ThinkCentre™

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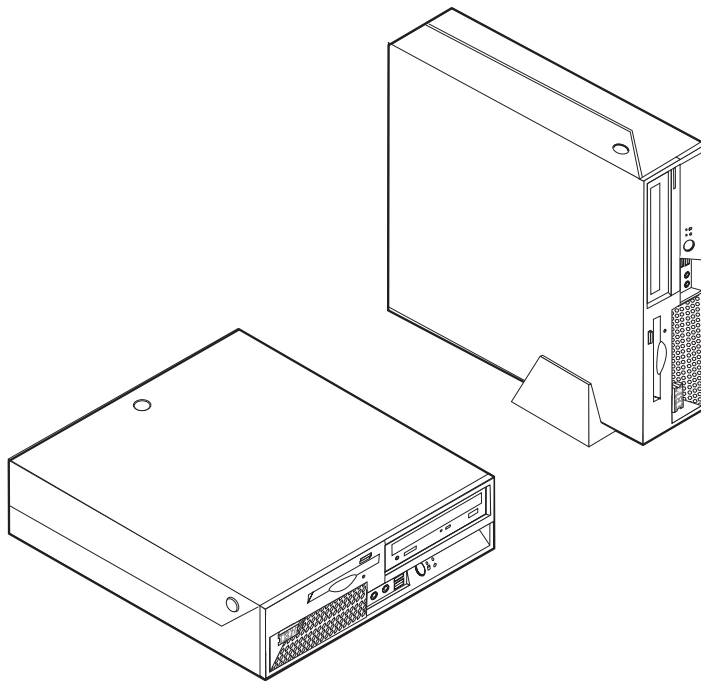
Hardware Removal and Replacement Guide
Types 8424, 8425, 8428
Types 8171, 8172, 8173

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Hardware Removal and Replacement Guide
Types 8424, 8425, 8428
Types 8171, 8172, 8173

Contents

Overview

This guide contains instructions for replacing the following customer replacement units (CRUs):

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

Safety information

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

Additional information resources

If you have Internet access, the most up-to-date manuals for your computer are available from the World Wide Web. To access this information, point your browser to: `http://www.ibm.com/pc/support`

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

Tools required

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

Handling static-sensitive devices

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

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

When you handle CRUs 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 CRUs 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 CRUs and other computer components.

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

Replacing customer replaceable units (CRUs)

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

Opening the cover

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

To open the 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 the floor stand, if attached.
5. If a cover lock is installed, unlock the cover.
6. Press inward on the two buttons and pivot the top cover upward as illustrated.
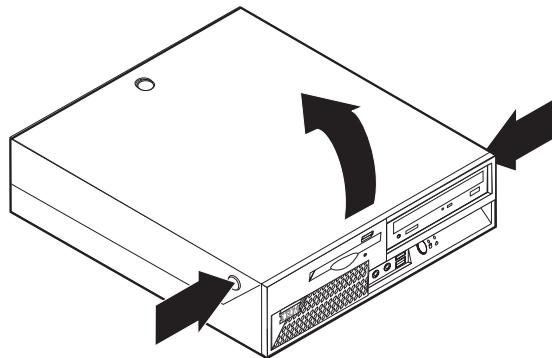
Locating components

The following illustration will help you locate the various components in your computer.
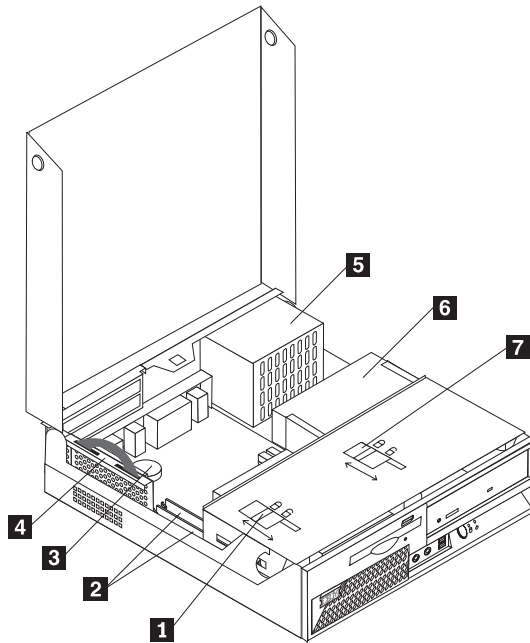
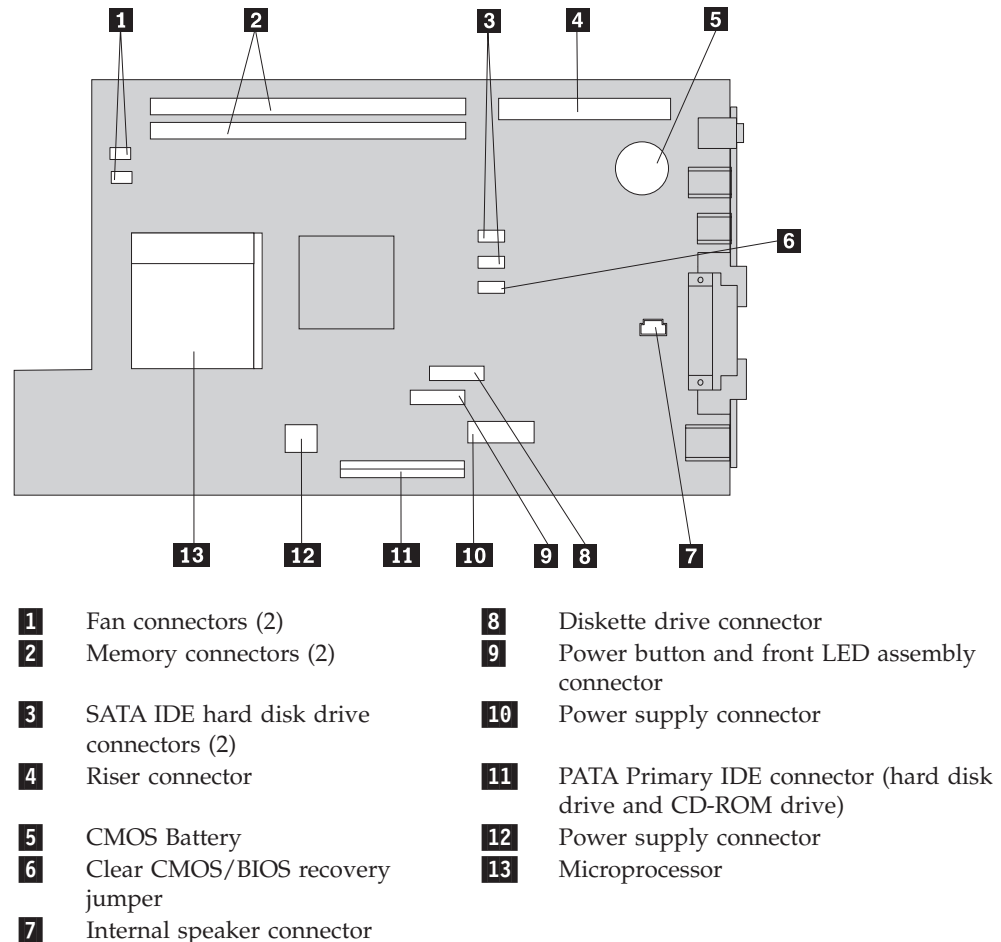|			
1	Diskette drive lock	**5**	Power supply assembly
2	Memory modules	**6**	CD or DVD drive (hard disk drive is under the CD drive)
3	Battery	**7**	CD or DVD drive lock
4	PCI riser		

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	Fan connectors (2)	**8**	Diskette drive connector

1	Fan connectors (2)	**8**	Diskette drive connector
2	Memory connectors (2)	**9**	Power button and front LED assembly connector
3	SATA IDE hard disk drive connectors (2)	**10**	Power supply connector
4	Riser connector	**11**	PATA Primary IDE connector (hard disk drive and CD-ROM drive)
5	CMOS Battery	**12**	Power supply connector
6	Clear CMOS/BIOS recovery jumper	**13**	Microprocessor
7	Internal speaker connector		

# Removing and replacing the power supply

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

To remove and replace the power supply, do the following:

1. Open the cover. Go to "Opening the cover" on page 1.

2. Pivot the drive bay assembly upward to gain access to the cable connections.
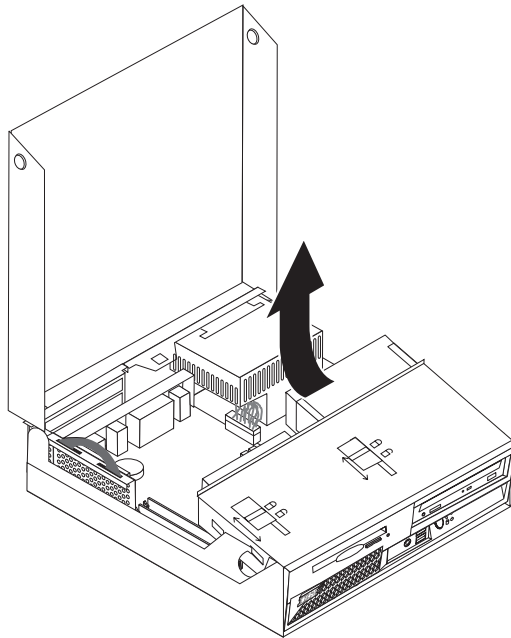
3. Locate the power supply. See "Locating components" on page 2.

   Note: Note the routing of the power supply cables. It is important to route the cables the same way when installing a new power supply assembly.
4. Disconnect the power cables from the hard disk drive and the CD-ROM drive.
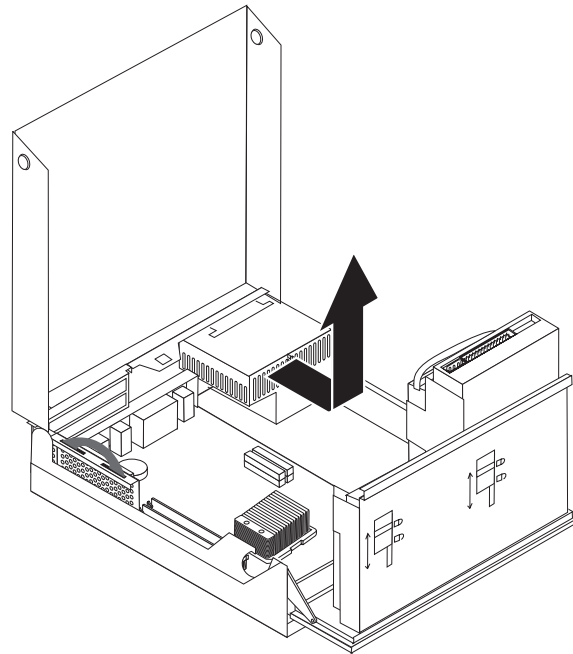5. Disconnect the power cables P1 **1** and P2 **2** from the system board.
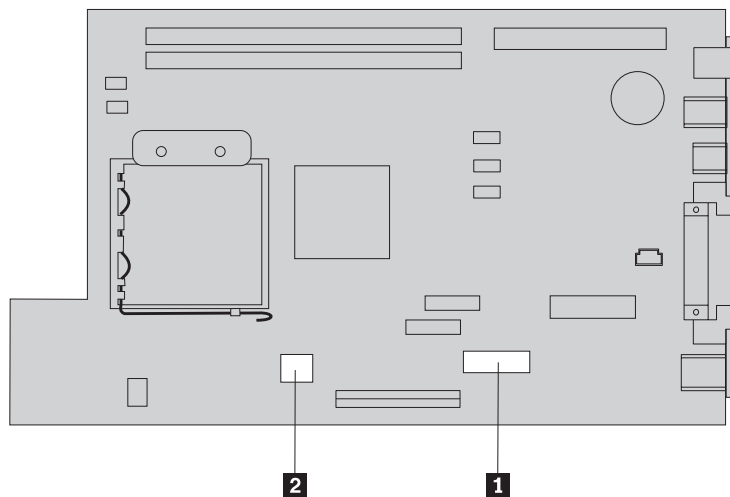
6. Disconnect the wire from the internal speaker connector on the system board. See "Identifying parts on the system board" on page 3.

7. Remove the screws at the rear of the chassis that secure the power supply.
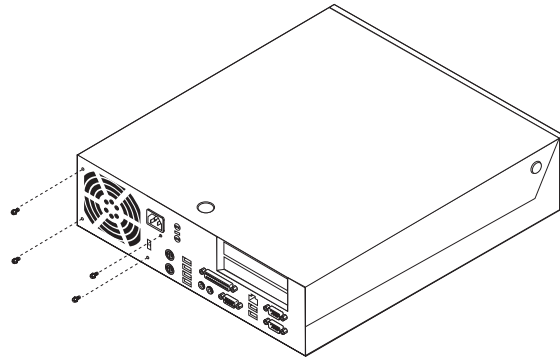
8. Slide the power supply forward and remove from the computer.

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

   Note: Use only the screws provided by IBM.

10. Install and tighten the four screws at the rear of the chassis that secure the power supply.

11. Reconnect the speaker wire to the system board.

12. Reconnect power supply connectors to the system board.

13. Reconnect power supply connectors to the hard disk drive and CD-ROM drive, as required.

14. Correctly route all power supply cables to avoid interference with the drive bay assembly, and fold the ribbon cables **1** and **2** along the existing crease lines.

> ── **Attention** ──
> Keep cables **1** through **3** clear of the hinges and sides of the computer chassis.
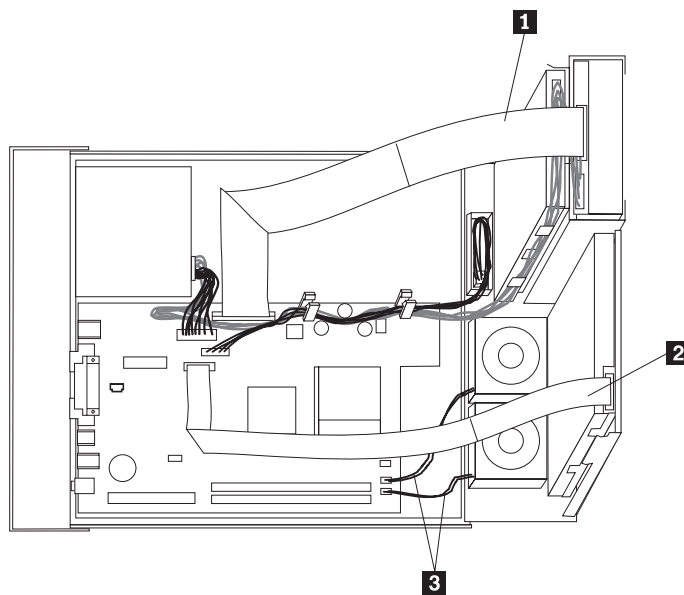
15. Close the cover and reconnect the external cables . Go to "Completing the installation" on page 19.

Removing and replacing the system board assembly

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

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

1. Turn off the computer and allow the computer to cool for one hour.
2. Open the cover. Go to "Opening the cover" on page 1.
3. Pivot the drive bay assembly upward to gain access to the system board.
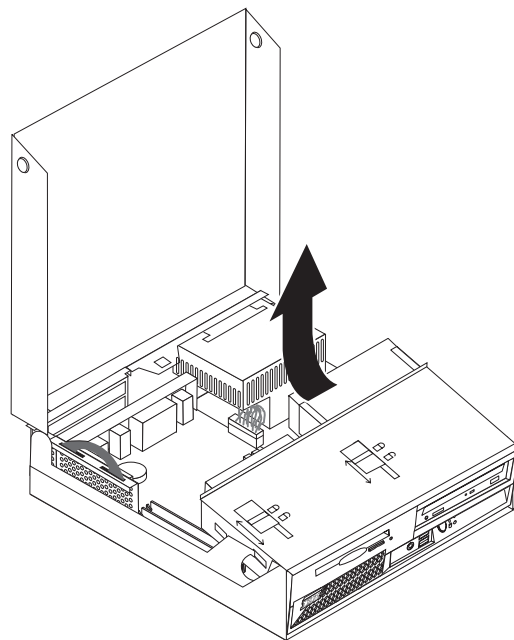
4. While holding the rear of the computer chassis down, pull upward on the handle provided to remove the PCI riser and any adapters that are currently
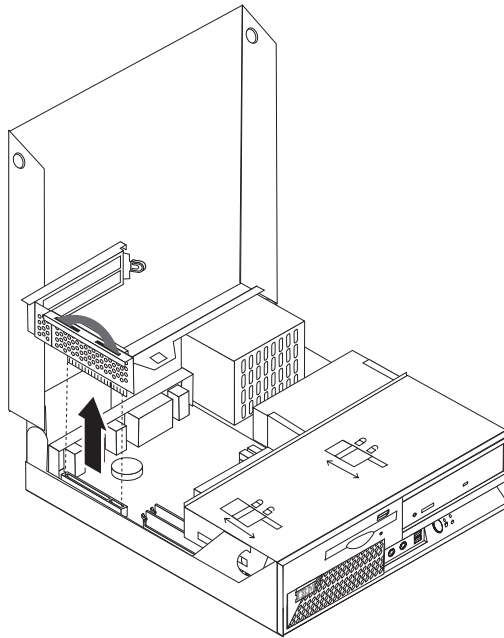
installed.

5. Carefully note the location of all cable connections on the system board. It will be necessary to reconnect them properly after installing the new system board assembly.

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

6. Disconnect the diskette drive cable from the system board by sliding the plastic cable retainer upward to release the cable.

7. Disconnect all other cables connected to the system board. See "Identifying parts on the system board" on page 3 to locate the cables.

8. Remove the power supply. Go to "Removing and replacing the power supply" on page 3.

9. Remove the six screws that secure the system board to the chassis.

10. Using the two blue handles provided, lift the system board assembly out of the computer.
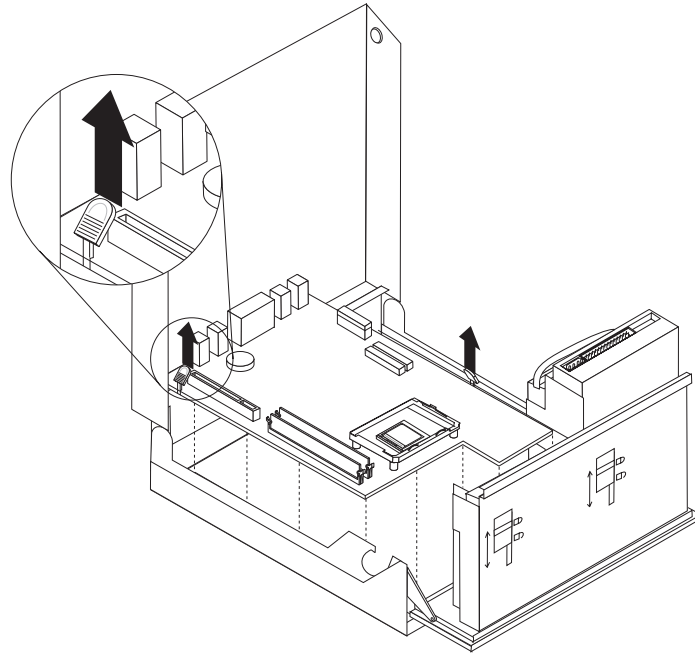
11. Place the old system board next to the new system board on a clean, flat surface.
12. Remove the microprocessor from the old system board. Go to "Removing and replacing the microprocessor" on page 10. Return here after removing the microprocessor.
13. Remove all memory modules from the old system board, and install them on the new system board. Go to "Removing and replacing memory modules" on page 15. Return here after installing the memory modules.
14. Install the new system board into the computer chassis by aligning the two tabs on the rear of the system board with the slots in the rear of the computer chassis. Slide the system board to the rear of the computer until the front edge of the system board fits behind the flange in the front of the chassis and is seated flush to the bottom of the chassis.
15. Install the six screws to secure the system board to the chassis.

    Note: Use only the screws provided by IBM.
16. Reinstall the power supply. See "Removing and replacing the power supply" on page 3.
17. Reconnect all cables that were disconnected from the system board. Make sure all cables are routed correctly.
18. Reinstall the PCI riser and any adapters that are currently installed.
19. Lower the drive bay assembly into the original position.
20. Close the cover and reconnect the external cables . Go to "Completing the installation" on page 19.

Removing and replacing the microprocessor

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

> **Important**
> Shut down and turn off your computer for at least one hour before removing the microprocessor to allow the thermal interface between the microprocessor and the heat sink time to cool down.
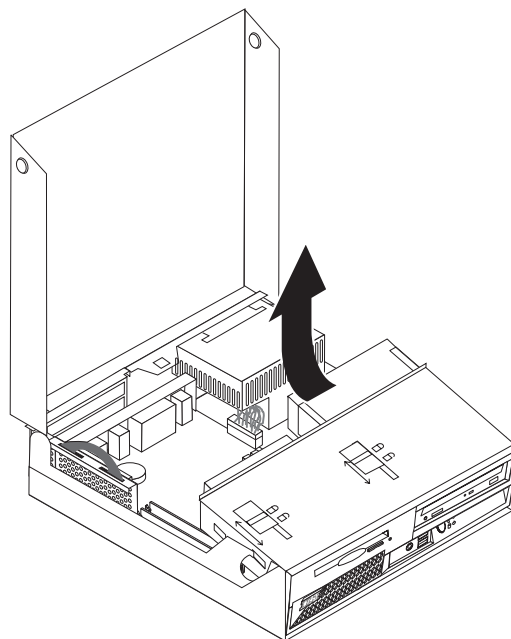
When you receive a new microprocessor, you will also receive a new heat sink and vacuum pen. You must use the new heat sink with the new microprocessor. If you use the old heat sink with the new microprocessor, your computer might overheat causing intermittent problems.

> **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.

To remove the microprocessor, do the following:
1. Turn off the computer and allow it to cool for one hour.
2. Open the cover. Go to "Opening the cover" on page 1.
3. Pivot the drive bay assembly upward to gain access to the microprocessor.

4. Release the lever ▮1 holding the microprocessor heat sink.
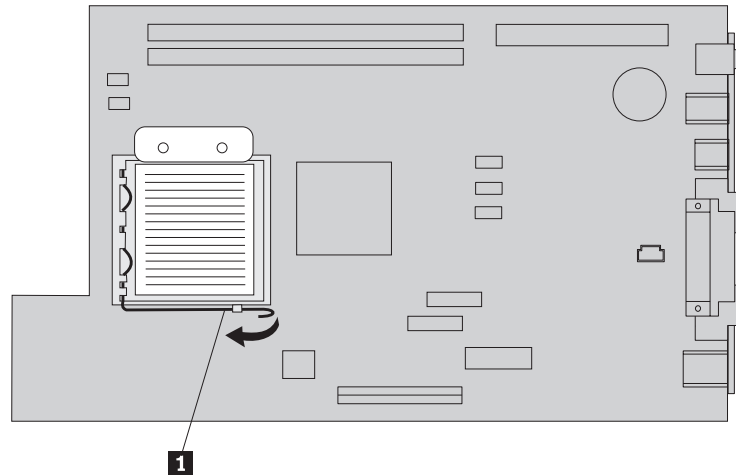
5. Remove the heat sink, and do one of the following:
   - If you are replacing the microprocessor, place the old heat sink aside. You must use the new heat sink shipped with the new microprocessor.

   > **Note**
   > Do not use the old heat sink with the a new microprocessor. If you use the old heat sink with the new microprocessor, your computer might overheat causing intermittent problems.

   - If you are replacing the system board, carefully 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.

6. Release the lever ▮3 holding the microprocessor retainer ▮1 , and pivot the retainer to the open position.
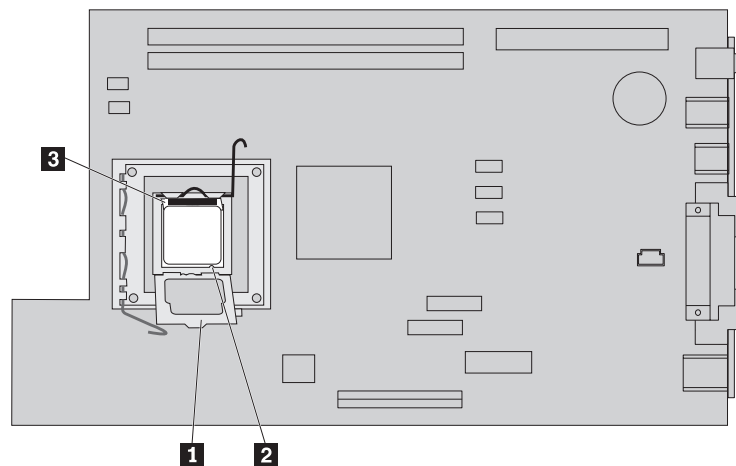
Notes:

a. Notice of the orientation of the notches `1` on the microprocessor . This is important when reinstalling the microprocessor on the system board.
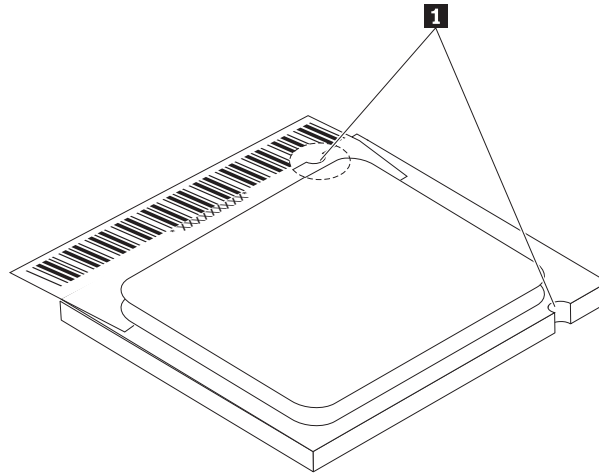
b. Do not drop anything on the socket while it is open. Keep all contacts as clean as possible.

7. To install the microprocessor, do **one** of the following:

Attention

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


Important

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

- If you are installing a **new** microprocessor:
 a. Remove the old microprocessor using the vacuum pen and place the microprocessor aside.

b. Remove the new microprocessor from its static-protective package.
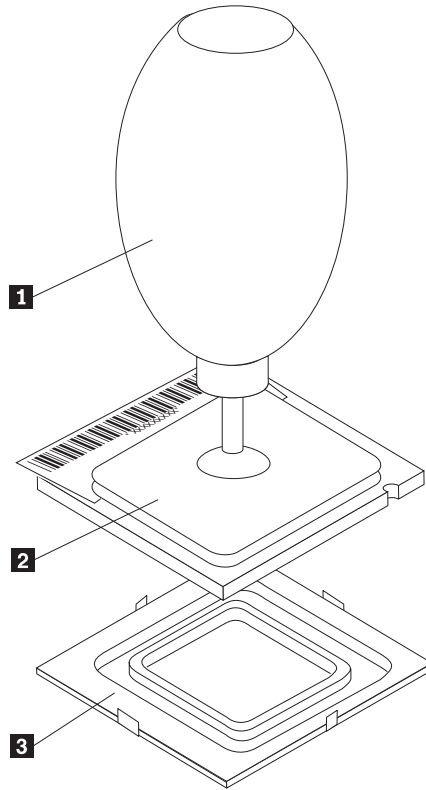
c. Hold the microprocessor **2** by its sides and loosen the black cover **3** on the microprocessor, but do not remove the black cover.

d. Place the microprocessor on the static-protective package.

e. Use the vacuum pen **1** to pick up the new microprocessor, and remove the black cover.

f. Place the black cover on the old microprocessor to protect the gold contacts.

g. Install the new microprocessor by inserting it straight down into the socket.

- If you are **replacing** the system board:

    a. Use the vacuum pen **1** to pick up the microprocessor from the old system board.
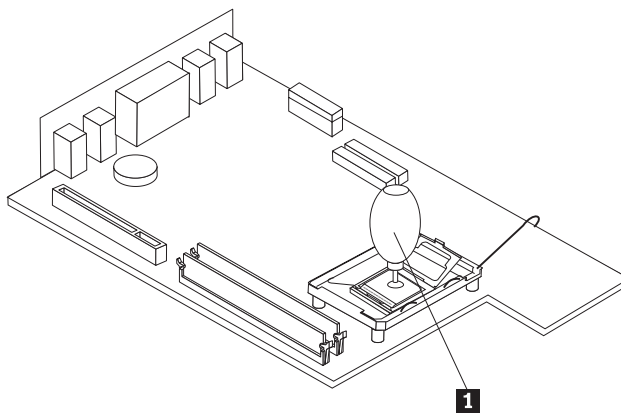
b. Install the microprocessor by inserting it straight down into the socket of the new system board.

8. Pivot the retaining plate **1** closed, and lock the lever **3** to secure the microprocessor **2** in place. Be sure to engage the retainer tab when locking the microprocessor.
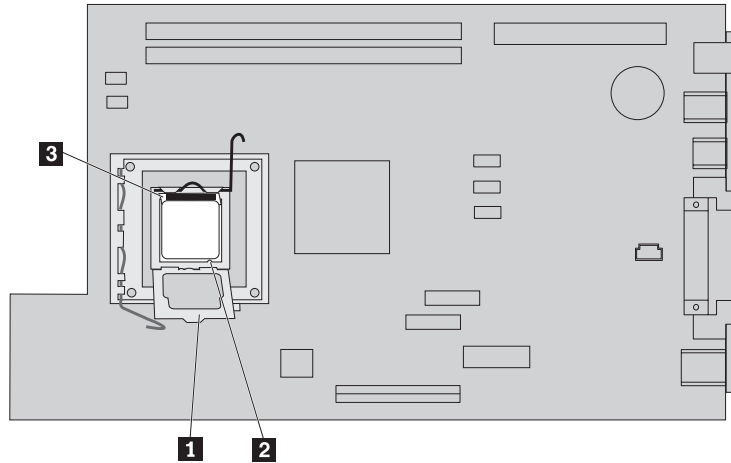
9. Do one of the following:
   - If you have replaced the microprocessor, place the **new** heat sink on the microprocessor, and lower the lever into the locked position.

   > **Note**
   >
   > Do not use the old heat sink with the a new microprocessor. If you use the old heat sink with the new microprocessor, your computer might overheat causing intermittent problems.

   - If you have replaced the system board:
     a. A black cover will cover the retaining plate protecting the contacts on the new system board. Remove this black cover after you have locked the microprocessor in place. Place this cover on the retaining plate of the old system board.
     b. Reinstall the **original** heat sink on the microprocessor, and lower the lever into the locked position. Return to the system board procedure.

10. Close the cover and reconnect the external cables . Go to "Completing the installation" on page 19.

Removing and replacing memory modules

> **Attention**
>
> Do not open your computer or attempt any repair before reading the "Safety notices" in the *Quick Reference* that was included with your computer. If you no longer have this copy of the *Quick Reference*, you can obtain one online from the IBM Web site at http://www.ibm.com/pc/support.
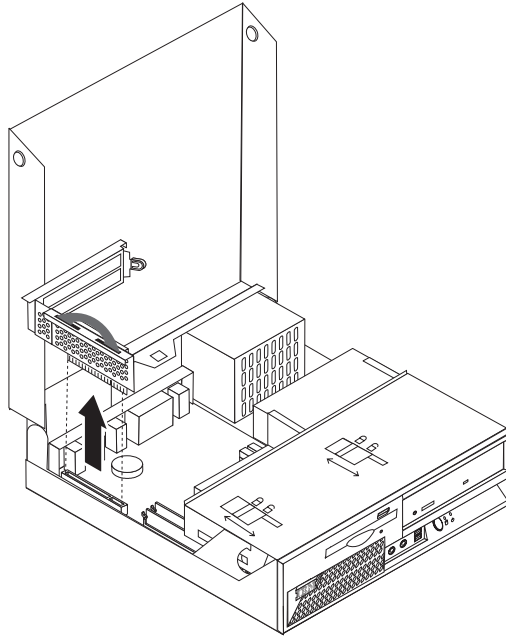
To remove and replace the memory modules:

1. Open the cover. Go to "Opening the cover" on page 1.
2. Pivot the drive bay assembly upward to gain access to the system board.
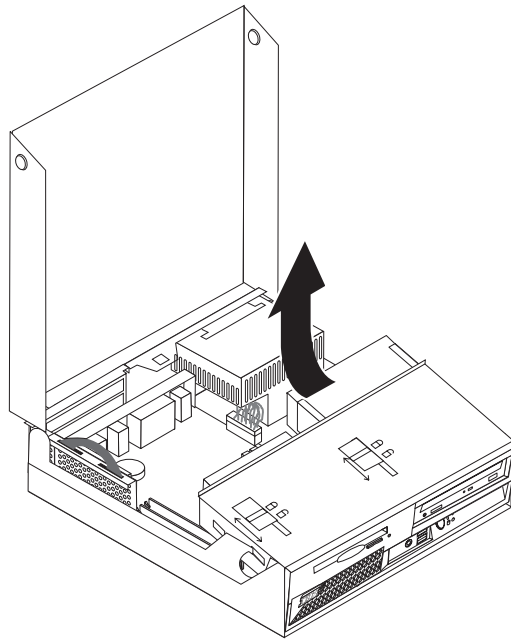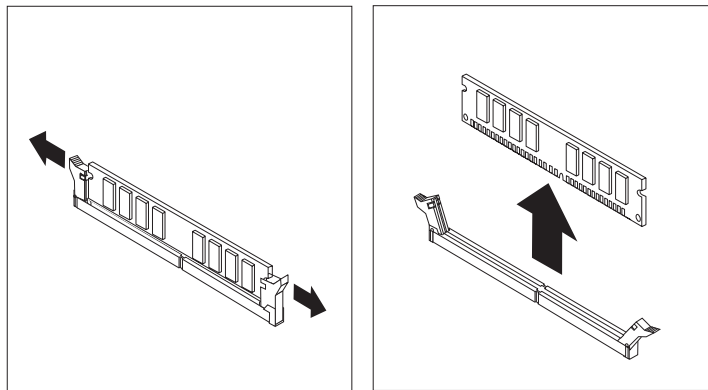
3. While holding the rear of the computer chassis down, pull upward on the handle provided to remove the PCI riser and any adapters that are currently
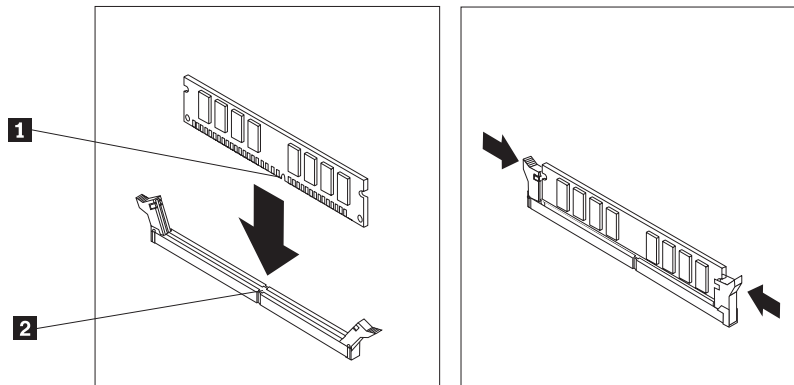
installed.

4. Locate the memory connectors. See "Locating components" on page 2.
5. Open the retaining clips, and lift the memory module out of its connector.

6. Insert the replacement memory module in the memory connector. Ensure the notch on the replacement 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.

7. Reinstall the PCI riser and adapters if they were removed.
8. Pivot the drive bay assembly back to the original position.
9. Close the cover and reconnect the external cables . Go to "Completing the installation" on page 19.

Removing and replacing a hard disk drive

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

1. Open the cover. Go to "Opening the cover" on page 1.
2. Pivot the drive bay assembly upward to gain access to the cable connections.
3. If a CD drive is installed, to disconnect the signal cable from the drive to access the hard disk drive cables.

   Note: Blue straps are provided to help when disconnecting cables.
4. Disconnect the signal and power cables from the hard disk drive.
5. Pivot the hard disk drive to the rear, then pull the hard disk drive out of the hard drive bay by pulling on the blue handle.
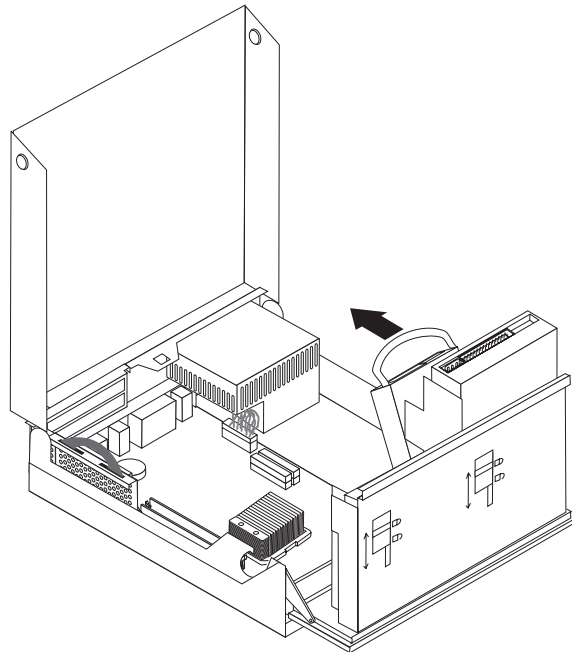
6. Remove the old hard disk drive from the blue bracket by flexing the bracket. Do not touch the circuits **5** on the hard disk drive.
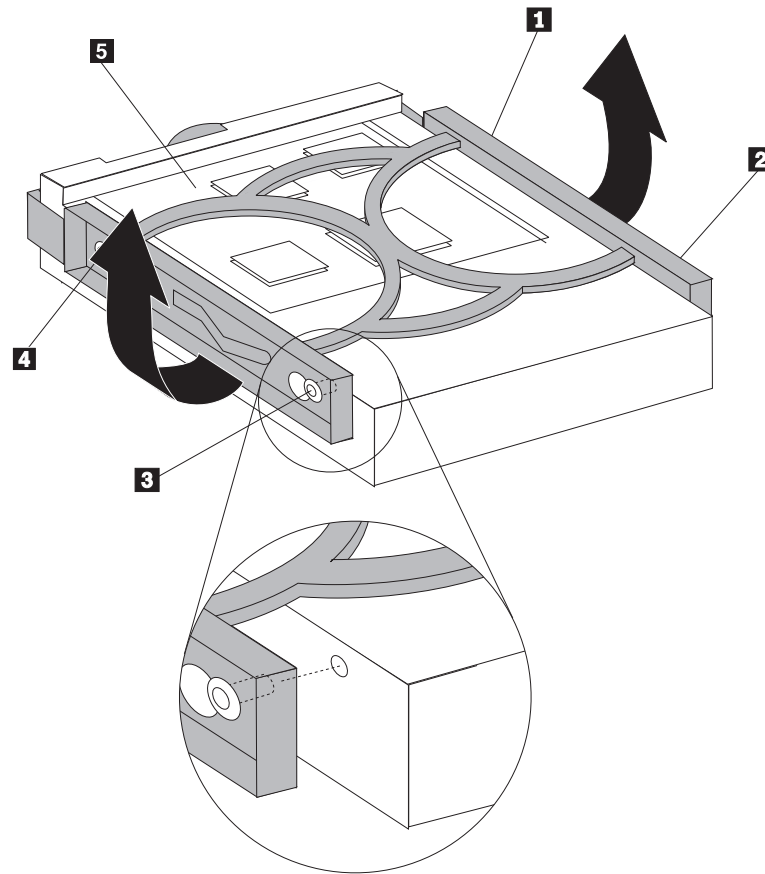
7. Insert the new hard disk drive into the blue bracket aligning the pins **1** through **4** on the bracket with the holes in the hard disk drive.
8. Insert the hard disk drive into hard disk bay with the circuits facing up and snap it into position.
9. Connect a power connector to the drive.
10. Reconnect the CD drive cable.
11. Lower the drive bay assembly into the original position.
12. Close the cover and reconnect the external cables . Go to "Completing the installation."

Completing the installation

After replacing the CRUs, you need to close the cover and reconnect cables, including telephone lines and power cords. Also, depending on the CRU that was replaced, you might need to confirm the updated information in the IBM Setup Utility program. See "Starting the IBM Set Utility" in your *Quick Reference*.

To complete the CRU 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 2 for the location of various components.
2. Correctly route all power supply cables to avoid interference with the drive bay assembly, and fold the ribbon cables **1** and **2** along the existing crease lines.

> **Attention**
> Keep cables **1** through **3** clear of the hinges and sides of the computer chassis.
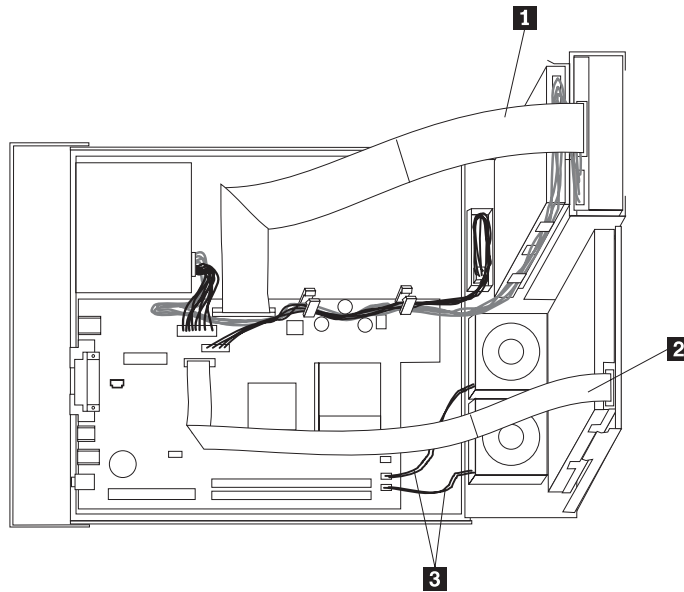
3. Make sure that the drive locks on the drive bay assembly are both in the **locked position**. Otherwise, you cannot close the cover.
4. Close the cover.
5. If a cover lock is installed, lock the cover.
6. If your computer is being placed in the vertical position, attach the floor stand.

   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. Plug the power cord into the computer then into a properly grounded power receptacle.
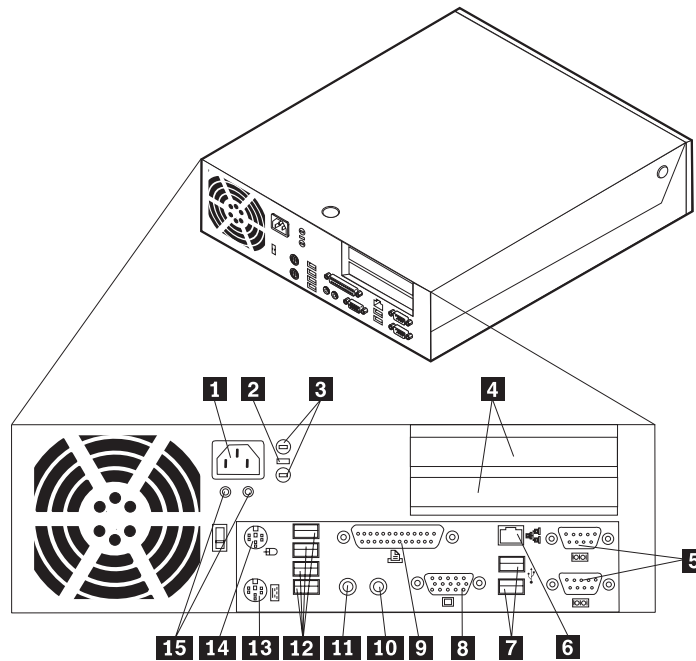
1	Power cord connector	**9**	Parallel connector
2	Cable lock latch	**10**	Audio line-in connector
3	Rope clip (U-bolt) holes	**11**	Audio line-out connector
4	PCI and PCI express adapter slots	**12**	USB connectors (4)
5	Serial connectors (2)	**13**	PS/2 keyboard connector
6	Ethernet connector	**14**	PS/2 mouse connector
7	USB connectors (2)	**15**	LEDs
8	VGA monitor connector		

8. If you are replacing the system board, you must update (flash) the BIOS, see "Updating (flashing) BIOS from a diskette."

9. To update your configuration, see "Starting the IMB Setup Utility" in the *Quick Reference* that was included with your computer.

Updating (flashing) BIOS from a diskette

Important

Start the IBM Setup Utility program to view your system information. See "Starting the IBM 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, do the following:

1. Insert a system program update (flash) diskette into the diskette drive (drive A) in your computer. 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.

IBM ®

Part Number: 19R0821

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