

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

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

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

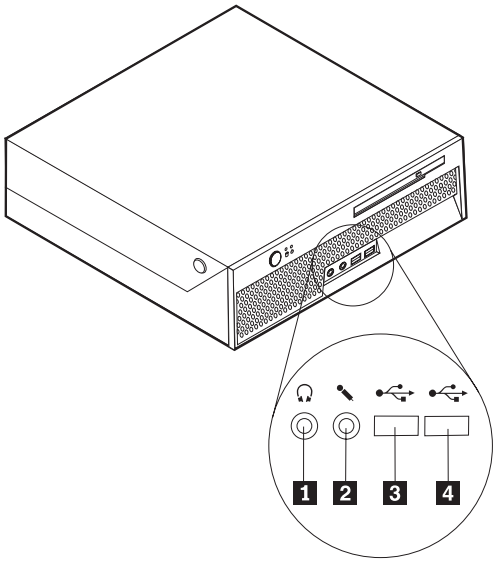
- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle parts and other computer components carefully. Handle adapters, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts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

Chapter 1. Locations

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

Locating the connectors on the front of your computer

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



1 Headphone connector
2 Microphone connector
3 USB connector
4 USB connector

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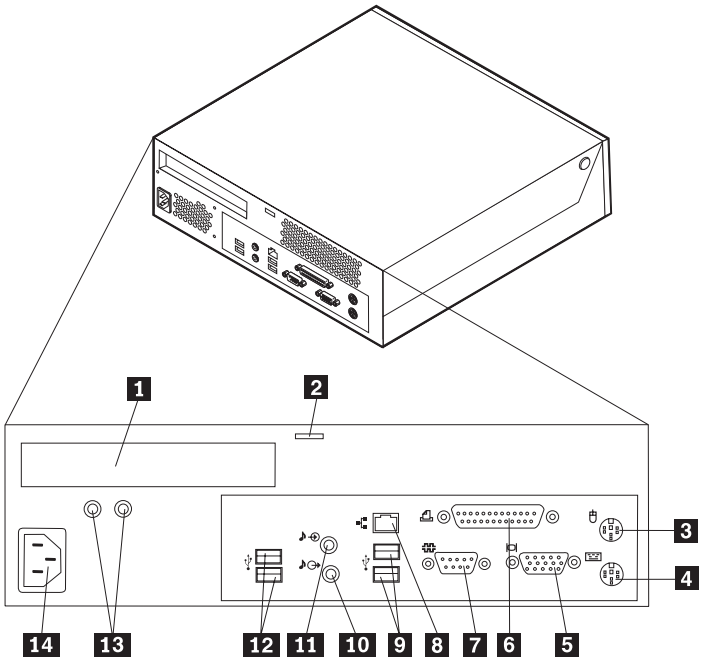
Locating the connectors on the rear of your computer

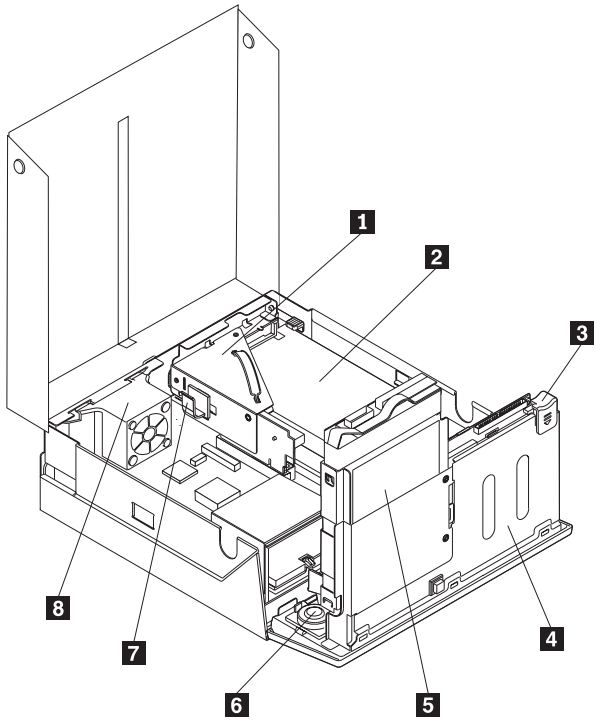
The following illustration shows the location of connectors on the rear of the computer.



1	PCI adapter connector	8	Ethernet connector
2	Integrated cable lock	9	USB connectors
3	Standard mouse connector	10	Audio line out connector
4	Standard keyboard connector	11	Audio line in connector
5	VGA monitor connector	12	USB connectors
6	Parallel connector	13	Power supply diagnostic LEDs
7	Serial connector	14	Power connector

Locating components

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

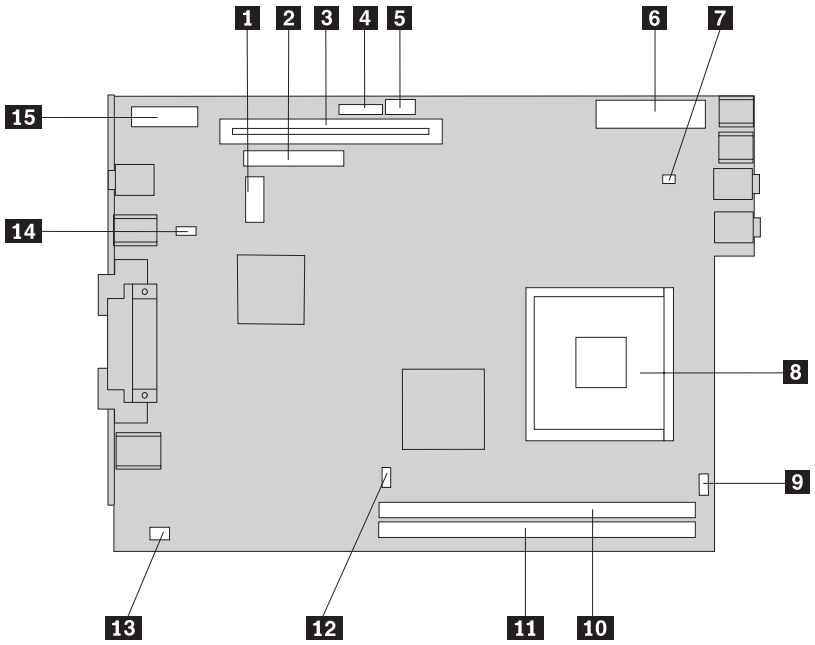


1	PCI riser	5	Hard disk drive
2	Power supply assembly	6	Internal speaker
3	Optical drive eject button	7	Cable clip
4	Optical drive	8	Rear fan bracket assembly

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	SATA connector	9	Internal speaker connector
2	IDE connector	10	Memory connector 1
3	PCI riser connector	11	Memory connector 2
4	Front panel connector	12	Microprocessor fan connector
5	12v power connector	13	Rear fan connector
6	Power connector	14	Clear CMOS/Recovery jumper
7	System fan connector	15	Battery
8	Microprocessor		

Note: Your computer has support for two double data rate 2 (DDR2) dual inline memory modules (DIMMs).

Chapter 2. Replacing hardware

Attention

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

Note: Use only parts provided by IBM.

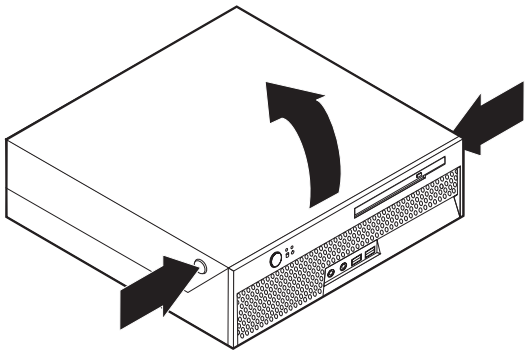
Opening the cover

Important

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

To open the computer cover:

1. Remove any media (diskettes, CDs, or tapes) from the drives, shut down your operating system, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer.
4. Remove any locking devices such as a Kensington lock that secure the cover.
5. Press the buttons on the sides of the computer and pivot the cover upward to open the computer as shown.



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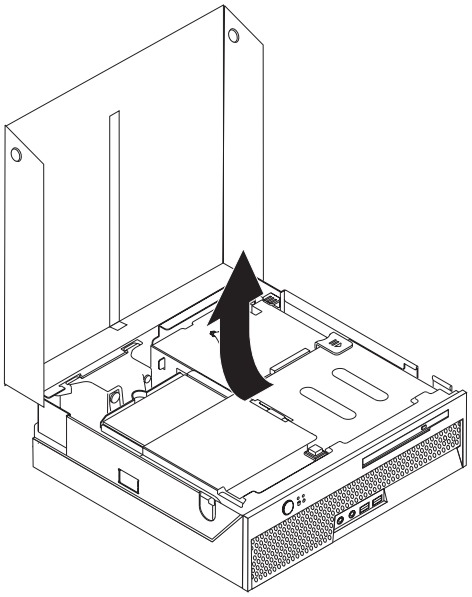
Replacing the power supply

Attention

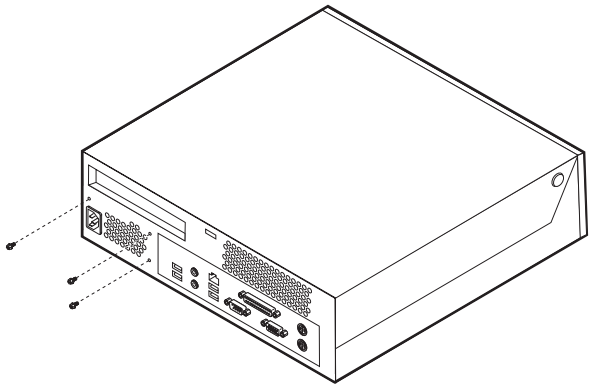
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/.

This section provides instructions on how to replace the power supply.

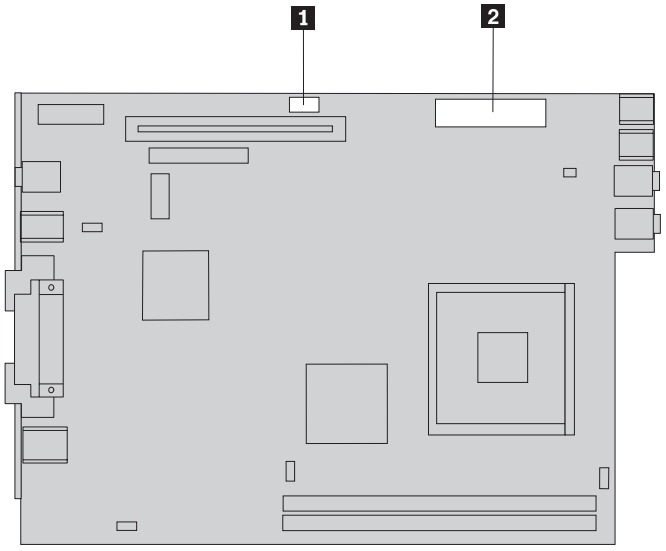
1. Open the computer cover. See "Opening the cover" on page 5.
2. Pivot the drive bay assembly upward to gain access to the power supply.



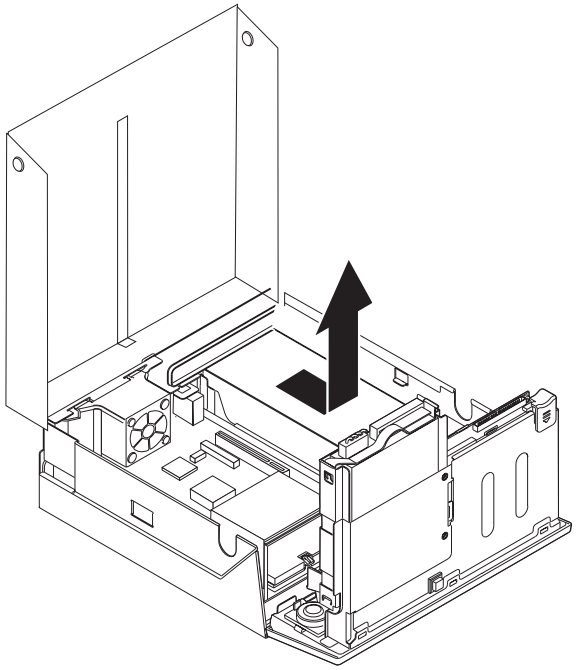
3. Remove the PCI riser. See "Replacing a PCI adapter" on page 22.
4. Remove the three screws at the rear of the chassis securing the power supply.



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



6. Disconnect the power supply cables from all the drives.
7. Remove the power supply assembly from the computer.



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

   Note: Use only the screws that are provided.
9. Install and tighten the three screws at the rear of the chassis to secure the power supply assembly.
10. Reconnect all the power supply cables to the drives and the system board.
11. Reinstall the PCI riser.
12. Go to "Completing the parts replacement" on page 26.

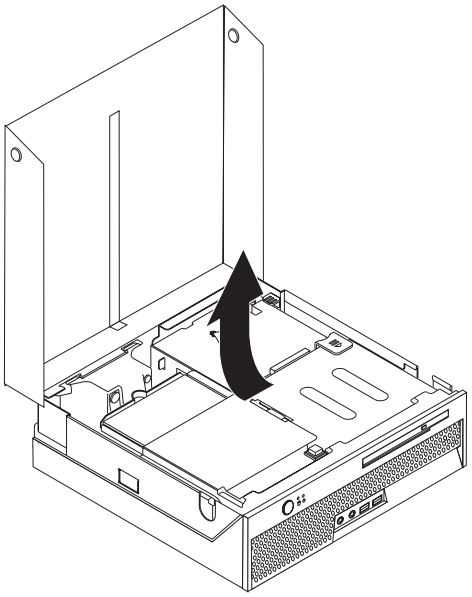
Replacing the system board

Attention

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

This section provides instructions on how to replace the system board.

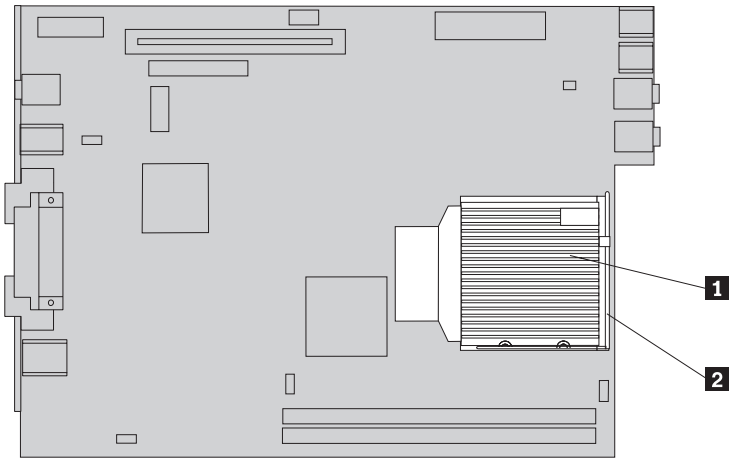
1. Open the computer cover. See "Opening the cover" on page 5.
2. Pivot the drive bay assembly upward to gain access to the system board.



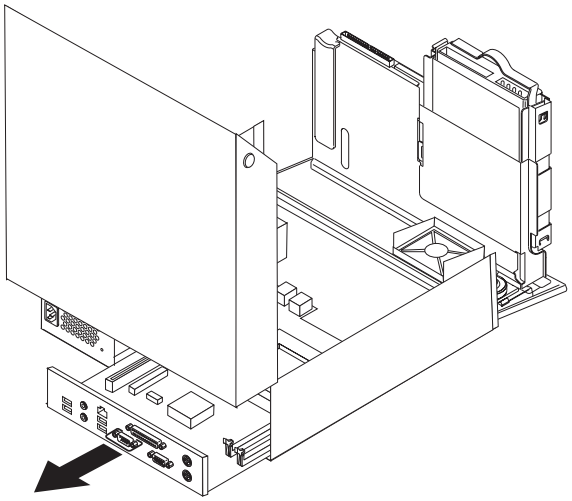
3. Remove the PCI riser. See "Replacing a PCI adapter" on page 22.
4. Locate the rear fan bracket assembly and the rear fan connector. See "Locating components" on page 3 and "Identifying parts on the system board" on page 4.
5. Disconnect the rear fan cable and remove the rear fan bracket assembly by lifting it off the system board.
6. 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.
7. Disconnect all cables connected to the system board. See "Identifying parts on the system board" on page 4.
8. Take note of the location of the memory modules and remove them from the failing system board. See "Replacing a memory module" on page 20. Return here after removing the memory modules.

9. Remove the heat sink **1** from the system board by pivoting the lever **2** securing the heat sink until it is fully in the up position. Carefully lift the heat sink off of the system board.

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

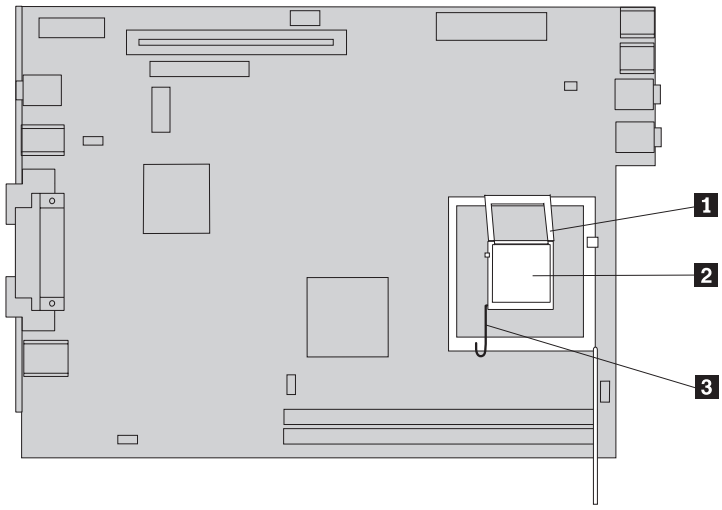


10. Use the handle at the rear of the system board to pull the system board and tray out the rear of the chassis.



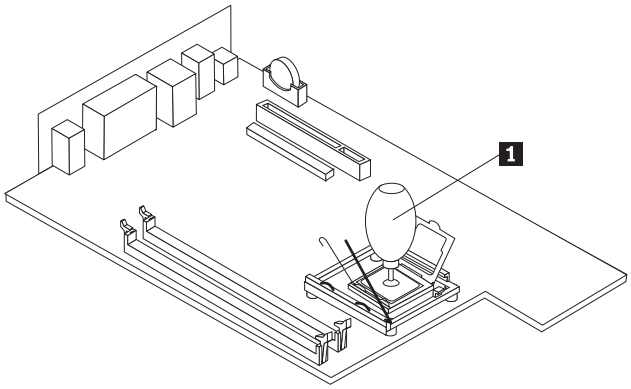
11. Place the failing system board next to the new system board on a clean, flat surface.

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



13. Use the vacuum pen **1** to remove the microprocessor from the system board socket by lifting it out of the socket.

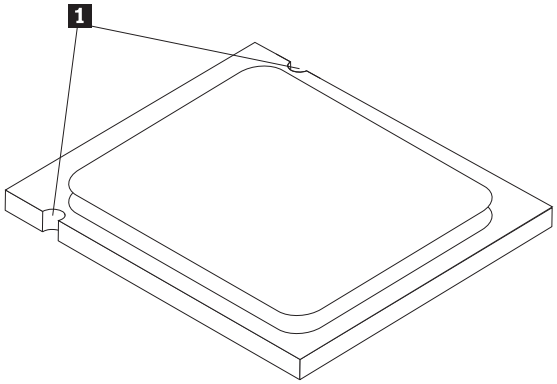
    Note: If you are replacing a failing microprocessor, you will receive a vacuum pen with the new microprocessor.



Important

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

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

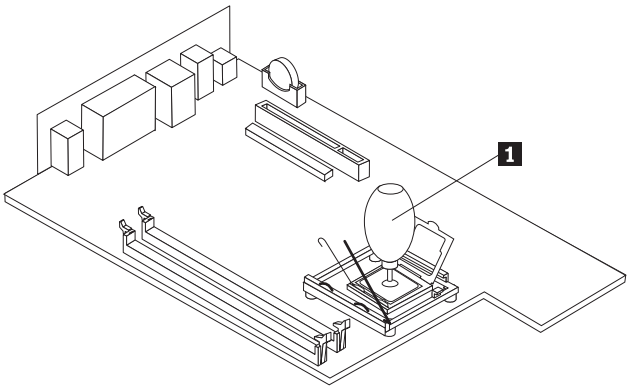


b. Do not drop anything on the socket while it is open. Keep all contacts as clean as possible.

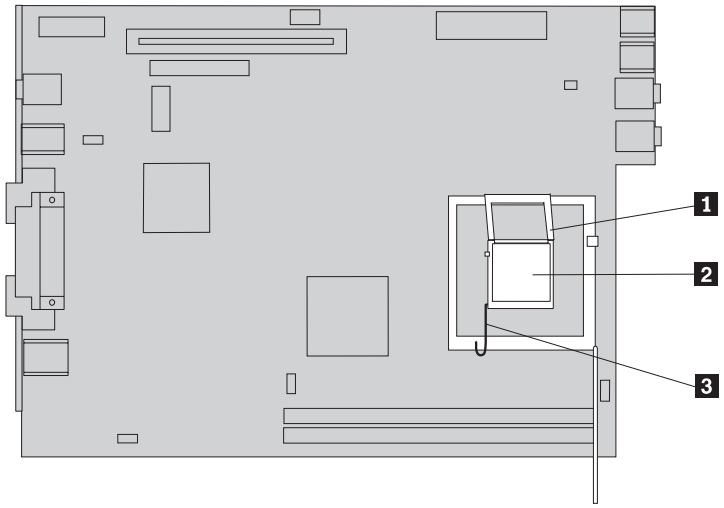
14. On the new system board, release the lever securing the microprocessor retainer then pivot the retainer until it is fully open.
15. Position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

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

16. Use the vacuum pen **1** to lower the microprocessor straight down into the system board socket of the new system board.

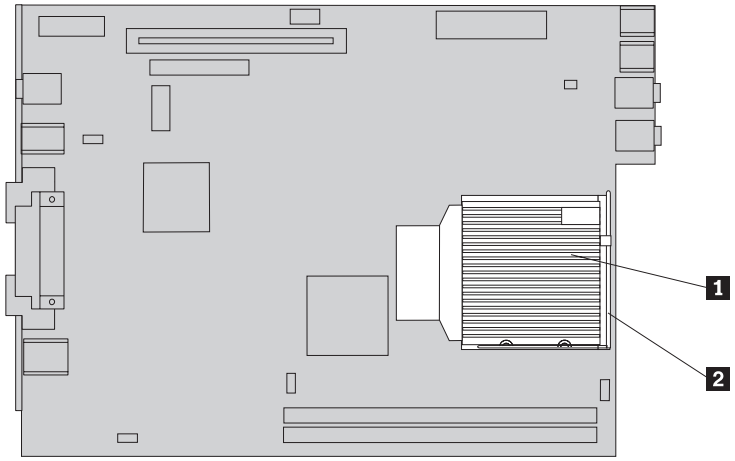


17. Lower the microprocessor retainer **1** and then lower the lever **3** to secure the retainer. Make sure the lever is securely locked into position.



Note: There will be a black plastic cover on the microprocessor retainer to protect the socket on the new system board. When you lock the microprocessor in position, remove the cover. Place the black cover on the microprocessor retainer of the failing system board.

18. Install the new system board and tray into the rear of the chassis until it is fully seated.
19. Place the heat sink **1** into position and lower the lever **2** to secure the heat sink.



20. Reinstall the memory modules on the new system board in the same location as they were on the failing system board. See “Replacing a memory module” on page 20.
21. Reconnect all cables that were disconnected from the system board. See “Identifying parts on the system board” on page 4.
22. Reinstall the PCI riser that was removed. See “Replacing a PCI adapter” on page 22.
23. Reinstall the rear fan bracket assembly and connect the fan cable to the system board.
24. Go to “Completing the parts replacement” on page 26.

Replacing the microprocessor

Attention

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

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 over heat and could cause intermittent problems.

Important

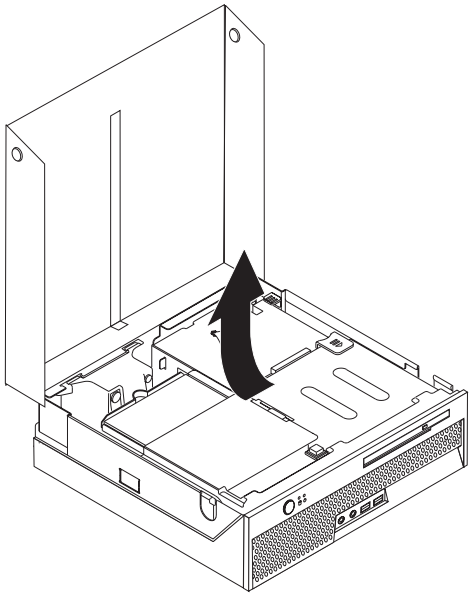
Do not touch the gold contacts on the bottom of the microprocessor. Use the vacuum pen provided to remove and install the microprocessor. If you must touch the microprocessor, touch only the sides.

This section provides instructions on how to replace the microprocessor.

Important

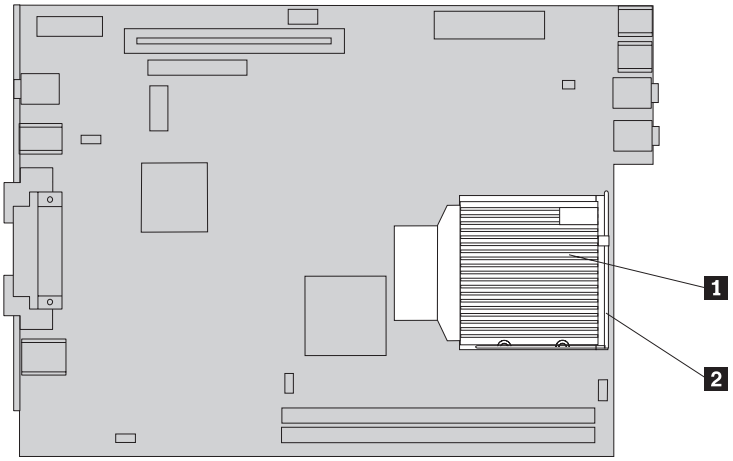
Leave your computer turned off for at least one hour before removing the microprocessor to allow the thermal interface between the microprocessor and the heat sink time to cool down.

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

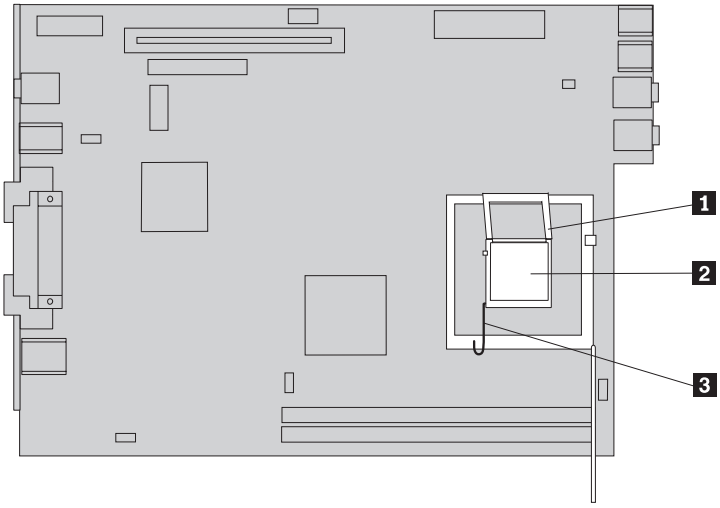


3. Locate the microprocessor fan connector on the system board. See "Identifying parts on the system board" on page 4.
4. Disconnect the microprocessor fan cable from the system board.

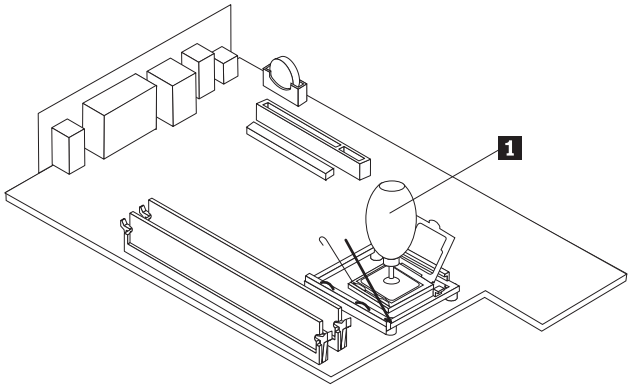
5. Remove the heat sink 1 from the system board by pivoting the lever 2 securing the heat sink until it is fully in the up position. Carefully lift the heat sink off of the system board.



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



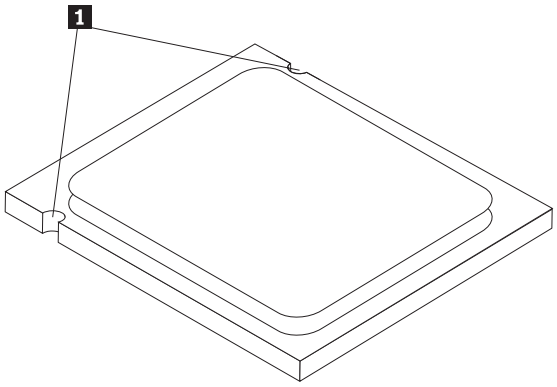
7. Use the vacuum pen 1 to remove the microprocessor from the system board socket by lifting it out of the socket.



Important

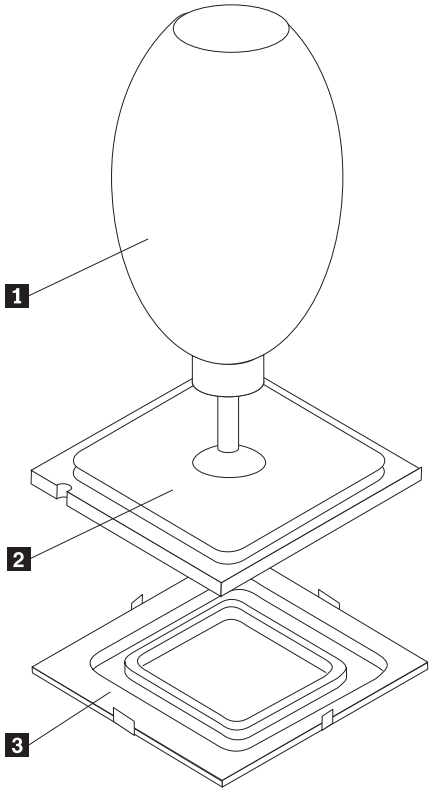
Do not touch the gold contacts on the bottom of the microprocessor. If you must touch the microprocessor, touch only the sides.

a. Take 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 on the socket while it is open. Keep all contacts as clean as possible.

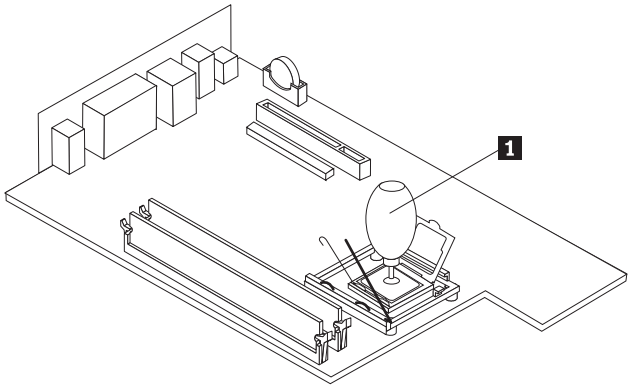
8. Make sure that the lever on the microprocessor retainer is fully open.
9. Loosen the black cover **3** that protects the gold contacts on the microprocessor **2**, but do not remove it. Use the vacuum pen **1** to pick up the new microprocessor then completely remove the black cover. Place the black cover on the old microprocessor.



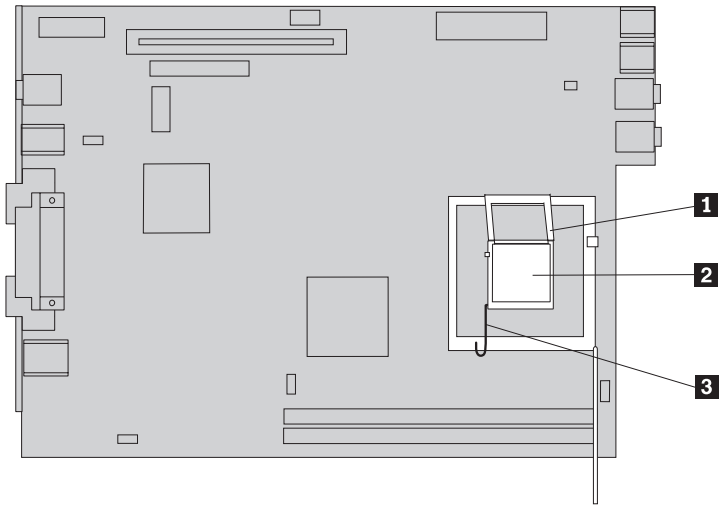
10. Position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

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

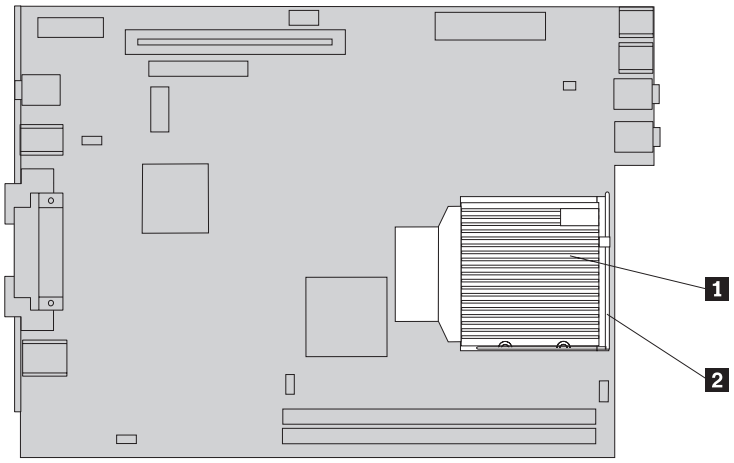
11. Use the vacuum pen **1** to lower the microprocessor straight down into the system board socket.



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



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



14. Reconnect the microprocessor fan cable to the system board.
15. Go to "Completing the parts replacement" on page 26.

Replacing the hard disk drive

Attention

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

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

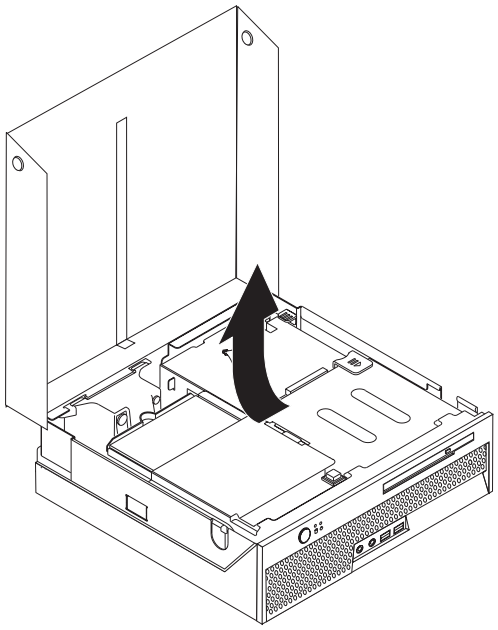
Important

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 your *Quick Reference*.

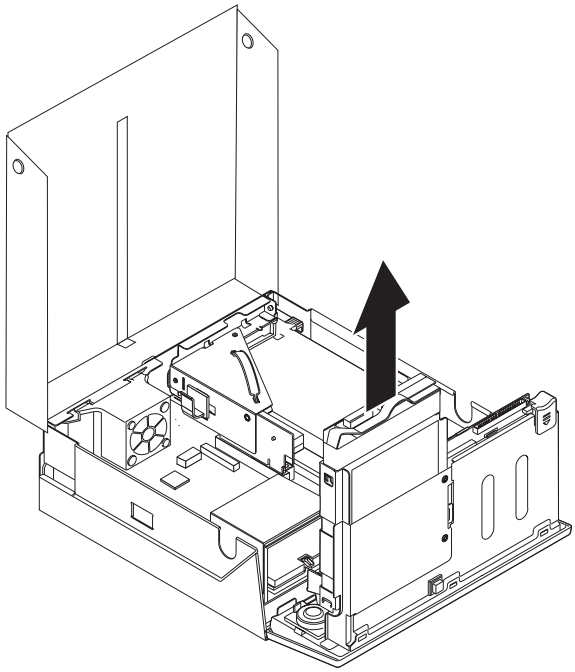
To replace a hard disk drive, do the following:

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

2. Pivot the drive bay assembly upward to gain access to the hard disk drive.

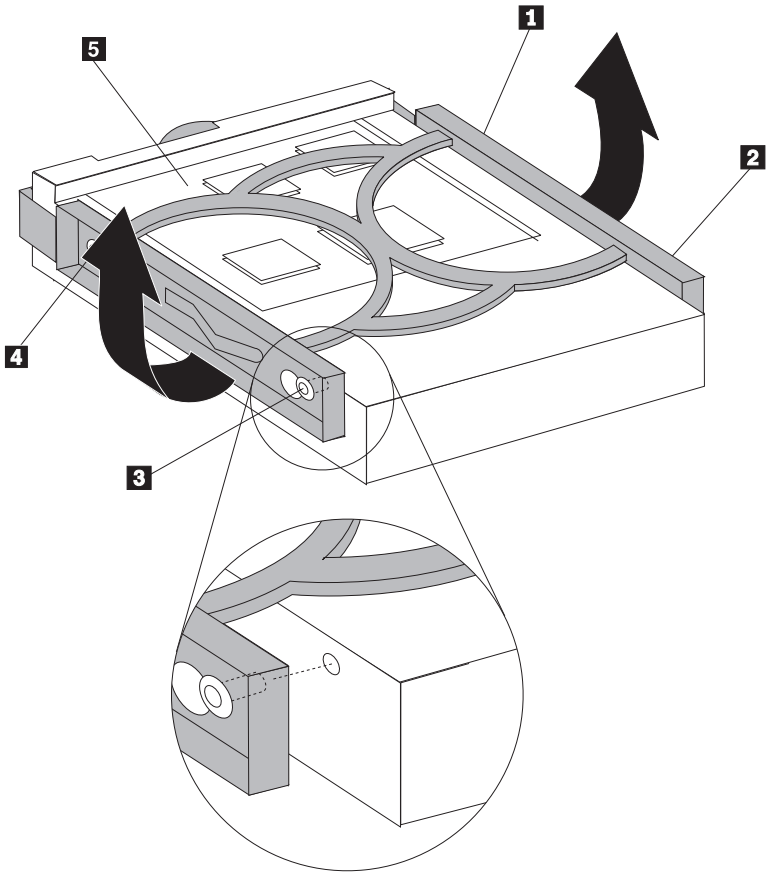


3. Disconnect the signal and power cables from the rear of the hard disk drive.
4. Lift the hard disk drive and bracket up to remove it from the hard drive bay.



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

6. To install the new hard disk drive into the blue bracket, flex the bracket and align the pins 1 through 4 on the bracket with the holes in the hard disk drive. Do not touch the circuit board 5 on the bottom of the hard disk drive.



7. Insert the new hard disk drive into the hard drive bay until it snaps into position.
8. Connect the signal and power cables to the rear of the hard disk drive.
9. Go to "Completing the parts replacement" on page 26.

Replacing the optical drive

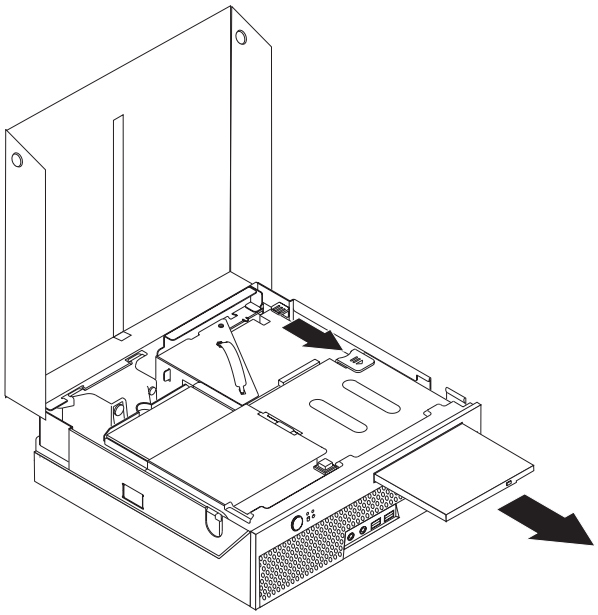
Attention

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

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

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

2. Push the optical drive eject button and slide the optical drive out of the front of the computer.



3. Slide the new optical drive into the bay until it snaps into position.
4. Go to "Completing the parts replacement" on page 26.

Replacing a memory module

Attention

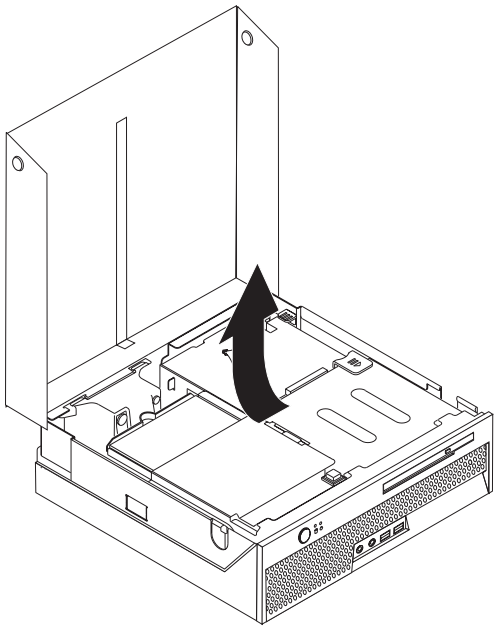
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/.

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

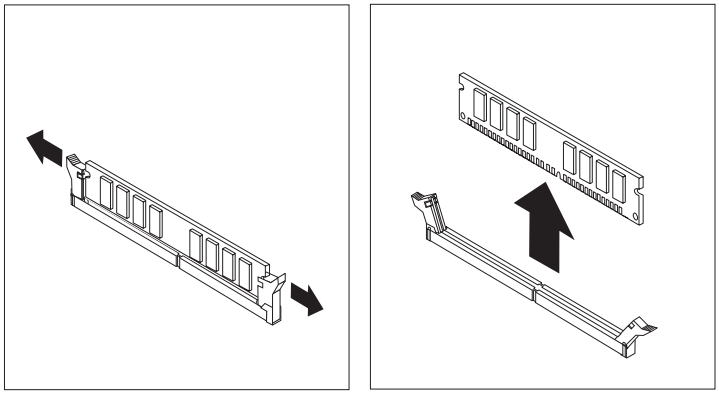
Note: Your computer has support for two memory modules.

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

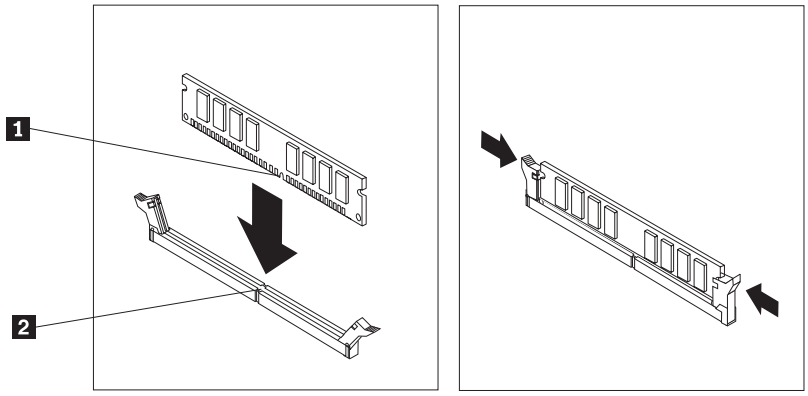
2. Pivot the drive bay assembly upward to gain access to the system board.



3. Remove any parts that might prevent access to the memory connectors.
4. Remove the memory module being replaced by opening the retaining clips as shown.



5. 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.



6. Go to "Completing the parts replacement" on page 26.

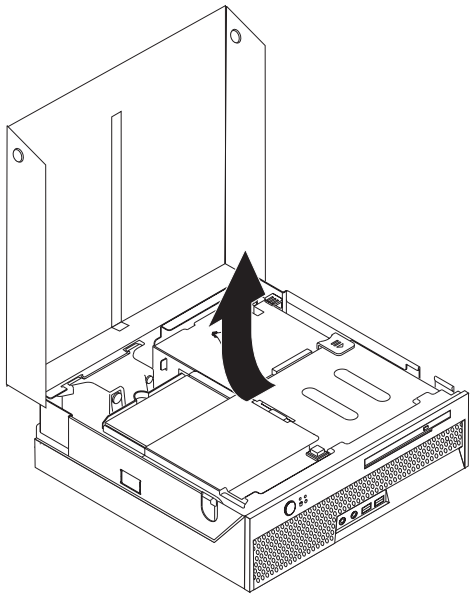
Replacing a PCI adapter

Attention

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

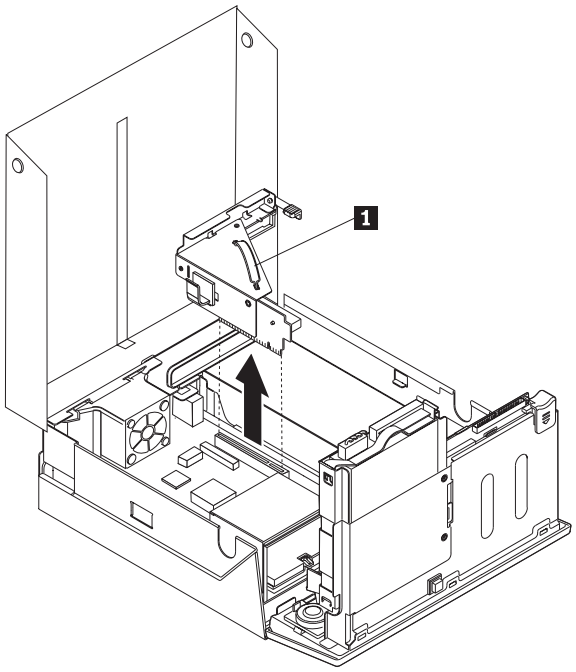
This section provides instructions on how to replace a PCI adapter.

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

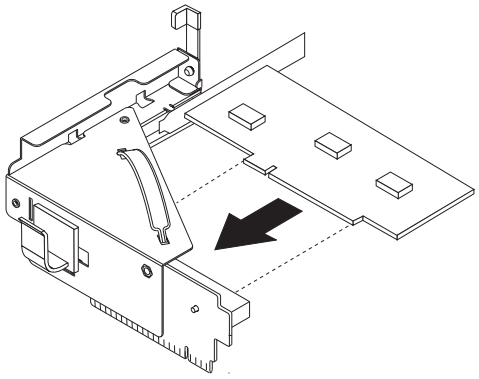


3. Locate the cable clip. See "Locating components" on page 3.
4. Remove all cables from the cable clip attached to the PCI riser.

5. Pull upward on the blue handle **1** to remove the PCI riser from the computer.



6. Pivot the adapter latch upward and remove the failing adapter.
7. Remove the new adapter from its static-protective package.
8. Install the new adapter into the expansion connector in the PCI riser.



9. Pivot the adapter latch down to retain the adapter.
10. Reinstall the PCI riser into the system board.
11. Go to "Completing the parts replacement" on page 26.

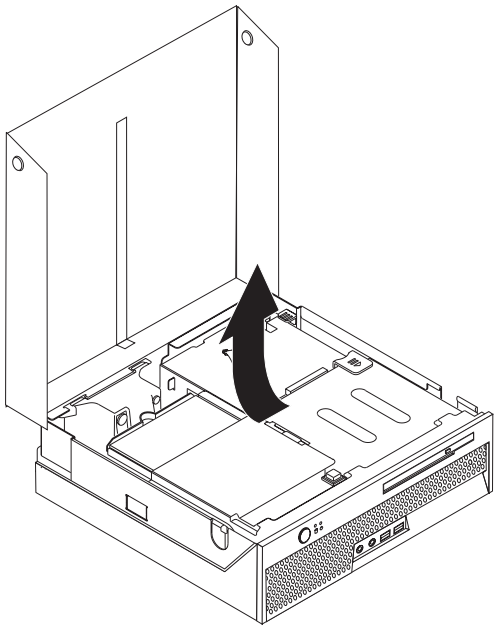
Replacing the internal speaker

Attention

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

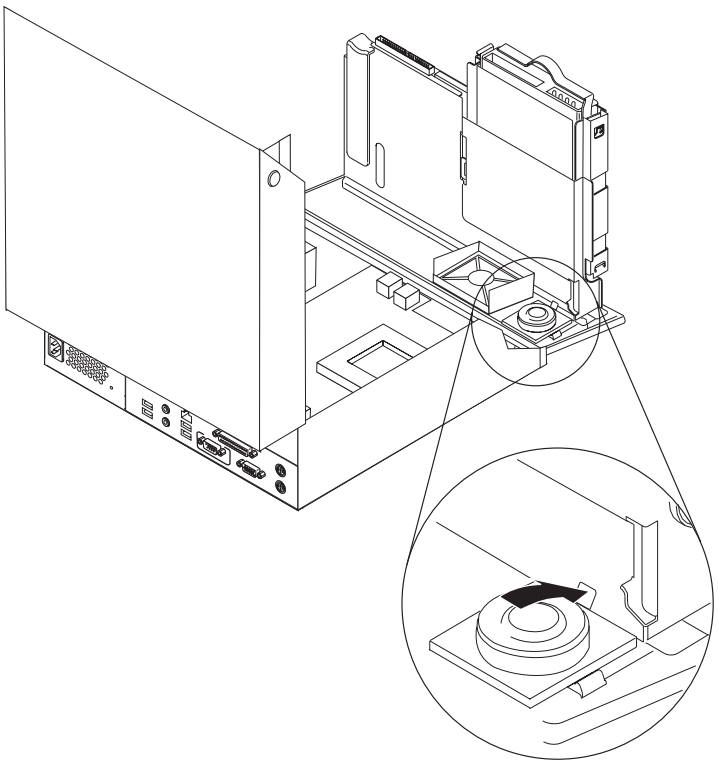
This section provides instructions on how to replace the internal speaker.

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



3. Locate the speaker connector on the system board. See “Identifying parts on the system board” on page 4.
4. Disconnect the speaker cable from the system board.
5. Push downward on the metal tab shown while lifting the speaker out from the computer.

   Note: You might need a flat-blade screwdriver to gently pry the speaker from the metal tabs that secure it.



6. Position the bottom of the new speaker into the metal tabs then pivot the top of the speaker downward until it snaps into position.
7. Connect the speaker cable to the system board. See “Identifying parts on the system board” on page 4.
8. Go to “Completing the parts replacement” on page 26.

Replacing a keyboard

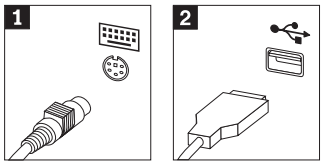
Attention

Do not open your computer or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/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 26.

Replacing a mouse

Attention

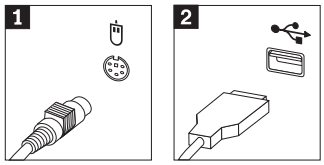
Do not open your computer or attempt any repair before reading the “Important safety information” in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/.

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**. Depending on where your mouse 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.

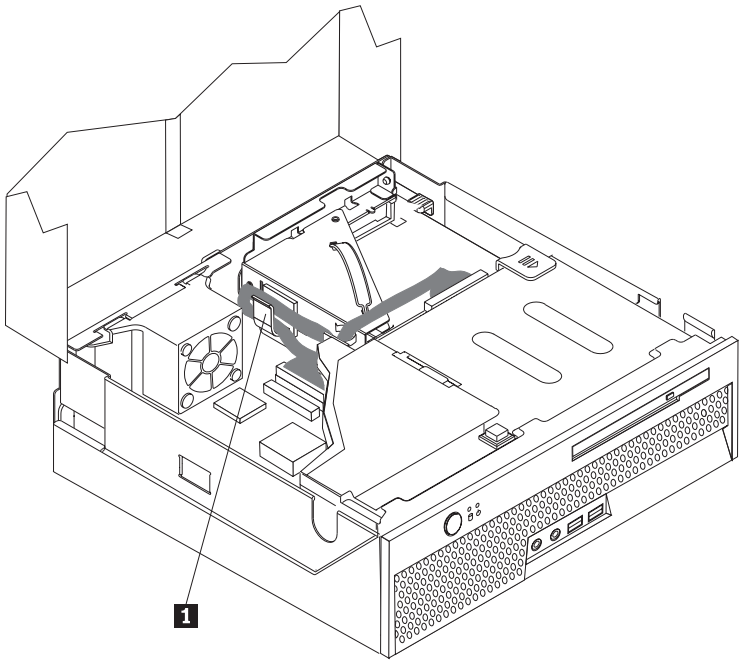


4. Disconnect the failing mouse cable from the computer.
5. Connect the new mouse to the appropriate connector on the computer.
6. Go to "Completing the parts replacement."

Completing the parts replacement

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

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
2. Clear any cables that might impede the replacement of the cover.
3. Lower the drive bay assembly.
4. Make sure all cables are routed correctly through the cable clip **1**.



5. Close the computer cover.
6. If your computer is being placed in the vertical position, attach the floor stand.

   Attention: To prevent overheating and possible component damage, always attach the floor stand when placing the computer in the vertical position.

7. Reconnect the external cables and power cords to the computer. See “Locating the connectors on the rear of your computer” on page 2.
8. If you are replacing the system board, you must update (flash) the BIOS, see “Updating (flashing) BIOS from a diskette or CD-ROM.”
9. To update the configuration, see *“Starting the Setup Utility”* in the *Quick Reference* that was included with your computer.

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*. 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:

Note: An optional USB diskette drive is required to update (flash) BIOS from a diskette.

1. Insert a system program update (flash) diskette or CD-ROM into the diskette drive or optical drive. System program updates are available at http://www.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.

Part Number: 39J8095

Printed in USA

(1P) P/N: 39J8095