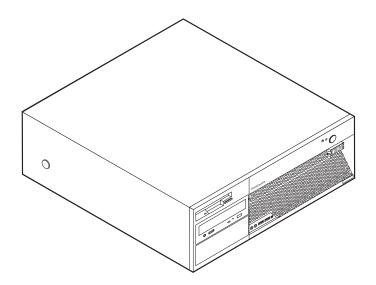
ThinkCentre<sup>™</sup>



# Hardware Replacement Guide Types 8129, 8132, 8133 Types 8134, 8135, 8136



 $\mathrm{Think}\mathrm{Centre}^{^{\mathrm{\tiny TM}}}$ 



# Hardware Replacement Guide Types 8129, 8132, 8133 Types 8134, 8135, 8136

First Edition (February 2005)

## Contents

Overview		-	-		. V
Safety information for replacing CRUs.					. v
Safety information for replacing FRUs.					. v
Additional information resources					. v
Tools required					. vi
Handling static-sensitive devices					. vi
Chapter 1. Locations					. 1
Locating the connectors on the front of	yοι	ır			
computer	•				. 1
Locating the connectors on the rear of y					
Locating components				•	. 3
Identifying parts on the system board .					

Chapter 2	Replacing	hardware.					5
-----------	-----------	-----------	--	--	--	--	---

Removing the cover				. 5
Replacing the power supply .				. 6
Replacing the system board .				. 9
Replacing the microprocessor				. 11
Replacing the hard disk drive				. 16
Replacing the diskette drive .				. 17
Replacing the optical drive .				
Replacing memory modules .				. 20
Replacing a PCI adapter				. 21
Replacing the internal speaker				. 23
Replacing a keyboard				. 24
Replacing a mouse				. 24
Completing the parts replaceme				. 25
Updating (flashing) BIOS from a				
CD-ROM				. 26

## **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:

- Power supply
- · System board
- Microprocessor
- Hard disk drive
- Diskette drive
- Optical drive
- · Memory modules
- 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/site.wss/document.do?lndocid=part-video.

## 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). To obtain a copy of the *HMM*, go to the World Wide Web at http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

## 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, point your browser to: http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video

## **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.

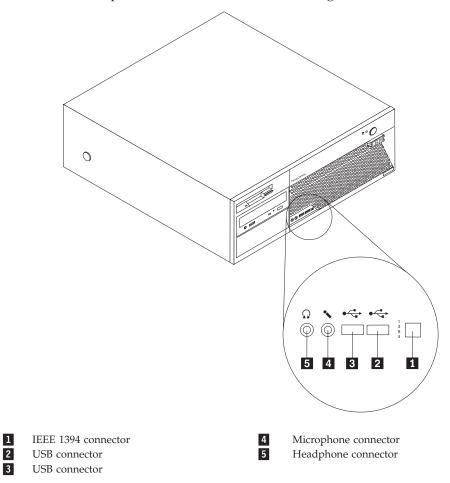
## **Chapter 1. Locations**

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

## Locating the connectors on the front of your computer

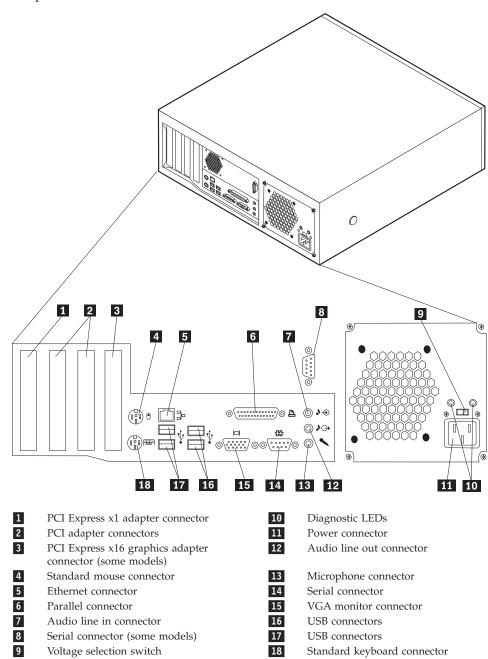
The following illustration shows the location of connectors on the front of the computer.

Note: Not all computer models will have the following connectors.



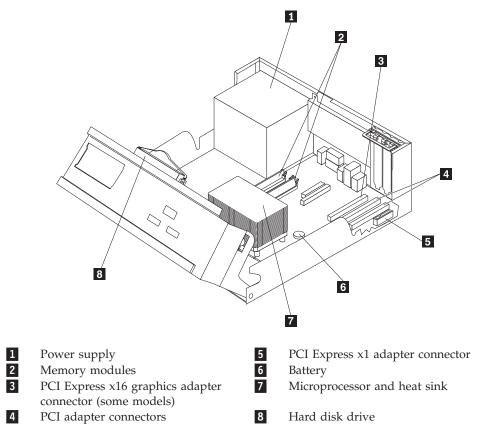
## Locating the connectors on the rear of your computer

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



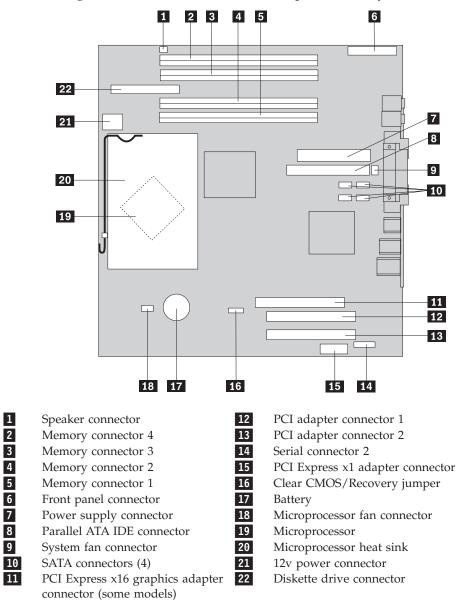
## Locating components

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



## 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.



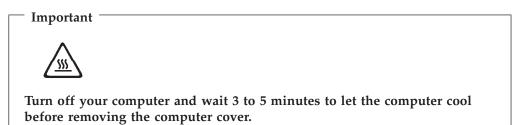
**Note:** Your computer has support for four double data rate 2 (DDR2) dual inline memory modules (DIMMs).

## 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). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

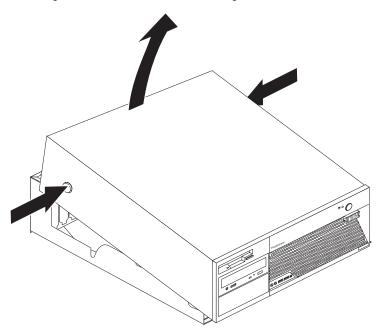
## Removing the cover



To remove the computer cover:

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

5. Press the buttons on the sides of the computer and pivot the rear end of the cover up toward the front of the computer.



## Replacing the power supply

#### Attention

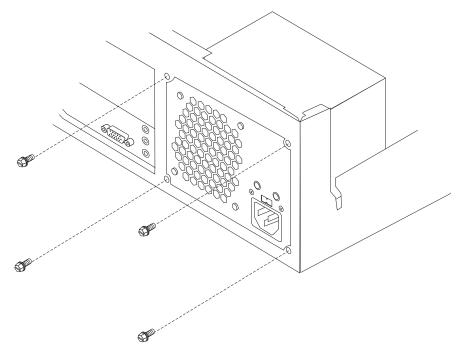
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

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

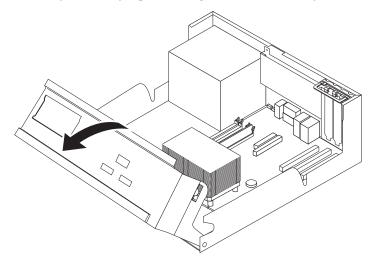
1. Remove the computer cover. See "Removing the cover" on page 5.

2. Remove the four screws at the rear of the chassis.

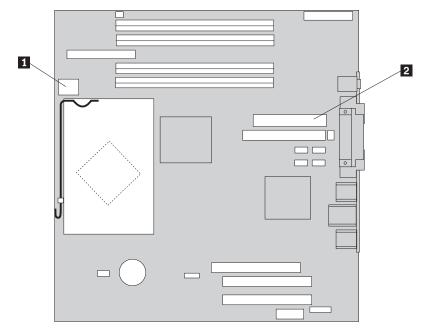
Note: You will need a flat-blade screwdriver.



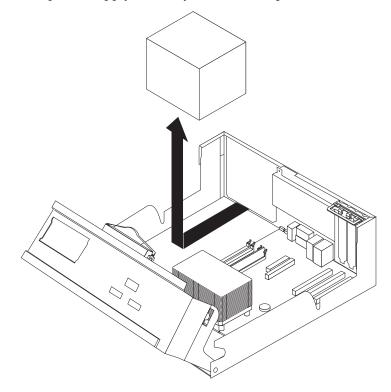
**3**. Pivot the drive bay assembly upward to gain access to the system board.



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



- 5. Disconnect the power supply cables from all of the drives.
- 6. Remove the cables from the cable clips and ties.
- 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 were provided.

- **9**. Install and tighten the four screws at the rear of the chassis to secure the power supply assembly.
- 10. Reconnect the power supply cables to all the drives and the system board.
- 11. Route the cables through the cable clips and ties.
- 12. Go to "Completing the parts replacement" on page 25.

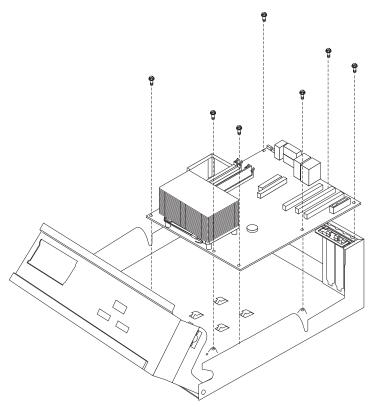
## Replacing the system board

#### Attention

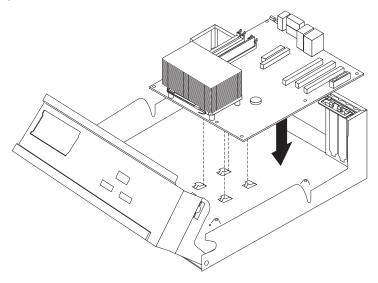
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

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

- 1. Remove the computer cover. See "Removing the cover" on page 5.
- 2. Remove any PCI adapters. See "Replacing a PCI adapter" on page 21.
- **3**. 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.
- 4. Disconnect all cables connected to the system board. See "Identifying parts on the system board" on page 3.
- 5. Remove the seven screws that attach the system board to the chassis and slide the system board toward the drive bay assembly. Carefully lift out the system board.



- **6**. Place the failing system board next to the new system board on a clean, flat surface.
- 7. Remove all memory modules from the failing system board and install them in the same location on the new system board. See "Replacing memory modules" on page 20. Return here after installing the memory modules.
- 8. Remove the microprocessor from the failing system board and install it on the new system board. See "Replacing the microprocessor" on page 11. Return here after replacing the microprocessor.
- **9**. Install the new system board by aligning the slots in the metal plate on the bottom of the system board with the tabs on the chassis, then slide the system board toward the rear of the computer until the screw holes are aligned properly.



#### Important

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

- 10. Install the seven screws that secure the system board to the chassis.
- 11. Reconnect all cables that were disconnected from the system board. See "Identifying parts on the system board" on page 3.
- 12. Replace any PCI adapters that were removed. See "Replacing a PCI adapter" on page 21.
- 13. Go to "Completing the parts replacement" on page 25.

## **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). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

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

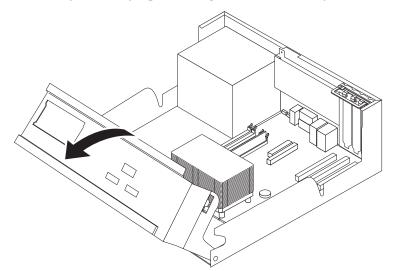
Do not touch the gold contacts on the bottom of the microprocessor. Use the vacuum pen provided to remove and install the microprocessor. If you must touch the microprocessor, touch only the sides.

This section provides instructions on how to replace the microprocessor.

#### Important

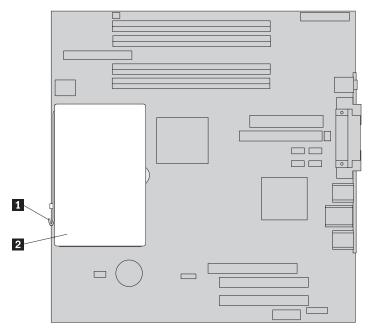
Leave your computer turned off for at least one hour before removing the microprocessor to allow the thermal interface between the microprocessor and the heat sink time to cool down.

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

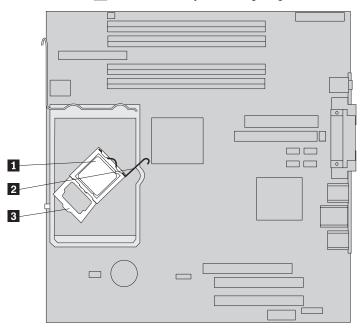


3. Remove the heat sink 2 from the system board by pivoting the lever 1 securing the heat sink until it is fully in the up position. Carefully lift the heat sink off of the system board.

**Note:** If you are only replacing the system board, 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.



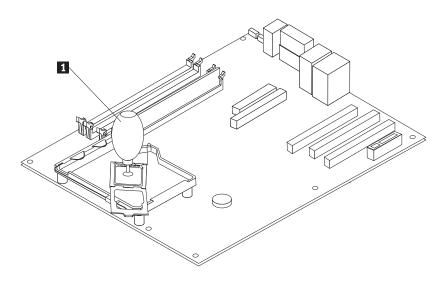
Release the lever 2 securing the microprocessor 1 then pivot the microprocessor retainer 3 until it is fully in the open position.



5. Remove the microprocessor from the system board socket using the vacuum pen **1**.

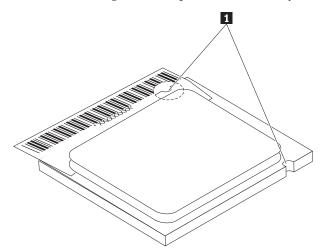
#### — Important

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



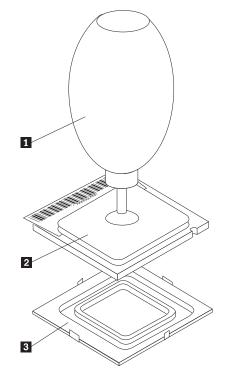
#### Notes:

a. 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.
- 6. Make sure that the lever on the microprocessor retainer is fully in the up position.

7. When installing the new microprocessor 2, loosen the black cover 3 that protects the gold contacts on the microprocessor, 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.

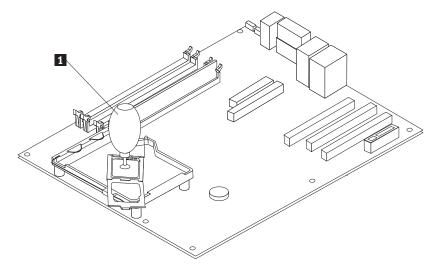


8. Position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

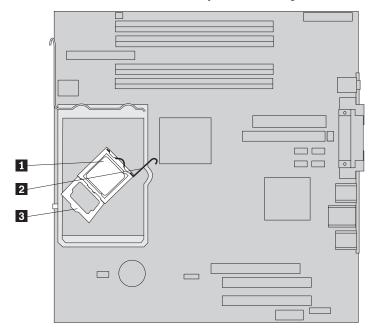
- Important

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

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



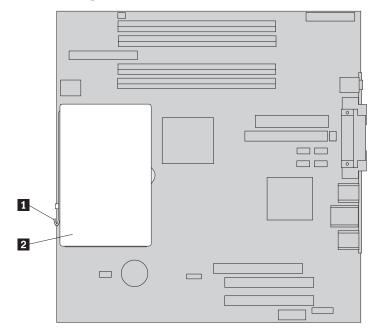
10. Lower the microprocessor retainer **3** and then lower the lever **2** to secure the retainer. Make sure the lever is securely locked into position.



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

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

**Note:** If you are only replacing a system board, install and secure the original heat sink on the microprocessor.



- **12.** If you are replacing the system board, continue at Replacing the system board at step 9 on page 10. If you are replacing the microprocessor, continue at the next step.
- 13. Go to "Completing the parts replacement" on page 25.

## Replacing the hard disk drive

#### Attention

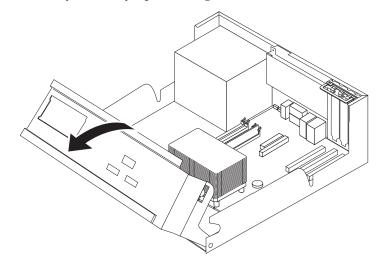
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

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

#### <sup>-</sup> Important

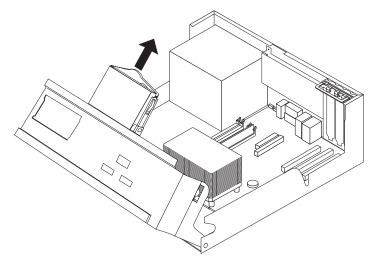
When you receive a new hard disk drive, you will also receive a *Product Recovery CD*. The *Product Recovery CD* will enable you to restore the contents of the hard disk drive to the same state as when your computer was originally shipped from the factory. For more information on recovering factory-installed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

- 1. Remove the computer cover. See "Removing 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. Pull the hard disk drive and bracket out to remove it from the drive bay.



- 5. Note the orientation of the hard disk drive in the plastic bracket.
- 6. Remove the drive by flexing the plastic enough to slide the drive out.
- 7. Install the new hard disk drive into the plastic bracket by flexing the plastic enough to slide the drive in.
- 8. Install the hard disk drive and bracket into the bay until it snaps into position.
- **9**. Locate an available SATA connector on the system board. See "Identifying parts on the system board" on page 3.
- **10.** Connect one end of the signal cable to the drive and the other to an available SATA connector on the system board.
- 11. Connect a power connector to the drive.
- 12. Go to "Completing the parts replacement" on page 25.

## Replacing the diskette drive

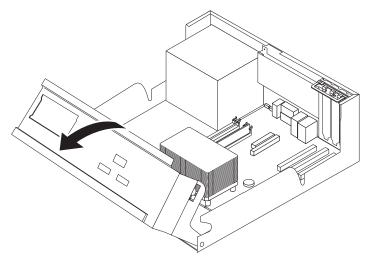
#### Attention

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). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

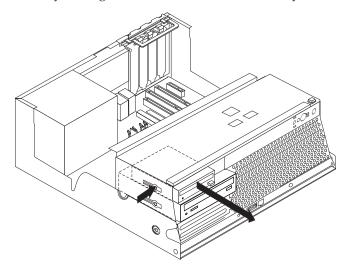
This section provides instructions on how to replace the diskette drive.

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

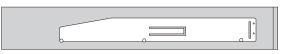
2. Pivot the drive bay assembly upward to gain access to the diskette drive cables.



- 3. Disconnect the signal and power cables from the rear of the diskette drive.
- 4. Release the diskette drive by pressing inward on the blue retainer at the side of the drive.
- 5. Remove the drive by sliding it out the front of the drive bay.



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



- 7. Install the diskette drive into the bay from the front until it snaps into position.
- 8. Connect the signal and power cables to the diskette drive.
- 9. Go to "Completing the parts replacement" on page 25.

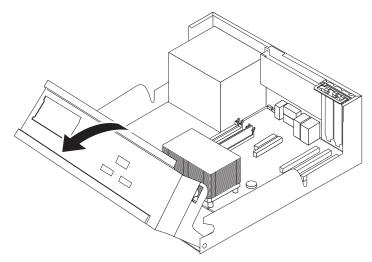
## Replacing the optical drive

#### Attention

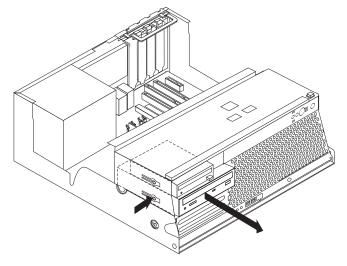
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

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

- 1. Remove the computer cover. See "Removing the cover" on page 5.
- 2. Pivot the drive bay assembly upward to gain access to the optical drive cables.



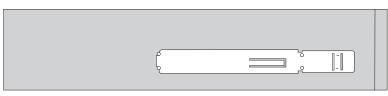
- 3. Disconnect the signal and power cables from the rear of the optical drive.
- 4. Release the optical drive by pressing inward on the blue retainer at the side of the drive.
- 5. Remove the drive by sliding it out the front of the drive bay.



6. Make sure the drive that you are installing is set correctly as either a master or a slave device.

Refer to the documentation that comes with your drive for master/slave jumper information.

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



- 8. Install the drive into the bay until it snaps into position.
- 9. Connect the signal and power cables to the optical drive.
- 10. Go to "Completing the parts replacement" on page 25.

## **Replacing memory modules**

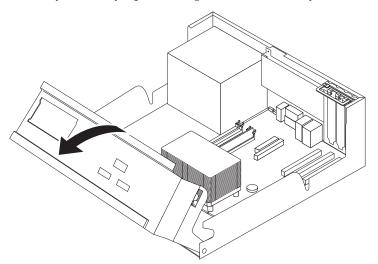
#### Attention

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). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

This section provides instructions on how to replace memory modules.

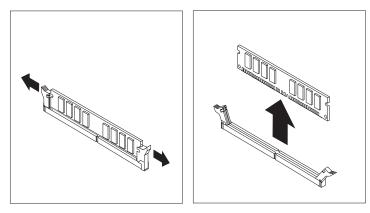
**Note:** Your computer has support for four double data rate 2 (DDR2) dual inline memory modules (DIMMs).

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

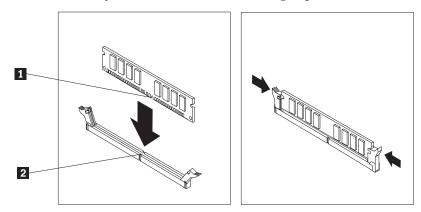


3. Remove any parts that might prevent access to the memory connectors.

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 25.

## **Replacing a PCI adapter**

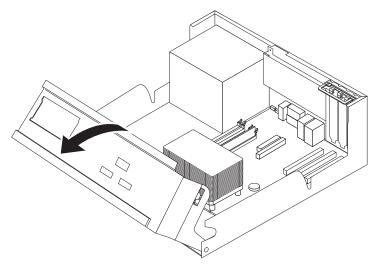
#### Attention

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). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

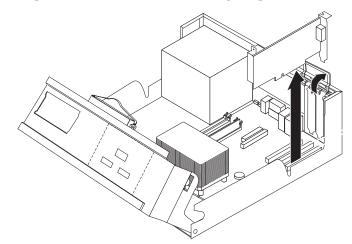
This section provides instructions on how to replace a PCI adapter.

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

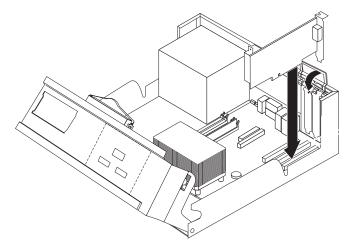
2. Pivot the drive bay assembly upward to gain access to the system board.



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



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



6. Go to "Completing the parts replacement" on page 25.

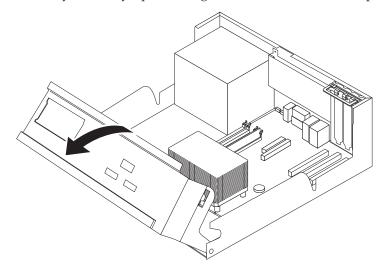
## Replacing the internal speaker

#### Attention

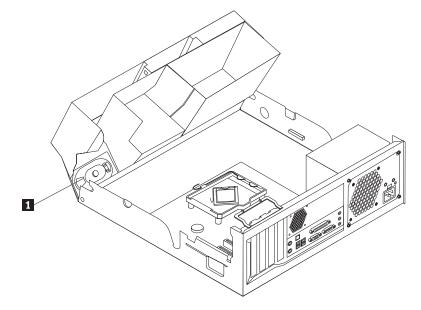
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

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

- 1. Remove the computer cover. See "Removing the cover" on page 5.
- 2. Pivot the drive bay assembly upward to gain access to the internal speaker.



- **3**. Locate the internal speaker connector on the system board. See "Identifying parts on the system board" on page 3.
- 4. Disconnect the speaker cable from the system board.
- 5. Slide the speaker **1** upward to release it from the metal tabs that secure it.



6. Slide the new speaker downward into position so that the metal tabs can secure it.

- 7. Connect the speaker cable to the system board.
- 8. Go to "Completing the parts replacement" on page 25.

## Replacing a keyboard

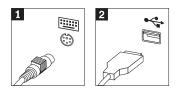
#### Attention

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). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

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 mouse connector.

**Note:** Your keyboard might be connected to a standard keyboard connector **1** or a USB connector **2**. 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 25.

## Replacing a mouse

#### Attention

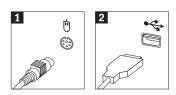
Do not open your computer or attempt any repair before reading the "Important safety information" in the *Quick Reference* that was included with your computer or in the *Hardware Maintenance Manual* (HMM). To obtain copies of the *Quick Reference* or *HMM*, go to http://www.ibm.com/pc/support/site.wss/document.do?lndocid=part-video.

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**. 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.

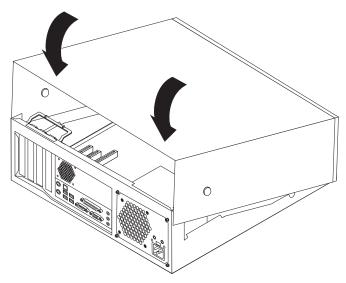


- 4. Disconnect the failing mouse cable from the computer.
- 5. Connect the new mouse to the appropriate connector on the computer.
- 6. Go to "Completing the parts replacement."

## Completing the parts replacement

After working with parts, you need to replace the 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. Lower the drive bay assembly.
- 3. Clear any cables that might impede the replacement of the cover.
- 4. Position the cover over the chassis and pivot it down over the computer until it snaps into place.



- 5. Reconnect the external cables and power cords to the computer. See "Locating the connectors on the rear of your computer" on page 2.
- 6. If a cover lock is installed, lock the cover.
- 7. Reconnect the power cords to properly grounded electrical outlets.
- 8. If you are replacing the system board, you must update (flash) the BIOS, see "Updating (flashing) BIOS from a diskette or CD-ROM" on page 26.

**9**. To update your 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:

- 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.

## IBW ®

Part Number: 39J7755

Printed in USA

(1P) P/N: 39J7755

