hp x4000 workstation
accessory installation guide

Accessory Installation Guide
HP x4000 Workstation

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Important Safety Information

Static electricity can damage electronic components. Turn OFF all equipment. Don't let your clothes touch the accessory. To equalize the static electricity, rest the accessory bag on top of the Workstation while you are removing the accessory from the bag. Handle the accessory as little as possible and with care.

WARNING

To avoid electrical shock, do not open the power supply. There are no user-serviceable parts inside.

To avoid electrical shock and harm to your eyes by laser light, do not open the laser module. The laser module should be serviced by service personnel only. Do not attempt to make any adjustment to the laser unit. Refer to the label on the CD-ROM for power requirements and wavelength. This product is a class I laser product.

WARNING

For your safety, never remove the Workstation cover without first disconnecting the power cord from the power outlet and removing any connection to a telecommunications network. If a Power Protection Device is fitted to your Workstation, you must shut down your computer through the operating system, then remove the power cord before removing the Workstation's cover. Remove the Power Protection Device cables before any servicing operation. Always replace the cover before switching the Workstation on again.

WARNING

Some parts inside the computer may be hot, please wait for them to cool down before touching them.

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WARNING   **If you have a modem:**

- **Do not attempt to connect this product to the phone line during a lightning storm. Never install telephone jacks in wet locations unless the telephone line has been disconnected at the network interface. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines. Avoid using a telephone (other than a cordless type) during an lightning storm. There may be a risk from lightning.**

- **Do not use the telephone to report a gas leak in the vicinity of the leak.**

- **Never touch or remove the communications board without first removing the connection to the telephone network.**

4

Getting Help

Printed Documentation

The *x4000 Getting Started Guide* came with your Workstation. It contains basic setup and installation information, basic troubleshooting guidance, warranty information, and information on contacting customer support.

Downloading Documentation from HP's Web Site

The HP Workstation web site (**www.hp.com/workstations/support**) contains a wide range of free information, including downloadable documentation, service and support options, and the latest versions of drivers, utilities BIOS, and firmware.

The web accessible documentation includes the *x4000 Technical Reference/Troubleshooting Guide.* This guide contains detailed information about your Workstation, including the system board switches, power consumption and acoustic noise emission test configurations, troubleshooting, and system architecture.

Additional Web Sites

- **www.hp.com/workstations/support** contains the latest drivers and BIOS for your Workstation.

- **www.hp.com/ergo** contains the online version of *Working in Comfort*. This is also preloaded on the hard disk of your HP Workstation.

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1 Understanding the Workstation Hardware

This chapter gives you a brief overview of your Workstation's internal components, system board, and Memory Expander Card (MEC).

Internal Components

An internal view of the x4000 Workstation is shown in Figure 1-1.

Figure 1-1   **HP x4000 Workstation**

Power Supply Unit

Main Fan

Chassis Beam
Assembly (this
holds the Memory
Expander Card in
place)
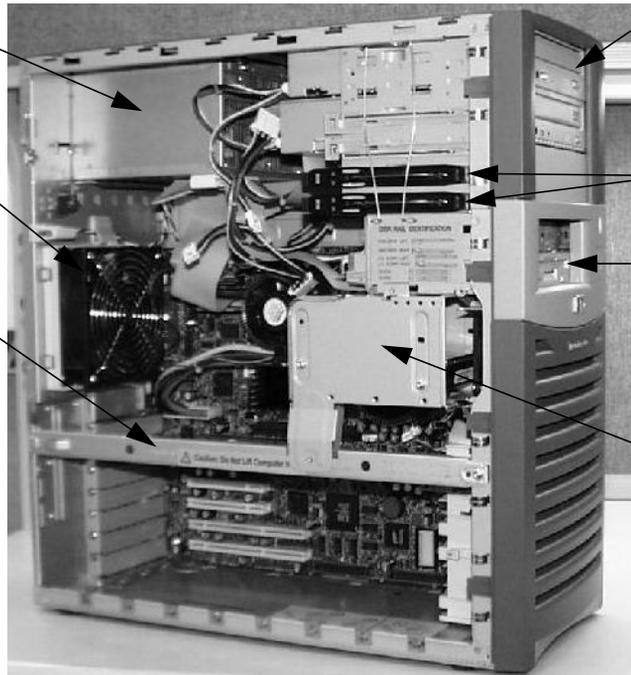
Three 5.25-inch
drive shelves
(can be used for
removable
drives)

Spare Mounting
Rails

Two 3.5-inch
shelves

Hard Disk Drive
Cage (holds up
to 2 SCSI hard
drives)

System Board

The x4000 system board is shown in Figure 1-2. (Your system board may look slightly different.)

Figure 1-2   **HP x4000 Workstation System Board**

CPU 0 Socket

Internal SCSI
External SCSI
MEC Connector

Up to six accessory cards can be installed:

CPU 1 Socket

Two 64-bit PCI slots

Three 32-bit PCI slots

One AGP-PRO 4X slot (graphics)

Primary IDE Controller

Secondary IDE Controller

Floppy Disk Drive Controller
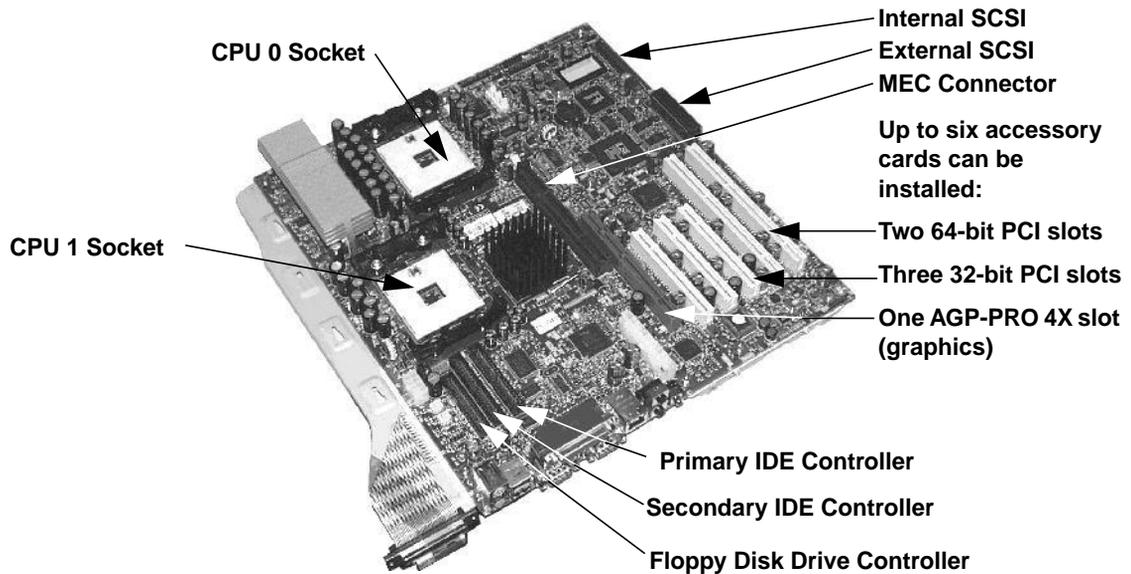
Memory Expander Card (MEC)

The main memory for the x4000 Workstation is not located on the system board. Instead, a Memory Expander Card (MEC) plugs into the system board and contains up to eight memory modules in connectors 1A (J5) through 4B (J4). The MEC is shown in Figure 1-3.

Figure 1-3 **x4000 Memory Expander Card**
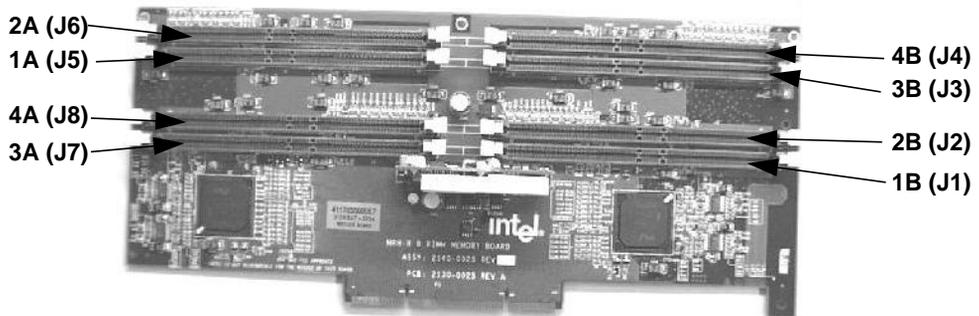
2   Installing Accessories

Overview

This chapter contains the following topics that explain accessory installation and removal techniques:

NOTE Check your configuration every time you install, remove, or upgrade an accessory. For instructions on how to check your configuration using the HP Setup program, refer to the *Getting Started Guide* that came with your x4000 Workstation, or the *HP x4000 Workstation Technical Reference Guide* located at **www.hp.com/workstations/support**.

Cover and Front Bezel

Removing the Left Side Cover

WARNING   **For your safety, never remove the Workstation cover without
first disconnecting the power cord from the power outlet and
removing any connection to a telecommunications network. If a
Power Protection Device is fitted to your Workstation, you must
shut down your computer through the operating system, then
remove the power cord before removing the Workstation's cover.
Remove the Power Protection Device cables before any servicing
operation. Always replace the cover before switching the
Workstation on again.**

To remove the cover (Figure 2-1):

1. Turn off the display and shut down the Workstation. Disconnect all
   power cables and any LAN or telecommunications cables.

2. If necessary, unlock the cover on the back of the Workstation.

3. Unscrew the two thumb screws located at the back of the Workstation
   until they release. You may need to use a T15 Torx driver. The thumb
   screws do not need to be completely removed to remove the cover.

4. Standing at the back of the Workstation, slide the cover towards you,
   tilt it open, then lift it off.

Figure 2-1   **Removing the Cover**
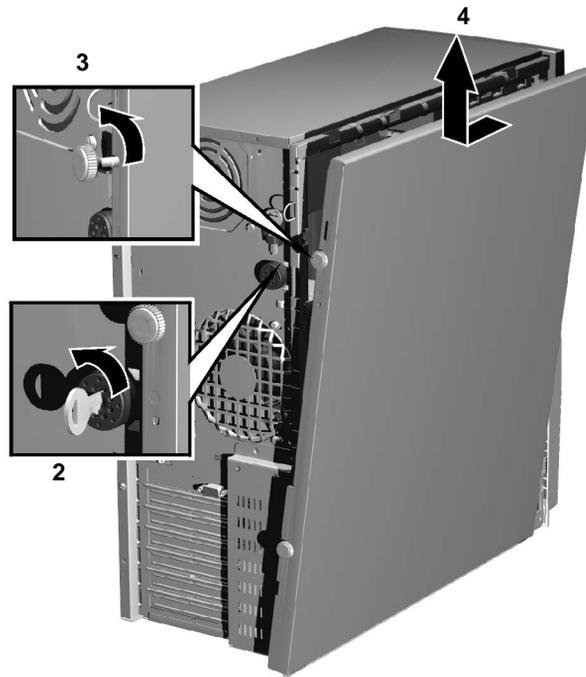
Removing the Front Bezel

You only need to remove the front bezel when you are adding or removing devices in the 5.25-inch or 3.5-inch front drive bays.

To remove the bezel:

1. Gently lift the four plastic tabs starting with the bottom tab and working your way to the top.

2. Rotate the bezel off the Workstation chassis.

Figure 2-2   **Removing the bezel**

Plastic Tabs
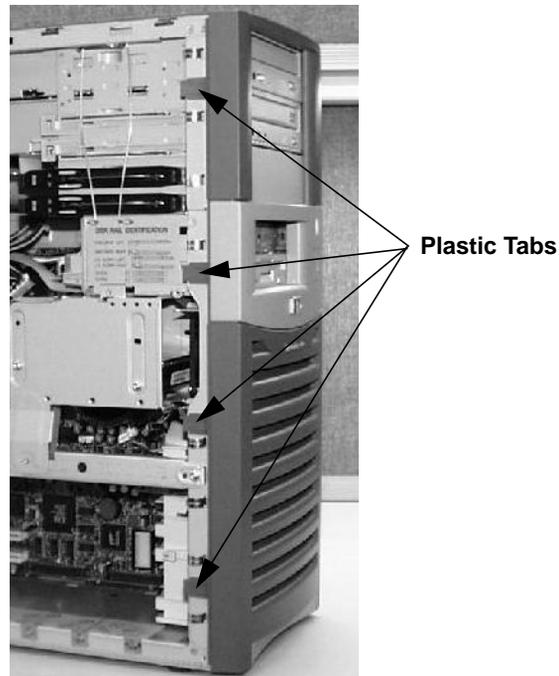
Replacing the Cover and Front Bezel

To replace the cover and front bezel:

1. Ensure that all internal cables are properly connected and safely routed.

2. If necessary, replace the front bezel:

   a. Align the plastic quarter rounds on the inside of the bezel with the sheet metal sockets on the right side of the chassis.

   b. Rotate the bezel into position and verify that the plastic tabs on the left side of the bezel click into position on the Workstation chassis.

   The bezel should be flush against the Workstation.

3. Standing at the back of the Workstation, lower the cover onto the chassis (aligning the guide rail on the bottom inside edge of the cover with the bottom edge of the Workstation chassis).

4. Shut the cover ensuring that the guides on the top of the cover slide into the rails at the top of the chassis.

5. Slide the cover forward, then tighten the two thumbscrews.

6. If required, lock the cover using the key provided.

Hard Disk Drive Cage

Opening the Hard Disk Drive Cage

To open the cage (Figure 2-3):

1. Disconnect the SCSI cable(s) and power cable(s) from the hard disk drive(s).

CAUTION　　Do not rotate the cage before you disconnect the cables.

2. Remove and retain the two Torx screws that hold the cage closed as shown in Figure 2-3.

3. Pull the cage toward you until you hear the hard disk drive cage clip catch the cage.

WARNING　　**Make sure the clip has latched the cage in the open position. An injury could result if the cage falls.**

Figure 2-3   **Hard Disk Drive Cage**
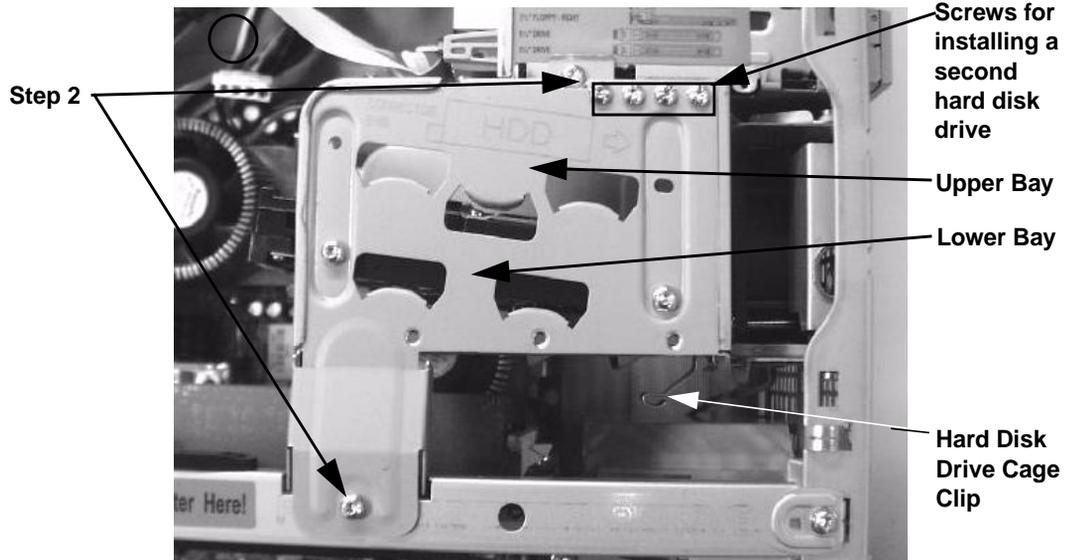
Closing and Securing the Hard Disk Drive Cage

CAUTION   Clear all cables from the area where the hard disk drive cage rests on the chassis beam assembly. If cables are in the way, you may damage them when you move the hard disk drive cage back into the closed position.

To close and secure the hard disk drive cage:

1. Push in the clip shown in Figure 2-3 on page 20 and rotate the hard drive cage *carefully* into the closed position.

CAUTION   Do not allow the cage to drop into place. This could damage the hard drive(s).

2. Fasten the cage with two screws in the locations shown in Figure 2-3 on page 20.

3. If it is not already attached, connect the SCSI cable to the system board internal SCSI connector as shown in Figure 2-4.

Figure 2-4   **Internal SCSI Connector and Cable**

SCSI cable connected to internal SCSI Connector

External SCSI connector
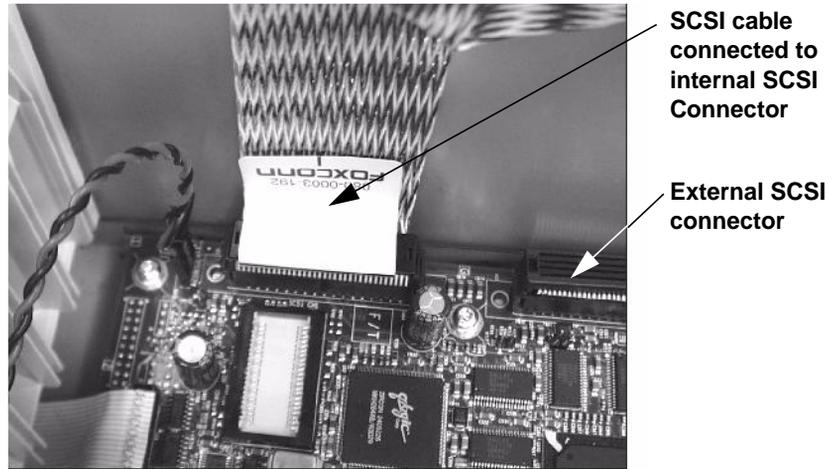
4. Connect the SCSI cable to the hard disk drive(s):

    a. Attach the SCSI connector farthest from the system board to the hard drive in the upper bay.

    b. Attach the remaining SCSI connector to the hard drive in the lower bay.

5. Connect the power supply cable(s) to the hard disk drive(s):

    a. Connect the power supply cable labeled P3 to the hard disk drive in the upper bay.

    b. Attach the power supply cable labeled P4 to the hard disk drive in the lower bay.

Chassis Beam Assembly

Before you can access many of the components inside your Workstation, you must remove the chassis beam assembly.

Removing the Chassis Beam Assembly

To remove the chassis beam assembly:

1. Open the hard disk drive cage (see page 19).

2. Remove the screw that holds the chassis beam assembly in place.

3. Carefully rotate the chassis beam assembly off the chassis.

Figure 2-5   **Chassis Beam Assembly**
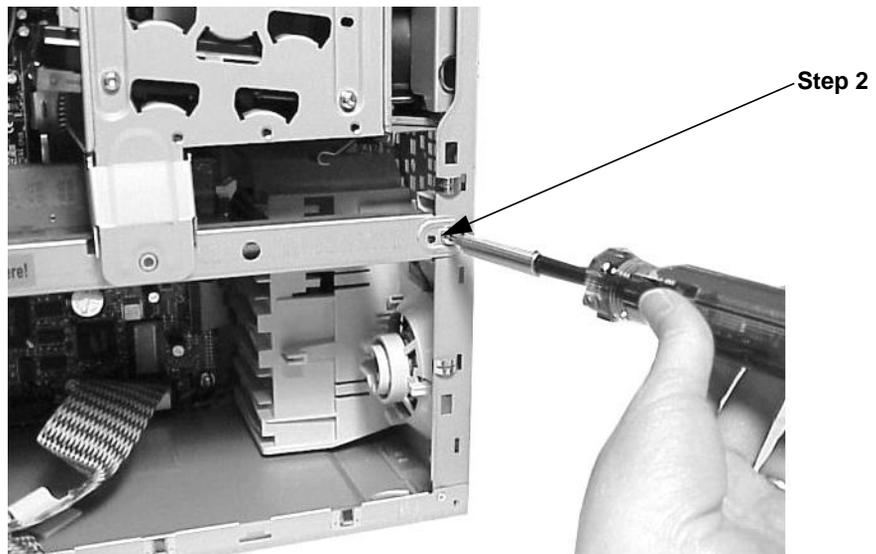
Installing the Chassis Beam Assembly

To install the chassis beam assembly:

1. Hook the chassis beam assembly to the left side of the chassis and rotate it down over the MEC and the graphics card making sure the MEC and graphics card retainer clips are centered on the cards as shown in Figure 2-6 and Figure 2-7.

CAUTION   Make sure the retaining clips slide easily over the cards, or the clips may put undue pressure on the card connectors.

2. Replace the screw that holds the chassis beam assembly in place.

Figure 2-6   MEC Retainer Clip

Retaining clip
on MEC.
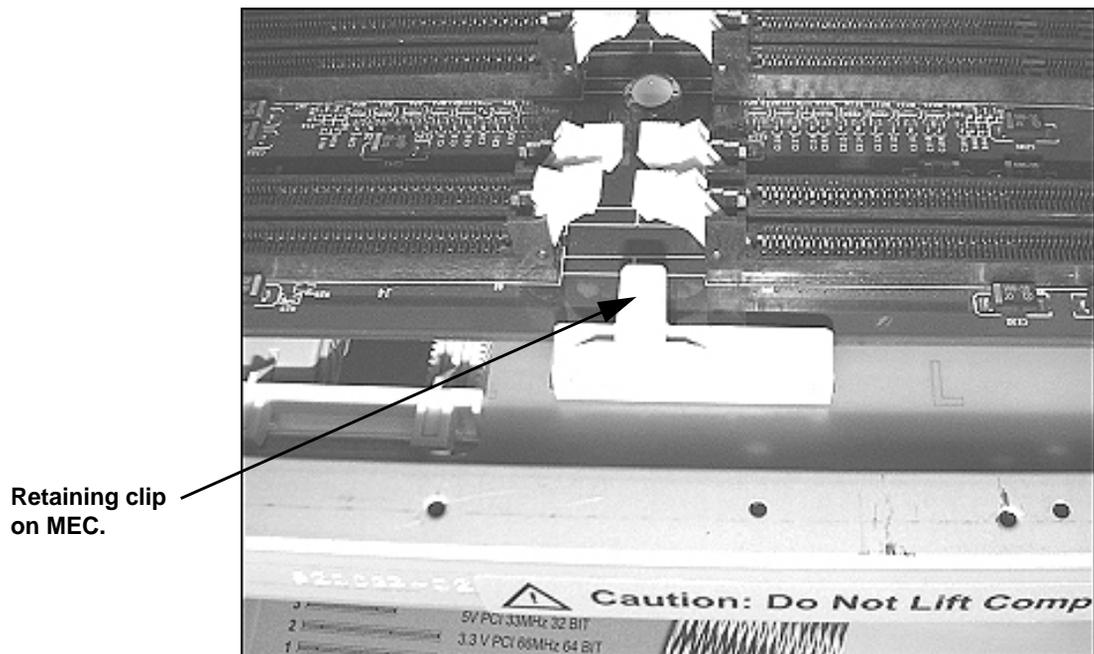
3. If your graphics card does not have a separate graphics card retainer beam, you must secure the graphics card by engaging the Universal Retainer piece (see Figure 2-7).

NOTE Not all systems use the chassis beam assembly Universal Retainer piece to hold the graphics card in place. Your system may use a separate graphics card retainer beam (see Figure 2-14).

Figure 2-7 **Secure the Universal Retainer Piece**

Graphics Card
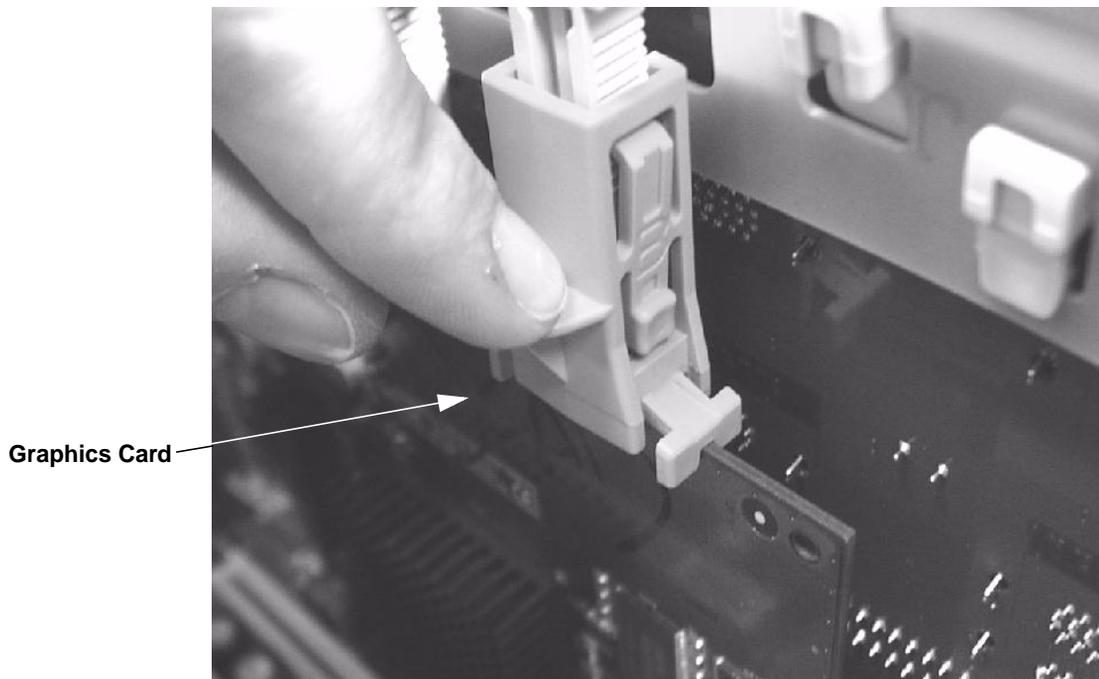
Memory Expander Card (MEC)

Removing the MEC

To remove the MEC:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover (see page 15).

3. To ease installation, place the Workstation on its side with the system board facing upwards.

4. Rotate the hard disk drive cage to the open position (see page 19).

5. Remove the chassis beam assembly (see page 22).

6. Remove retaining screw that holds the MEC in place and gently remove the MEC from the chassis as shown in Figure 2-8.

CAUTION   You must remove the MEC to install RIMMs. The MEC card guides are not strong enough to bear the force of the RIMMs being inserted.

Figure 2-8   **Removing the MEC**
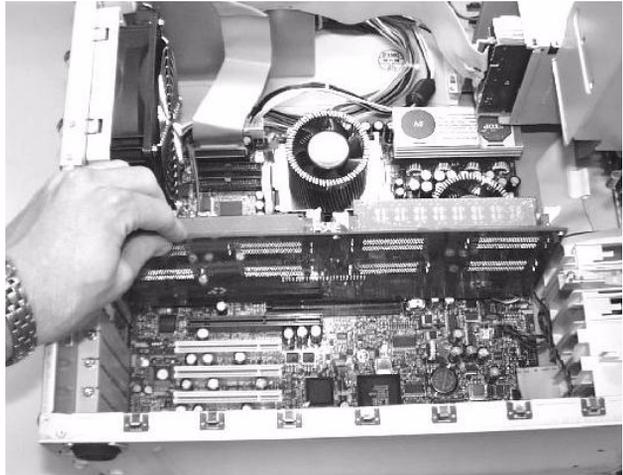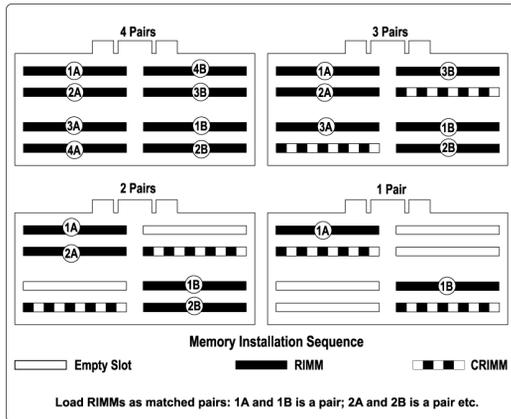
Installing the MEC

To install the MEC:

1. Replace the MEC, making sure it is fully seated, and tighten the retaining screw.

2. Replace the chassis beam assembly (see page 23).

3. Close and secure the hard disk drive cage (see page 20).

4. Replace the Workstation cover (see page 18).

5. Reconnect all power cables and any LAN or telecommunications cables.

System Memory

NOTE   Use only HP RIMMs specifically designed for your Workstation model. To
find out about available accessories for your Workstation, go to
www.hp.com/workstations/support.

Upgrading Memory

The memory for the HP x4000 Workstation is located on a Memory
Expander Card (shown in Figure 2-9 on page 28), which plugs into the
system board.

There are two memory banks (RDRAM channels):

- Bank I includes sockets 1B (J1), 2B (J2), 1A (J5), and 2A (J6).

- Bank II includes sockets 3B (J3), 4B (J4), 3A (J7), and 4A (J8).

This allows for a total of 8 RIMMs.

You must adhere to the following rules when loading memory:

- RIMMs must be loaded in *matched pairs*. Matching RIMMs have the
  same RDRAM size, speed and Mbit technology.

- Each RDRAM bank (channel) must be either completely empty or
  completely filled as shown in Figure 2-10. Therefore, if only one pair
  of RIMMs is installed in a bank, then the remaining sockets in the
  bank must contain continuity modules (CRIMMs) to ensure
  continuity.

NOTE   All Workstations (unless they already have 8 RIMMs) ship with a pair of
CRIMMs in case they are needed in future memory configurations.
CRIMMS may be stored in an unused memory bank.

Figure 2-9   **x4000 Memory Expander Card (MEC)**

2A (J6)
1A (J5)
4A (J8)
3A (J7)
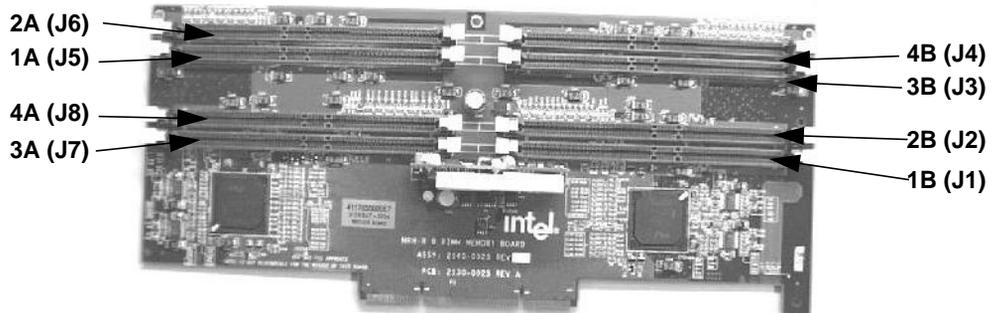
4B (J4)
3B (J3)
2B (J2)
1B (J1)

Memory Bank I consists of:

RIMM pair 1: 1A (J5) and 1B (J1)
RIMM pair 2: 2A (J6) and 2B (J2)

Memory Bank II consists of:

RIMM pair 3: 3A (J7) and 3B (J3)
RIMM pair 4: 4A (J8) and 4B (J4)

*If a memory bank only contains 1 pair of RIMMs, the remaining
2 connectors must contain CRIMMs to ensure continuity.*

Figure 2-10   **Replacing or Upgrading Memory**
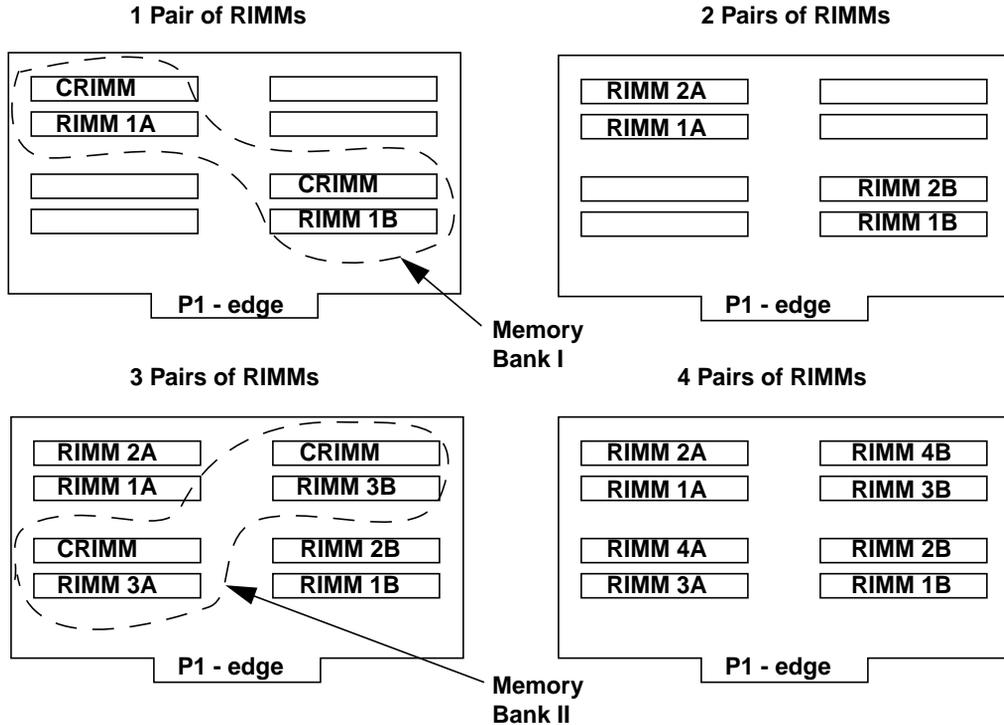
Note: RIMM 1A and 1B are a matched pair, 2A and 2B are a matched pair,
3A and 3B are a matched pair, and 4A and 4B are a matched pair.

Installing Memory

1. Before turning off your Workstation, check the current amount of installed memory. Refer to your operating system documentation for instructions on finding this information.

2. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

3. Remove the Workstation's cover (see page 15).

4. To ease installation, place the Workstation on its side with the system board facing upwards.

5. Rotate the hard disk drive cage to the open position (see page 19).

6. Remove the chassis beam assembly (see page 22).

7. Remove the Memory Expander Card (MEC) (see page 25).

CAUTION   You must remove the MEC to install RIMMs (and CRIMMs). The MEC card guides are not strong enough to bear the force of the RIMMs being inserted.

---

8. Install the RIMMs (and CRIMMs if required) on the MEC according to Figure 2-10.

   a. If you are installing additional RIMMs, you may need to remove the CRIMMs. Open the retaining clips by pushing down on them, and remove the CRIMM from the socket. See Figure 2-11 on page 31.

   b. If you are replacing existing RIMMs, open the retaining clips by pushing down on them, and remove the existing RIMMs from their sockets.

NOTE   Always store any removed RIMMs and CRIMMs in a safe place for future use. CRIMMs may be stored in an empty memory bank if one is available.

---

   c. Install your new RIMMs or CRIMMs, ensuring that the two notches on the bottom edge are aligned with those of the socket. With the two retaining clips open, press the RIMM fully into the socket until the retaining clips click into position. You can also close the retaining clips by hand to ensure that the RIMM is correctly inserted.

Figure 2-11 Inserting RIMMs and CRIMMs
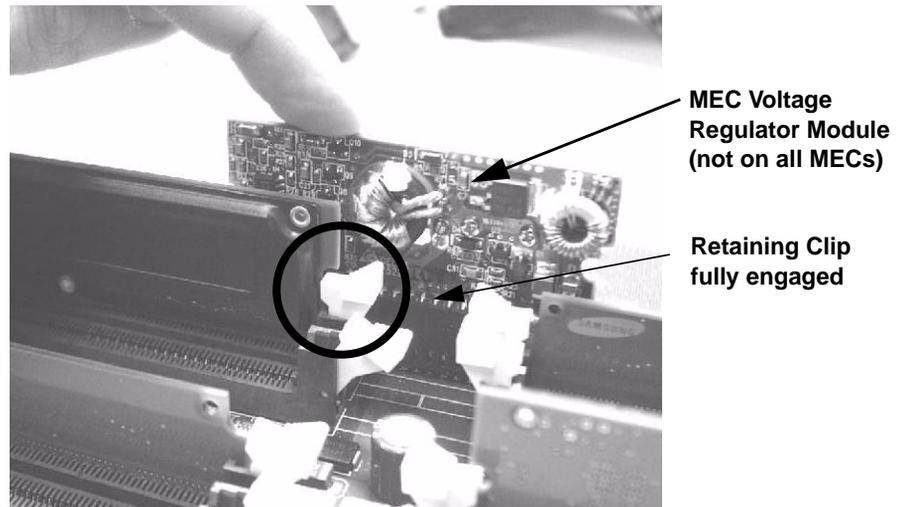
9. Replace the MEC (see page 26).

10. Replace the chassis beam assembly (see page 23).

11. Close and secure the hard disk drive cage (see page 20).

12. Replace the Workstation cover (see page 18).

13. Reconnect all power cables and any LAN or telecommunications cables.

14. Start the Workstation and check the Summary Screen by pressing **Esc** when prompted to verify the new configuration. The Summary Screen displays the amount of memory.

Graphics Card

Removing a Graphics Card

NOTE   Uninstall the driver for this graphics card before installing a new graphics card.

To remove a graphics card:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover (see page 15).

3. Remove any cables connected to the graphics card on the rear panel.

4. To ease installation, place the Workstation on its side with the system board facing upwards.

5. Rotate the hard disk drive cage to the open position (see page 19).

6. Remove the chassis beam assembly (see page 22).

7. Before removing the graphics card:

   • If your graphics card came with a separate graphics retainer beam as shown in Figure 2-14 on page 34:

      a. Remove the screw that attaches the graphics card and the graphics retainer beam to the rear slot panel.

      b. Remove the full-length graphics card retaining screw.

   • If your graphics card did not come with a separate graphics retainer beam, remove the retaining screw as shown in Figure 2-12 on page 33.

8. Carefully pull out the card.

9. Store the card in a static bag.

Figure 2-12   **Removing the Graphics Card Retaining Screw**
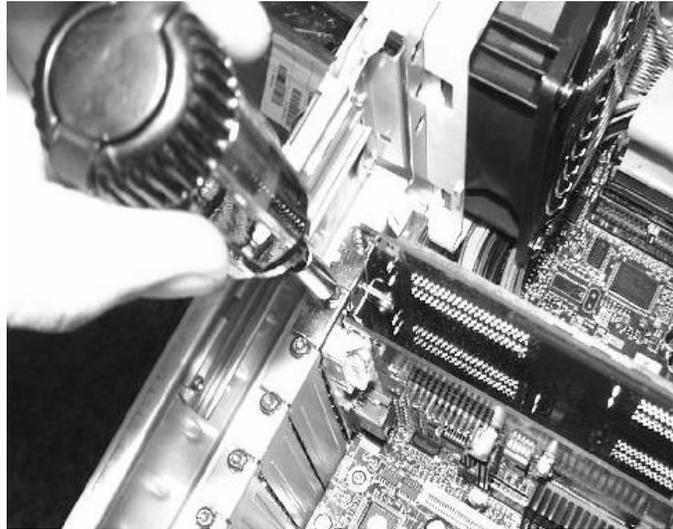
Installing a Graphics Card

To install a graphics card:

1. If you are replacing an existing card, remove the current card (see page 32).

2. Unscrew and remove the rear slot panel that corresponds AGP PRO 4X connector. The screw you removed is used to retain the graphics card.

NOTE   If you are installing a full-length graphics card, you must remove the graphics board retaining screw near the front of the chassis as shown in Figure 2-13.

Figure 2-13   **Full-Length Graphics Card Retaining Screw**

Full-Length
Graphics Card
Retaining Screw

3. Align the new card carefully and slide it into position. Press it firmly into the slot.

4. Secure your graphics card:

- If your graphics card came with a separate graphics retainer beam:

   a. Remove both of the universal retainer pieces from the chassis beam assembly shown in Figure 2-15 and store these in a safe place for future use.

   b. Using the screw that you removed from the rear slot panel and the graphics card retaining screw shown in Figure 2-13, attach the graphics retainer beam as shown in Figure 2-14.

Figure 2-14 Graphics Card Retainer Beam

This screw
attaches the
retainer beam to
the rear panel
slot.

Full-Length
Graphics
Card
Retaining
Screw
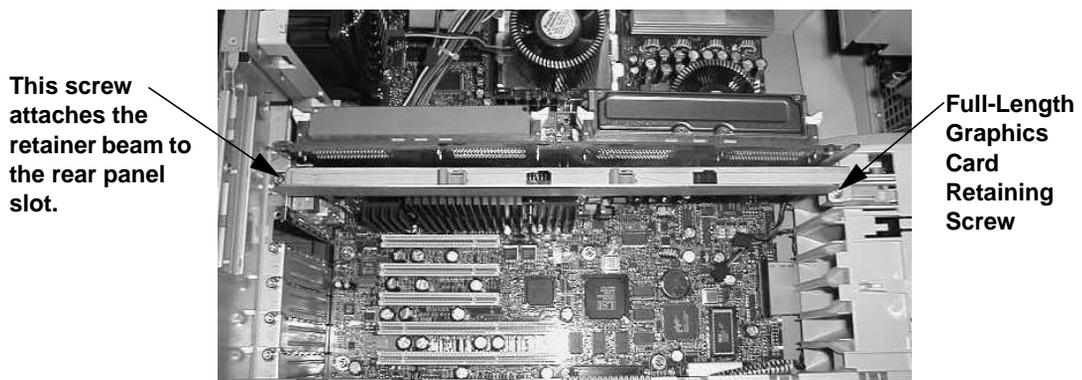
- If your graphics card did *not* come with a separate graphics retainer beam, you must use the retainer clip on the chassis beam assembly to secure your graphics card. The retainer clip holds the graphics card securely in the AGP slot:

   a. Use the screw you removed the rear slot panel to attach the graphics card to the chassis.

   b. There are two universal retainer clips on the chassis beam assembly (see Figure 2-15). The longer clip (A) is used for shallower graphics cards. The shorter clip (B) is used for deeper graphics cards. Remove the retainer clip you don't need.

   c. Move the remaining retainer clip to the center position shown in Figure 2-15. If your graphics card is too shallow for the clip to hold it tightly in this position, return it to the other arm.

Figure 2-15 Retainer Pieces on the Chassis Beam Assembly

Remove the unused retainer clip and move the required retainer clip to the center position.

The retainer clip keeps the graphics board seated on the system board when the chassis beam assembly is installed.

Center Position

Retainer Clip A

Retainer Clip B
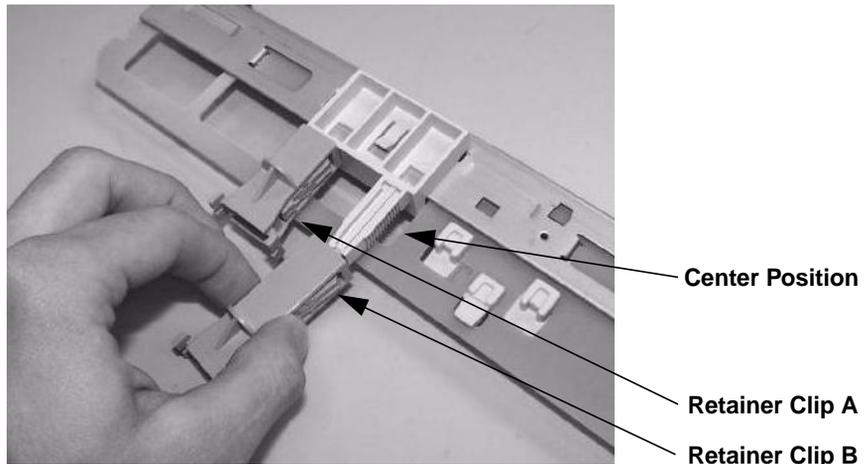
5. Replace the chassis beam assembly (see page 23).

   If your graphics card has a retainer beam, once the chassis beam assembly is in place it looks like Figure 2-16.

Figure 2-16   **Graphics Card Retainer Beam and Chassis Beam Assembly**

**Chassis Beam
Assembly**

**Graphics Card
Retainer Beam**
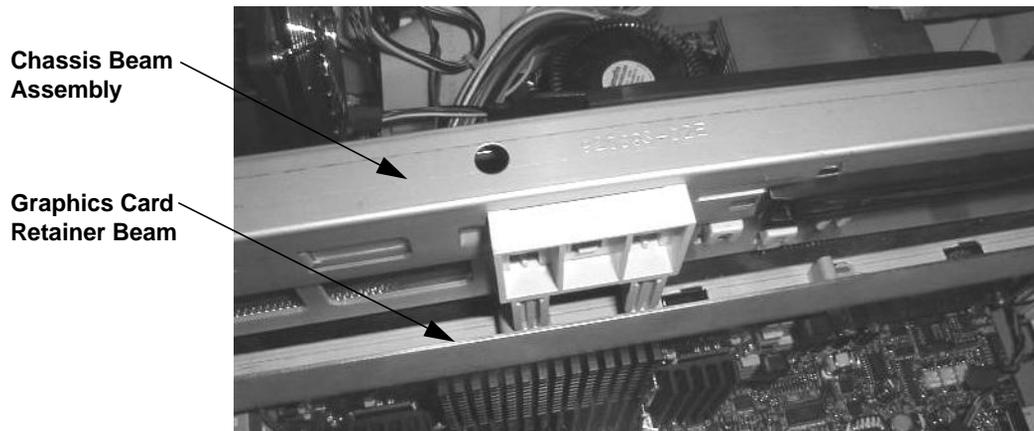
6. Close and secure the hard disk drive cage (see page 20).

7. Replace the Workstation cover (see page 18).

8. Reconnect all power cables and any LAN or telecommunications cables.

SCSI Hard Drive

CAUTION   Back up your files before you install a hard disk drive.

Your Workstation has on-board SCSI capability. You can connect up to two internal SCSI hard disk drives.

Figure 2-17 shows the internal and external SCSI connectors on the system board.

Figure 2-17   **SCSI System Board Connectors**

Internal SCSI connector

External SCSI connector
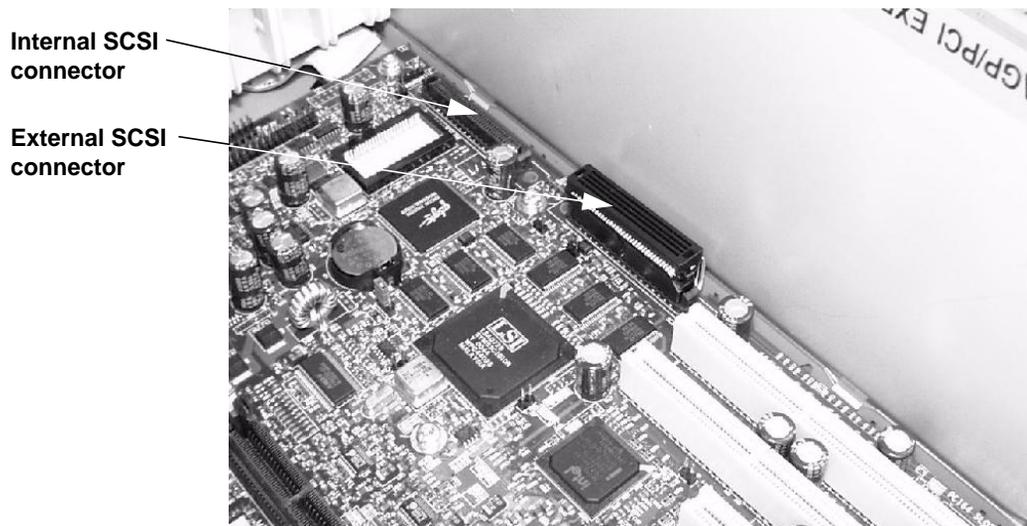
Removing a SCSI Hard Disk Drive

To remove the SCSI hard disk drive:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover (see page 15).

3. Open the hard disk drive cage (see page 19).

4. Remove the hard disk drive from the cage by removing the four Torx screws that hold the drive in place as shown in Figure 2-18.

Figure 2-18   Removing the Hard Disk Drive

Screws for installing a second hard disk drive

Upper Bay

Lower Bay

These 4 screws (2 front, 2 back) hold one hard drive in place.
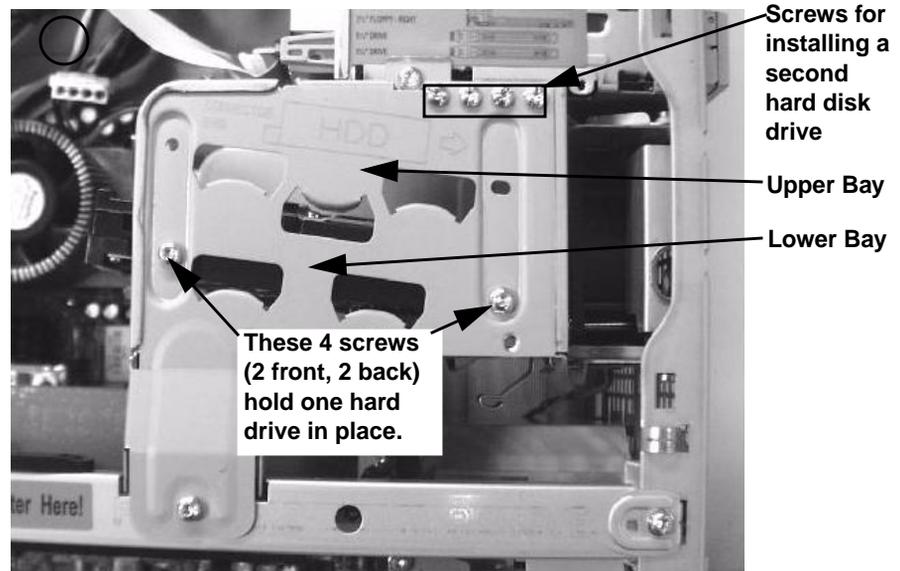
Setting SCSI IDs for a New Hard Disk Drive

You must assign an unused SCSI ID to your hard disk drive. SCSI IDs range from 0 to 15 for wide 16-bit SCSI.

SCSI ID 0 is used by the first SCSI hard disk drive. SCSI ID 7 is reserved for the integrated SCSI controller (see Table 2-1). You should assign an unused SCSI ID to the second SCSI hard disk drive (SCSI ID 1 is recommended).

Table 2-1   SCSI ID Settings

SCSI ID	Used By
0	First SCSI hard drive
1	Optional second SCSI hard drive
2 - 6	Unused
7	SCSI controller
8 - 15	Unused

The SCSI ID is configured with jumpers on the SCSI hard disk drive. Refer to the information label on the hard disk drive, or the HP x4000 Technical Reference Guide at **www.hp.com/workstations/support**, for additional details on setting the SCSI ID.

Installing a SCSI Hard Disk Drive

CAUTION

Before proceeding with this section, make sure you have set the SCSI ID for your hard disk drive (see page 39). Devices that are incorrectly configured cause the Workstation to behave unpredictably.

Take care when handling the hard disk drive during installation. A one-quarter inch drop can damage it.

To install one or two hard disk drives:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover (see page 15).

3. Open the hard disk drive cage (see page 19).

4. Install the hard disk drive(s) in the cage using the screws provided on the hard disk drive cage as shown in Figure 2-18 on page 38:

   a. If you only have one hard drive, install it in the bottom bay.

   b. If required, install a second hard drive in the top bay.

   c. Align the screw holes on each hard drive with the openings in the hard disk drive cage.

   d. Fasten each hard disk drive to the cage with four screws, two on each side of the cage. The screws for installing the new drive are attached to the hard disk drive cage.

5. Close and secure the hard disk drive cage (see page 20).

6. Replace the Workstation cover (see page 18).

7. Reconnect all power cables and any LAN or telecommunications cables.

8. Start the Workstation and check the Summary Screen by pressing **Esc** when prompted to verify the new configuration.

CD-RW or DVD

The CD-RW and DVD are IDE devices. The IDE system board connectors are shown in Figure 1-2 on page 11.

An IDE cable is shown in Figure 2-19.

Figure 2-19   **IDE Data Cable**

Connects to system board IDE controller

Connects to Slave IDE device

Red stripe indicates Pin 1

Connects to Master IDE device
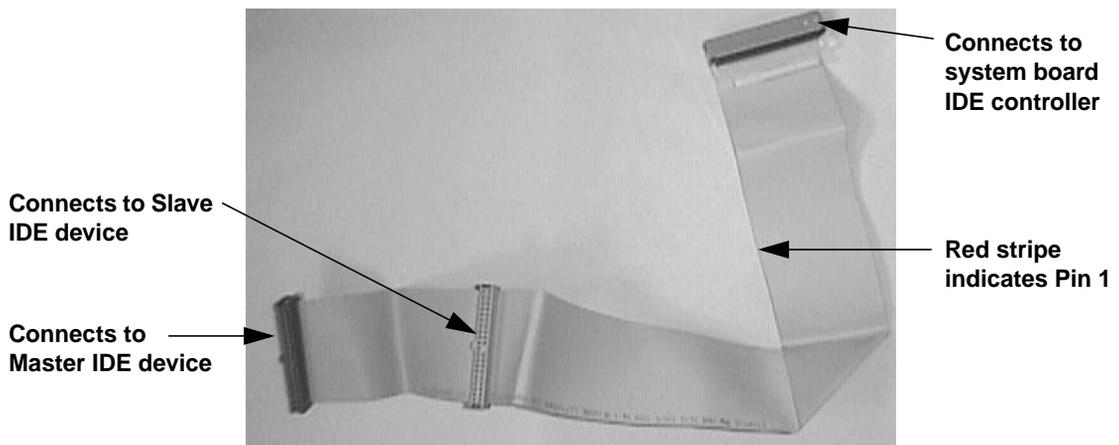
Determining IDE Connections

The following table explains which data connectors to use when you install IDE devices. All the IDE devices are jumpered Cable Select at the factory. This means that Master and Slave configurations are determined by the device position on the IDE cable:

•   The device attached to the connector closest to the system board is the Slave.

•   The device attached to the connector farthest from the system board is the Master.

IDE Drive Cabling Suggestions (always use the secondary IDE controller)	
1 CD-ROM drive	Master
1 CD-RW drive	Master
1 DVD drive	Master
1 CD-ROM drive 1 CD-RW drive	Master Slave
1 CD-ROM drive 1 DVD drive	Master Slave
1 DVD drive 1 CD-RW drive	Master Slave

Removing a CD-ROM, CD-RW, or DVD

To remove an optical device:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover and front bezel (see page 15) for instructions).

3. Disconnect the power, data, and audio cables from the old drive.

4. Remove the drive by pressing the two front rail clips inward and sliding the drive out the front of the chassis.

5. Remove the guide rails by gently prying them off the drive. These guide rails are required for the new drive.

Figure 2-20   **Removing the Old Drive**
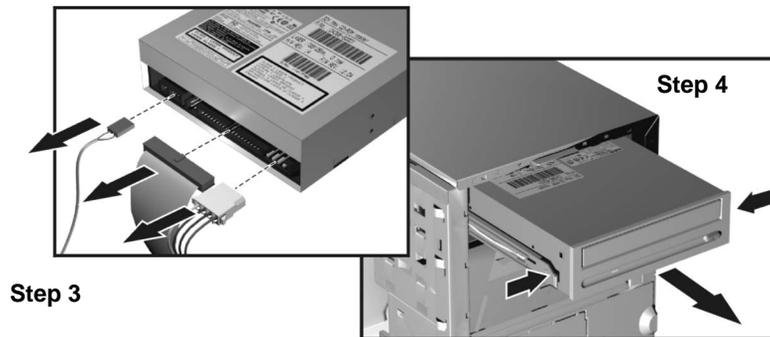
Installing a CD-RW or DVD

To install an optical device:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover and front bezel (see page 15) for instructions).

3. Remove the 5.25-inch metal filler plate from the chassis of the Workstation by using your finger to pull the plate from the chassis.

4. Add the guide rails to the new drive. Refer to the sticker on the Workstation chassis for the correct rails for your drive. Insert the guide rails in the two holes located at the bottom of the drive. The guide rails are not side-specific.

5. Align the guide rails on both sides of the drive with the internal shelf guides, then slide the drive until it clicks into position. You should put your Master device in the top bay and your Slave device in the lower bay. For more information on Master/Slave configuration, see page 42.

6. Connect the power, data, and audio cables to the rear of the new drive.

7. Replace the Workstation's bezel and cover (see page 18).

8. Reconnect all the power and telecommunications cables.

NOTE   If you installed a CD-RW, you must install the software that came with the drive before you can write to the device.

The CD-ROM driver is pre-loaded and is used by the CD-ROM, CD-RW, and DVD to read standard CD-ROM format media.

Load the Software Applications for Your CD-RW

If you have a CD-RW in your Workstation, you must install both the Direct CD and Easy CD Creator applications located on the *Applications* CD-ROM before you can use the write/re-write functionality of the drive.

To install these applications:

1. Put the *Applications* CD-ROM in your CD-RW drive. Installation begins automatically.

2. When the installation window appears, a dialog box appears asking you to select your language. Select the language you wish to install.

3. Select one of these choices and follow the on-screen directions for installation:

    •   **Easy CD Creator**

    •   **Direct CD**

4. When the installation wizard returns, you *must* restart your system before installation is complete. To restart your system:

    a. Select **Exit**.

    b. Remove the *Applications* CD-ROM and click **Yes** to restart your system.

NOTE   Repeat these instructions to install the second application. You *must* restart your system between each installation in order for both applications to install correctly.

If you do not install either Easy CD Creator and Direct CD, you can only use the CD-RW drive's read functionality.

Processor

The x4000 Workstation can have two processors. The processors must be identical. For their locations, see Figure 1-2 on page 11.

CAUTION   If you are upgrading your current processor, you must update the BIOS. The latest BIOS is located at **www.hp.com/workstations/support**.

If you are adding a second processor, you must update your operating system (see "Updating Your Operating System" on page 49).

Removing a Processor

CAUTION   Before removing your processor, turn on the Workstation and let it run for 3 to 5 minutes. This warms up the processor and makes it easier to detach the heatsink. *Be very careful when removing the heatsink*. If your processor turbo cooler fan is not operating, the heatsink may be very hot. Under normal circumstances, the turbo cooler fan is operational and a slight twist of the heatsink should release it from the processor.

To remove a processor:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover (see page 15).

3. Place the Workstation on its side for better access.

4. Open the hard disk drive cage (see page 19).

5. Remove the Chassis Beam Assembly as shown in Figure 2-5 on page 22.

6. Remove the MEC card (see page 32).

7. Remove the heatsink power connector from the system board.

8. Remove the two heatsink clips by pressing the release lever on the clips. Then lift off the heatsink. There is a thermal interface material between the heatsink and the processor. This may cause the processor to stick to the heatsink.

Figure 2-21   **Removing a Processor**

Step 8

Step 10
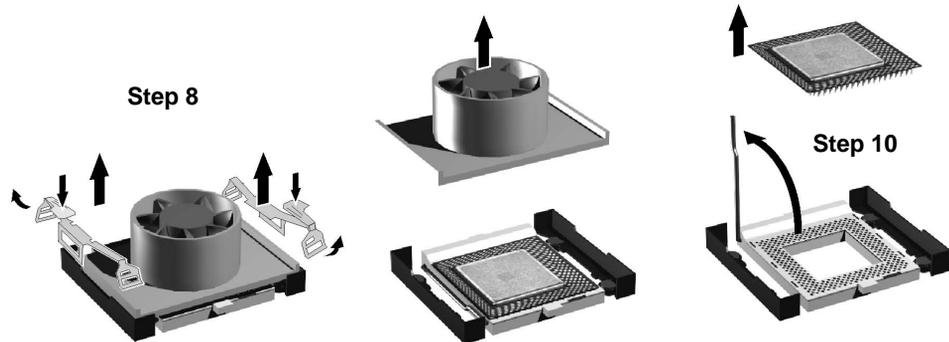
9. Remove the thermal interface material from the heatsink and discard it. You can leave any residue that remains on the heatsink. This does not impair the heat transfer.

10. Open the Zero Insertion Force (ZIF) lever, located at the side of the processor socket, until it is in the vertical position (depending on the socket design, the handle may need to go past vertical), then carefully lift out the processor. To avoid bending the processor pins, keep the processor perfectly flat when removing it.

11. Store the processor in an anti-static bag (such as the one provided with the replacement processor).

12. If you are permanently removing a second processor, you must update your operating system (see page 49). You should also store the heatsink and clips in a safe place.

Installing a Processor

To install a processor:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover (see page 15).

3. Place the Workstation on its side for better access.

4. Open the hard disk drive cage (see page 19).

5. Remove the Chassis Beam Assembly (see page 22).

6. Remove the MEC card (see page 32).

7. Ensure the processor is correctly oriented by matching the notches on the processor to the notches on the ZIF socket. Then carefully lower the new processor into place. When the processor is fully inserted, close the ZIF lever.

CAUTION   Be extremely careful when you insert the processor. If you bend one of the pins, it will not go into the socket.

Figure 2-22   **Inserting a Processor**

Step 7

Step 9
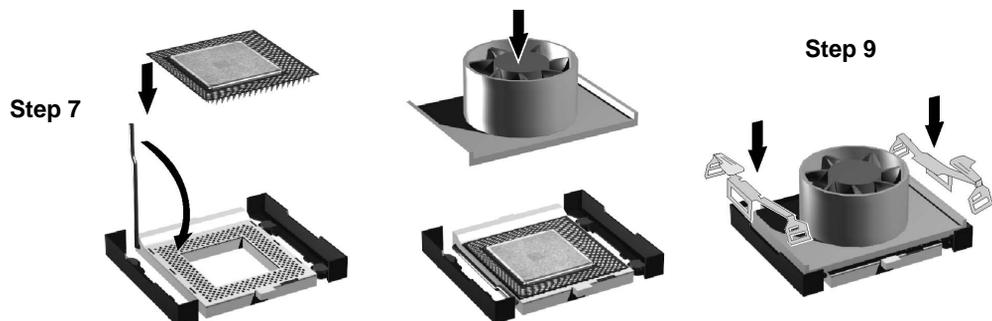
8. Affix the new thermal interface material, provided with the new processor, to the top of the processor.

9. Attach the heatsink to the processor. Use the retaining clips to attach the heatsink. For easier installation, partially attach both clips by hooking one end of the side slot in each clip. Press down on the remaining ends of both clips until they click into place.

10. Connect the heatsink turbo fan power connector to the system board. The fan connectors are labeled **CPU0** and **CPU1** on the system board.

11. Replace the MEC card.

12. Replace the Chassis Beam Assembly (see page 23).

13. Close and secure the hard disk drive cage (see page 20).

14. Replace the Workstation's cover (see page 18).

15. Reconnect all the power and telecommunications cables.

16. Update your operating system (see page 49).

Updating Your Operating System

If you are adding a second processor to your Workstation (or removing a
processor), you must update your operating system to reflect these
changes.

Windows 2000

To update your operating system in Windows 2000:

1. Go to the Control Panel by selecting **Start > Settings > Control Panel**.

2. Select the **System** icon.

3. In the Hardware tab, select **Device Manager**.

4. Expand the **Computer** branch. The type of support that you currently
    have is displayed:

    -   **ACPI UniProcessoor PC**

    -   **ACPI MultiProcessor PC**

    To change the type of support, double click on this icon to bring up the
    ACPI PC properties.

5. In the Driver tab, select **Update Driver**. The Upgrade Device Driver
    Wizard appears and you must select **Next** to continue.

6. Choose to display a list of all the known drivers and click **Next**.

7. When all the drivers are located, click the radio button to show all
    hardware of this device class, select one of the following and click **Next**
    to install the new driver:

    -   **ACPI MultiProcessor PC** if you have added a second processor.

    -   **ACPI UniProcessoor PC** if you have removed your second processor.

Windows NT

To update your operating system in Windows NT, use the HP
DualExpress utility which is posted at **www.hp.com/workstations/support**.

Installing Accessories
Processor

Part Number A6068-90010
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E0501

A6068-90010