COMPAQ

Maintenance & Service Guide

Compaq Evo W8000 Workstation

COMPAQ

Maintenance & Service Guide

Compaq Evo Workstation W8000

Document Part Number: 229690-001
Spare Part Number: 229781-001

May 2001

Contents

Contents

Preface

1 Product Description

2 Spare Parts

3 Removal & Replacement Preliminaries

4 Removal & Replacement Procedures

5   Connectors and Jumpers

A SCSI Devices

B Specifications

Index

Preface

ABOUT THIS GUIDE

This *Maintenance & Service Guide* is a troubleshooting and repair guide that can be used for reference when servicing the Compaq Evo W8000 Workstation. Only authorized technicians trained by Compaq should attempt to repair this equipment.

Compaq Computer Corporation reserves the right to make changes to the these models without notice.

Symbols and Conventions

The following text and symbols mark special messages throughout this guide:

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of data.

Text set off in this manner presents commentary, sidelights, clarifying information, or specific instructions.

Technician Notes

⚠️ **WARNING:** Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indications of component replacement or printed wiring board modifications may void any warranty.

⚠️ **WARNING:** To reduce the risk of electric shock or damage to the equipment:
- Do not disable the power grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Disconnect the power from the computer by unplugging the power cord either from the electrical outlet or the computer.

⚠️ **CAUTION:** To properly ventilate your system, you must provide at least 3 inches (7.6 cm) of clearance at the front and back of the computer.

Locating Additional Information

The following documentation is available to support these products:

- User Documentation
- Technical Training Guides
- Compaq Service Advisories and Bulletins
- Compaq QuickFind
- *Technical Reference Guide*
- *Compaq Quick Reference Guide*
- *Compaq Service Reference Guide*
- *Compaq Quick Troubleshooting Guide*

1

Product Description

This chapter describes the model offerings and features of the Compaq Evo W8000 Workstation.

1.1   Product Features

The W8000 ships with a mouse and keyboard. Some models are also equipped with a CD-ROM, DVD-ROM, or CDRW drive. A Compaq color monitor or other compatible monitor does not ship with the workstation.

1.1.1   Front Panel Controls and LEDs
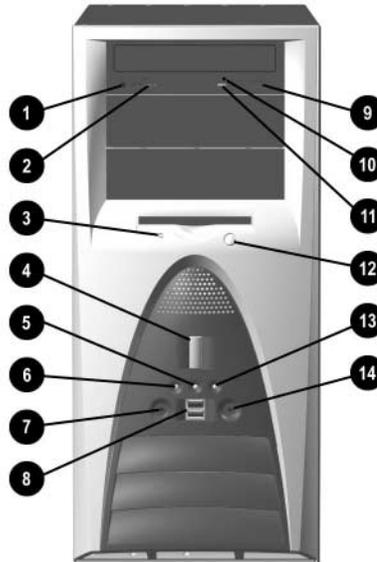
Ref.	Component/Function	Ref.	Component/Functions
❶	CD-ROM headphone connector	❽	Two Universal Serial Bus (USB) connectors
❷	CD-ROM volume	❾	CD-ROM eject button
❸	Diskette drive activity light	❿	CD-ROM emergency eject opening
❹	Power button	⓫	CD-ROM activity light
❺	Hard drive activity light	⓬	Diskette drive eject button
❻	Power-on light	⓭	Network link/activity light
❼	Headphone connector	⓮	Microphone connector

1.1.2 Rear Panel Connectors
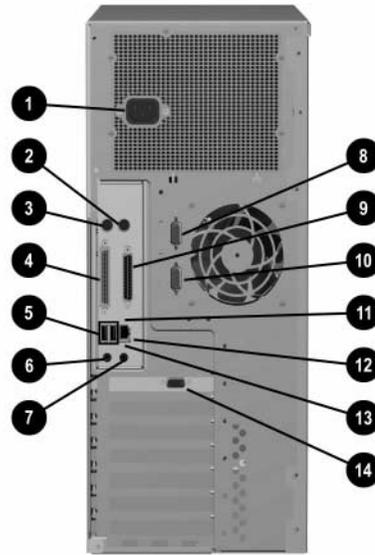
Ref.	Component/Function	Ref.	Component/Functions
❶	Power cord connector	❽	Serial connector B
❷	Mouse connector	❾	Parallel connector
❸	Keyboard connector	❿	Serial connector A
❹	Ultra160 SCSI connector	⓫	Network Link/Activity LED
❺	Two Universal Serial Bus (USB) connectors	⓬	Ethernet connector
❻	Line-out audio connector	⓭	Network Connection Speed LED
❼	Line-in audio connector	⓮	Video (monitor) connector

1.1.3 Drive Positions

The workstation provides seven drive bays. Bays 1 through 3 are located in the 3.5-inch removable hard drive cage, which is located behind the side access panel of the workstation. Drive bays 4 through 7 are located on the front of the workstation. The drives support various drive configurations.

Item	Component	Description
❶	Bay 1	Part of the removable hard drive cage. A 3.5-inch, third-height bay that supports a 1.0-inch hard drive or a 1.6-inch hard drive.
❷	Bay 2	Part of the removable hard drive cage. A 3.5-inch, third-height bay that supports a 1.0-inch hard drive. Bay 2 is not available when a 1.6-inch hard drive is installed in either bay 1 or bay 3.
❸	Bay 3	Part of the removable hard drive cage. A 3.5-inch, third-height bay that supports a 1.0-inch hard drive or a 1.6-inch hard drive.
❹	Bay 4	5.25-inch, half-height bay that supports 1.0-inch or 1.6-inch storage devices. Either a CD-ROM drive or DVD-ROM drive is shipped in bay 4.
❺	Bay 5*	5.25-inch, half-height bay that supports 1.0-inch or 1.6-inch storage devices.
❻	Bay 6*	5.25-inch, half-height bay that supports 1.0-inch or 1.6-inch storage devices.
❼	Bay 7	3.5-inch, third-height bay that supports a 1.0-inch device. A standard 3.5-inch diskette drive is shipped in bay 7.

*An optional Zip drive can be installed in bay 5 or 6.

1.2 Serial Number Location

Provide the workstation serial number to Compaq whenever you request information or order spare parts. There are two serial number locations on the unit. One is located on the top front corner of the access panel. The other is on the rear of the unit below the power supply.

For asset control, the serial number is also embedded in the Electrically Erasable Programmable Read Only Memory (EEPROM) on the system board. If the system board is replaced with a spare part from Compaq, an invalid serial number condition will be reported during the Power-On Self-Tests (POST). To clear the condition, re-enter the original serial number through Computer Setup.

2

Spare Parts

Spare parts are listed and illustrated on the Illustrated Parts Map, spare part number 229782-001.

3

Removal & Replacement Preliminaries

This chapter provides general service information for the workstation. Adherence to the procedures and precautions described in this chapter is essential for proper service.

⚠ **CAUTION:** When the workstation is plugged into an AC power source there is always voltage applied to the system board. You must disconnect the power cord from the power source before opening the workstation to prevent system board or component damage.

3.1 Electrostatic Discharge Information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not appear to be affected at all and can work perfectly throughout a normal cycle. The device may function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Circuitry built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

3.1.1 Generating Static

The following table shows that:

■ Different activities generate different amounts of static electricity.

■ Static electricity increases as humidity decreases.

Event	Relative Humidity		
	55%	40%	10%
Walking across carpet	7,500 V	15,000 V	35,000 V
Walking across vinyl floor	3,000 V	5,000 V	12,000 V
Motions of bench worker	400 V	800 V	6,000 V
Removing DIPs* from plastic tube	400 V	700 V	2,000 V
Removing DIPs* from vinyl tray	2,000 V	4,000 V	11,500 V
Removing DIPs* from Styrofoam	3,500 V	5,000V	14,500 V
Removing bubble pack from PCB	7,000 V	20,000 V	26,500 V
Packing PCBs in foam-lined box	5,000 V	11,000 V	21,000 V

*These are then multi-packaged inside plastic tubes, trays, or Styrofoam.

✎ 700 volts can degrade a product.

3.1.2 Preventing Electrostatic Damage to Equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following proper packaging and grounding precautions are necessary to prevent damage to electric components and accessories.

■ To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.

■ Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.

■ Keep electrostatic sensitive parts in their containers until they arrive at static-free stations.

■ Place items on a grounded surface before removing them from their container.

■ Always be properly grounded when touching a sensitive component or assembly.

■ Avoid contact with pins, leads, or circuitry.

■ Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

3.1.3 Personal Grounding Methods and Equipment

Use the following equipment to prevent static electricity damage to equipment:

■ Wrist straps are flexible straps with a maximum of one-megohm +/- 10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.

■ Heel straps/Toe straps/Boot straps can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of one-megohm +/- 10% resistance between the operator and ground.

Static Shielding Protection Levels	
Method	**Voltage**
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

3.1.4 Grounding the Work Area

To prevent static damage to the work area, use the following precautions:

■ Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.

■ Use static-dissipative mats, foot straps, or air ionizers to give added protection.

■ Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.

■ Turn off power and input signals before inserting and removing connectors or test equipment.

■ Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.

■ Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.

■ Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

3.1.5 Recommended Materials and Equipment

Materials and equipment that are recommended for use in preventing static electricity include:

■ Antistatic tape

■ Antistatic smocks, aprons, or sleeve protectors

■ Conductive bins and other assembly or soldering aids

■ Conductive foam

■ Conductive tabletop workstations with ground cord of one-megohm +/- 10% resistance

■ Static-dissipative table or floor mats with hard tie to ground

■ Field service kits

■ Static awareness labels

■ Wrist straps and footwear straps providing one-megohm +/- 10% resistance

■ Material handling packages

■ Conductive plastic bags, opaque shielding bags, transparent metallized shielding bags

■ Conductive plastic tubes

■ Conductive tote boxes

■ Transparent shielding tubes

3.2   Routine Care

3.2.1   General Cleaning Safety Precautions

1. Never use solvents or flammable solutions to clean the workstation.

2. Never immerse any parts in water or cleaning solutions; apply any liquids to a clean cloth and then use the cloth on the component.

3. Always unplug the workstation when cleaning with liquids or damp cloths.

4. Always unplug the workstation before cleaning the keyboard, mouse, or air vents.

5. Disconnect the keyboard before cleaning it.

6. Wear safety glasses equipped with side shields when cleaning the keyboard.

3.2.2   Cleaning the Chassis Exterior

Follow all safety precautions in Section 3.2.1 before cleaning the workstation.

■   To clean the workstation case, follow the procedures described below:

■   To remove light stains or dirt, use plain water with a clean, lint-free cloth or swab.

■   For stronger stains, use a mild dishwashing liquid diluted with water. Rinse well by wiping it with a cloth or swab dampened with clear water.

■   For stubborn stains, use isopropyl (rubbing) alcohol. No rinsing is needed as the alcohol will evaporate quickly and not leave a residue.

■   After cleaning, always wipe the unit with a clean, lint-free cloth.

■   Occasionally clean the air vents on the workstation. Lint and other foreign matter can block the vents and limit the airflow.

3.2.3   Cleaning the Keyboard

Follow all safety precautions in Section 3.2.1 before cleaning the keyboard.

To clean the tops of the keys or the keyboard body, follow the procedures described in Section 3.2.2.

When cleaning debris from under the keys, review all rules in Section 3.2.1 before following these procedures:

⚠ **CAUTION:** Use safety glasses equipped with side shields before attempting to clean debris from under the keys.

■   Visible debris underneath or between the keys may be removed by vacuuming or shaking.

■   Canned, pressurized air may be used to clean debris from under the keys. Caution should be used as too much air pressure can dislodge lubricants applied under the wide keys.

■   If you remove a key, use a specially designed key puller to prevent damage to the keys. This tool is available through many electronic supply outlets.

⚠️ **CAUTION:** Never remove a wide leveled key (like the space bar) from the keyboard. If these keys are improperly removed or installed, the keyboard may not function properly.

- Cleaning under a key may be done with a swab moistened with isopropyl alcohol and squeezed out. Be careful not to wipe away lubricants necessary for proper key functions. Use tweezers to remove any fibers or dirt in confined areas. Allow the parts to air dry before reassembly.

3.2.4 Cleaning the Monitor

- Wipe the monitor screen with a clean cloth moistened with water or with a towelette designed for cleaning monitors. Do not use sprays or aerosols directly on the screen, the liquid may seep into the housing and damage a component. Never use solvents or flammable liquids on the monitor.

- To clean the monitor body follow the procedures in Section 3.2.2.

3.2.5 Cleaning the Mouse

Before cleaning the mouse, ensure that the power to the workstation is turned off.

- Clean the mouse ball by first removing the retaining plate and the ball from the housing. Pull out any debris from the ball socket and wipe the ball with a clean dry cloth before reassembly.

- To clean the mouse body, follow the procedures in Section 3.2.2.

3.3 Service Considerations

Listed below are some of the considerations that you should keep in mind during the disassembly and assembly of the workstation.

3.3.1 Power Supply Fan

The power supply fan is a variable-speed fan based on the temperature in the power supply.

⚠️ **CAUTION:** The cooling fan is off **only** when the workstation is turned off or the power cable has been disconnected.

The cooling fan is always on in all other instances (when the workstation is either in the "On," "Standby," or "Suspend" mode).

You must disconnect the power cord from the power source before opening the workstation to prevent system board or component damage.

3.3.2 Tools and Software Requirements

To service the workstation, you need the following:

■ Torx T-15 screwdriver (Compaq screwdriver with bits, PN 161946-001)

■ Phillips screwdriver (may sometimes be used in place of the Torx screwdriver)

■ Diagnostics software

■ Compaq tamper-resistant T-15 wrench (Smart Cover FailSafe Key, PN 166527-001) or Compaq tamper-resistant bits (Smart Cover FailSafe Key, PN 166527-002)

3.3.3 Screws

The screws used in the workstation are not interchangeable. They may have standard or metric threads and may be of different lengths. If an incorrect screw is used during the reassembly process, it can damage the unit. Compaq strongly recommends that all screws removed during disassembly be kept with the part that was removed, then returned to their proper locations.

✎ As each subassembly is removed from the workstation, it should be placed away from the work area to prevent damage.

3.3.4 Cables and Connectors

Most cables used throughout the unit are flat, flexible cables. These cables must be handled with care to avoid damage. Apply only the tension required to seat or unseat the cables during insertion or removal from the connector. Handle cables by the connector whenever possible. In all cases, avoid bending or twisting the cables, and ensure that the cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced.

⚠ **CAUTION:** When servicing this workstation, ensure that cables are placed in their proper location during the reassembly process. Improper cable placement can damage the workstation.

3.3.5 Hard Drives

Handle hard drives as delicate precision components, avoiding all physical shock and vibration. This applies to failed drives as well as replacement spares.

■ If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable protective packaging and label the package "Fragile: Handle With Care."

■ Do not remove hard drives from the shipping package for storage. Keep hard drives in their protective packaging until they are actually mounted in the CPU.

■ Avoid dropping drives from any height onto any surface.

■ If you are inserting or removing a hard drive, turn off the workstation. Do not remove a hard drive while the workstation is on or in standby mode.

■ Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector. For more information about preventing electrostatic damage, refer to Section 3.1, "Electrostatic Discharge."

■ Do not use excessive force when inserting a drive.

■ Avoid exposing a hard drive to liquids, temperature extremes, or products that have magnetic fields such as monitors or speakers.

3.3.6 Lithium Coin Cell Battery

The battery that comes with the workstation provides power to the real-time clock and has a minimum lifetime of about three years.

See Chapter 4, "Removal and Replacement Procedures," for instructions on the replacement procedures.

WARNING: This workstation contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 140°F (60°C).

CAUTION: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste.
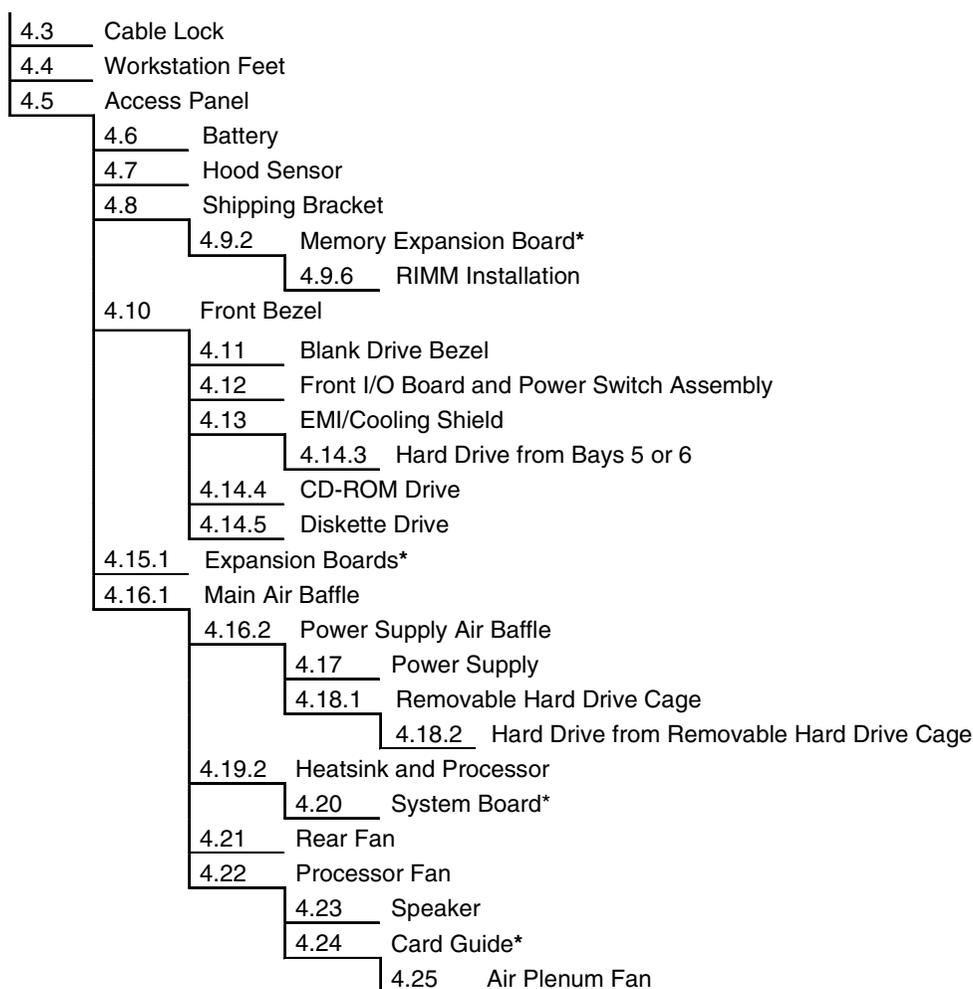
4

Removal & Replacement Procedures

This chapter provides general service information for the workstation. Adherence to the procedures and precautions described in this chapter is essential for proper service.

After completing all necessary removal and replacement procedures, run the Diagnostics utility to verify that all components operate properly.

4.1   Disassembly Sequence Chart

Use the chart below to determine the disassembly sequence for removing components from the workstation.

4.3	Cable Lock
4.4	Workstation Feet
4.5	Access Panel
4.6	Battery
4.7	Hood Sensor
4.8	Shipping Bracket
4.9.2	Memory Expansion Board*
4.9.6	RIMM Installation
4.10	Front Bezel
4.11	Blank Drive Bezel
4.12	Front I/O Board and Power Switch Assembly
4.13	EMI/Cooling Shield
4.14.3	Hard Drive from Bays 5 or 6
4.14.4	CD-ROM Drive
4.14.5	Diskette Drive
4.15.1	Expansion Boards*
4.16.1	Main Air Baffle
4.16.2	Power Supply Air Baffle
4.17	Power Supply
4.18.1	Removable Hard Drive Cage
4.18.2	Hard Drive from Removable Hard Drive Cage
4.19.2	Heatsink and Processor
4.20	System Board*
4.21	Rear Fan
4.22	Processor Fan
4.23	Speaker
4.24	Card Guide*
4.25	Air Plenum Fan

These steps are interdependent.

4.2   **Preparation for Disassembly**

See Chapter 3, "Removal and Replacement Preliminaries," for initial procedures.

1. Close any open software applications.

2. Exit the operating system.

3. Remove any diskette or compact disc from the workstation.

4. Turn off the workstation and any peripheral devices that are connected to it.

$\triangle$ **CAUTION:** Turn off the workstation before disconnecting any cables.

5. Disconnect the power cord from the grounded AC outlet and then from the workstation.

$\triangle$ **CAUTION:** The power supply in the W8000 has an auxiliary power section. This section is always active as long as the unit is plugged into a live AC outlet. Be sure to turn off the switch and unplug the power cord before performing any service work.

$\triangle$ **CAUTION:** Electrostatic discharge can damage electronic components of the workstation. Before beginning these procedures, be sure you are properly grounded. See Chapter 3, "Removal and Replacement Preliminaries" for more information.

6. Disconnect all peripheral device cables from the workstation.

✎ During disassembly, label each cable as you remove it, noting its position and routing. Keep all screws with the units removed.

✎ In some of the removal procedures in this chapter, you will be asked to place the workstation on its side when servicing certain internal components.

$\triangle$ **CAUTION:** The screws used in the workstation are of different thread sizes and lengths; using the wrong screw in an application may damage the unit.

4.3   Cable Lock

The workstation comes standard with a cable lock provision for attaching a padlock and/or cable lock. If installed, the locks must be removed before accessing internal components.

1. Unlock and remove the cable lock or the padlock.

2. Remove the security bracket (plate) seated over the cable lock bracket.

3. Unfasten the retaining screw to release the cable lock bracket.
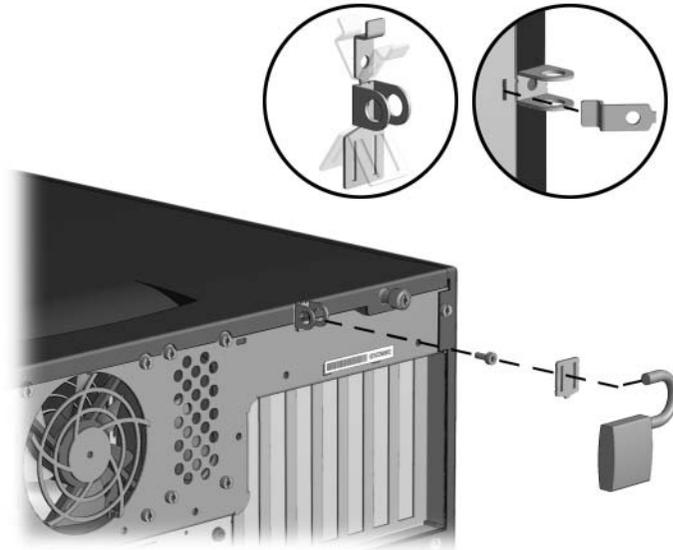
4.4   Workstation Feet

Four (4) rubber feet are mounted to the chassis, as shown below. No parts have to be removed to access the feet. The replacement feet have an adhesive surface and are shipped with a protective backing in place. Remove the backing from the feet before installation.

If necessary, remove the old feet and remove any adhesive residue from the chassis.

To replace the feet, reverse the above procedure.

4.5   Access Panel

⚠ **CAUTION:** Do not operate the workstation with the access panel removed. The panel is an integral part of the cooling system; removing it while the system is running may adversely affect data integrity and the life of your system.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Loosen the four rear panel thumbscrews ❶ and slide off the access panel ❷.
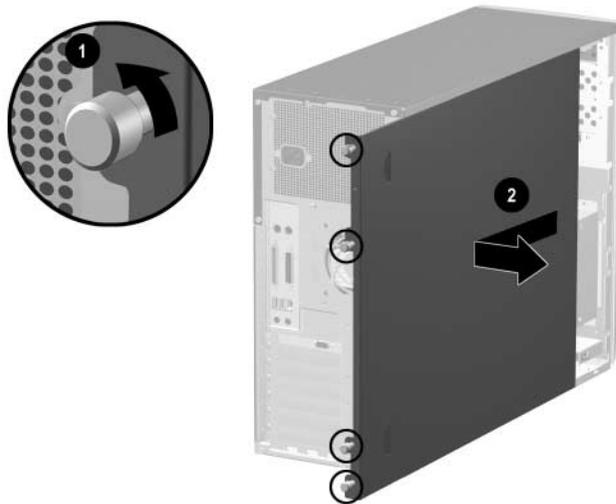
⚠ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

⚠ **WARNING:** When replacing the access panel, be sure to tighten all four thumbscrews.

To replace the access panel, reverse the above procedure.

4.6 **Battery**

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠ **WARNING:** Power is continuous to the system board and power supply even when the power switch is turned off. To prevent damage to the unit, disconnect the power cord from the power source or the unit before beginning disassembly procedures.

2. Remove the access panel (Section 4.5).

3. Locate the battery on the system board. If there are expansion boards installed, you may need to remove them to gain access to the battery.

4. Lift the battery out of the holder.

5. Slide the replacement battery into position with the positive side up. The battery holder automatically secures the battery in the proper position.

6. If you removed expansion boards, reinstall them now.

7. Replace the access panel.

8. Reassemble the workstation.

9. Reconnect the AC power cord and turn on the workstation.

10. Reset the date and time, your passwords, and any special system setups, using Compaq Computer Setup.

⚠ **WARNING:** This workstation contains a lithium-ion battery pack. There is a risk of fire and chemical burn if the battery pack is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 60°C (140°F).

🗑 In North America, dispose of nickel metal hydride or lithium-ion batteries by taking advantage of the Compaq battery recycling program. You will be provided with a postage-paid battery pack mailer preaddressed to a reclamation facility where the metals are recycled. Call the telephone number listed for your location in the *Contacting Customer Support* guide for more information.

In Europe, do not dispose of batteries with general household waste. Dispose of or recycle them by using the public collection system or returning them to Compaq, your authorized Compaq partners, or their agents.
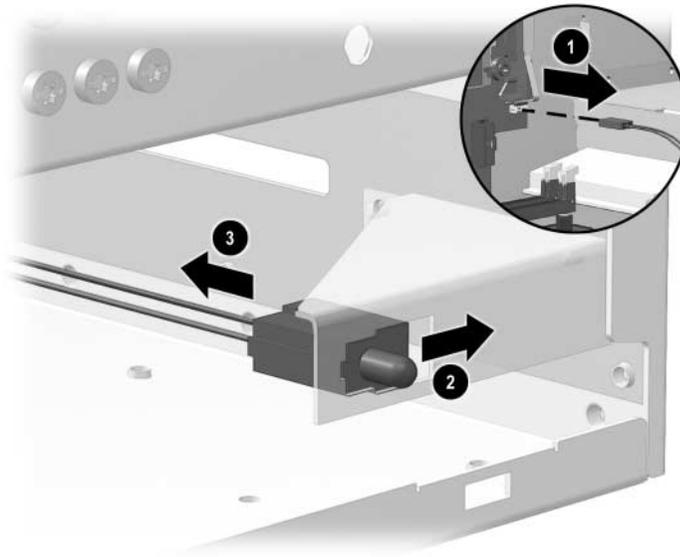
4.7   **Hood Sensor**

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

---

2. Remove the access panel (Section 4.5).

3. Unplug the cable from the system board ❶.

4. Slide the sensor toward the front side of the workstation ❷.

5. Remove the sensor from the chassis ❸.

To replace the hood sensor, reverse the above procedure.

4.8   Shipping Bracket

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

△ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

3. Remove the four screws that connect shipping bracket to the front of the chassis.

4. Remove the shipping bracket from the chassis.
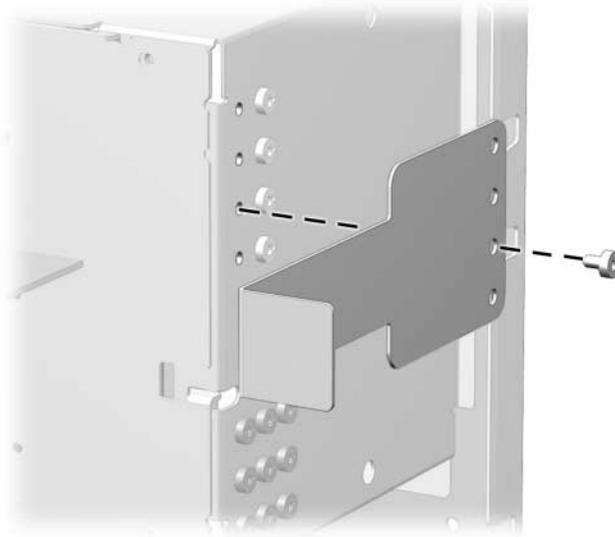
To replace the shipping bracket, reverse the above procedure.

4.9   Memory Components

The W8000 includes a memory expansion board that must be removed from the system board to remove and replace memory modules.

4.9.1   Overview

The W8000 has two Direct Rambus memory channels and uses Error Checking and Correcting (ECC) Direct Rambus Inline Memory Modules (RIMMS). Continuity RIMMs (CRIMMs) are also available to populate empty RIMM slots.

Dual Direct Rambus memory channels operate on the following three principles:

1. Dual channels maximize performance by doubling the speed at which data in transferred to and from memory, compared to single channel systems. Memory hubs divide each main channel into two sub-channels. For example, channel A is divided into channel A-top and channel A-bottom, and channel B is divided into channel B-top and channel B-bottom. Each sub-channel consists of two RIMM sockets.

2. Dual channels operate in unison, not independently, thus identical RIMMs must be installed in pairs across channels. For example, if you install a RIMM in RIMM socket 3 (channel B-top), you must also install an identical RIMM in RIMM socket 4 (channel A-top).

3. Dual channels must have electrical continuity for your system to boot. For example, if you install identical RIMMs in RIMM sockets 3 and 4, but fail to install CRIMMs in RIMM sockets 1 and 2, the continuity will be broken and your system will not boot.

4. For optimal performance, RIMMs should be placed in the sockets closest to the memory repeater hubs. For example, having RIMMs in sockets 3 & 4 and CRIMMs in sockets 1 & 2 will result in better performance than having RIMMs in sockets 1 & 2 and CRIMMs in sockets 3 & 4.

4.9.2 Removing the Memory Expansion Board

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Locate the memory expansion board that is connected to the system board.
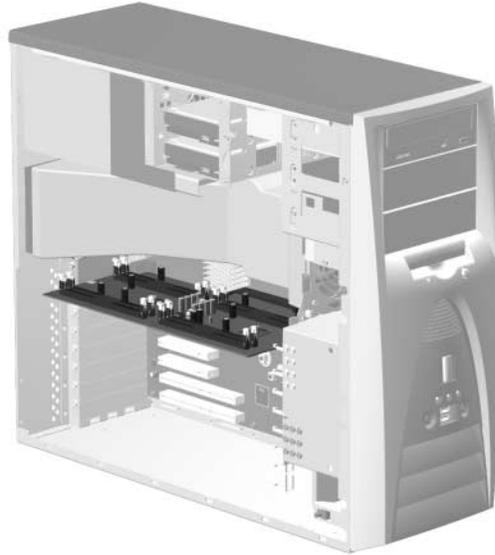
4. Remove the torx screw on the back of the metal slot cover that secures the memory board to the expansion board slot.

5. To release the memory expansion board, press downward on the plastic release latch ❶ that holds the memory expansion board in the card guide.
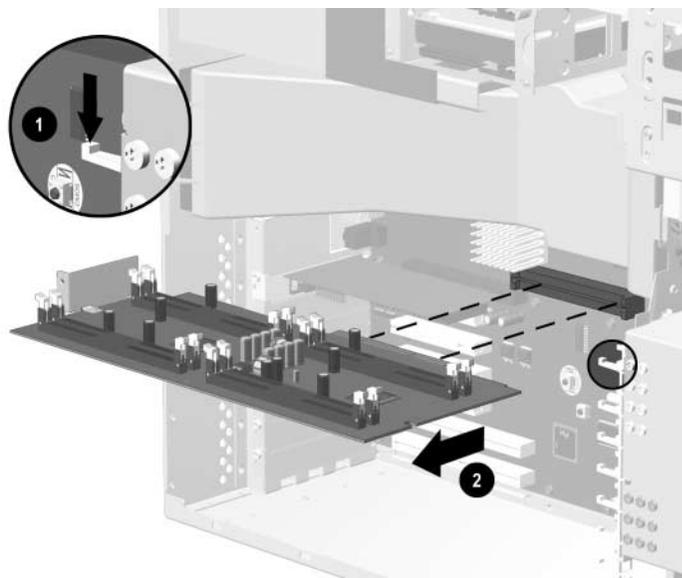
6. Carefully remove the memory board from the memory expansion board socket ❷.

To install the memory expansion board, reverse the above procedure.

4.9.3 RIMM Installation Guidelines

⚠ **WARNING:** To reduce the risk of personal injury when replacing or removing RIMMs, allow the module being removed from the RIMM slot sufficient time to cool. RIMM temperatures can reach 100°C (212°F).

⚠ **CAUTION:** When handling a RIMM, be careful not to touch any of the contacts. Doing so may damage the module.

⚠ **CAUTION:** Static electricity can damage the electronic components of the workstation or optional boards. Before beginning these memory upgrade procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

When installing RIMMs, you must follow the guidelines listed below or the workstation will not function:

1. A RIMM can be installed only one way. Be sure to match the two key slots on the RIMM with the tabs on the RIMM socket. Push the RIMM down into the RIMM socket, ensuring that it is fully inserted and properly seated, and that the retaining arms are locked in place.

2. CRIMMs must be installed in all empty RIMM sockets on channels that are used. The CRIMMs are removed when you populate the sockets with RIMMs. For examples of the correct configuration sequence (Section 4.9.5).

3. Install RIMMs in pairs across both memory channels. Each RIMM socket populated with a RIMM or CRIMM on Channel A must be populated with an identical RIMM or CRIMM on Channel B.

4. Do not exceed 32 Direct RDRAM devices on each Direct Rambus memory channel. A label on the RIMM will indicate the number and speed of Direct RDRAM devices on the RIMM.

✎ The number of Direct RDRAM devices on a RIMM cannot be changed.

5. Use only 800-MHz RIMMs.

6. Use only RIMMs that have been tested and approved by Compaq. Not all RIMMs meet the Compaq standard for quality and reliability.

✎ Only 800-MHz RIMMs can be used in this workstation. The workstation will not function if RIMMs of different speeds are inserted.

4.9.4 RIMM Slot Locations

The W8000 ships with an eight-RIMM socket memory expansion board (two RIMM sockets per memory channel).
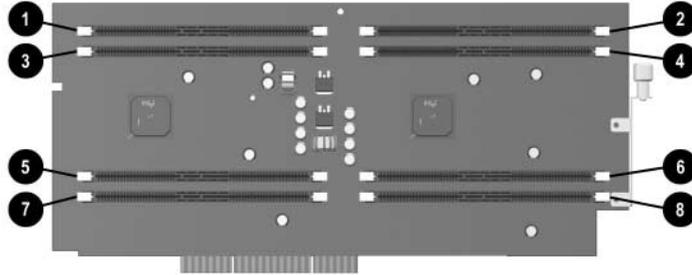
Identifier	RIMM Socket	Memory Channel
❶	RIMM Socket 1	Channel B-Top
❷	RIMM Socket 2	Channel A-Top
❸	RIMM Socket 3	Channel B-Top
❹	RIMM Socket 4	Channel A-Top
❺	RIMM Socket 5	Channel B-Bottom
❻	RIMM Socket 6	Channel A-Bottom
❼	RIMM Socket 7	Channel B-Bottom
❽	RIMM Socket 8	Channel A-Bottom

4.9.5 RIMM Socket Configurations

When installing RIMMs on the eight-RIMM slot memory board, you must follow one of the following four configurations.

✎ CRIMMs must be installed in all unpopulated RIMM sockets on channels being used.

Location	Config 1 1 Pair RIMMs	Config 2 2 Pair RIMMs	Config 3 3 pairs RIMMs	Config 4 4 pairs RIMMS
RIMM Sockets 1 and 2	CRIMM	CRIMM	RIMM	RIMM
RIMM Sockets 3 and 4	RIMM	RIMM	RIMM	RIMM
RIMM Sockets 5 and 6	Empty	RIMM	RIMM	RIMM
RIMM Sockets 7 and 8	Empty	CRIMM	CRIMM	RIMM

4.9.6 Installing a Memory Device

⚠ **WARNING:** To reduce the risk of personal injury when replacing or removing RIMMs, allow the module being removed from the RIMM slot sufficient time to cool. RIMM temperatures can reach 100°C (212°F).

⚠ **CAUTION:** When handling a RIMM, be careful not to touch any of the contacts. Doing so may damage the module.

⚠ **CAUTION:** Static electricity can damage the electronic components of the workstation or optional boards. Before beginning these memory upgrade procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

Before installing additional RIMMs, read "RIMM Installation Guidelines" in this chapter.

✎ CRIMMs must be installed in all unpopulated RIMM sockets on channels being used.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the memory expansion board (Section 4.9.2).

4. Press outward on the two RIMM slot retainer latches ❶.

5. Place the RIMM in the appropriate RIMM socket ❷ ensuring that it is fully inserted and properly seated.

⚠ **CAUTION:** Be sure to follow the correct configuration guidelines or your system will not function.

6. Press inward on the two retainer latches ❸ to secure the RIMM in the socket.
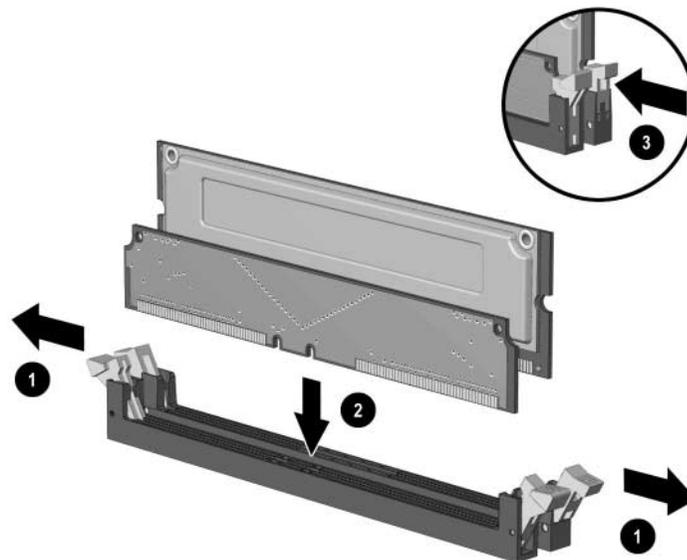
To remove a memory module from a RIMM slot, reverse the above procedure.

4.10 Front Bezel

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

3. Press the two front bezel release latches ❶ and remove the front bezel ❷.
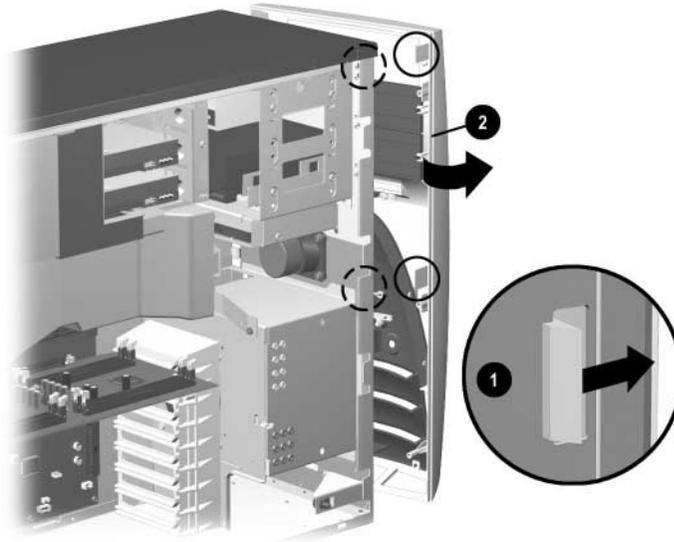
To replace the front bezel, reverse the above procedure.

4.11 Blank Drive Bezel

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠️ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

3. Remove the front bezel (Section 4.10).

4. Pinch together the retainer snaps on the back of the front bezel ❶. This allows the bezel blank to move pass the retainer snaps.

5. Rotate the bezel blank outward, detaching it from the front bezel ❷.
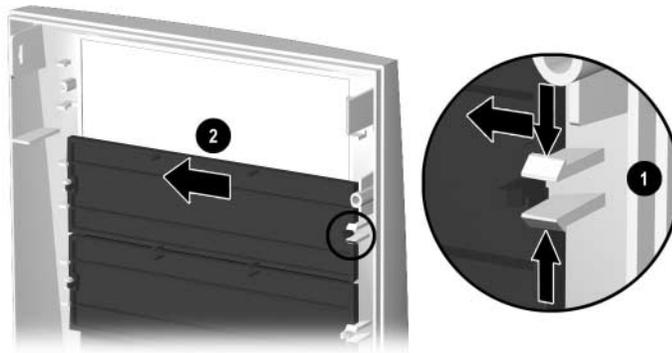
To replace the blank drive bezel, reverse the above procedure.

4.12 Front I/O Board and Power Switch Assembly

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the front bezel (Section 4.10).

4. Disconnect the cable from the system board ❶.

5. Remove the four screws connecting the cage to the chassis ❷, then remove the cage from the chassis ❸.

6. Disconnect the cable from the I/O board mounted in the cage ❹.

7. Thread the cable though the hole in the front of the chassis ❺ and through the hole in the side of the air plenum.
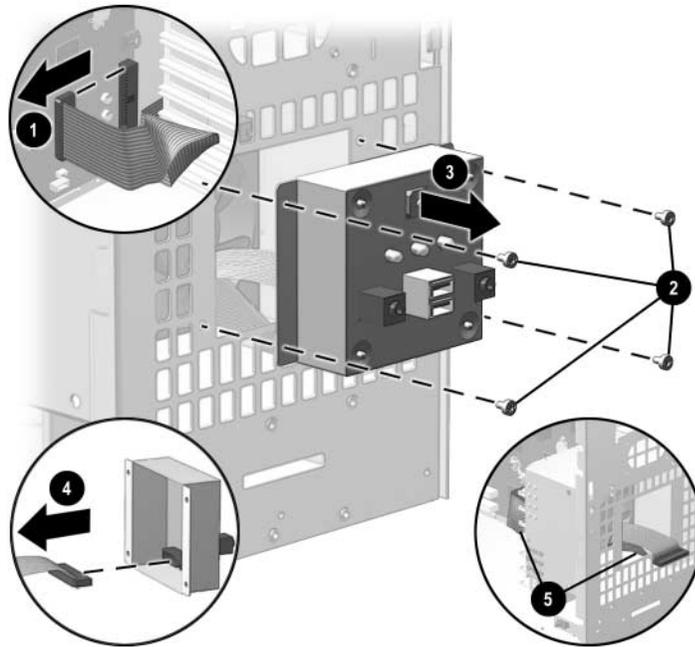
8. Remove the four screws connecting the I/O board to the cage ❻.

9. Remove the I/O board from the cage ❼.
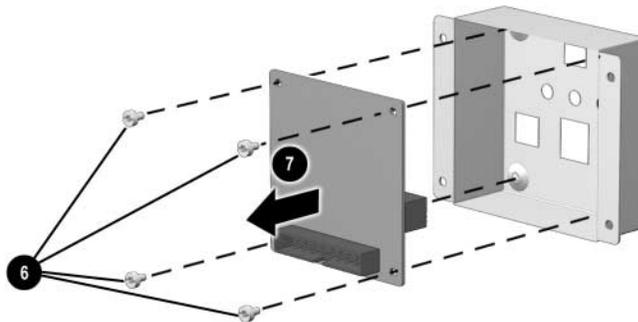
To replace the assembly, reverse the above procedure.

4.13 EMI/Cooling Shield

An EMI/cooling shield covers bays 5 and 6 to provide proper cooling and EMI protection.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

$\triangle$ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

3. Remove the front bezel (Section 4.10).

4. Remove the two screws that connect the EMI/cooling shield to the front of the chassis.

5. Remove the EMI/cooling shield from the drive slot.
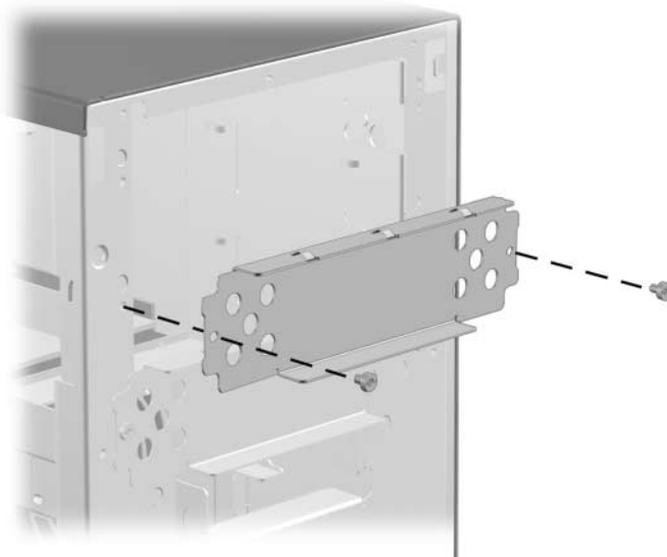
Important: Replace the shield after a hard drive is installed in the bay.

To replace an EMI/cooling shield, reverse the above procedure.

4.14 Mass Storage Devices

4.14.1 Drive Positions

The W8000 can house up to seven mass storage devices. The following illustration identifies the physical drive locations. Refer to the corresponding table for a list of the recommended drive configurations.

Item	Component	Description
❶	Bay 1	Part of the removable hard drive cage. A 3.5-inch, third-height bay that supports a 1.0-inch hard drive or a 1.6-inch hard drive.
❷	Bay 2	Part of the removable hard drive cable. A 3.5-inch, third-height bay that supports a 1.0-inch hard drive. Bay 2 is not available when a 1.6-inch hard drive is installed ion either bay 1 or bay 3.
❸	Bay 3	Part of the removable hard drive cage. A 3.5-inch, third-height bay that supports a 1.0-inch hard drive or a 1.6-inch hard drive.
❹	Bay 4	5.25-inch, half-height bay that supports 1.0-inch or 1.6-inch storage devices. Either a CD-ROM drive or DVD-ROM drive is shipped in bay 4.
❺	Bay 5*	5.25-inch, half-height bay supporting 1.0-inch or 1.6-inch storage devices.
❻	Bay 6*	5.25-inch, half-height bay supporting 1.0-inch or 1.6-inch storage devices.
❼	Bay 7	3.5-inch, third-height bay that supports a 1.0-inch device. A standard 3.5-inch diskette drive is shipped in bay 7.

*An optional Zip drive can be installed in bay 5 or 6.

⚠️ **CAUTION:** If a drive is not installed in bays 5 or 6 or if the bays are empty, be sure an EMI/cooling shield is installed to ensure proper airflow and cooling.

4.14.2 Spare Screws

A total of 17 extra spare screws are provided on the side of the air plenum. The top group of eight screws are standard 6-32 x 3/16-inch long screws and are for installing hard drives in the removable hard drive cage. The bottom group of nine screws are metric M-3 x 5 mm long and are for installing removable media storage devices in the front drive bays.
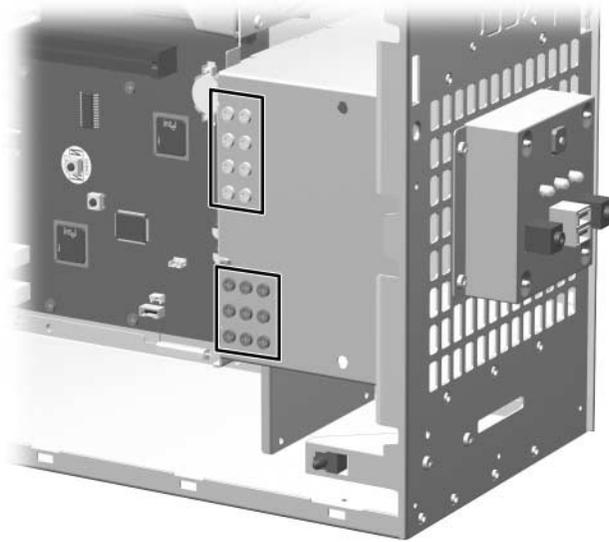
4.14.3 Removing a Hard Drive from Bays 5 or 6

Drive bays 5 and 6 can be configured with either a 1.0-inch or 1.6-inch hard drive. To remove a hard drive:

✎ Before removing a SCSI device, please read the "SCSI Devices" appendix.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the front bezel (Section 4.10).

4. Remove the EMI/Cooling shield (Section 4.13).

5. Remove the cables from the back of the hard drive.

6. Remove the screws from the side of the drive and remove the drive from the drive bay.
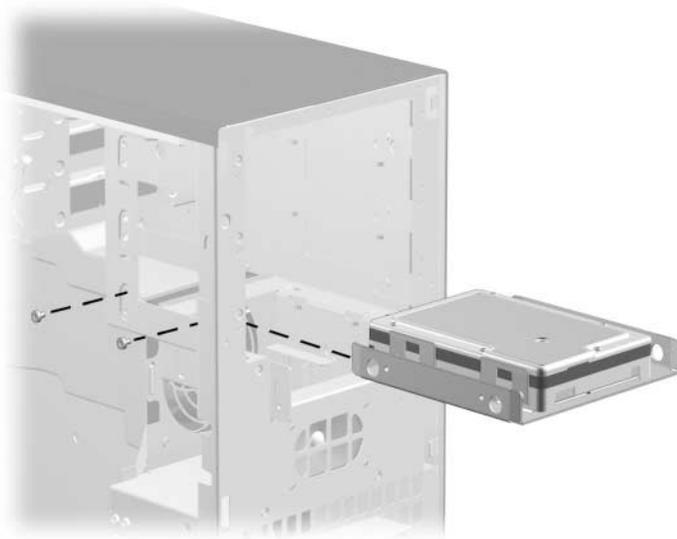
To replace the hard drive, reverse the previous procedure.

4.14.4 CD-ROM Drive

✎ This procedure also applies to removing other similar devices.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the front bezel (Section 4.10).

4. Remove the two screws securing the right side of the drive.

5. Slide the drive slightly out of the drive cage.

6. Disconnect all cables from the rear of the drive.

7. Pull the drive straight out of the chassis.
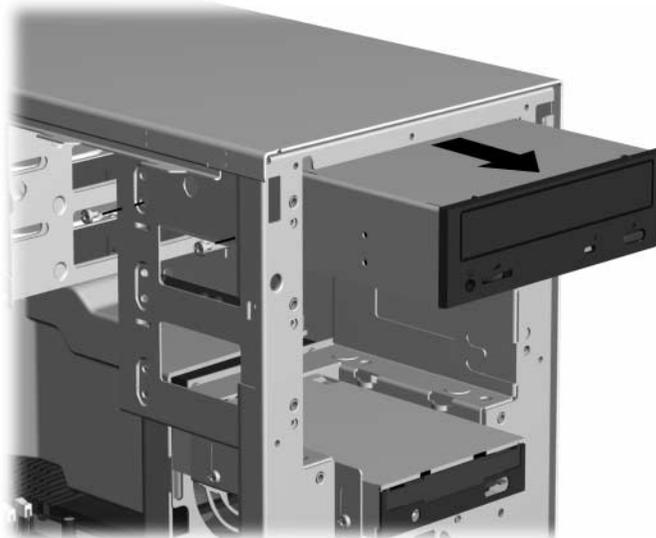
To replace the drive, reverse the above procedure.

⚠ **CAUTION:** Use only 3/16-inch or 5-mm long screws as guide screws. Longer screws can damage the internal components of the drive. Be sure to transfer the guide screw from the old drive to the new one. The screw is installed on the right front side of the drive. Note that extra guide screws are provided on the side of the air plenum.

⚠ **CAUTION:** When servicing the workstation, be sure cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the workstation.

4.14.5 Diskette Drive

Important: Before beginning the removal procedure, be sure there is no diskette in the drive.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠️ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

3. Remove the front bezel (Section 4.10).

4. Disconnect the cables from the back of the diskette drive.

5. Remove the two screws that secure the diskette drive.

6. Pull the diskette drive straight out of the drive cage.
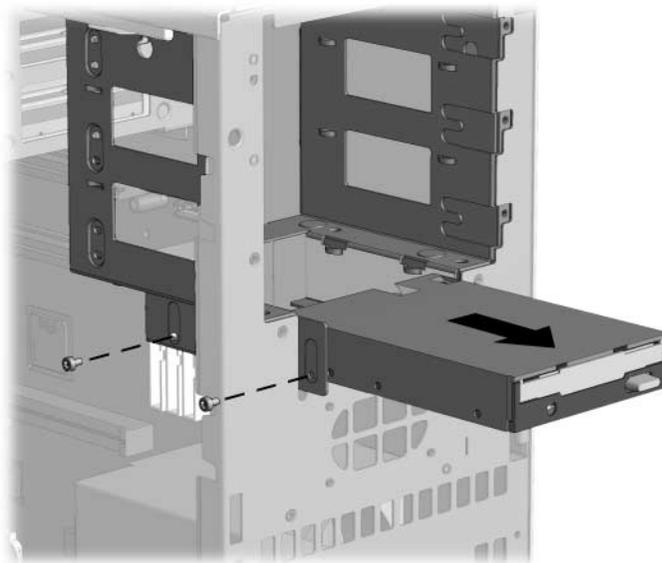
To replace the diskette drive, reverse the above procedure.

⚠️ **CAUTION:** Use only 3/16-inch or 5-mm long screws. Longer screws can damage the internal components of the drive. If you are replacing the drive with a new one, transfer the guide screw from the old drive to the new one. Be sure the guide screw is placed in the first hole on the right side of the drive. Note that extra guide screws are provided on the side of the air plenum.

⚠️ **CAUTION:** When servicing the workstation, be sure cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the workstation.

4.15 Expansion Boards

✎ The W8000 supports 1.5V (typically 4X) AGP and AGP Pro cards only. Older type AGP cards (3.3V) are not supported and will NOT fit in the AGP socket.

This workstation contains one AGP and six PCI sockets. The following illustration identifies the physical location of these sockets.
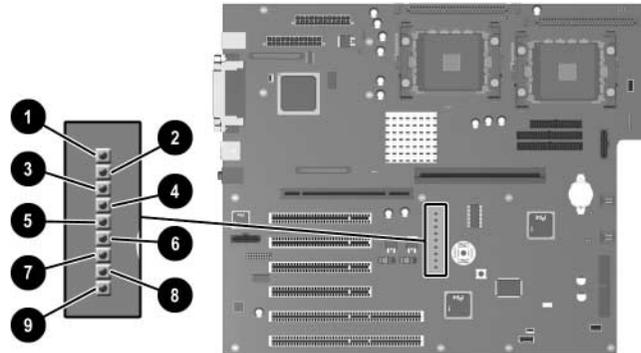
Item	Component
❶	One 1.5V, AGP Pro Socket
❷	Four 32-bit, 33-MHz PCI Sockets; primary bus
❸	Two 64-bit, 66-MHz PCI Sockets; secondary bus

4.15.1 Removing an Expansion Board

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠️ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.
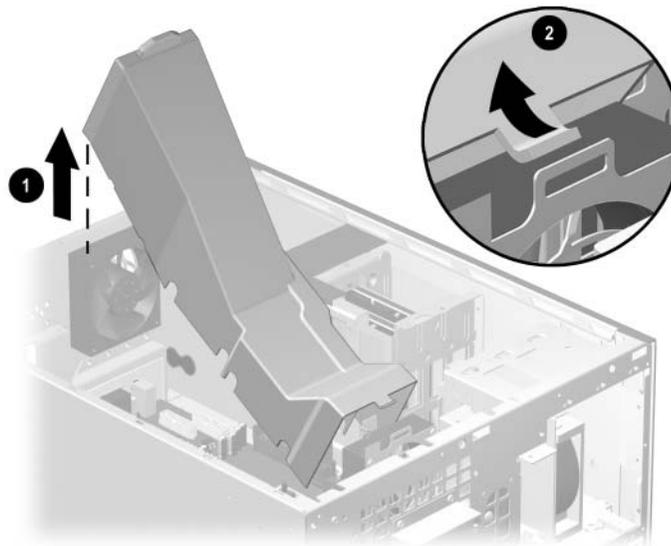
2. Remove the access panel (Section 4.5).

3. Disconnect any cables attached to the expansion board.

4. Remove the expansion board retaining screw.

5. Hold the board at each end and carefully rock it back and forth until the connectors pull free from the slot. Do not scrape the board against other components.
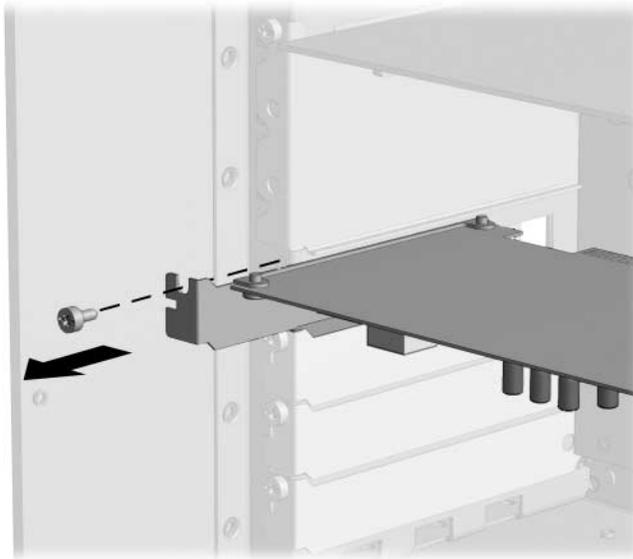
6. Store the board in antistatic packaging.

7. Install an expansion slot cover to close the open slot.

8. Replace the access panel.

9. Reassemble the workstation.

10. Reconfigure the workstation, if necessary.

4.15.2 Installing an Expansion Board

1. Prepare the workstation for disassembly (Section 4.2).

2. Remove the access panel (Section 4.5) and locate the correct vacant PCI slot.

3. Remove the screw securing the expansion slot cover, then remove the slot cover

4. Slide the expansion board into the expansion slot and press the board firmly into place.
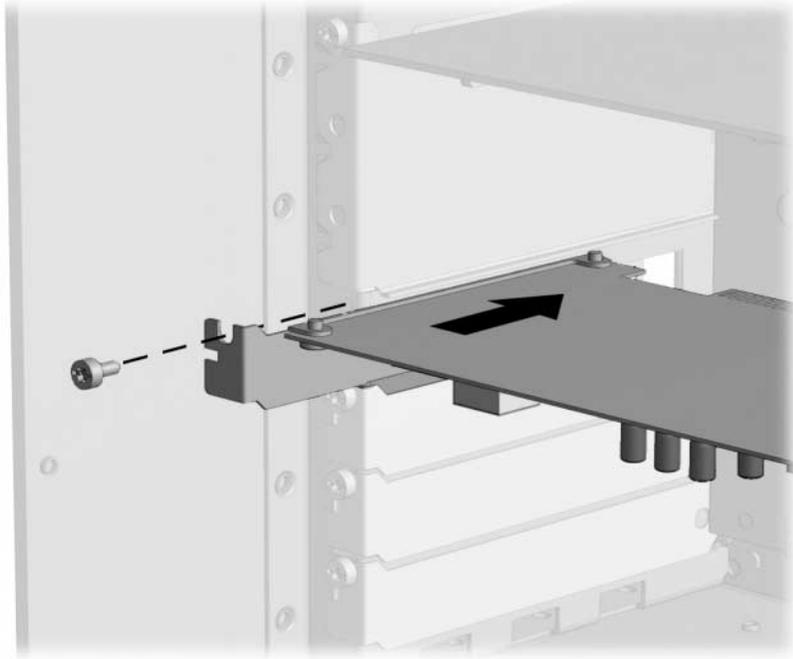
Important: When installing an expansion board, press firmly on the board so that the whole connector seats properly in the expansion board slot.

✎ If you are installing a full-length PCI board, make sure the card is engaged with the card guide.

An AGP expansion board (with additional components or PCI expansion boards attached) may occupy up to two adjacent PCI sockets on the workstation system board.

5. Replace the screw at the side of the expansion slot.

6. Replace the access panel.

7. Connect external cables to the installed board, if necessary.

8. Reassemble the workstation.

9. Reconfigure the workstation, if necessary.

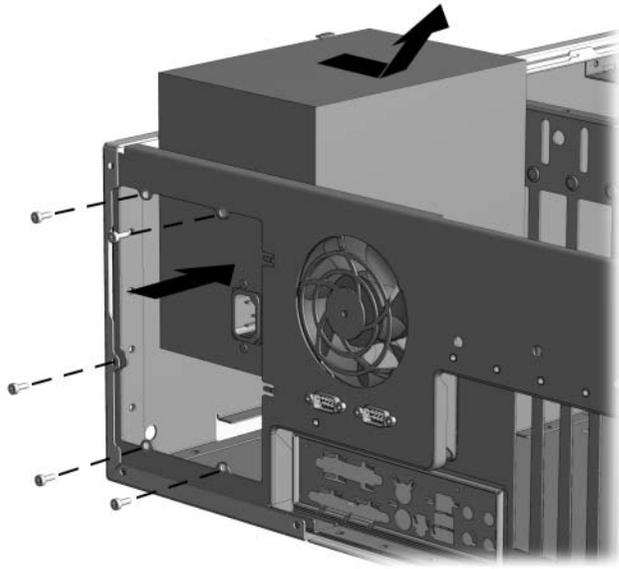# 4.16 Air Baffles

4.16.1 Main Baffle

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

✎ Depending on workstation options, you may have to unplug SCSI and/or IDE cables from the system board. Remove the memory expansion board to gain access to these cables.

3. Grasp the end of the air baffle seated at the rear of the chassis.

4. Rotate the end of the baffle in an upward direction ❶.

5. Pull the baffle tab out of the front fan bracket ❷.

6. Lift the baffle out of the chassis.

To replace the air baffle, reverse the above procedure.

4.16.2 Power Supply Air Baffle

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠️ **CAUTION:** before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

3. Remove the clear, main baffle from the chassis (Section 4.16.1).

4. Remove the power supply air baffle from the hook and loop adhesive tabs.
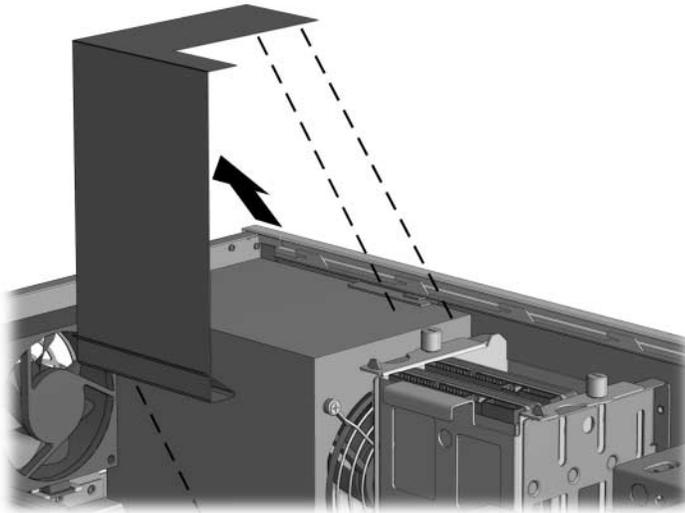
To replace the power supply air baffle, reverse the above procedure.

✎ Route the drive power cables between the baffle and the power supply.

4.17 Power Supply

⚠ **WARNING:** Only qualified personnel should perform this procedure. Do not reconnect power to the workstation until the workstation cover is replaced. Connecting the power before replacing the workstation cover can result in personal injury or equipment damage.

⚠ **WARNING:** To reduce the risk of electric shock or damage to the equipment:
■ Do not disable the power cord grounding plug. The ground plug is an important safety feature.
■ Plug the power cord into a grounded (to earth) electrical outlet that is easily accessible at all times.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

3. Remove the main air baffle (Section 4.16.1).

4. Remove the power supply air baffle (Section 4.16.2).

5. Unplug all power cables from the system board.

6. Remove the five screws that secure the power supply to the back of the chassis.

7. Slide the power supply toward the front of the chassis, then pull up to remove it.

To replace the power supply, reverse the above procedure.

4.18 Removable Hard Drive Cage

4.18.1 Removing the Removable Hard Drive Cage

Drive bays 1 through 3 are located in the removable hard drive cage.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Loosen the power supply air baffle, as necessary (Section 4.16.2).

4. Remove/loosen the screws ❶ on top of the cage.

✎ The removable hard drive cage may be retained by either torx screws or thumbscrews.

5. Hold the tab ❷ and pull the cage up and out of the chassis.
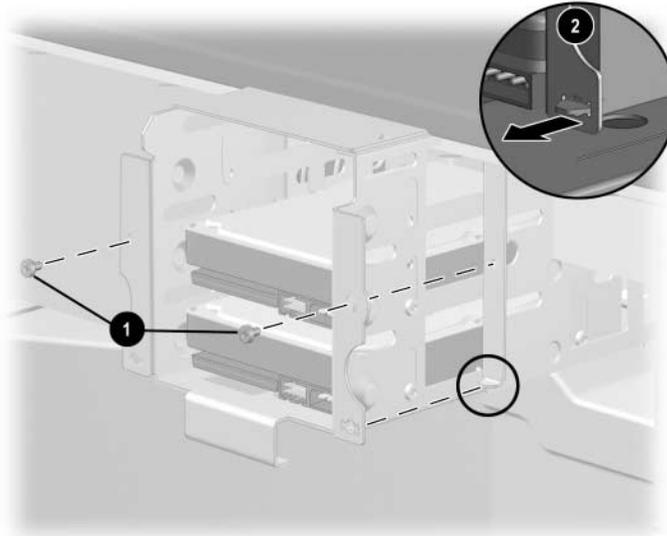
To install the removable hard drive cage, reverse the above procedures.

⚠ **CAUTION:** The power supply air baffle must be properly replaced to sufficiently cool the hard drive(s).

4.18.2 Removing a Hard Drive from the Removable Hard Drive Cage (Bays 1-3)

✎ The removable hard drive cage supports up to three 1.0-inch hard drives or two 1.6-inch hard drives. Other than using different screw holes, the removal and replacement for both drives is the same.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Disconnect the cables from the back of the hard drive.

4. Remove the removable hard drive cage from the chassis (Section 4.18.1).

5. Remove the four hard drive screws that secure the hard drive in the removable hard drive cage, then pull the hard drive straight out of the hard drive cage.
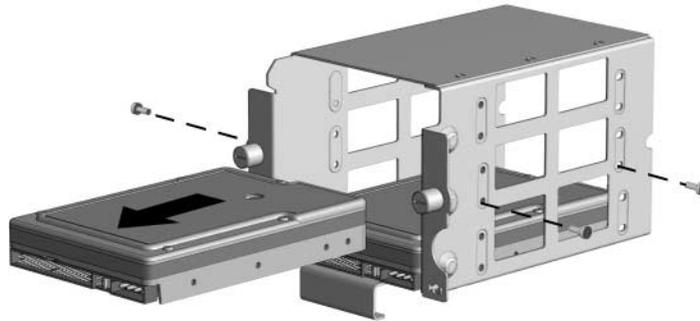
⚠ **CAUTION:** When servicing the workstation, make sure cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the workstation.

4.18.3 Installing a Hard Drive in the Removable Hard Drive Cage (Bays 1-3)

The removable hard drive cage can be configured with up to three 1.0-inch hard drives or two 1.6-inch hard drives. Other than using different screw holes, the installation for both types of drives is the same.

✎ Before installing a SCSI device, please read the "SCSI Devices" appendix.

✎ If only one SCSI hard drive is used, install it in bay 2.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the removable hard drive cage from the chassis (Section 4.18.1).

4. Remove four hard drive screws (top group of screws) from the side of the air plenum located at the front of the workstation.

5. Install the drive into the drive cage using four screws. See the following illustration for screw locations.
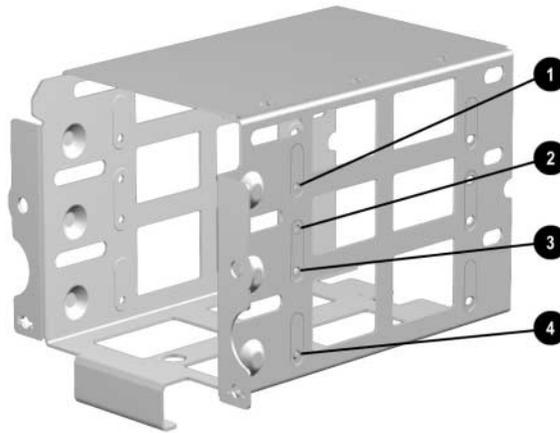
Item	Location
❶	1.0-inch drive
❷	1.6-inch drive
❸	1.0-inch drive
❹	1.0-inch or 1.6-inch drive
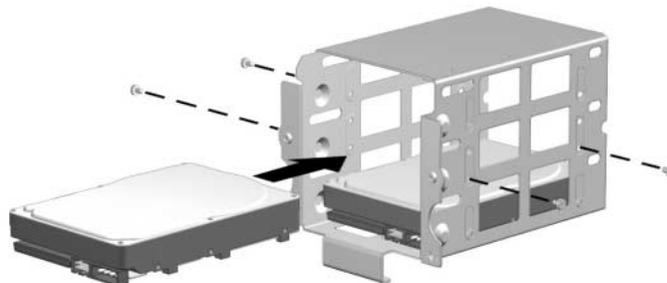
6. Reinstall the removable hard drive cage.

7. Connect the SCSI signal cables and power cables to the back of the drive(s).

8. Reassemble the workstation.

4.19 Heatsink and Processor

4.19.1 Separating the Heatsink-Processor Assembly

The following sequential events must take place in order to remove the existing heatsink and processor assembly:

1. Heat the heatsink-processor assembly to an optimum temperature to break the compound bonding them together. See the following sections:

   ❏ "Heatsink Cool-Down Time"

   ❏ "Heatsink Warm-Up Time"

2. Separate the heatsink from the processor.

3. Release the processor from the processor socket.

Heatsink Cool-Down Time

The heat generated from the processor core transfers to the heatsink making the assembly too hot to handle. From power-on to power-off, it takes up to 13 minutes to cool the heatsink sufficiently so that it can be handled comfortably and the compound holding it to the processor remains pliable.

Heatsink Warm-Up Time

Minimal warm-up time is required to generate enough heat to soften the compound holding the heatsink to the processor.

△ **CAUTION:** Lifting the heatsink straight up while it is in a cold state can result in damage to the processor, because it may pull the processor out of the processor socket. If this should occur, you will need to open the processor socket, by lifting up on the processor retention lever, before attempting to install the new processor.

From power-off to power-on, see the following steps to warm (but not overheat) the heatsink so that the heatsink can be handled comfortably, and the compound holding it to the processor will be pliable.

1. Turn on the workstation and allow the operating system to boot.

2. Shut down the operating system properly, then turn off the workstation and any external devices.

3. Disconnect the power cord from the grounded AC outlet.

4.19.2 Removing the Heatsink and Processor

⚠ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

⚠ **CAUTION:** Lifting the heatsink straight up while it is in a cold state can result in damage to the processor, because it may pull the processor out of the processor socket. If this should occur, you will need to open the processor socket, by lifting up on the processor retention lever, before attempting to install the new processor. If the heatsink is cold to the touch, see "Guidelines for Separating the Heatsink/Processor Assembly" in this chapter.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the memory expansion board (Section 4.9.2).

4. Disconnect the drive cables from the system board and move them away from the processor area.

5. Remove the main air baffle (Section 4.16.1).

6. Ensure the heatsink is warm to the touch (Section 4.19.1).

7. Release the two metal clips that hold the heatsink to the processor retention module.

8. Twist the heatsink slightly ❶ to break the compound that holds it to the processor.

9. Lift the heatsink off the processor ❷.
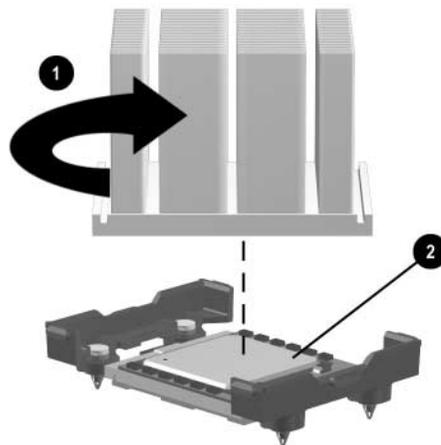
10. Open the processor socket by pulling up on the processor retention lever ❶.

11. Lift the processor out of the processor socket ❷.
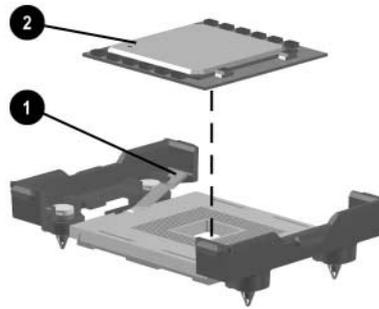
To replace the processor, reverse the above procedure.

✎ If installing a new heatsink, be sure to remove the tear-away tab covering the thermal material on the heatsink.

4.19.3 Installing an Additional Processor

✎ A manual Hardware Abstraction Layer (HAL) upgrade is necessary when installing a second processor after the system has gone through the software bundling process. If a second processor is installed prior to unbundling, a manual upgrade is not necessary.

Hardware Abstraction Layer

To update Windows NT 4.0 or Windows 2000 to recognize a second processor using the Hardware Abstraction Layer (HAL), complete the following steps:

1. Start Windows.

2. Insert the upgrade diskette. Then select Start > Run.

3. Type A:\setup.exe and select OK.

4. Select Uniprocessor HAL and Kernel.

5. Select Upgrade and insert the media used to upgrade the operating system to a new Service Pack if requested; then click Retry.

6. If prompted, insert the operating system CD and click OK.

7. After the installation is complete, close the setup program and restart the workstation.

Additional Processor Installation

You can upgrade the workstation to a multiprocessor system. When you install a second processor, it must be the same speed, cache size, and type as the existing processor.

△ **CAUTION:** Static electricity can damage the electronic components of the workstation. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the memory expansion board (Section 4.9.2).

4. Disconnect the cables from the hard drive and move them away from the processor area.

5. Remove the main air baffle (Section 4.16.1).

6. Install the second processor:

❏ Open the processor socket by pulling up on the processor retention lever ❶.

⚠ **CAUTION:** Processor pins are delicate and bend easily. Use extreme care when placing the processor in the socket.

❏ Insert the new processor ❷ and close the retention lever. Ensure that the processor is locked into place and is not loose in the socket.

❏ Ensure the thermal pad is on the bottom of the heatsink ❸ before setting the heatsink on top of the processor.

❏ Install the two metal clips ❹ that hold the heatsink to the processor retention module.

✎ Ensure the metal clips are firmly attached to the retaining clips.
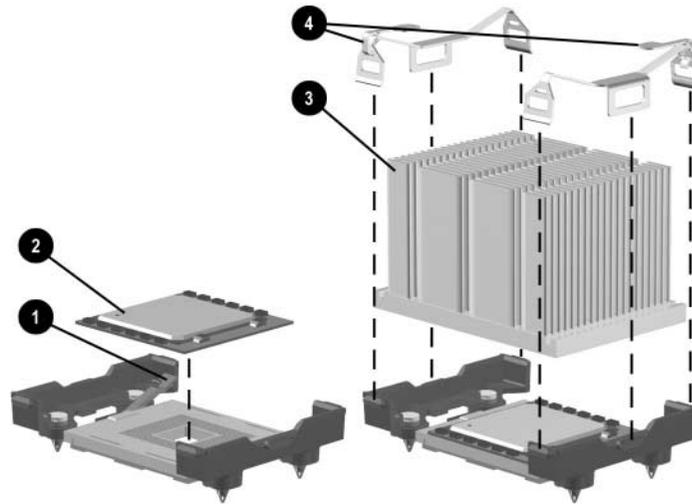
⚠ **CAUTION:** A processor must always be installed in processor socket A or the workstation will not function.

7. Install the Voltage Regulator Module (VRM):

   ❏ Make sure the VRM is fully inserted and properly seated.

⚠ **CAUTION:** You must install a Compaq approved VRM when installing a second processor. Using a VRM that is incompatible with the primary VRM may severely, permanently damage the system board.

   ❏ Install the VRM clip, making sure the clip snaps into place.
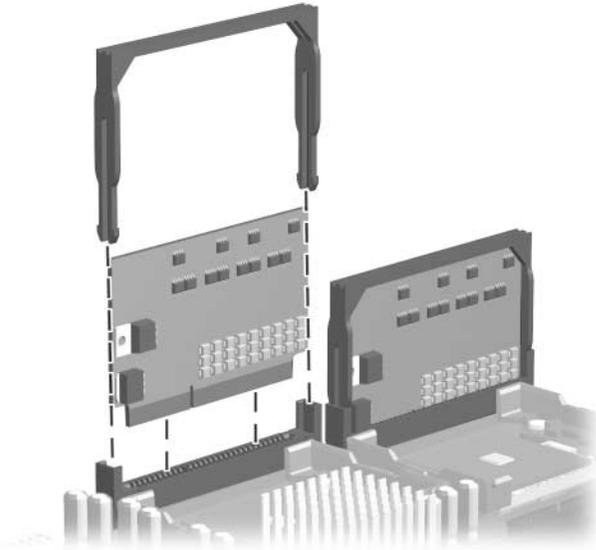
8. Reinstall the main air baffle.

⚠ **CAUTION:** The air baffle is essential to proper cooling of the processors. Without it, the processors will slow down to avoid overheating.

✎ Air flows across the processors from front to back. The front fan moves air over the processors while the back fan pulls the air out of the chassis.

9. Reattach the hard drive cables, memory expansion board, and reassemble the workstation.

⚠ **CAUTION:** If only one processor is installed and you are replacing that processor, be sure to install the processor in the primary processor socket or your workstation will not function.

4.20 System Board

The system board has nine LEDs to help troubleshoot component-related problems. See Section 5.1.2 for more information.
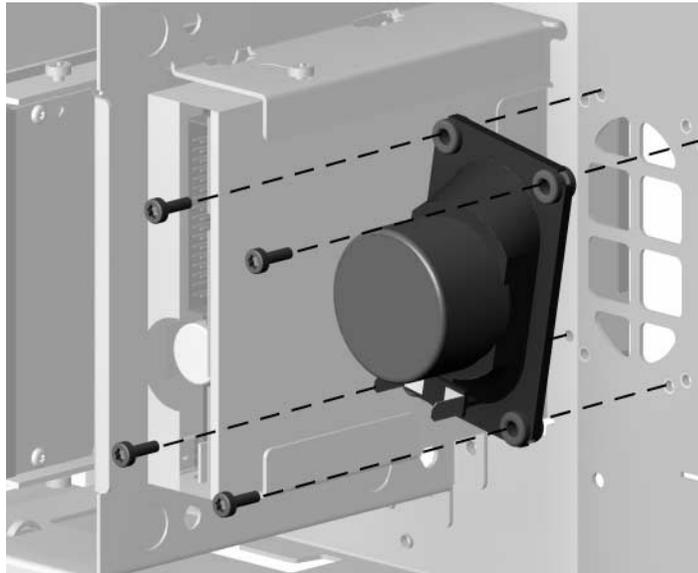
1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, and all cables are disconnected from the back of the workstation.

2. Remove the access panel (Section 4.5).

3. Remove the memory expansion board (Section 4.9.2).

4. Remove any expansion boards (Section 4.15.1).

5. Remove the main air baffle (Section 4.16.1).

6. Disconnect and remove all cables plugged into the system board.

7. Remove the processor heatsink(s) (Section 4.19.2).

8. Remove the nine screws securing the system board to the chassis ❶.

9. Remove the four screws (one under each heatsink bracket) that connect the system board to the chassis ❷.

10. Carefully remove the system board from the chassis ❸.
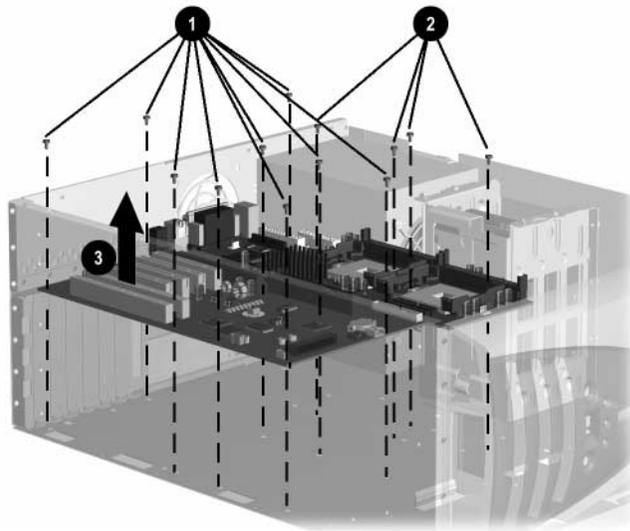
To install a new system board, reverse the above procedure.

✎ Plug the CD analog audio cable back in before reinstalling the system board.

4.21 Rear Fan

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the main air baffle (Section 4.16.1).

4. Disconnect the fan's power cable from the system board.

5. Remove the four screws securing the fan to the back of the chassis ❶.

6. Remove the fan from the chassis ❷.
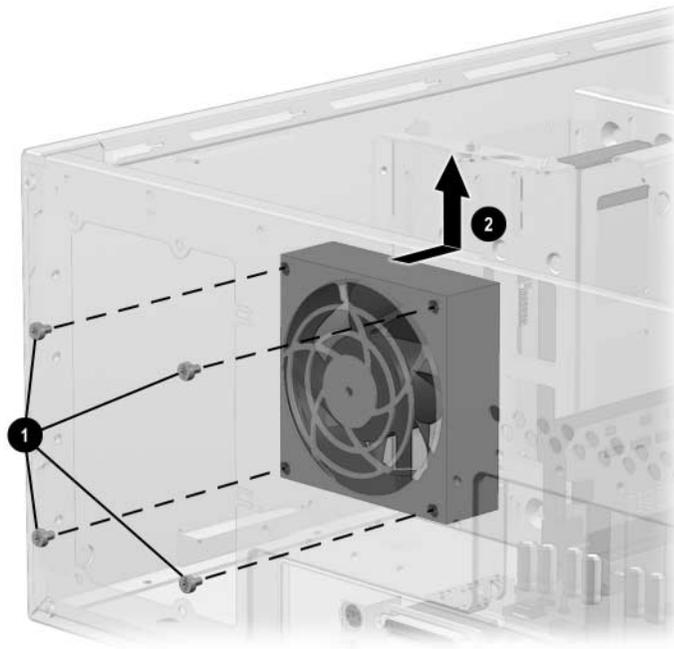
To replace the system fan, reverse the above procedure.

4.22 Processor Fan

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5)

3. Remove the main air baffle (Section 4.16.1)

4. Disconnect the fan power cable from the system board.

5. Remove the screw securing the fan assembly to the air plenum.

6. Lift the fan assembly out of the chassis.
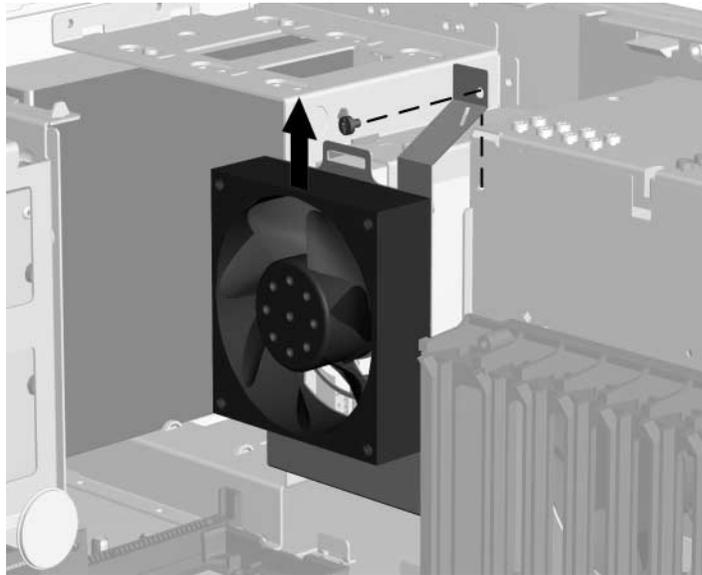
7. Remove the four screws that connect the fan to the bracket.

8. Remove the fan from the bracket.
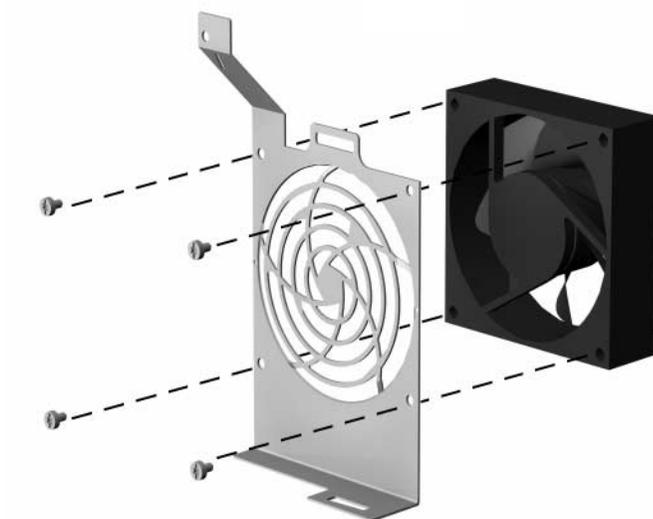
To replace the processor fan, reverse the above procedure.

4.23 Speaker

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

⚠ **CAUTION:** Before removing the access panel, ensure that the workstation is turned off, all cables are disconnected from the back of the workstation, and the power cord is disconnected from the grounded AC outlet.

2. Remove the access panel (Section 4.5).

3. Remove the main air baffle (Section 4.16.1).

4. Remove the front fan (Section 4.22).

5. Unplug the speaker connector from the system board and remove the cable from the clip.

6. Remove the four screws securing the front of the speaker to the chassis.

7. Remove the speaker from the workstation by sliding it back, then lifting it up and out of the chassis.

To replace the speaker, reverse the above procedure.

4.24 Card Guide

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the memory expansion board (Section 4.9.2).

4. Remove any expansion cards from the card guide (Section 4.15.1).

5. Remove the main air baffle (Section 4.16.1).

6. Remove the front fan (Section 4.22).

7. Remove the remaining screw attaching the card guide bracket to the air plenum.
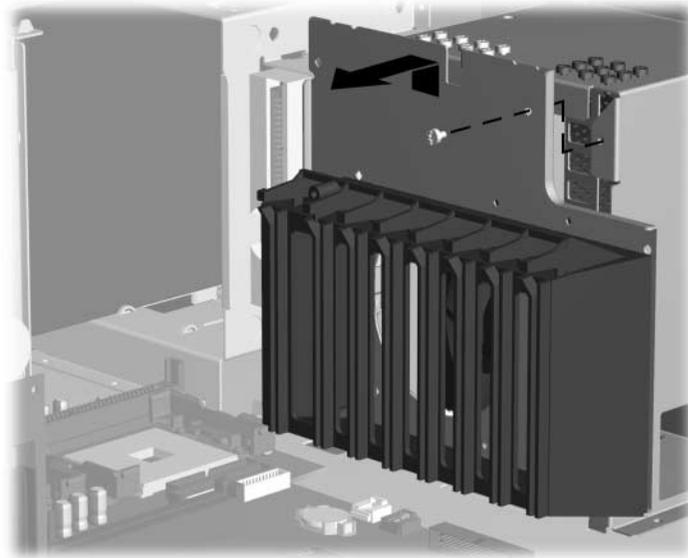
8. Remove the four screws securing the card guide to the card guide bracket.

9. Remove the card guide from the bracket.
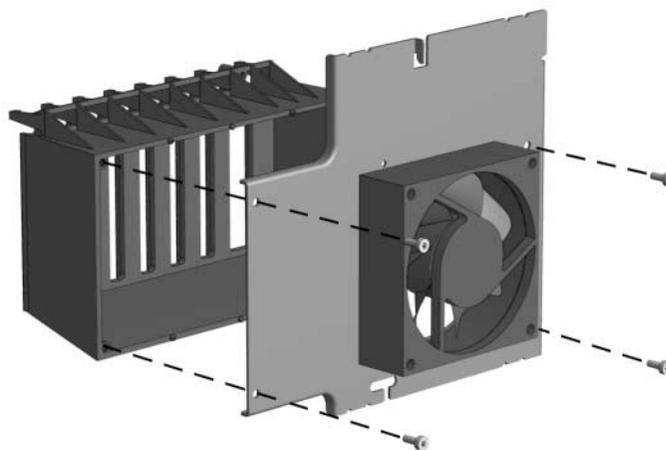
To replace the card guide, reverse the above procedure.

4.25 Air Plenum Fan

1. Prepare the workstation for disassembly (Section 4.2), then place it on its side.

2. Remove the access panel (Section 4.5).

3. Remove the main air baffle (Section 4.16.1).

4. Remove the processor fan (Section 4.22).

5. Remove the card guide (Section 4.24).

6. Disconnect the fan cable from the system board and remove the cable from the clip.

7. Remove the four screws securing the fan to the fan bracket ❶.

8. Remove the fan from the fan bracket ❷.

To replace the system fan, reverse the above procedure.

5
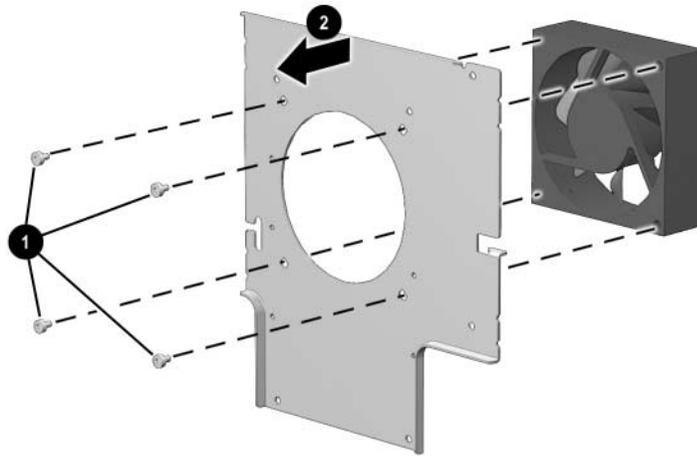
Connectors and Jumpers

5.1   System Board

5.1.1   Connectors and Jumpers
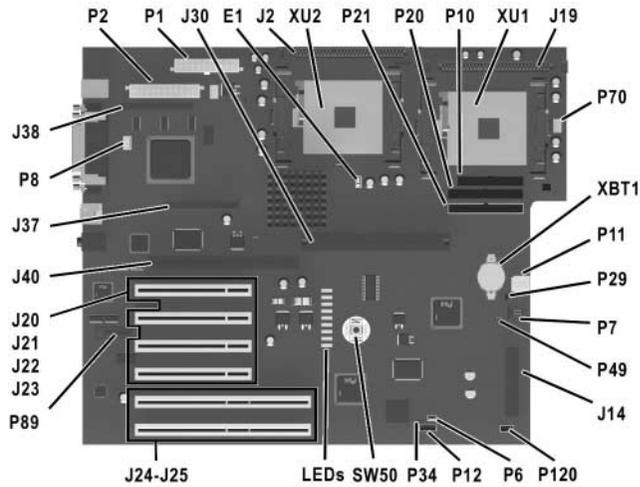
Ref	Description	Ref	Description
E1	Bus parking disable header	P10	Diskette drive connector
J2	VRM socket B	P11	Auxiliary audio-in connector
J14	Front I/O board connector	P12	AOL connector
J19	VRM socket A	P20	Primary Ultra ATA connector
J20-23	32-bit, 33-MHz PCI sockets	P21	Secondary Ultra ATA connector
J24-25	64-bit, 66-MHz PCI sockets	P29	SCSI LED connector
J30	Memory expansion board socket	P34	Boot block protection disable header
J37	Ultra160 SCSI connector (Channel A)	P49	Power-on password enable jumper
J38	Ultra160 SCSI connector (Channel B)	P70	Processor fan connector
J40	1.5V AGP Pro socket	P89	Serial port connector
LEDs	Troubleshooting LEDs*	P120	Front fan connector
P1	24-position power connector	SW50	Clear CMOS Button
P2	22-position power connector	XBT1	Battery
P6	Front speaker connector	XU1	Primary Processor socket
P7	CD-ROM audio connector	XU2	Secondary Processor socket
P8	Rear fan connector		

5.1.2 System Board Troubleshooting LEDs

There are nine diagnostic LEDs next to the CMOS button on the system board to help you troubleshoot component-related problems.
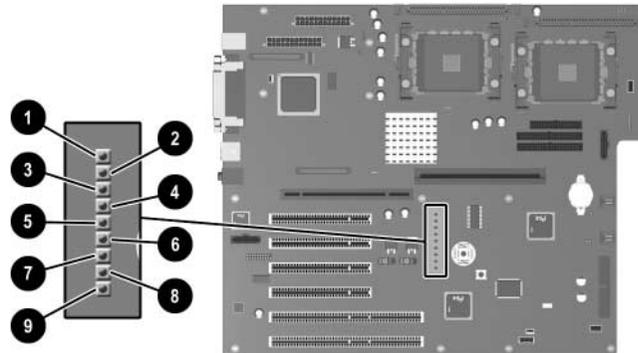
LED	Definition	LED	Definition
❶	Red–Processor A Error	❻	Green–All power good
❷	Yellow–VRM A error	❼	Orange–System board regulator bad
❸	Orange–Processor(s) hot	❽	Yellow–VRM B error
❹	Green–Turn on power supply	❾	Red–Processor B error
❺	Blue–Memory board error		

LED Based Hardware Troubleshooting Tables

✎ The error detection circuit can fail. If the system is operating normally, do not replace any components. If the system will not boot, and replacing the indicated component does not solve the problem, the system board may need to be replaced.

1. With system plugged in but turned OFF, are any LEDs lit?

LED	Problem indicated	Solution
Red	Processor A not properly inserted or is missing.	Make sure processor is properly latched in its socket.
		Replace processor.
Yellow	Voltage Regulator Module (VRM) is not fully inserted or is missing.	Reseat indicated VRM.
		Replace indicated VRM.
Blue	The memory board is not properly inserted or is missing.	Reseat the memory expansion card.
		Replace the memory expansion card.

2. With system turned ON, are any LEDs lit?

LED	Problem indicated	Solution
None lit	No power to the system.	Make sure AC power cable is connected to wall outlet and system power supply.
		Make sure power supply connectors are connected to the system board.
	I/O expansion board disconnected.	Make sure I/O expansion board cable is connected.
	The memory board is not properly inserted or is missing.	Make sure memory expansion card is firmly seated.
	Defective system board.	Replace system board.
	Defective power supply.	Replace power supply.
1 Green	Only partial power to system board.	Make sure power supply connectors are connected to the system board.
	Electrical short.	Check cables for pinching and/or damage, and for metal making contact with any board. Power supply may be crowbarred.
	Defective power supply.	Replace power supply.
	Shorted VRM.	Replace VRM. An internally shorted VRM will cause the power supply to crowbar.
	Defective system board.	Replace system board.
1 Green + Orange	Defective system board.	Replace system board.
1 Green + Blue	Unseated or defective memory expansion board.	Reseat the memory expansion board.
		Replace the memory expansion board.
1 Green + Yellow	Low VRM output voltage. (Text adjacent to the LED shows which VRM is bad.)	Reseat indicated VRM.
		Replace indicated VRM.
		Replace processor(s).
1 Green + 2 Red	Processor A and Processor B are reporting different Voltage IDs. This occurs if processor speeds are different.	Make sure both processors are identical.
	A VRM is pulling down a Voltage ID line.	Replace VRM(s).

2. With system turned ON, are any LEDs lit? *(Continued)*

LED	Problem indicated	Solution
2 Green + Red	A processor is reporting an internal error. (Text adjacent to the LED shows which processor has the error.) ✎ Note: If VRM B is installed and processor B is not, the processor B error LED may be lit. The system works normally in this situation.	Reboot the system to see if the problem goes away.
		Make sure the processor is properly latched in its socket.
		Verify the latest ROM (microcode patch) is being used.
		Replace the processor.
2 Green + Orange	A processor is reporting it is too hot.	Make sure airflow in and out of the system is not blocked.
		Make sure processor air baffle is properly installed.
		Make sure processor fan(s) is installed, connected to the system board, and functioning.
		Make sure the heatsink(s) are properly seated.
		Make sure the heatsink(s) are installed with thermal grease.
2 Green	Power rails appear to be OK, and the processors are not reporting an internal error. The machine is probably hanging during POST.	If you have a Port 84 card, put it in and see what code is shown when the system is hanging.
		Otherwise, refer to the keyboard, front panel LEDs, and audible beeps error reporting codes.

5.1.3 **Disable and Clear Password Jumper**

To disable the Power-On and Setup Password features, or to clear the Power-On and Setup Passwords if you forget them and cannot access the workstation system or Computer Setup, follow these steps:

1. Turn off the workstation. Disconnect the power cord from the grounded AC outlet.

2. Remove the access panel to access the P49 Jumper on the system board.

3. Remove the P49 Jumper.

4. Reassemble the workstation and reconnect the power cord to the power connector on the rear of the workstation and to the electrical wall outlet.

5. Turn on the workstation.

Important: To reenable the Power-On Password feature, reinstall the P49 Jumper.

Important: Clearing the Power-On Password will also clear the Setup Password. Be sure to reestablish your Setup Password after clearing the Power-On Password.

5.1.4 **Clearing CMOS**

The workstation configuration memory (CMOS) may occasionally be corrupted. When this occurs, it is usually due to software or hardware that is not functioning accurately, or to the addition or removal of expansion boards. If the workstation configuration memory becomes corrupted, it is necessary to clear the configuration memory.

1. Turn off the workstation and any external devices, then disconnect the power cord from the grounded AC outlet.

△ **CAUTION:** When the unit is plugged in, the power supply always has 5 volts applied to the system board even when the unit is turned off. Failure to disconnect the power cord can result in damage to the system.

△ **CAUTION:** Static electricity can damage the electronic components of the workstation or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

2. Remove the access panel to access the system board.

3. Locate the SW50 pushbutton switch on the system board.

4. Press the SW50 pushbutton switch to clear the workstation CMOS.

5. Replace the access panel.

6. Reconnect the network cable and external devices.

7. Plug in the workstation and turn on the power.

✎ When the Clear CMOS Button is pressed, your passwords will become invalid because the passwords are stored in the configuration memory. Reset your passwords and any special system setups.

5.2   Mass Storage

The W8000 supports Ultra-160 SCSI, Wide Ultra2 SCSI, and Ultra ATA hard drives.

5.2.1   Hard Drives

Refer to the labels on individual drives for pin and jumper settings.

5.2.2   CD-ROM or DVD-ROM Drive
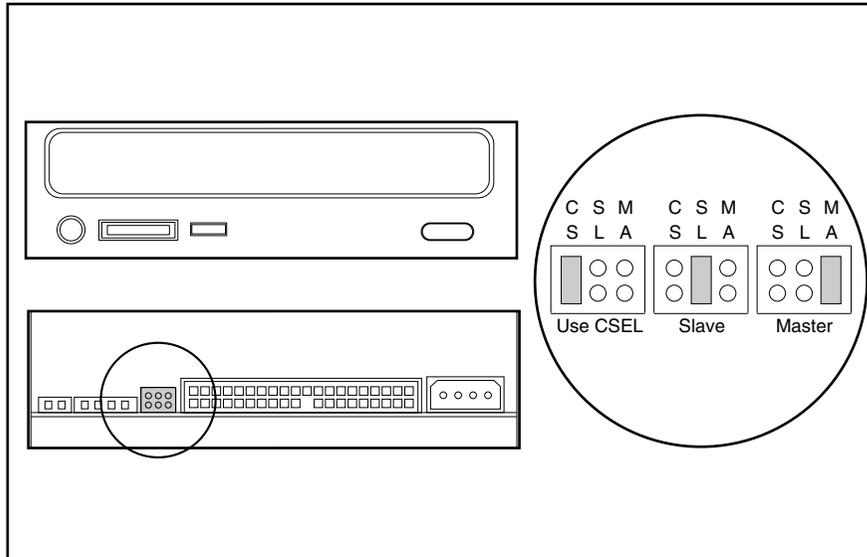
5.2.3 Zip Drive

The jumper positions for the 100- and 250-MB Zip drives are identical.

Default
Settings

Jumper Setting
for Cable Select
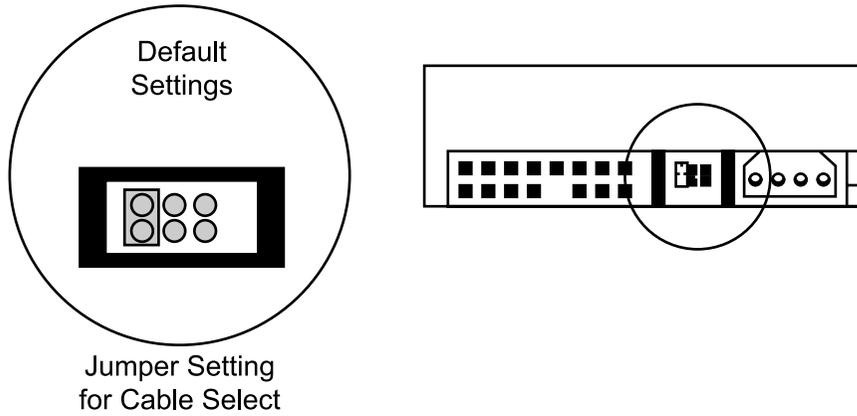
Jumper Settings

Configuration	Pair 1	Pair 2	Pair 3
Device 0 (Master)			jumper
Device 1 (Slave)			
Cable Select (Default)	jumper		

A
SCSI Devices

SCSI Guidelines

When installing and operating SCSI devices, you must follow these guidelines:

■ A narrow (50-pin) SCSI controller allows you to daisy-chain up to 7 additional SCSI devices. Counting the controller, that amounts to 8 total SCSI devices.

■ A wide (68-pin) SCSI controller allows you to daisy-chain up to 15 additional SCSI devices. Counting the controller, that amounts to 16 total SCSI devices.

■ If two narrow (50-pin) SCSI controllers are each connected to separate system board SCSI connectors, each controller may have seven SCSI devices attached. Counting the controller, this gives a total of 16 SCSI devices on the system.

■ Compaq does not recommend mixing different width SCSI devices on the same SCSI chain or on the same SCSI channel. Mixing devices of different widths on the same chain or channel will always result in a data transfer rate of the slowest machine in that chain. The only exception to this is that Ultra Wide SCSI devices will cause a speed degradation when mixed with other 68-pin devices.

■ If multiple SCSI devices are used, split the devices between Channels A and B for optimum performance. Cable length for the second channel should not be longer than 18 inches.

■ If two controllers are used, each may use SCSI devices having widths and speeds different from the other. If a 68-pin data cable is used on a controller having 50-pin SCSI devices, use an internal cable adapter (Compaq number 199618-001) or an external cable adapter (Compaq number 270187-B21).

$\triangle$ **CAUTION:** Do not route data cables near the air intake to the power supply. Cables routed in this manner may block the airflow and cause the computer to overheat.

All SCSI controllers require a unique SCSI ID (0-7 or 8-15) for each SCSI device installed. The controller identifies a SCSI device by its SCSI ID number rather than its location. Moving a SCSI device from one position to another on the SCSI chain does not affect communication between the controller and the device. The reserved and available SCSI ID numbers for SCSI devices are:

■ 0 is reserved for the primary hard drive.

■ 7 is reserved for the SCSI controller.

■ 1 through 6 and 8 through 15 are available for all other SCSI devices.

■ 68-pin SCSI controllers require a 53 inch maximum length-twisted pair, LVD cable with built-in terminator, maximum of 5 drives with a minimum driving spacing of 5.25 inches.

■ Every SCSI chain or circuit must be terminated (closed) at both ends. Some system boards have both ends of the SCSI cable connected to, and terminated by, the system board. Termination can be accomplished in one of several ways:

❏ Use a cable with a built-in terminator.

❏ Use a cable with a terminating resistor plug in the last connector.

❏ Connect a SCSI device with its termination enabled into the last connector.

❏ Connect an external SCSI device with its termination enabled to the external SCSI connector on the rear panel of the computer.

■ Turn on all external SCSI devices before turning on the power to the computer. This enables the SCSI controller to recognize the external devices.

Using the Multi-Mode SCSI Cable

Some products ship standard with a multi-mode SCSI cable having a terminator ❶ on one end. This cable supports both low voltage differential (LVD) and single ended (SE) devices. One end of the cable connects to the internal LVD/SE connector on the system board, while the remaining connectors being used on the hard drives in the hard drive bays.
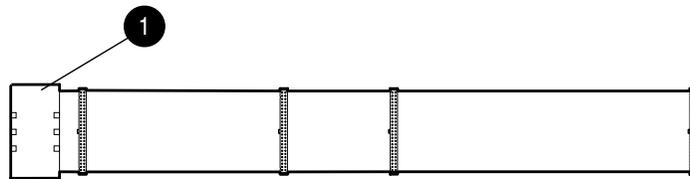
✎ The multi-mode cable included with the computer may differ from the one pictured.

For additional information about installing optional SCSI devices, refer to the documentation included with the device option kit.

Using SCSI*Select* with SCSI Devices

The Ultra160 and faster SCSI host adapters includes the SCSI*Select* utility to configure the host adapter and to run the SCSI disk utilities. To run the SCSI*Select* utility:

- **In POST Messages Enabled mode**—Press Ctrl+A when the Press<Ctrl><A> for SCSI*Select* Utility message appears during POST.

- **In POST Messages Disabled mode**—When the Compaq logo screen appears, press any key to exit the logo screen. Immediately after exiting the logo screen, press Ctrl+A to access the SCSI*Select* utility.

A menu appears with the following options:

- Configure/View Host Adapter Settings
    - ❏ SCSI Bus Interface Definitions
        - ◆ Host Adapter SCSI ID
        - ◆ SCSI Parity Checking
        - ◆ Host Adapter SCSI Termination
    - ❏ Additional Options
        - ◆ Boot Device Options
        - ◆ SCSI Device Configuration
        - ◆ Advanced Configuration Options
- SCSI Disk Utilities
- Lists all SCSI devices and SCSI ID numbers

✎ For information about configuring POST message display status refer to the *Computer Setup Guide* for additional information.

SMART

The Self Monitoring Analysis and Reporting Technology (SMART) IDE and SCSI hard drives for the Compaq Personal Computers and Workstations have built-in drive failure prediction that warns the user or the network administrator of an impending failure or crash of the hard drive. The SMART drives track fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, and calibration retry count. If the drive determines that a failure is imminent, it generates a fault alert.

B

Specifications

System Specifications

Dimensions (with bezel and without feet)		
Height	18.7 inch	47.50 cm
Depth	23.2 inch	58.90 cm
Width	8.03 inch	20.40 cm
Weight	54.75 lb	24.89 kg
Power Supply Input Requirements		
Rated Input Voltage	100 VAC to 120 VAC	200 VAC to 240 VAC
Rated Input Current	8.6 A	4.3 A
Rated Input Frequency	50 Hz to 60 Hz	50 Hz to 60 Hz
Input Power	770 W	770 W
Input Power (BTU/h)	2630 BTU/h	2630 BTU/h
Power Supply Output Power		
Rated Steady-State Power	500 W	500 W
Maximum Peak Power	525 W	525 W
Relative Humidity		
Operating	20% to 80%	20% to 80%
Non-operating	10% to 95%	10% to 95%
Temperature		
Operating	50°F to 104°F	10°C to 40°C
Non-operating	-40°F to 149°F	-40°C to 65°C

System Interrupts

For hardware IRQ, DMA, I/O, and system memory map information, refer to the Illustrated Parts Map for this workstation.

Index