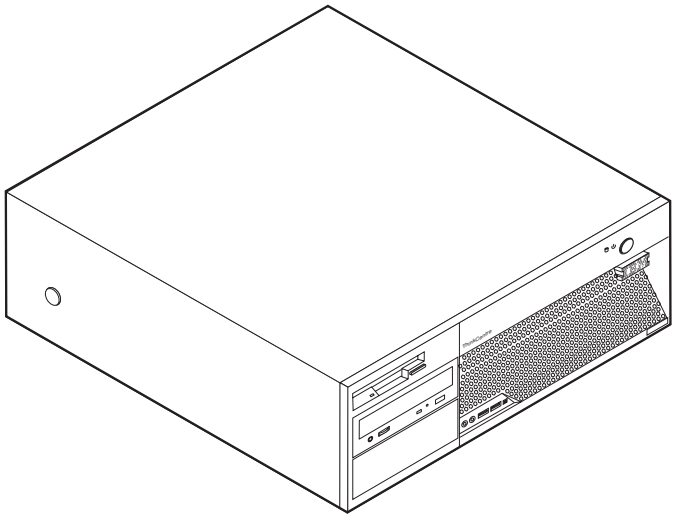
ThinkCentre™

IBM

Hardware Removal and Replacement Guide
Types 8141, 8142, 8145
Types 8420, 8421, 8426



ThinkCentre™

Hardware Removal and Replacement Guide
Types 8141, 8142, 8145
Types 8420, 8421, 8426

First Edition (May 2004)

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Overview

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

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

Information resources

The *Quick Reference* that comes with your computer provides information for installing your computer and starting the operating system. It also includes basic troubleshooting information, software recovery procedures, help and service information, and warranty information.

Access IBM, on your desktop, provides a link to more information about your computer.

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

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

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

Tools required

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

Handling static-sensitive devices

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

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

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

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters and memory modules by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.

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- When you install a new option, touch the static-protective package containing the option to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the option and install it directly in the computer without setting the option down. When this is not possible, place the static-protective package that the option came in on a smooth, level surface and place the option on it.
- Do not place the option on the computer cover or other metal surface.

Replacing customer replaceable units (CRUs)

Attention

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

Removing the cover

Important

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

To remove the cover:

1. Shut down your operating system, remove any media (diskettes, CDs, or tapes) from the drives, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer.

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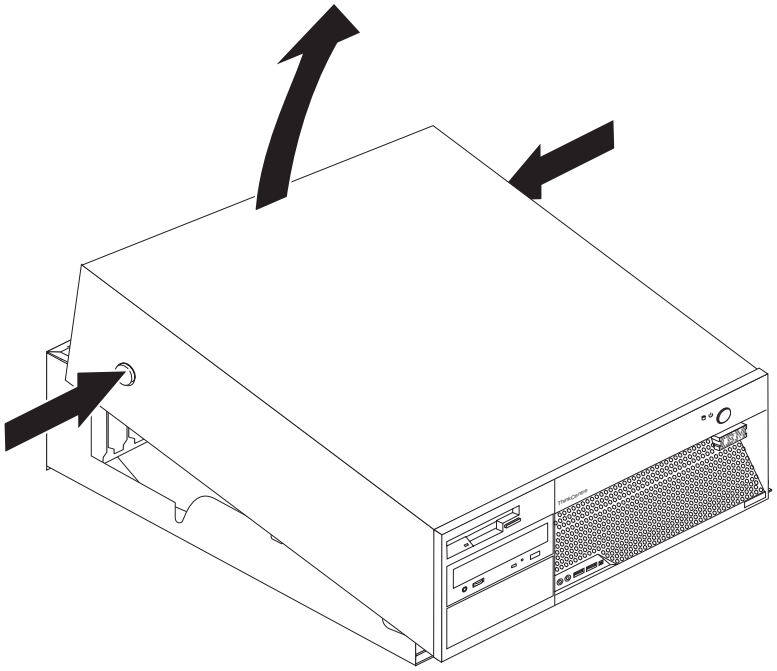
4. Press the buttons on the sides of the computer and pivot the rear end of the cover up toward the front of the computer.



Removing and replacing the power supply

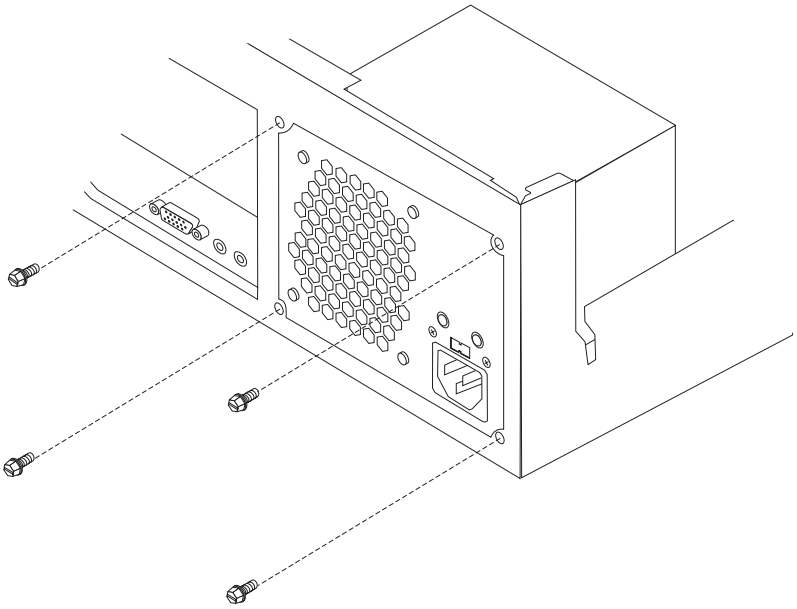
Attention

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

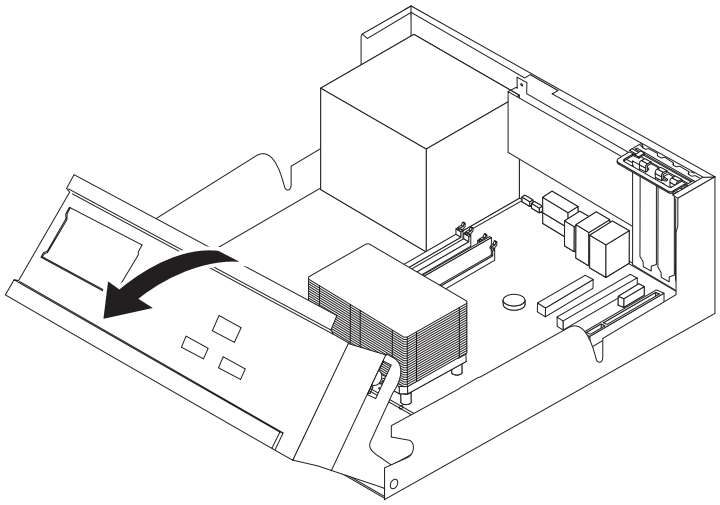
This section provides instructions on how to remove and replace the power supply.

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

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



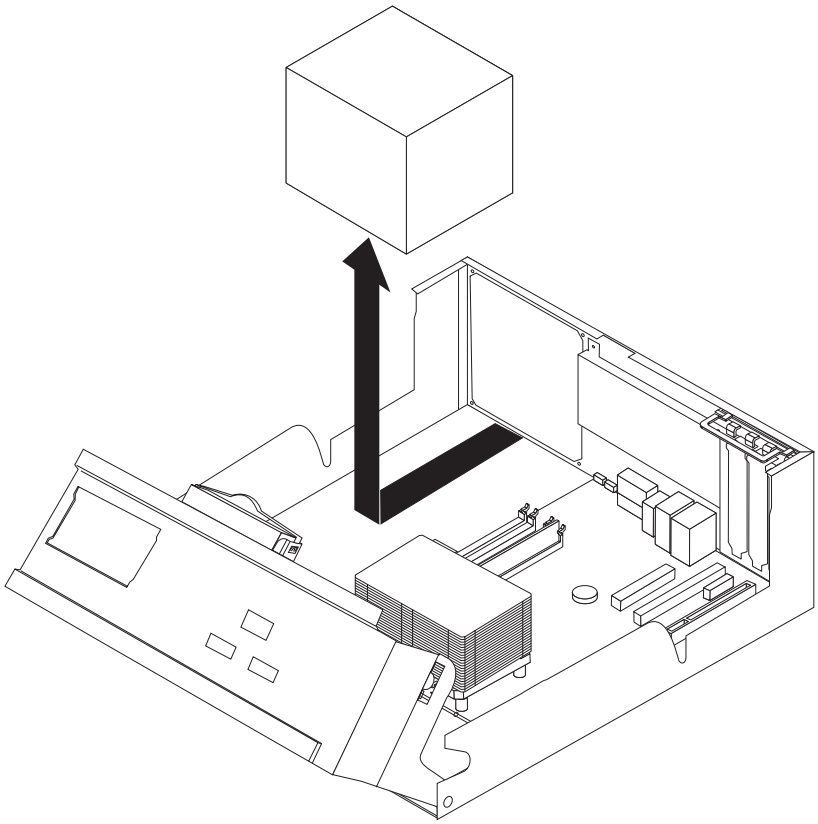
3. Rotate the drive bay assembly upward to gain access to the system board.



4. Disconnect all power supply cables from the drives and the system board. Remove the cables from the cable clips and ties. See Figure 1 on page 5.

   Note: Take note of the locations of the power supply cables.

5. Remove the power supply assembly from the computer.



6. 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 provided by IBM.
7. Install and tighten the four power supply assembly screws into the rear of the chassis.
8. Route the cables through the cable clips and ties. Reconnect all the power supply cables to the drives and the system board.
9. To complete the installation, go to "Completing the CRU replacement" on page 16.

Removing and 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. 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.

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

1. Remove the cover. See "Removing the cover" on page 1.
2. Remove any PCI adapters. See "Removing and replacing a PCI adapter" on page 15.

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.

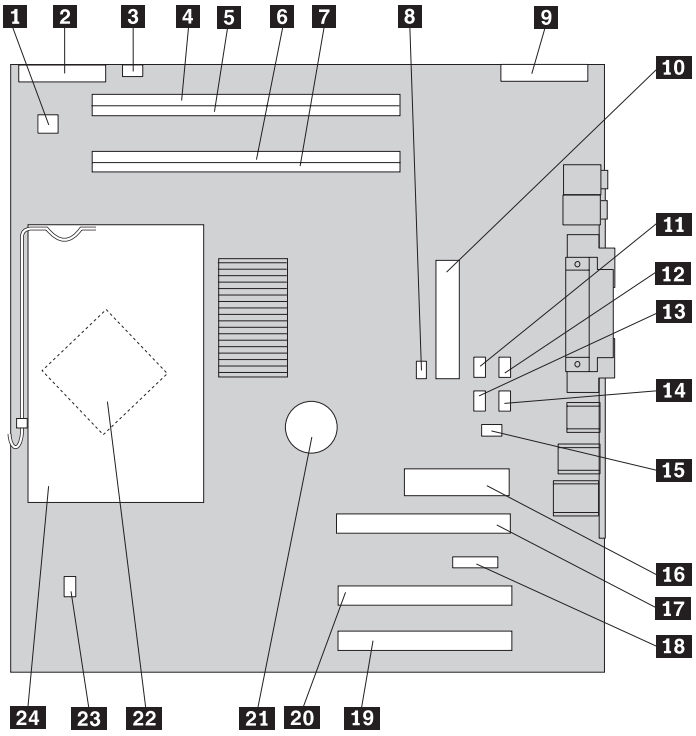
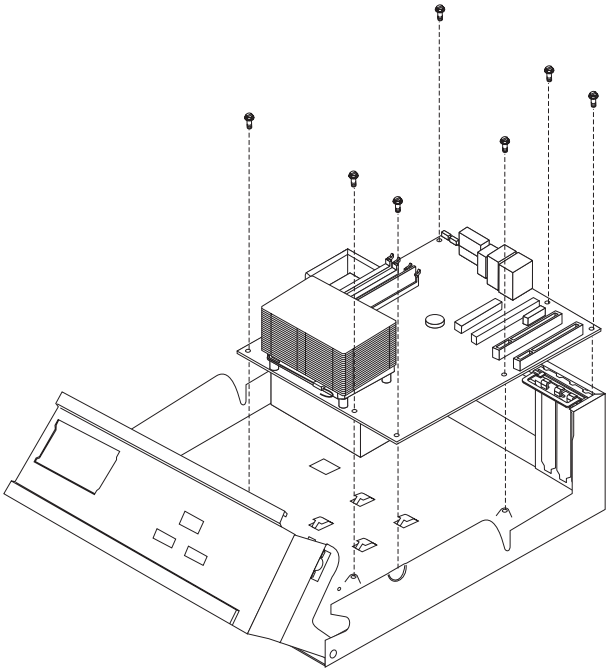


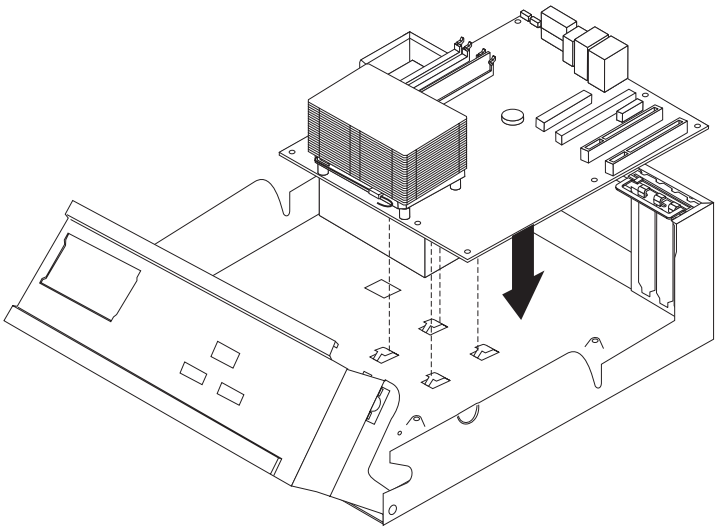
Figure 1. System board

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

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. Take note of the location of the DIMMs and remove them from the system board. See "Removing and replacing memory" on page 13.
7. Install the DIMMs on the new system board in the same location as they were on the system board being replaced.
8. Remove the microprocessor from the failing system board and install it on the new system board. See "Removing and replacing the microprocessor" on page 7.
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.



Important

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

10. Install the screws that secure the system board to the chassis.
11. Reconnect all cables that were disconnected from the system board. See Figure 1 on page 5.
12. Replace any PCI adapters that were removed. See "Removing and replacing a PCI adapter" on page 15.
13. To complete the installation, go to "Completing the CRU replacement" on page 16.

Removing and replacing the microprocessor

Attention

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

Important

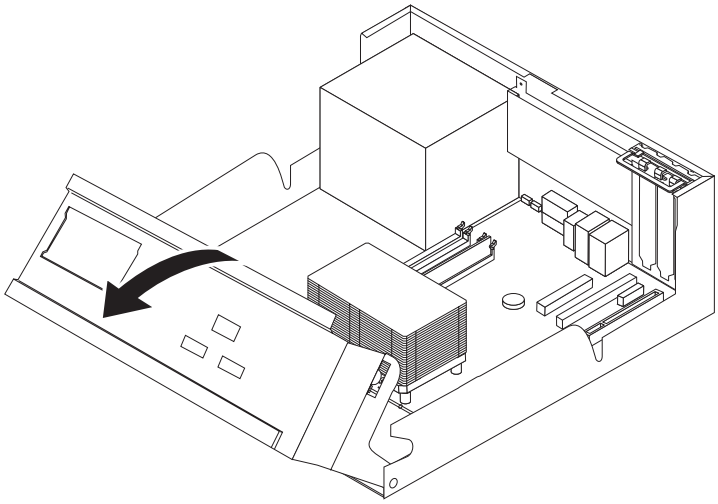
Shut down and turn off your computer for at least one hour before removing the microprocessor to allow the thermal interface between the microprocessor and the heat sink time to cool down.

When you receive a new microprocessor, you will also receive a new heat sink and vacuum pen. You must also replace the heat sink when replacing the microprocessor. If you use the old heat sink with the new microprocessor, your computer might over heat and periodically shut down.

This section provides instructions on how to remove and replace the microprocessor.

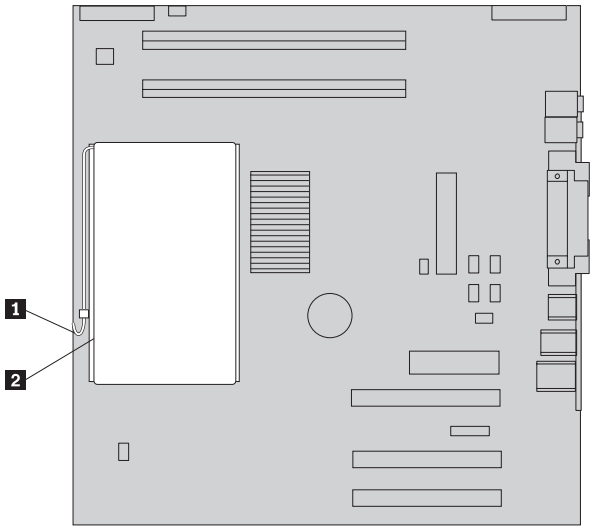
1. Remove the cover. See "Removing the cover" on page 1.

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

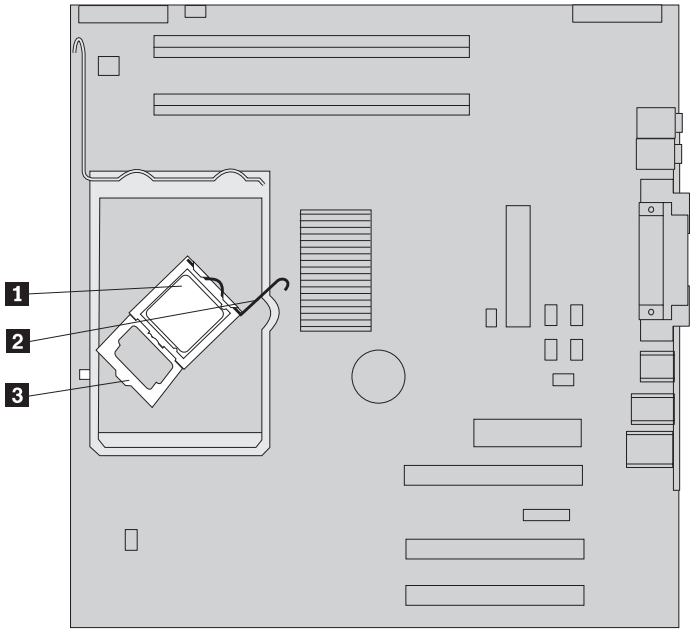


3. Remove the heat sink **2** from the system board by rotating the lever **1** securing the heat sink until it is fully in the up position. Carefully lift the heat sink off of the system board.

   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.

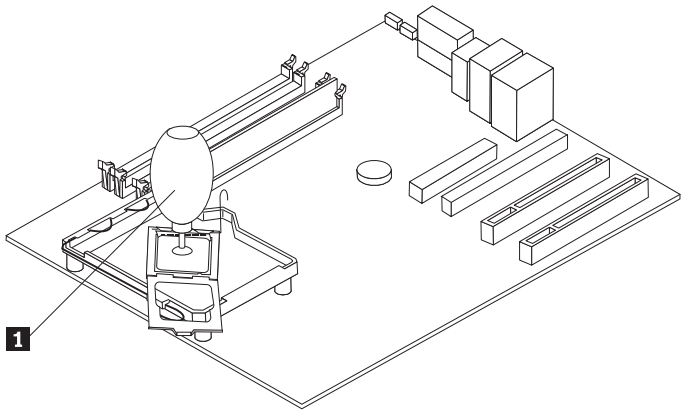


4. Release the lever **2** securing the microprocessor **1** then rotate the microprocessor retainer **3** until it is fully in the up position.



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.



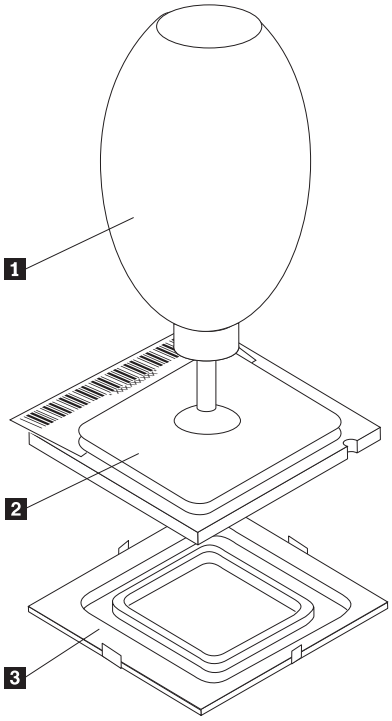
Notes:

a. Take notice of the orientation of the notches 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.

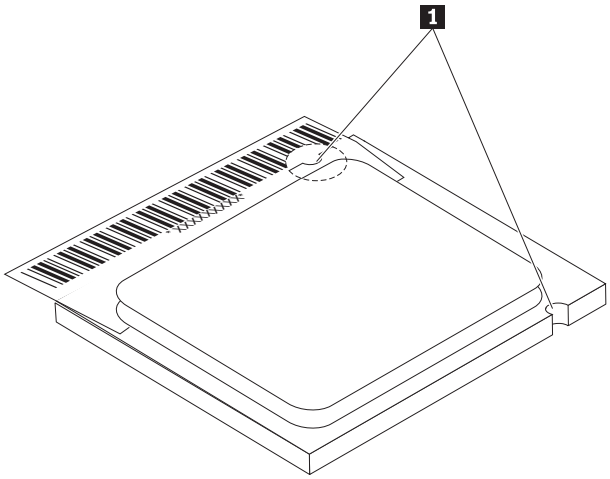
7. When installing a new microprocessor 2 , loosen the black cover 3 that protects the gold contacts on the microprocessor, but do not remove it. Use the vacuum pen 1 to pick up the new microprocessor then completely remove the black cover.



8. Position the microprocessor so that the notches 1 on the microprocessor are aligned with the tabs in the microprocessor socket.

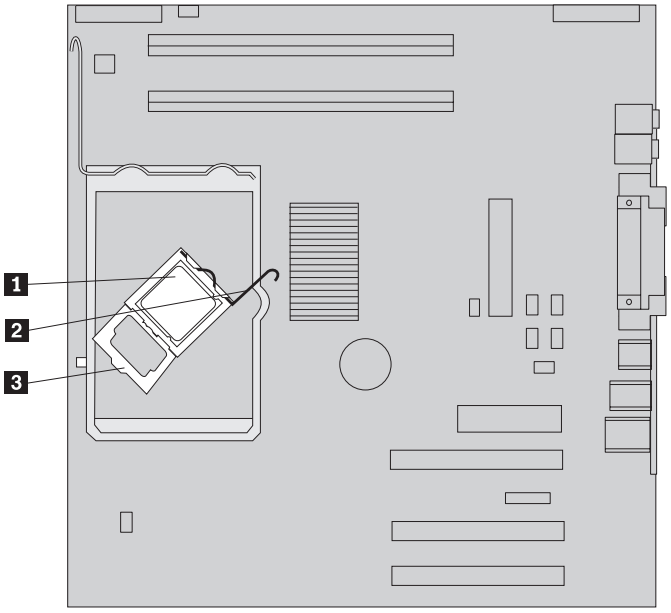
Important

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



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

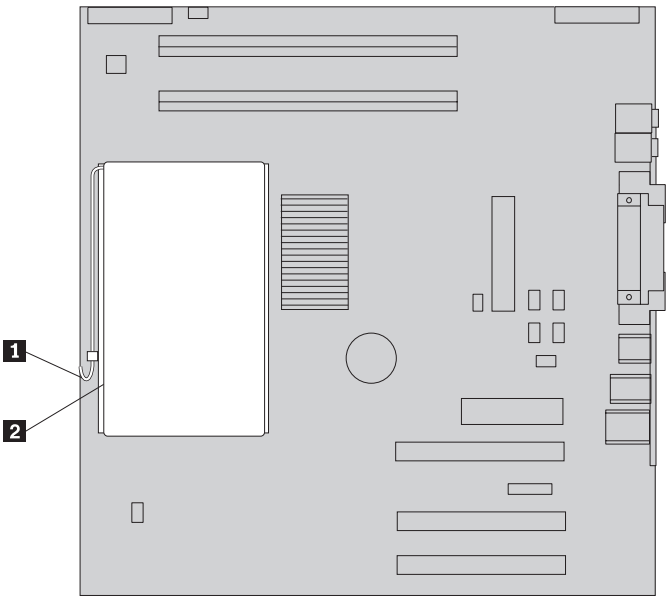
10. Lower the microprocessor retainer 3 and then lower the lever 2 to secure the retainer. Make sure the lever is securely locked into position.



Note: If you are replacing the system board, a piece of black plastic will cover the microprocessor retainer. When you lock the microprocessor in position, remove the cover.

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 Removing and replacing the system board at step 9 on page 6. If you are replacing a failing microprocessor, continue at step 13 on page 12.

13. To complete the installation, go to "Completing the CRU replacement" on page 16.

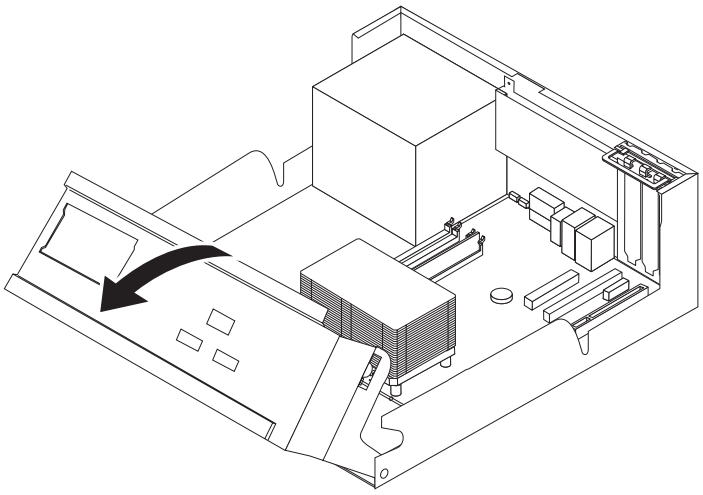
Removing and replacing the hard disk drive

Attention

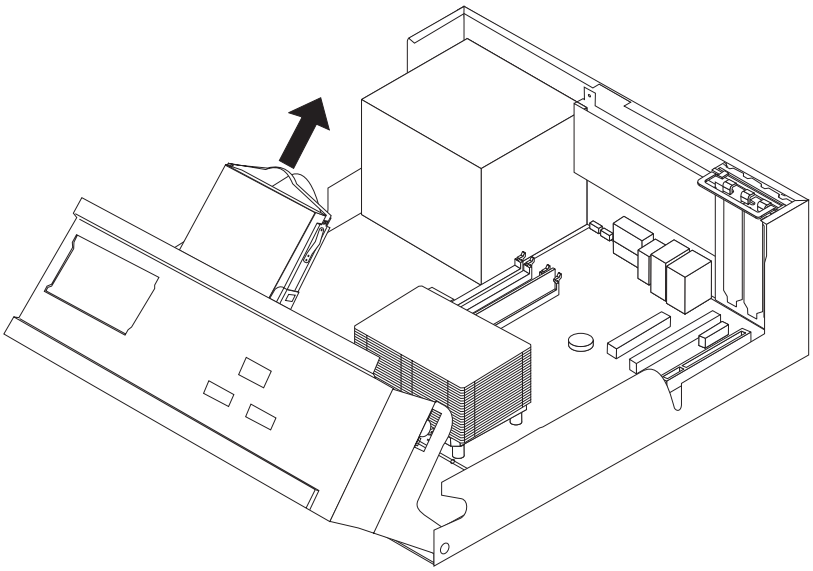
Do not open your computer or attempt any repair before reading the "Important safety information" in the ***Quick Reference*** that was included with your computer. If you no longer have this copy of the ***Quick Reference***, you can obtain one online from the IBM Web site at http://www.ibm.com/pc/support.

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

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



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 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 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. Depending on the type of drive you are installing, go to "Connecting a serial ATA hard disk drive" or "Connecting a parallel ATA hard disk drive."

Connecting a serial ATA hard disk drive

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

1. Locate the signal cable that comes with the new drive.
2. Locate an available SATA connector on the system board. See Figure 1 on page 5.
3. Connect one end of the signal cable to the drive and the other to an available SATA connector on the system board.
4. Connect a power connector to the drive.
5. To complete the installation, go to "Completing the CRU replacement" on page 16.

Connecting a parallel ATA hard disk drive

1. Locate the PATA IDE connector on the system board and the three-connector signal cable.
2. Connect one end of the signal cable to the drive and the other to the PATA IDE connector on the system board. See Figure 1 on page 5.
3. Connect a power connector to the drive.
4. To complete the installation, go to "Completing the CRU replacement" on page 16.

Removing and replacing memory

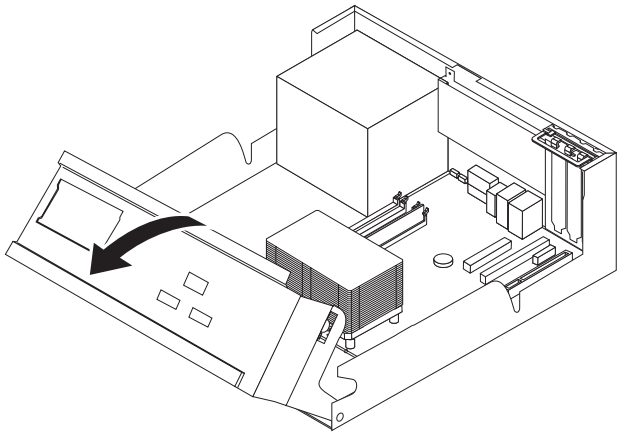
Attention

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

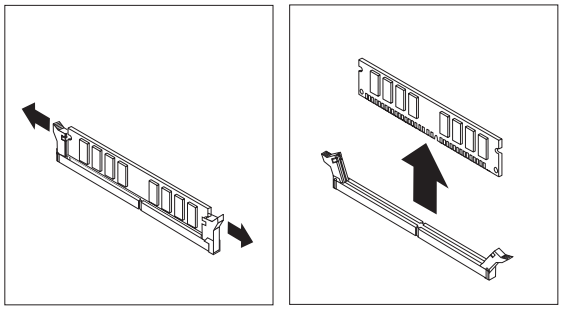
This section provides instructions on how to remove and replace memory.

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

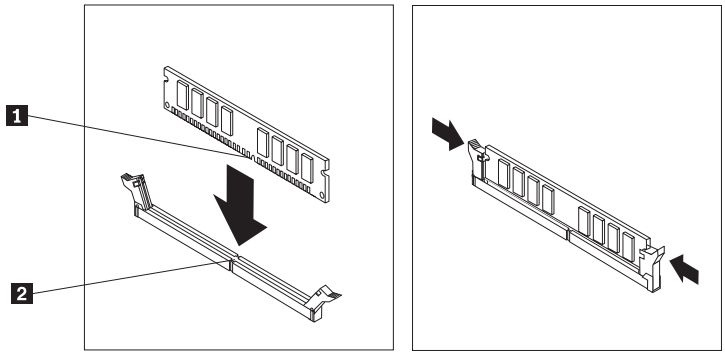
2. Rotate the drive bay assembly upward to gain access to the system board.



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



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



6. To complete the installation, go to "Completing the CRU replacement" on page 16.

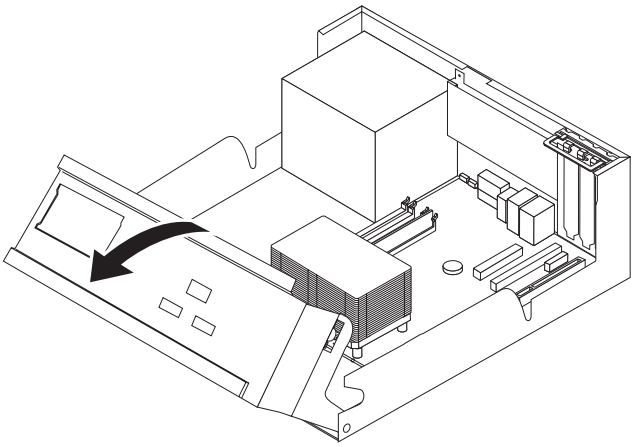
Removing and replacing a PCI adapter

Attention

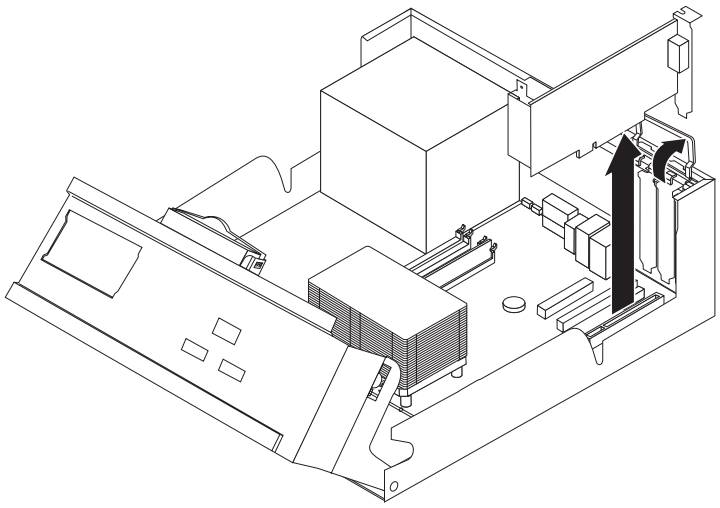
Do not open your computer or attempt any repair before reading the "Important safety information" in the ***Quick Reference*** that was included with your computer. If you no longer have this copy of the ***Quick Reference***, you can obtain one online from the IBM Web site at http://www.ibm.com/pc/support.

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

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

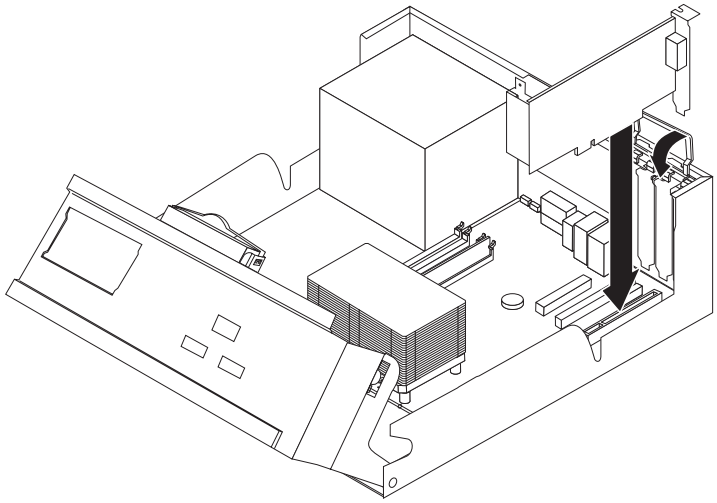


3. Open the adapter latch and remove the failing adapter.



4. Remove the new adapter from its static-protective package.

5. Install the new adapter into the appropriate slot on the system and close the adapter latch.

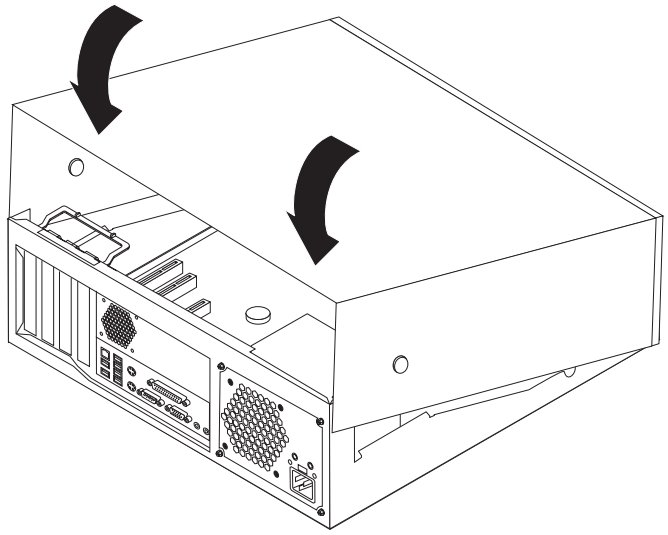


6. Rotate the drive bay assembly back to the normal position.
7. To complete the installation, go to "Completing the CRU replacement."

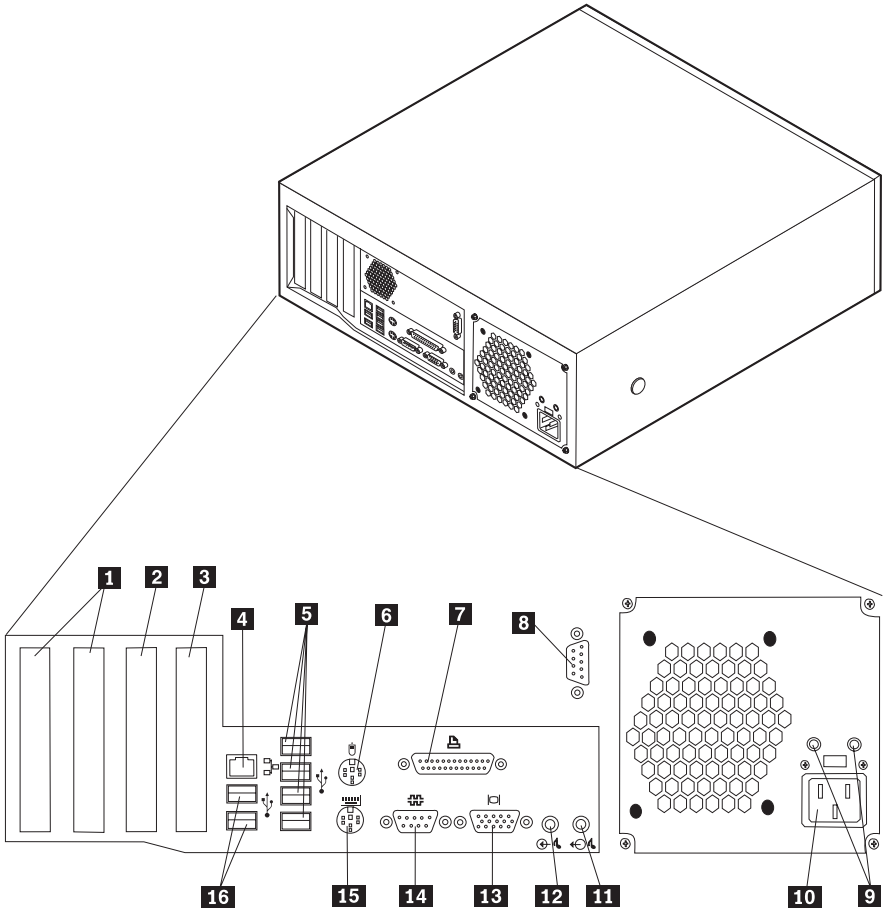
Completing the CRU replacement

After working with CRUs, you need to install any removed parts, replace the cover, and reconnect any cables, including telephone lines and power cords.

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.



1 PCI slots
2 PCI Express (x1) slot
3 PCI Express (x16) graphics slot
4 Ethernet connector
5 USB connectors
6 Mouse connector
7 Parallel connector
8 Serial connector (some models)
9 Diagnostic LEDs
10 Power connector
11 Audio line out connector
12 Audio line in connector
13 VGA monitor connector
14 Serial connector
15 Keyboard connector
16 USB connectors

6. If a cover lock is installed, lock the cover.

Part Number: 19R0805

Printed in USA

(1P) P/N: 19R0805