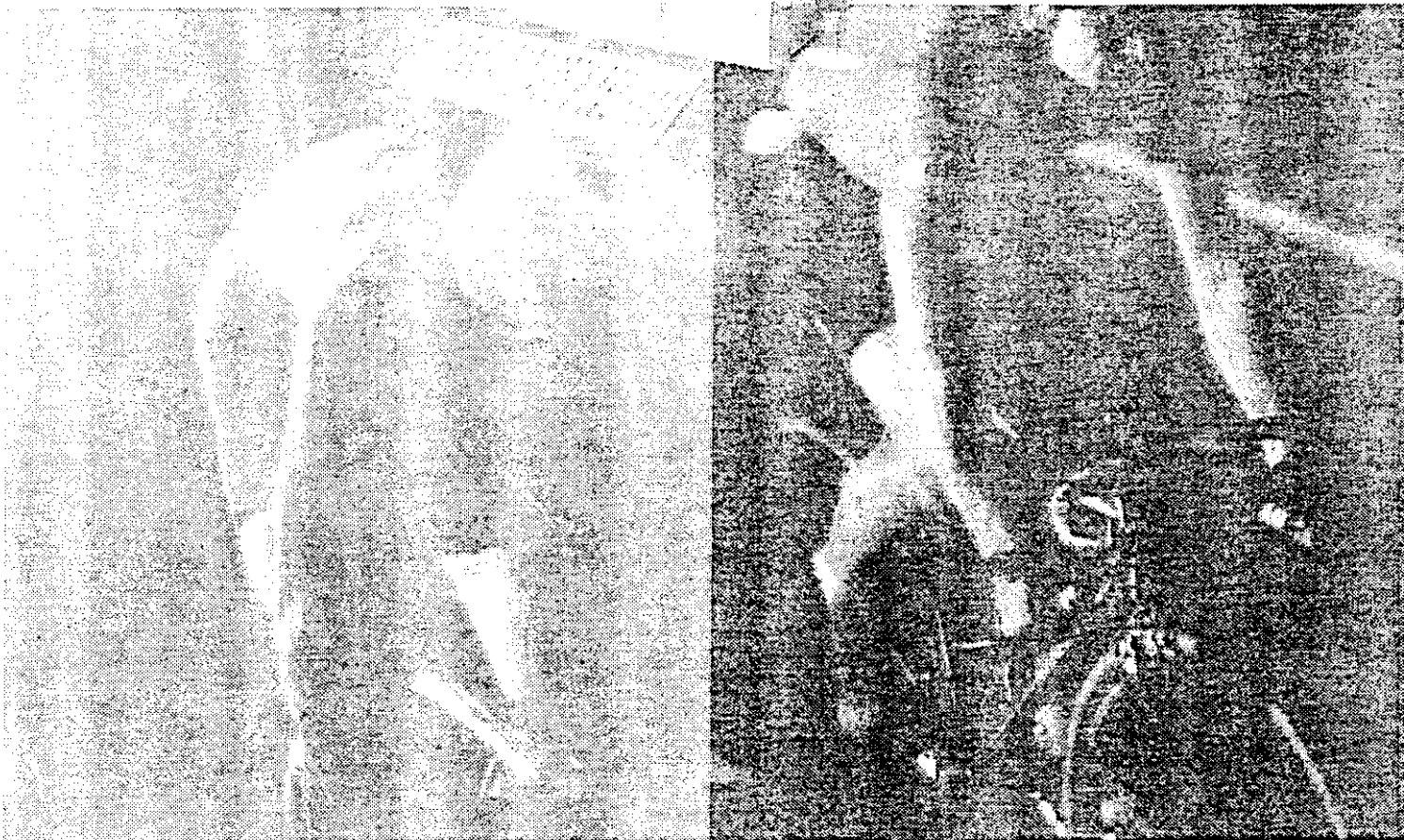
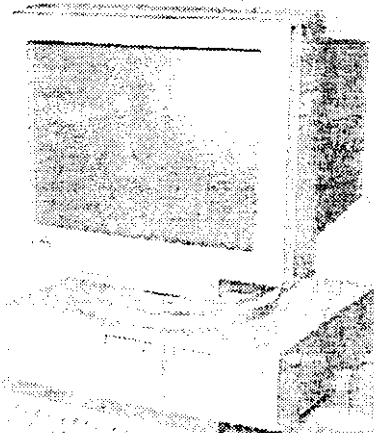




COMPAQ

REFERENCE GUIDE

Compaq Professional Workstations



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Reference Guide

Compaq Professional Workstations

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preface

USING THIS GUIDE

This *Reference Guide* includes computer setup information, general information about your computer, troubleshooting and diagnostics, and technical specifications.

Symbols and Conventions

The following format conventions distinguish elements of the text throughout this guide:

- When keys must be pressed at the same time, the action is represented by the key names and the plus (+) symbol. For example, Ctrl+Alt+Delete.
- The names of files are presented in uppercase italic type as shown here: *FILENAME*.
- The names of commands, folders, or directories are presented in uppercase type as shown here: COMMAND or DIRECTORY. Commands that are to be entered at the system prompt are shown on a separate line.
- When you are asked to type something without pressing the Enter key, you are directed to “type” the information.
- When you need to type information and press the Enter key, you will be directed to “enter” the information.
- When you need to make a selection with a mouse, you will be directed to “select” or “click” the information.

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



WARNING: Text set off in this manner indicates that failure to follow directions 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 information.

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

Environmental Commitment

Compaq is committed to making environmentally friendly products. Your computer was produced in a chlorofluorocarbons (CFC)-free factory. All plastics used in the product are stamped with material composition to make recycling more efficient. Reduce, reuse, and recycle are words to live by at Compaq.

chapter 1

THE WORKSTATION AT A GLANCE

This chapter summarizes the features of your workstation, identifies the main parts of your workstation, and briefly discusses caring for your workstation.

Features

- Pentium Pro 200-MHz processor
- Dual Pentium Pro capable
- 256-Kbyte write-back, four-way, set associative secondary (L2) cache integrated into the processor
- 32-, 64-, 96-, or 128-megabyte unbuffered extended data output (EDO) dynamic random access memory (DRAM) standard, with error checking and correcting (ECC) support and a 4 KHz refresh rate; expandable to 512 megabytes, installed in dual inline memory modules (DIMMs),
- Gloria-L graphics controller with 8-megabytes VRAM standard for display memory and 8-megabytes DRAM for the Z-buffer; DRAM upgradable to 16 megabytes
- Matrox MGA Millennium 64-bit, PCI-based graphics controller with 2-megabytes WRAM standard; upgradable to 4- or 8-megabytes WRAM
- Integrated Ultra-Wide SCSI controller
- One Ultra-SCSI hard drive installed; hard drive sizes range from 2.0 to 4.0 gigabytes
- Intelligent Manageability and security features, including removable media lock, surge protector in the power supply, Smart Cover Sensor, power-on and setup (administrator) passwords, device disabling, QuickLock/QuickBlank, and cable lock provision
- Microsoft Windows NT Workstation 4.0 operating system delivered with all models

 References to Windows NT in this guide refer to Microsoft Windows NT Workstation 4.0.

- Chassis includes expansion slots for up to five expansion boards:
 - Three dedicated PCI slots (graphics controller is installed in one of the PCI slots)
 - One dedicated ISA-bus slot
 - One "combination slot" for either a PCI or an ISA expansion board
- Chassis includes four drive bays:
 - One external 3.5-inch, third-height diskette drive bay
 - Two external 5.25-inch, half-height drive bays
 - One internal 3.5-inch drive bay
- Integrated 32-bit, PCI-based, Ethernet network interface controller (NIC), 10Base-T standard, 100Base-TX autosensing
- Peripheral Components Interconnect (PCI) chipset used for PCI/ISA, memory, and peripheral control Integrated audio controller
- Integrated audio controller
- Compaq SpaceSaver keyboard, featuring Microsoft Windows-specific keys
- IDE 8X CD-ROM drive installed
- Two RS-232C-compatible, 9-pin serial connectors
- One multimode, 25-pin enhanced parallel connector
- Two PS/2-compatible ports for use with mouse and keyboard
- 240-watt continuous power supply; switch-selectable for 115 and 230 VAC operation
- 1.44-megabyte, 3.5-inch high-density diskette drive installed
- Easy serviceability features, including a slide-out drive cage, a removable expansion board cage, and a slide-out system board

Graphics Capabilities

Your workstation offers one of three levels of graphics support, depending on the model:

- Matrox MGA Millennium high performance PCI graphics
- Gloria-L graphics

The purpose of a graphics controller is to generate and send the graphics signal to the monitor. The quality of the picture you see depends on the resolution of your monitor and the number of colors that the graphics controller can display. High-resolution graphics with many colors requires that the graphics controller have its own memory.

The MGA Millennium graphics controller comes standard with 2 megabytes of VRAM, upgradable to 4 or 8 megabytes. The Gloria-L graphics controller comes standard with 8 megabytes of VRAM for display memory and 8 megabytes of DRAM for the Z-buffer and texture buffer; DRAM is upgradable to 16 megabytes. The MGA Millennium and Gloria-L graphics controllers support the following resolutions and number of colors:

Maximum Color Support			
Matrox MGA Millennium (Single Buffer Mode)			
Resolution	2-MB WRAM	4-MB WRAM	8-MB WRAM
1600 x 1200	256	64,000	16.7 million
1280 x 1024	256	16.7 million	16.7 million
1152 x 864	64,000	16.7 million	16.7 million
1024 x 768	64,000	16.7 million	16.7 million
800 x 600	16.7 million	16.7 million	16.7 million
640 x 480	16.7 million	16.7 million	16.7 million
Matrox MGA Millennium (Double Buffer Mode)			
Resolution	2-MB WRAM	4-MB WRAM	8-MB WRAM
1600 x 1200	n/a	n/a	256
1280 x 1024	n/a	256	64,000
1152 x 864	n/a	256	64,000
1024 x 768	n/a	256	16.7 million
800 x 600	256	64,000	16.7 million
640 x 480	64,000	16.7 million	16.7 million

**Maximum Color Support
(Single Buffer Mode)**

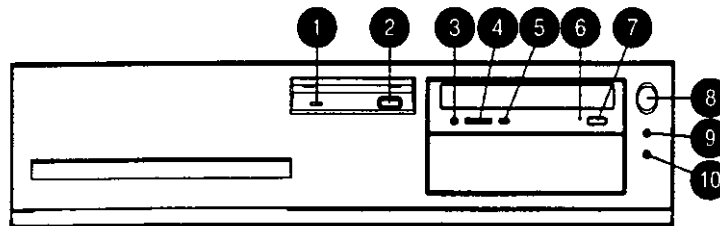
Resolution	Gloria-L
1600 x 1200	16.7 million
1280 x 1024	16.7 million
1152 x 864	16.7 million
1024 x 768	16.7 million
800 x 600	16.7 million
640 x 480	16.7 million

**Maximum Color Support
(Double Buffer Mode)**

Resolution	Gloria-L
1600 x 1200	65,000
1280 x 1024	65,000
1152 x 864	16.7 million
1024 x 768	16.7 million
800 x 600	16.7 million
640 x 480	16.7 million

Front Panel Components

The following illustration and table show and describe the components on the front panel of the workstation.



Front Panel Components

Front Panel Components		
Ref.	Component	Function
①	Diskette Drive Activity Light	Turns on when the diskette drive is reading or saving data.
②	Diskette Eject Button	Ejects a loaded diskette.
③	Stereo Headphone Jack	Connects headphones to the CD-ROM drive.
④	CD-ROM Volume Control	Adjusts the volume of the CD-ROM drive.
⑤	CD-ROM Activity Light	Turns green when a CD is present; flashes amber when the drive is reading a CD.
⑥	CD-ROM Manual Eject Hole	Allows you to manually eject a CD if the load/unload button is inoperable.
⑦	CD-ROM Load/Unload Button	Opens and closes the disc tray.
⑧	Power Switch	Turns the workstation on and off.
⑨	Power-On Light	Turns on when power to the workstation is turned on and blinks (optional) in Energy Saver mode.
⑩	Hard Drive Activity Light	Turns on when the hard drive is reading or saving data.

The lights of the workstation provide information about its operation. When the power switch ⑧ is turned on, the power-on light ⑨ is green.

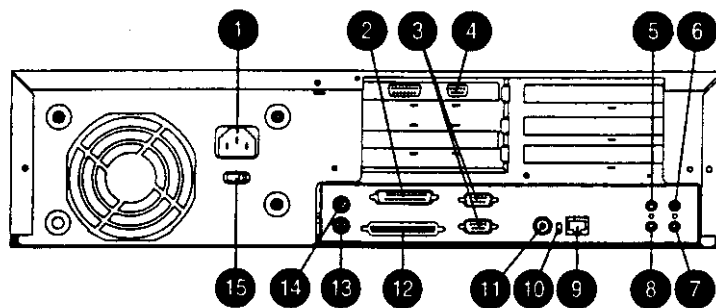
When the hard drive activity light ⑩ or diskette drive activity light ① is on, the drive is either reading information from the disk or storing information on the disk.

Rear Panel Connectors

The following illustration and table show and describe the connectors on the rear panel of the workstation. Each connector includes an icon to help you identify its function.



WARNING: To reduce the risk of electric shock or damage to your equipment, do not disable the power cord grounding feature. This equipment is designed to be connected to a grounded (earthed) power outlet that is easily accessible to the operator. The grounding plug is an important safety feature.



Rear Panel Connectors

Rear Panel Connectors		
Ref.	Connector	Function
❶	Power Cord Connector	Connects the workstation to an electrical power outlet.
❷	Parallel Connector	Connects a parallel device, such as a parallel printer.
❸	Serial Connectors	Connects serial devices, such as a serial printer. (COM2 is the top connector. COM1 is the bottom connector.)
❹	Monitor Connector	Connects a monitor. NOTE: The graphics controllers include a multimedia port, which can be used with an optional Matrox Media XL module. The Gloria-L graphics controller includes a VGA bypass port which can be used to support a separate graphics controller.
❺	Microphone Connector	Connects a microphone (blue-colored icon).
❻	Line-In Audio Connector	Connects a device that supplies sound, such as a tape deck or CD player.

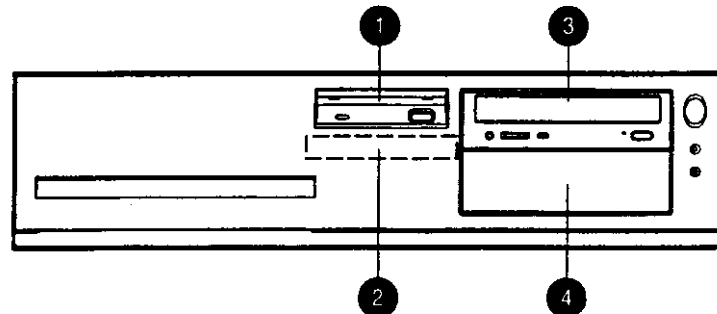
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Rear Panel Connectors *Continued*

⑦	Line-Out Audio Connector	Connects an external amplifier (to power additional speakers) or a tape deck for recording.
⑧	Headphone Connector	Connects headphones.
⑨	Ethernet RJ-45 Connector	Connects the Ethernet network, using an RJ-45 cable.
⑩	LAN Activity Lights	Indicates network activity.
⑪	Ethernet BNC Connector	Connects the Ethernet network, using a thin-coax cable.
⑫	Ultra-Wide SCSI Connector	Connects external SCSI devices.
⑬	Keyboard Connector	Connects a keyboard (orange-colored icon).
⑭	Mouse Connector	Connects a mouse (green-colored icon).
⑮	Voltage Select Switch	Switches voltage between 115V (U.S.) and 230V to match geographical requirements.

Drive Positions

The workstation can house up to four mass storage devices. The following illustration and table describe the recommended drive configurations.



Drive Positions

Drive Configuration	
Drive Position	Configuration
❶	Standard 3.5-inch 1.44 MB diskette drive
❷	Standard 3.5-inch internal hard drive (2.0 GB or 4.0 GB)
❸	Standard CD-ROM drive
❹	Optional diskette drive, tape drive, hard drive, PD-CD Drive, or CD-ROM drive (half height)

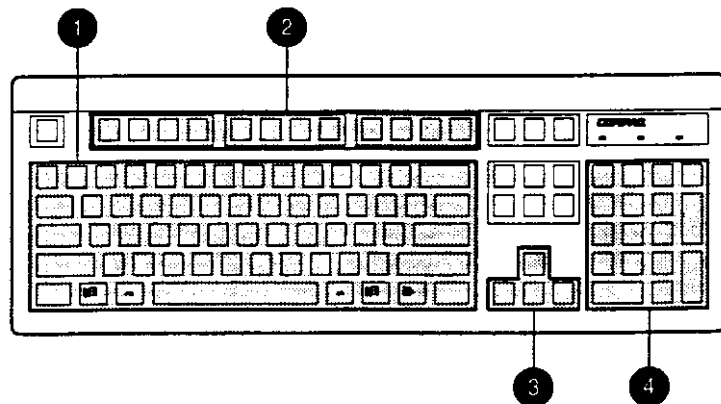
To verify which mass storage devices are installed in your workstation, run the INSPECT utility. Refer to Chapter 3, "Using Compaq Software," for more information.

Using the Compaq Enhanced Keyboard

The Compaq Enhanced keyboard has four principal typing areas:

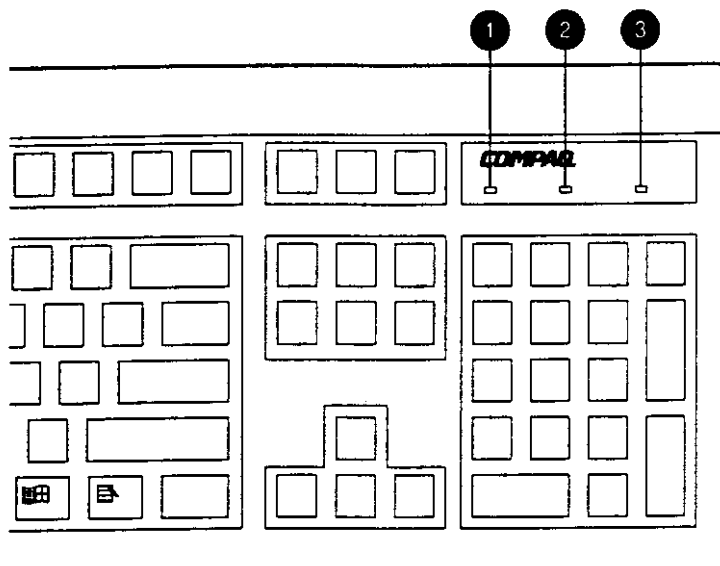
- ❶ Main (typewriter) keypad.
- ❷ Function keys—F1 through F12—at the top of the keyboard. Each key instructs the workstation to carry out a specific task.
- ❸ Arrow keys for moving the cursor up, down, right, and left. The cursor indicates your position on the screen. If typing, the cursor shows where letters will appear.
- ❹ Numeric (calculator style) keypad.

The numeric keypad has two operating modes, numeric and editing. When the Num Lock indicator light is on, the keypad is in the numeric mode and can be used like a calculator. To switch the keypad to the editing mode, press the Num Lock key (the light goes off).



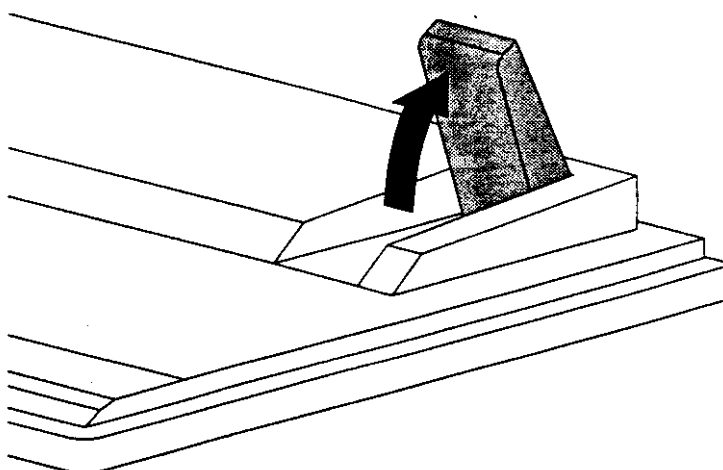
Keyboard Typing Areas

Three keys perform specific keyboard functions. The corresponding lights at the top of the keyboard indicate whether the keys are on or off (Num Lock ❶, Caps Lock ❷, and Scroll Lock ❸).



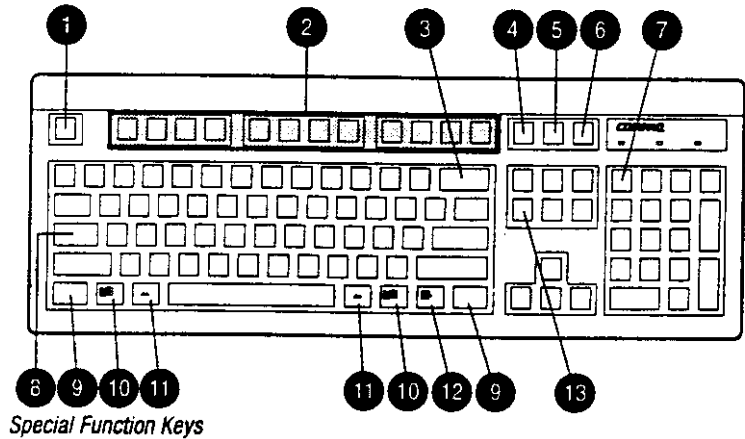
Keyboard Lights

The keyboard has feet on the bottom to tilt the keyboard to a comfortable typing angle.



Keyboard Tilt Foot

Some keys on the keyboard provide special functions, depending on the software application you are using. These keys are described in the following table.



Special Function Keys		
Reference	Key	Function
❶	Esc	Often assigned a specific task by the application. Frequently used as an exit key (for quitting an application), for moving back one screen, or for canceling a command.
❷	F1 - F12	Use for specific effects in applications and operating systems. Refer to the application software documentation.
❸	Backspace	Moves the cursor left and deletes characters as it moves to the left.

Continued

Special Function Keys *Continued*

Reference	Key	Function
●	Print Scrn	Depending on the software you are using, prints the displayed screen to a printer. Using this key may not print the entire file.
●	Scroll Lock	When the Scroll Lock light is on, the screen is prevented from scrolling.
●	Pause	Temporarily suspends screen scrolling or some operations.
●	Num Lock	When the Num Lock light is on, the numeric keypad is activated and the arrow keys are deactivated. (The arrow keys to the left of the keypad perform the same functions as the arrow keys on the keypad.)
●	Caps Lock	When the Caps Lock light is on, all letters typed are capitalized.
●	Ctrl	Used in combination with another key, its effect depends on the application software you are using.
●	Windows Logo*	Used to open the Start menu in Microsoft Windows NT. Used in combination with other keys to perform other functions. (See next table.)
●	Alt	Used in combination with another key, its effect depends on the application software you are using.
●	Application*	Used (like the right mouse button) to open pop-up menus in a Microsoft Office application. May perform other functions in other software applications.
●	Delete	Used to delete characters. Holding down Ctrl and Alt while pressing Delete restarts the system.

*Keys available in select geographic regions.

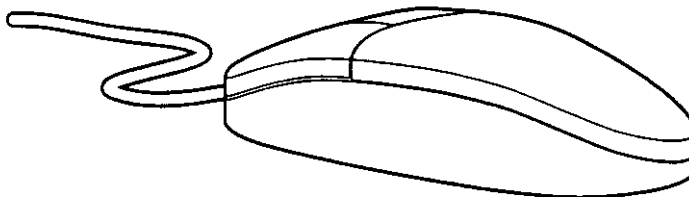
You may use the Windows Logo keys in combination with other keys to perform certain functions in Windows NT, as shown in the following table:

Windows Logo Key Combinations and Functions

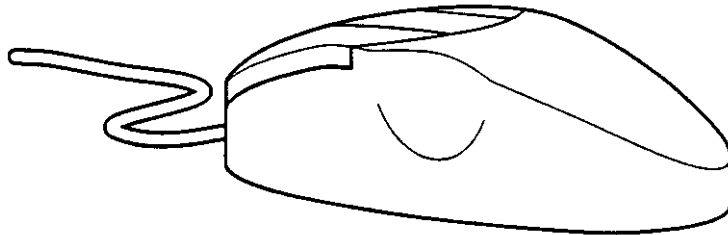
Windows Logo Key Combination	Functionality in Windows NT
Windows logo key + F1	Displays a pop-up menu for the selected object.
Windows logo key + Tab	Activates the next Taskbar button.
Windows logo key + E	Launches Explore My Computer.
Windows logo key + F	Launches Find Document.
Windows logo key + Ctrl+F	Launches Find Computer.
Windows logo key + M	Minimizes all open applications.
Shift+Windows logo key + M	Undoes Minimize All.
Windows logo key + R	Displays Run dialog box.

Using the Mouse

A 2-button or 3-button Compaq mouse comes with your workstation (depending on your model), but any serial PS/2 mouse will perform the same basic functions. The mouse controls the on-screen pointer or cursor when you use Windows and other mouse-oriented software.



Compaq Mouse (2-Button)



Compaq Mouse (3-Button)

Basic Techniques

Most software applications that support a mouse use these techniques:

Point	Move your mouse to point to your selection on the screen.
Click	Press and release the left mouse button once.
Double-click	Press and release the left mouse button twice.
Drag	Press and hold the left mouse button, then move the mouse. Release the button when you finish dragging your selection to a new location.

 The double-click speed is timed. If you double-click too slowly, your workstation responds as if you single-clicked twice. Remember, click quickly.

To use the mouse:

1. Make sure the mouse is properly connected to the workstation, that the workstation is turned on, and that startup is complete.
2. Place the mouse on a clean, flat surface, such as your desktop or mousepad.
3. Move your mouse across the flat surface. A pointer moves across your screen.
 - To type, move the pointer to a spot on the screen where you want to begin typing, and then press and release (this is called clicking) the left mouse button once. The cursor will begin blinking at the spot where you clicked, and you may begin typing there.

- ❑ To make a selection in a program menu, use the mouse to click the menu name, then click your selection in the drop-down menu list.
- ❑ To open icons (the small pictures that represent files and programs), position the mouse pointer on the icon, then click or double-click (depending on the operating system).

Routine Care

Follow these suggestions to take care of your workstation and monitor:

- Operate the workstation on a sturdy, level surface. Leave a 3-inch (7.6-cm) clearance at the back of the system unit and above the monitor to permit the required airflow.
- Never operate the workstation with the cover removed.
- Never restrict the airflow into the workstation by blocking the front vents or air intake. Do not place the keyboard, with the keyboard feet down, directly against the front of the workstation as this also restricts the airflow.
- Keep the workstation away from excessive moisture, direct sunlight, and extremes of heat and cold. For information about the recommended temperature and humidity ranges for your workstation, refer to Appendix B, "Specifications."
- Keep liquids away from the workstation and keyboard.
- Never cover the ventilation slots on the monitor with any type of material.

 Turn off the workstation before you do either of the following:

- Wipe the exterior of the workstation with a soft, damp cloth as needed. Using cleaning products may discolor or damage the finish.
- Occasionally clean the air vents on the front and back of the workstation. Lint and other foreign matter can block the vents and limit the airflow.

Turning Off the Workstation

To properly turn off your workstation in Windows NT 4.0:

Exit Windows by Clicking Shutdown from the Start menu. Select the option to shut down the workstation. The screen displays the message that it is safe to turn off the workstation. Turn off the power switch.

chapter 2

PROTECTING INFORMATION ON YOUR WORKSTATION

Your workstation includes security features that provide solutions for potential security problems. This chapter identifies these features and describes their purposes.

 This table describes how the utilities function. In some cases you may also need to set switches. For more information about these switches, refer to Appendix E, "System Board Switches."

 For information about protecting the software on your workstation, refer to Chapter 3, "Using Compaq Software."

Security Features		
Feature	Purpose	How It Is Established
Setup Password	Prevents reconfiguration of the workstation (use of the Computer Setup utility) until the setup password is entered.	Computer Setup from the Compaq Utilities menu.
Power-On Password	Prevents use of the workstation until the power-on password is entered.	Computer Setup from the Compaq Utilities menu.
Logon Password	Prevents use of the workstation unless logon password is entered.	Windows NT Security.
QuickLock/ QuickBlank	Disables keyboard and can blank the screen without exiting application; enabled with a power-on password.	Computer Setup from the Compaq Utilities menu.

Continued

Security Features *Continued*

Feature	Purpose	How It Is Established
Serial Interface Control	Prevents transfer of data through the integrated serial interface.	Computer Setup from the Compaq Utilities menu.
Parallel Interface Control	Prevents transfer of data through the integrated parallel interface.	Computer Setup from the Compaq Utilities menu.
Removable Media Control	Prevents startup from the removable media drives.	Computer Setup from the Compaq Utilities menu.
Removable Media Control	Prevents writing to the removable media drives. Allows read only.	Computer Setup from the Compaq Utilities menu.
Smart Cover Sensor	Indicates when workstation cover has been removed. Can be set to require setup password after cover has been removed.	Computer Setup from the Compaq Utilities menu.
Cable Lock Provision	Inhibits access to the interior of the workstation to prevent unwanted configuration changes or component removal. Can also be used to secure the workstation to a fixed object.	Install a padlock with the security bracket to inhibit access to the interior of the workstation; add a cable lock to secure the workstation to a fixed object.

Password Security

Your workstation supports security password features, which can be established by selecting:

- Security icon from the Control Panel in Windows NT
- Security Management from the Compaq Utilities menu

To access these features, complete one of the procedures described in the following sections:

-  Windows NT can override some security features you set through the Compaq Utilities menu at startup. Because of this, Compaq recommends that you set your passwords by using the Windows NT Security icon, located in the Control Panel.

Establishing a Power-On Password Using Computer Setup

Establishing a power-on password through Computer Setup prevents access to the workstation when power is turned on, unless the password is entered. The password must be entered each time the workstation is turned on, when the key icon () appears on the monitor.

To establish a power-on password through Computer Setup, complete the following steps:

1. Turn on the workstation.
2. When the cursor appears in the upper-right corner of the screen, press the F10 key.

-  The cursor displays in the upper-right corner of the screen for approximately two seconds. If you do not press the F10 key during this time, you must turn the workstation off, then on again to access the utility.

3. Press the Enter key to bypass the welcome screens and display the main menu.
4. From the main menu, select Computer Setup, and press the Enter key.
5. Select the Security Management feature.
6. Locate the power-on password option and follow the instructions provided to enable it.

For more information about the various screen and configuration options, refer to Chapter 3, "Using Compaq Software."

7. Save the configuration and exit the utility.

 The power-on password may only be established (for the first time) using the Computer Setup utility. Once established, the Setup utility cannot be used to change or delete the power-on password. To change or delete the power-on password, see "Changing a Power-on Password" or "Deleting a Power-on Password" in this chapter.

Establishing a Power-On Password in Windows NT

To establish a power-on password in Windows NT, complete the following steps:

1. Go to the Control Panel.
2. Select the Security icon and follow the instructions to set a new password.

Entering a Power-On Password

To enter the power-on password, complete the following steps:

1. Turn on the workstation.
2. When the key icon () appears on the monitor, enter your current password.

 Type carefully; for security reasons, the characters you type do not appear on the screen.

If you enter the password incorrectly, a broken key icon () appears. Try again. After three unsuccessful tries, you must turn off the workstation, then turn it on again before you can continue.

Changing a Power-On Password

To change the password, complete the following steps:

1. Turn on the workstation.
2. When the key icon () appears, type your current password, a slash (/) or alternate delimiter character, your new password, another slash (/) or alternate delimiter character, and your new password again as shown:

current password/new password/new password

 Type carefully; for security reasons, the characters you type do not appear on the screen. Refer to the "National Keyboard Delimiter Characters" section in this chapter for information about the alternate delimiter characters.

Completing this procedure causes the new password to take effect the next time you turn on the workstation.

Deleting a Power-On Password

To delete the password, complete the following steps:

1. Turn on the workstation.
2. When the key icon () appears, type your current password followed by a slash (/) or alternate delimiter character as shown:

current password/

 Refer to the "National Keyboard Delimiter Characters" section in this chapter for information about alternate delimiter characters.

Completing this procedure deletes the password until you establish a new one through Security Management.

National Keyboard Delimiter Characters

Each keyboard is designed to meet country-specific requirements. The syntax and keys that you use for changing or deleting your password depend on the keyboard that came with your workstation.

To determine the delimiter key required for changing or deleting your password, find your keyboard in the table below:

National Keyboard Delimiter Characters					
Arabic	/	Greek	-	Slovakian	-
Belgian	=	Hungarian	-	Spanish	-
BHCSY*	-	Italian	-	Swedish/ Finnish	/
Brazilian	/	Japanese	/	Swiss	-
Chinese	/	Hangul	/	Taiwanese	/
Czech	-	Latin American	-	Thai	/
Danish	-	Norwegian	-	Turkish	.
French	!	Polish	-	U.K. English	/
French Canadian	é	Portuguese	-	U.S. English	/
German	-	Russian	/		

* Bosnia-Herzegovina, Croatia, Slovenia, and Yugoslavia

Clearing a Power-On Password

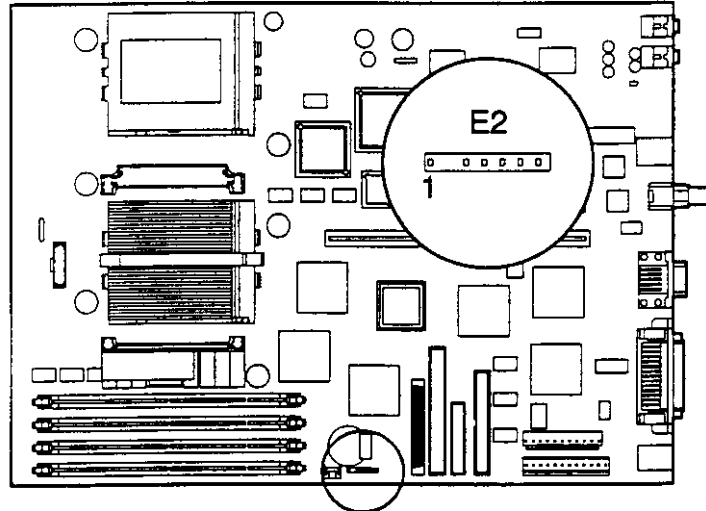
If you forget your password, you cannot access the workstation. To clear the power-on password, complete these steps:

1. Turn off the workstation.
2. Remove the workstation cover and the expansion board cage.

 Refer to Chapter 6 for workstation disassembly and reassembly instructions.

3. Remove the jumper at E2 from pins 6-7. (If an external battery is in use, the jumper will be on pins 5-6.)

Note the current pin positions so the jumper may be replaced in the original position later.



Location of the E2 Jumper on the System Board

4. ~~Re~~After waiting at least one minute, replace the jumper on pins 6-7 (or pins 5-6 if an external battery is in use).

 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. Reassemble and restart the workstation. Your password is erased from system memory.

 When you restart the workstation, the screen may display a message that says, "system options not set." If you see this message, you should verify the system date and time.

6. Establish a new power-on password, if you wish.

Advanced Security Management

The following security features can be accessed through the Computer Setup option on the Compaq Utilities menu.

- Disable removable media boot ability
- Disable removable media write ability
- Disable serial port
- Disable parallel port
- QuickLock\QuickBlank
- Smart Cover Sensor

 These features must be used in combination with a power-on or setup password.

Smart Cover Sensor

Smart Cover Sensor is a combination of hardware and software technologies that can alert you when the workstation cover has been removed. There are three levels of protection, as described in the following table:

Smart Cover Sensor Protection Levels		
Level	Setting	Description
Level 0	Disabled	Smart Cover Sensor is disabled.
Level 1	Notify User	When workstation is restarted, the screen displays a message indicating that the workstation cover has been removed.
Level 2	Setup Password	When workstation is restarted, the screen displays a message indicating that the workstation cover has been removed. You must enter the Setup password to continue.

Three elements determine the behavior of the Smart Cover Sensor:

1. The SW1-S1 (switch 1 of switch block 1, located on the system board).
2. The setup password.
Refer to "Establishing a Setup Password" or "Clearing a Setup Password" in this chapter to enable or disable the setup password.
3. The Smart Cover Sensor setting. Three settings are possible: disabled, notify user, and setup password. Refer to "Establishing a Setup Password" in this chapter to select the desired setting.

The following table summarizes the function of the Smart Cover Sensor based on the above three elements:

Smart Cover Sensor				
SW1-S1 Setting	Setup Password	Smart Cover Sensor	Cover Removed	Message displayed when workstation is turned on.
On	Enabled	Disabled	Yes	No message displayed. No setup password required.
On	Enabled	Disabled	No	No message displayed. No setup password required.
On	Enabled	Notify user	Yes	Cover removed message displayed. No setup password required. Press F1 to continue startup.
On	Enabled	Notify user	No	No message displayed. No setup password required.
On	Enabled	Setup password	Yes	Cover removed message displayed. No setup password required. Press F1 to continue startup.
On	Enabled	Setup password	No	No message displayed. No setup password required.
On	Disabled	Disabled	Yes	No message displayed. No setup password required.
On	Disabled	Disabled	No	No message displayed. No setup password required.
On	Disabled	Notify user	Yes	Cover removed message displayed. No setup password required. Press F1 to continue startup.
On	Disabled	Notify user	No	No message displayed. No setup password required.
Off	Enabled	Disabled	Yes	No message displayed. No setup password required.
Off	Enabled	Disabled	No	No message displayed. No setup password required.
Off	Enabled	Notify user	Yes	Cover removed message displayed. No setup password required. Press F1 to continue startup.

Continued

2-10 Protecting Information on Your Workstation

Smart Cover Sensor *Continued*

SW1-S1 Setting	Setup Password	Smart Cover Sensor	Cover Removed	Message displayed when workstation is turned on.
Off	Enabled	Notify user	No	No message displayed. No setup password required.
*Off	Enabled	Setup password	Yes	Cover removed message displayed. Setup password required. Press F1 to continue startup.
Off	Enabled	Setup password	No	No message displayed. No setup password required.
Off	Disabled	Disabled	Yes	No message displayed. No setup password required.
**Off	Disabled	Disabled	No	No message displayed. No setup password required.
Off	Disabled	Notify user	Yes	Cover removed message displayed. No setup password required. Press F1 to continue startup.
Off	Disabled	Notify user	No	No message displayed. No setup password required.

* Maximum security setting

** Default

Setting SW1-S1 to off, enabling the setup password, and choosing the "Setup Password" option for the Smart Cover Sensor setting will provide maximum security. If the cover is removed for any reason while the maximum security setting is in effect, the workstation will pause during the startup process. The startup process will not continue unless the setup password is entered.

Establishing a Setup Password

Establishing a setup password through the Computer Setup utility prevents reconfiguration of the workstation until the setup password is entered. When used in conjunction with the Smart Cover Sensor, the setup password provides additional security.

 The setup password is different from the power-on password. The setup password is designed for network administrators to lock in the proper configuration settings of the workstation. Individual users can still retain local control of the workstation by using the power-on password feature.

To establish a setup password through Computer Setup, complete the following steps:

1. Turn on the workstation.
2. When the cursor appears in the upper-right corner of the screen, press the F10 key.

 The cursor displays in the upper-right corner of the screen for approximately two seconds. If you do not press the F10 key during this time, you must turn the workstation off, then on again to access the utility.

3. Press the Enter key to bypass the welcome screens and display the main menu.
4. From the main menu, select Computer Setup, and press the Enter key.
5. Select the Security Management feature.
6. Locate the setup password option and follow the instructions on the screen to enable it.

 The setup password works in conjunction with SW1-S1 only as it relates to the Smart Cover Sensor. The setup password always works independently (regardless of SW1-S1) when it comes to protecting the setup configuration settings.

7. Save the configuration and exit the Computer Setup utility.

Entering the Setup Password

To enter the setup password, complete the following steps:

1. Turn on the workstation.
2. When the key icon () appears, enter your current setup password carefully.

 Be sure to enter the setup password, not the power-on password. Type carefully; for security reasons, the characters you type do not appear on the screen. If you enter the setup password incorrectly, a broken key icon () appears. Try again. After three unsuccessful tries, you must turn off the workstation, then turn it on again before you can continue.

Changing a Setup Password

To change the setup password, complete the following steps:

1. Turn on the workstation.
2. When the key icon () appears, type your current password, a slash (/) or alternate delimiter character, your new password, another slash (/) or alternate delimiter character, and your new password again as shown:

current password/new password/new password

 Refer to the “National Keyboard Delimiter Characters” section in this chapter for information about the alternate delimiter characters.

 Type carefully; for security reasons, the characters you type do not appear on the screen.

Completing this procedure causes the new password to take effect the next time you turn on the workstation.

 The setup password may also be changed by using the Computer Setup utility. Follow the “Establishing a Setup Password” procedure. Locate the setup password option and follow the instructions to change the setup password.

Deleting a Setup Password

To delete the setup password, complete the following steps:

1. Turn on the workstation.
2. When the key icon () appears, type your current password followed by a slash (/) or alternate delimiter character as shown:

current password/

 Refer to the "National Keyboard Delimiter Characters" section in this chapter for information about alternate delimiter characters.

Completing this procedure deletes the password until you establish a new one through Security Management.

 The setup password may also be deleted by using the Computer Setup utility. Follow the "Establishing a Setup Password" procedure. Locate the setup password option and follow the instructions to delete the setup password. The Setup utility will provide an option to disable the setup password; disabling the setup password is the same as deleting it.

Clearing a Setup Password

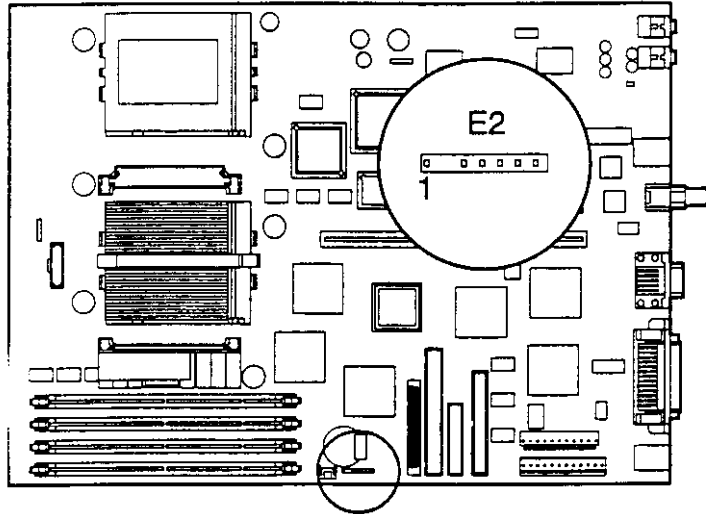
If you forget your setup password, you cannot use the Computer Setup utility to change the configuration settings. You may view the current settings, but you may not change them unless you know the setup password. To clear the setup password, complete these steps:

1. Turn off the workstation.
2. Remove the workstation cover and the expansion board cage.

 Refer to Chapter 6 for workstation disassembly and reassembly instructions.

3. Remove the jumper at E2 from pins 6-7. (If an external battery is in use, the jumper will be on pins 5-6.)

Note the current pin positions so the jumper may be replaced in the original position later.



Location of the E2 Jumper on the System Board

4. ~~Re~~After waiting at least one minute, replace the jumper on pins 6-7 (or pins 5-6 if an external battery is in use).

 Clearing the setup password will also clear the power-on password. Be sure to reestablish your power-on password after clearing the setup password.

QuickLock/QuickBlank

QuickLock and QuickBlank are enabled through Security Management in Computer Setup. The keyboard and mouse interface can be disabled and the screen blanked from within an application. Entering a QuickLock key combination (Ctrl+Alt+L) disables the keyboard and the mouse interface. If QuickBlank is not activated, the application remains in view on the screen, but it cannot be accessed.

To reenble the input device interface and access the application, you must enter the power-on password that you established in Security Management.

Enabling QuickLock and QuickBlank

To enable the QuickLock and QuickBlank features, complete the following steps:

1. Turn on the workstation.
2. When the cursor appears in the upper-right corner of the screen, press the F10 key.

 The cursor displays in the upper-right corner of the screen for approximately two seconds. If you do not press the F10 key during this time, you must turn the workstation off, then on again to access the utility.

3. Press the Enter key to bypass the welcome screens and display the main menu.
4. Select Computer Setup from the main menu and press the Enter key.
5. Select the Security Management feature.
6. Locate the QuickLock password and QuickBlank items on the screen and follow the instructions provided to enable them.

For more information about the various screen and configuration options, refer to Chapter 3, "Using Compaq Software."

7. Save the configuration and exit the utility.

Disabling the Keyboard and Mouse Interface

Once in an application, enter the QuickLock key combination (Ctrl+Alt+L).

The keyboard and mouse (or other input device connected to the mouse connector) are disabled. The application cannot be accessed, but remains in view, unless the QuickBlank feature was also enabled through the Computer Setup utility.

Enabling the Keyboard and Mouse Interface

To enable the keyboard and input device connected to the mouse connector, enter the password.

 For security reasons, the characters you type do not appear on the screen. The application will not be affected by the characters typed.

Upgrading the ROM

Your workstation comes with reprogrammable flash ROM (Read Only Memory). The purpose of ROM is to report operating system information to your workstation. By enabling a setup password, you can protect this operating system information from being unintentionally updated or overwritten. This is important to ensure workstation operating integrity. Should you need or want to upgrade your ROM, you may order an upgraded ROMPaq diskette from Compaq or obtain an upgraded ROMPaq diskette from the Compaq web site at <http://www.compaq.com>.



CAUTION: If your workstation does not have a setup password enabled, then the ROM is not write-protected. Updates may occur that could disrupt the operating system. The setup password is disabled when the workstation leaves the factory.

To upgrade the ROM after you receive an upgraded ROMPaq diskette:

1. Insert the ROMPaq diskette in the diskette drive, enter the correct command, and the workstation will prompt for the setup password.
 2. Enter the setup password.
-  If the setup password is incorrectly entered, the procedure will terminate and no changes will be made to the ROM.
3. If the setup password is entered correctly, the ROMPaq utility will take over and run the flash ROM upgrade.
-  Do not turn off the power to your workstation until the ROMPaq utility has completed the upgrade process.
4. When the utility finishes upgrading the ROM, remove the diskette from the diskette drive and restart your workstation.

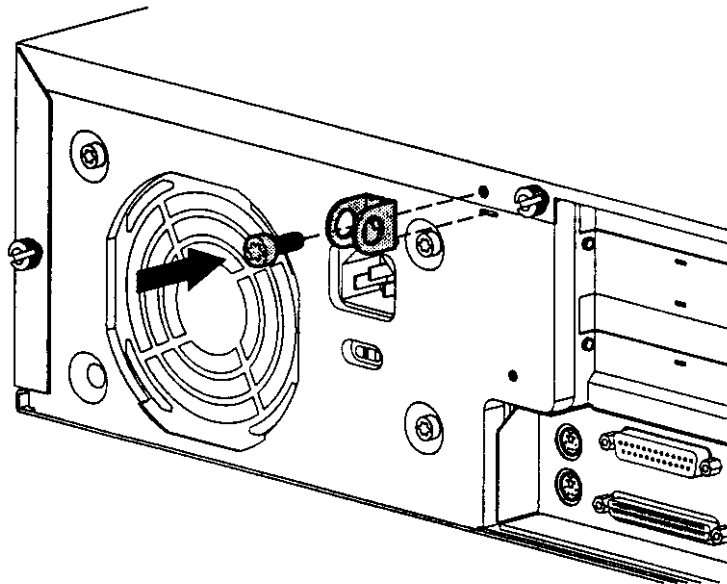
Installing the Cable Lock Provision

The cable lock provision consists of a two-piece security bracket. The bottom part of the bracket is attached to the workstation with a screw; the top part of the bracket covers the screw and prevents its removal.

 The security bracket can be used with a padlock to inhibit access to the interior of the workstation, which prevents unwanted configuration changes or component removal. For increased security, a cable lock can be installed to secure the workstation to a fixed object.

To install the security bracket, complete the following steps:

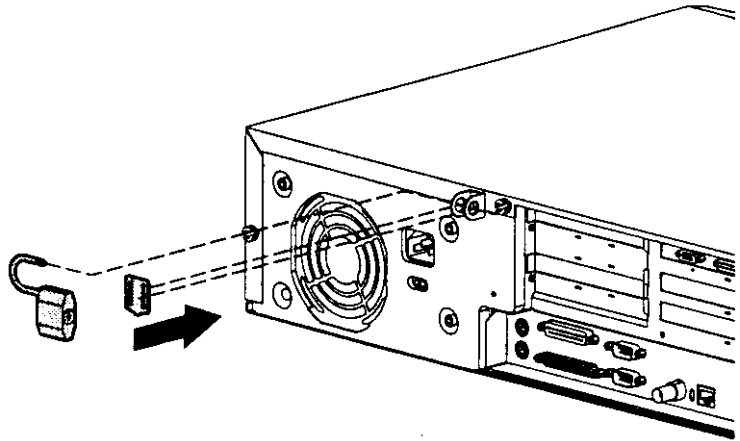
1. Separate the pieces of the security bracket by bending the metal where the two pieces join.
2. Slide the tab on the bottom part of the bracket into the notch on the back of the workstation (center of the workstation), then position the bracket over the screw hole.



Tab and Notch

3. Secure the bracket with the screw provided.
4. Cover the screw with the top part of the security bracket.

5. Install a padlock (not provided) to secure the top part of the security bracket and inhibit access to the interior of the workstation. Install a cable lock (not provided) to inhibit access to the interior of the workstation and secure the workstation to a fixed object.



Attaching a Security Bracket with Padlock

4/6

chapter 3

USING COMPAQ SOFTWARE

Your Compaq Professional Workstation comes with Compaq software. This software includes Compaq Utilities preinstalled on a hard drive partition and ROM BIOS (Read Only Memory Basic Input/Output System). This chapter explains how to access the Compaq Utilities menu, describes the options available in Compaq Utilities, and discusses the ROM BIOS. For more specific information about this software, see the online help.

If you have reformatted your hard drive and removed the Compaq Utilities partition, it can be reinstalled by using the Compaq SmartStart for Workstations compact disc or you may obtain Setup and User Diagnostics diskettes from the Compaq web site at <http://www.compaq.com>.

 For more information about installing your operating system, drivers, and other support software, refer to the Compaq SmartStart for Workstations *Installation Reference* (install.hlp).

Accessing the Compaq Utilities Menu

To access the Compaq Utilities menu, complete the following steps:

1. Turn on or restart the workstation.
-  Do not restart your workstation while in Windows. Instead, exit Windows then restart the workstation.
2. When the cursor blinks in the upper-right corner of the screen, press F10.
-  The cursor blinks in the upper-right corner of the screen for approximately 2 seconds. If you do not press F10 during this time, you must restart the workstation.
3. Press Enter to bypass the title and welcome screens. The Compaq Utilities menu appears.

The Compaq Utilities menu consists of the following choices:

- Computer Setup
- Computer Checkup (TEST)
- View System Information (INSPECT)
- Manage Diagnostics Partition
- Exit from this Utility

Computer Setup

Use Computer Setup in the following instances:

- To verify configuration parameters when resolving problems.
 - To get an overview of the workstation's hardware.
 - To modify settings for graphics, processor, memory, audio, storage, communications, and input devices.
 - To enable or disable removable media drive boot ability.
 - To enable or disable removable media drive write control.
 - To enable or disable the serial or parallel ports.
 - To resolve errors when a system configuration error is detected during the power-on self-test (POST) and is not automatically fixed by POST.
 - To change factory default settings.
 - To establish or modify Smart Cover Sensor settings.
 - If you add new options, such as a network interface controller upgrade.
-  Be sure to configure new options and drivers in your operating system after they have been configured by the Setup utility.

Security Management

Your workstation offers security features that provide solutions for a variety of potential concerns. Use the Security Management feature of Computer Setup in the following instances:

- To set, change, or delete your power-on password.
- To set, change, or delete the setup (administrator) password, which protects the workstation configuration.

- To set your power-on password, when prompted, after turning on the workstation.
- To set or change QuickLock/QuickBlank features.

Refer to Chapter 2, "Protecting Information on Your Workstation," to identify the security features, their purposes, and how to establish them.

Power Management

Use the Power Management feature of Computer Setup in the following instances:

- To create a custom power conservation level.
- To enable or disable power management.
- To change component time-out periods.



CAUTION: Using the Energy Save Monitor feature with non-Energy Star compliant monitors may cause video distortion when the Screen Save time-out occurs.

To set Power Management preferences, follow the instructions below:

1. Select Start, Settings, Control Panel.
2. Double-click the Power Management icon to set power management preferences for your system.
3. Double-click the Display icon to set power management preferences for your monitor.

Computer Checkup (TEST)

Use Computer Checkup (TEST) in the following instances:

- To determine if all devices are recognized by the system and functioning properly. Running TEST is optional, but recommended, after you install or connect a new device.
- To save, print, or display the information generated by TEST. It is recommended that you run TEST and have the printed report available before placing a call to the Compaq Customer Support Center.
- To assist your Compaq authorized dealer, reseller, or service provider in analyzing the system by allowing the service provider to reproduce the same environment on another workstation for testing.

To run Computer Checkup (TEST), complete the following steps:

1. Turn on only the external devices that you wish to test. You may wish to leave the printer connected to log error messages.
2. Access the Compaq Utilities menu.
3. From the Compaq Utilities menu, select Computer Checkup (TEST).
4. When the test option menu appears, select the option to view the device list.
5. Verify that TEST correctly detected the devices installed.

 This utility will detect all devices manufactured by Compaq; devices from other manufacturers may not be detected.

- ☐ If the list is correct, select OK and go on to step 6.
 - ☐ If the list is incorrect, be sure that any new devices are installed properly. If you do not find an installation problem, call your Compaq authorized dealer, reseller, or service provider.
6. Select one of the following from the test option menu:
- ☐ **Quick Check Diagnostics**—This option runs a quick, general test on each device with a minimal number of prompts. If errors occur, they are displayed when the testing is complete.
 - ☐ **Automatic Diagnostics**—This option runs unattended, maximum testing of each device with minimal prompts. You can choose how many times to run the tests, to stop on errors, or to print or file a log of errors.
 - ☐ **Prompted Diagnostics**—This option allows maximum control over the device testing process. You can choose attended or unattended testing, decide to stop on errors, or choose to print or file a log of errors.

7. Follow the instructions on the screen as the diagnostic tests are run on the devices. When the testing is complete, the screen displays the test option menu again.

 When running TEST, record any error message numbers and have them available when you contact your Compaq authorized dealer, reseller, or service provider for assistance.

8. Exit to the Compaq Utilities menu.

View System Information (INSPECT)

Use View System Information (INSPECT) in the following instances:

- To view information about the system once it has been configured.
- To save, print, or display the information generated by INSPECT. It is recommended that you run INSPECT and have the printed report available before placing a call to the Compaq Customer Support Center.
- To assist your Compaq authorized dealer, reseller, or service provider in analyzing the system by allowing the service provider to reproduce the same environment on another workstation for testing.

INSPECT provides the following information about the system's operating environment:

- Contents of the operating system startup files
- Current memory configuration
- ROM versions
- Type of processor and coprocessor
- Types of drives installed
- Active printer and communications interfaces
- Type of modem installed
- Graphics details

Exit from This Utility

Use this option to exit the Compaq Utilities menu.

ROM BIOS

Your workstation contains a set of software called Basic Input/Output System (BIOS) stored in Read Only Memory (ROM) on the system board. The BIOS contains a set of routines for power-on self-test (POST) and accessing hardware specific information.

Power-On Self-Test

When you turn on your workstation, the BIOS runs a number of tests, called power-on self-tests. These tests check and initialize many hardware components. The basic sequence for POST is:

1. Check and initialize low level hardware.
2. Count memory.

The memory count is displayed in the upper left corner of the monitor screen in increments of kilobytes (KB).

3. Check and initialize processors. For a workstation with one processor, a message will be displayed below the memory count:

"Initialized Processor 0"

For a workstation with a second processor, a second message will be displayed:

"Initialized Processor 1"

4. Detect and spin up hard drives. A message will be displayed:

"SCSI Device Detected - System Board, SCSI Idx: <disk ID> where x is from 0 to 15 and disk ID is the drive type."

5. Boot to the bootable diskette, CD-ROM, or hard drive.

Runtime Services

After your workstation boots to the operating system, the BIOS still provides some runtime services to the operating system. For instance, the BIOS provides information to the operating system on how many processors are installed, how the system interrupts are configured, and information on the disk drives. BIOS also provides information about your workstation's configuration and maintenance.

Upgrading the ROM BIOS

The ROM BIOS on your workstation may be upgraded. Since the BIOS is stored in ROM on the system board, the upgrade procedure is different than the upgrade procedure for other software.

New versions of BIOS may be downloaded from the Compaq web site at <http://www.compaq.com>. BIOS upgrades are called ROMpaq.

To upgrade your ROM BIOS, execute the ROMpaq software and follow the directions given by the ROMpaq software.

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chapter 4

USING NETWORK COMMUNICATIONS

This chapter provides information about networks and the hardware connectors and software device drivers that allow you to access a network. Once your network connection is active, you can share resources such as a printer, exchange information from device to device, and run common software programs.

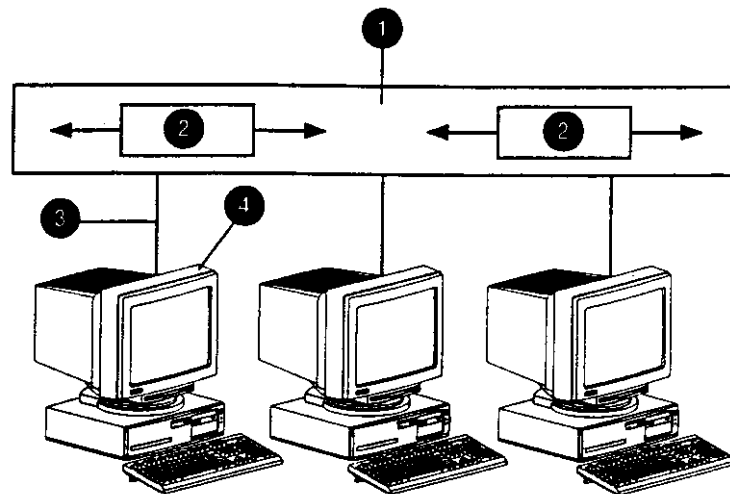
Your workstation comes Ethernet network ready, which means that it has an integrated network controller and network device drivers on the Compaq SmartStart for Workstations compact disc. The integrated network controller is a PCI bus mastering dual speed 10Base-T standard 100Base-TX controller that will automatically detect network connection speed and adjust accordingly. The controller supports full duplex Ethernet, allowing two-way transmission between nodes for up to 20 or 200 Mbits/sec aggregate bandwidth.

 Your workstation is also Token Ring Network capable. To connect to a Token Ring Network, you must install a Token Ring board.

Ethernet Network Structure

All Ethernet networks include some combination of the following elements:

- ① Ethernet cable
- ② Information packets
- ③ Drop cables
- ④ Workstations/Computers

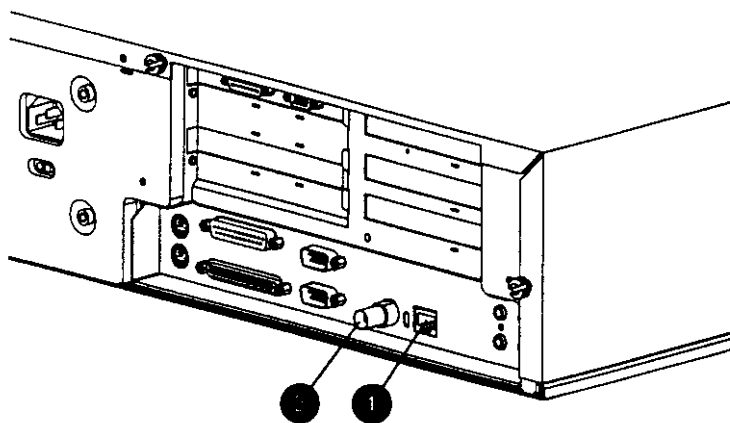


Ethernet Network Structure

Identifying the Ethernet Connectors

The following Ethernet connectors are built into the workstation on the rear panel:

- ❶ RJ-45 (8-pin) connector
- ❷ BNC (thin-coax cable) connector



Ethernet Network Connectors



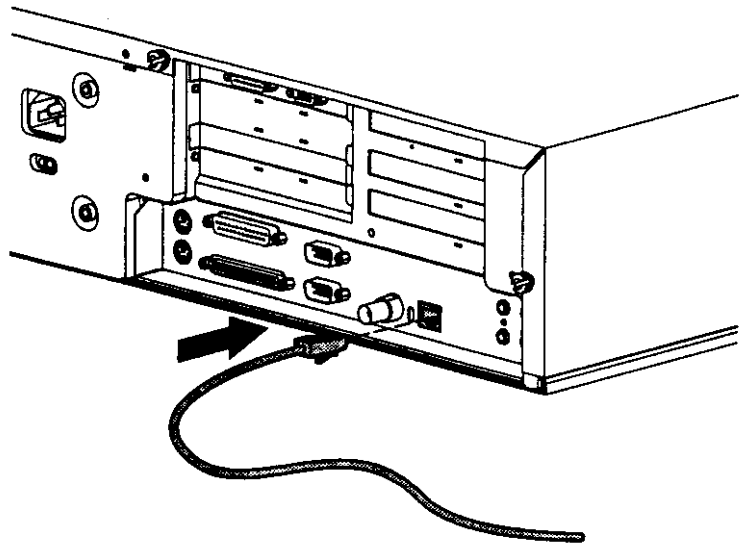
WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacles.

Connecting to an Ethernet Network

Two types of network connectors are included on your workstation. Each type requires different equipment and installation procedures as explained in the following sections.

Attaching a Network Cable to the RJ-45 Connector

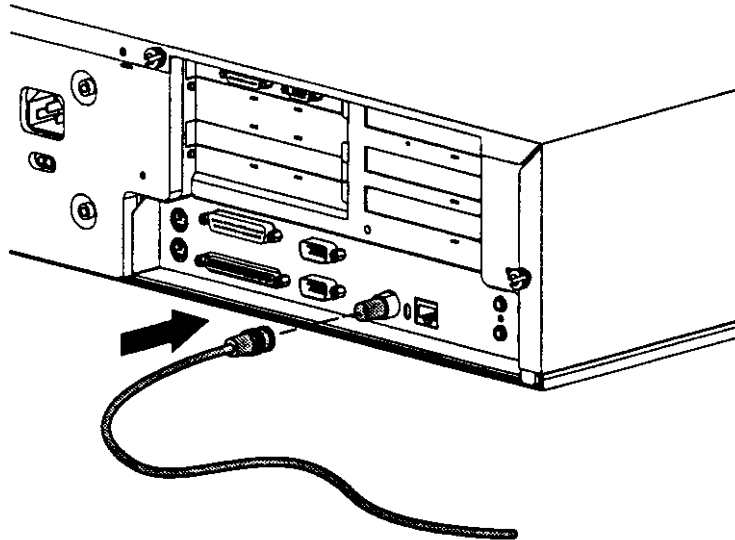
Insert one end of the network cable into the main network connection and the other end into the RJ-45 connector on your workstation. Ensure that both connectors are securely connected.



Attaching the Network Cable to the RJ-45 Connector

Attaching a Network Cable to the BNC Connector

Attach one end of the network cable to the main network connector and attach the other end to the BNC connector on your workstation. Ensure that both connectors are securely fastened.



Attaching the Network Cable to the BNC Connector

Installing the Network Drivers

The device drivers in the network software enable the workstation to communicate with the network. For information about installing drivers, operating systems, and other support software, refer to the Compaq SmartStart for Workstations *Installation Reference* (install.hlp).

Changing the Default Configuration

To change the default configuration settings, run the Setup utility. Refer to Chapter 3, "Using Compaq Software," for more information.

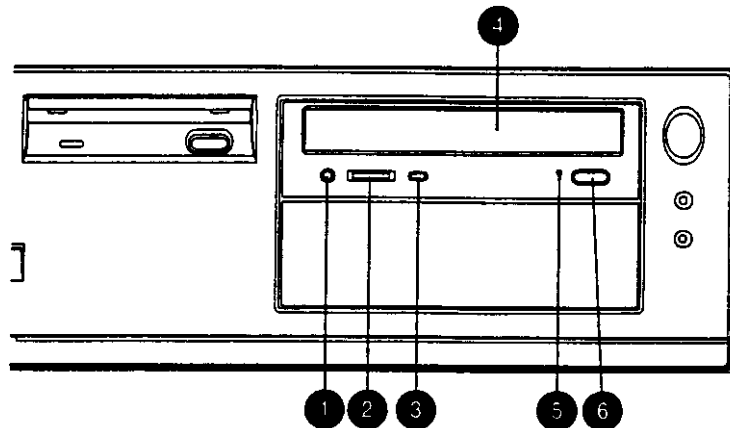
chapter 5

USING THE CD-ROM DRIVE

This chapter describes how to operate the 8X CD-ROM drive installed in your workstation. The 8X CD-ROM drive is a random access, read-only storage device capable of retrieving data from a removable compact disc.

CD-ROM Drive Front Panel

The 8X CD-ROM drive front panel consists of the following components.



CD-ROM Drive Front Panel

CD-ROM Drive Front Panel Components

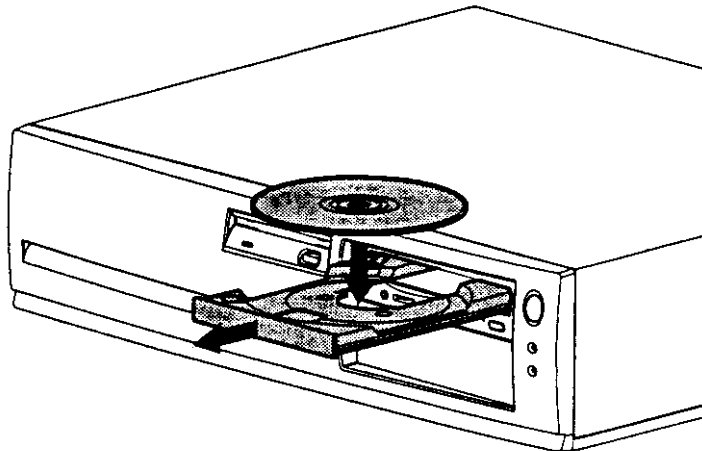
Ref.	Component	Function
①	Stereo Headphone Jack	Connects headphones to the CD-ROM drive.
②	Volume Control	Adjusts the volume of the CD-ROM drive.
③	Activity Light	Turns green when a CD is present; flashes amber when the drive is reading a CD.
④	Disc Tray	Slides in and out of the CD-ROM and holds the disc in place.
⑤	Manual Eject Hole	Manually ejects a CD if the load/unload button is inoperable.
⑥	Load/Unload Button	Opens and closes the disc tray.

Opening the Tray Automatically

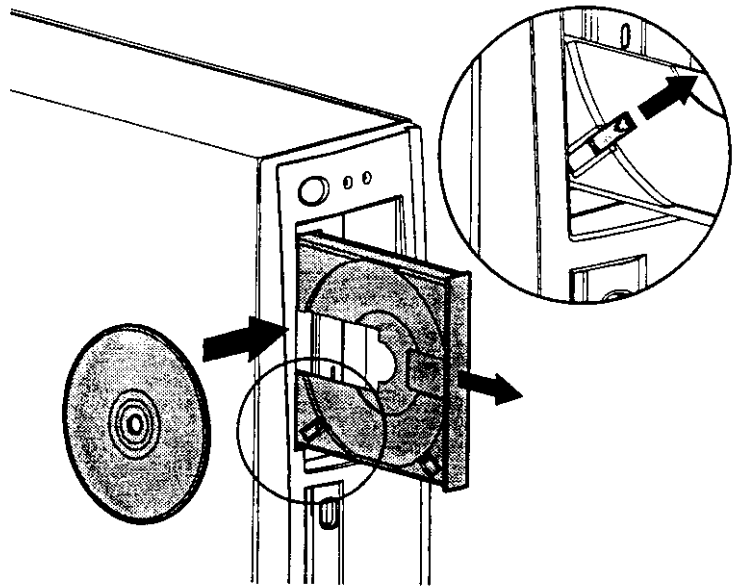
By following the instructions below, you can open and close the CD-ROM tray by using the automatic load/unload button.

1. Ensure plenty of clearance for the tray to open and close.
2. With your workstation turned on, open the CD-ROM tray by pressing the load/unload button on the front panel of the drive.
3. Place the CD-ROM disc in the tray, handling the CD-ROM disc from the edges, not the flat surfaces of the disc.

 If your workstation is in the tower position, engage the clips in the CD-ROM tray to stabilize the CD. The clips may not be identical to those shown in the illustration.



Inserting a CD (Desktop Position)



Inserting a CD (Tower Position)

4. Close the tray by pressing the load/unload button again.

The drive performs a diagnostic check and automatically begins reading the table of contents. The busy indicator turns amber while the drive reads the table of contents.

 The tray automatically opens if the disc is upside down, not properly nested in the tray, or if any other condition prevents the drive from reading the disc.

5. When the busy indicator turns green, the drive is ready to receive commands and data may be retrieved from the disc. Refer to the online help in the Windows Sound System software for further instructions.

 Certain applications or operating system software may disable the load/unload button to prevent accidental damage to the disc. If the load/unload button is disabled by the application software, it will not operate.

Opening the Tray Manually

In case the tray fails to open automatically, or if the power to the workstation is turned off, you can open the CD-ROM tray manually by using the emergency eject feature. Follow the instructions below.

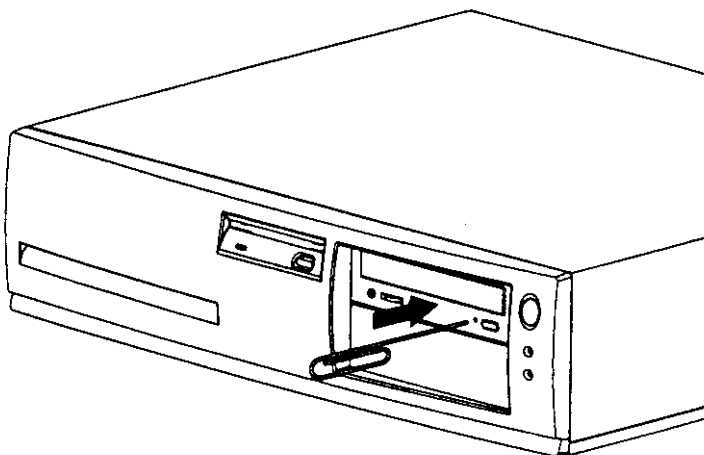


CAUTION: Before beginning this procedure, turn off the power to your workstation.

1. Insert a metal rod (approximately 1/16 inch in diameter and at least 1 3/8 inches in length [1.2 mm × 35 mm]) into the emergency eject hole and push firmly.



You may use a straightened paper clip to open the CD-ROM tray manually.



Opening the CD-ROM Tray Manually

2. Slowly pull out the tray from the drive until the tray is fully extended, then remove the disc.

Using CD-ROM Software

The first time you use a software program that comes on a compact disc, it may load a certain amount of program data onto the hard drive of your workstation. This enables the program to run more efficiently and quickly in the future.

Read the software manufacturer's instructions that accompany the compact disc before you attempt to use it. Information to look for includes:

- How much hard disk space will this program require? Do you have enough disk space?
- Will you activate the disc from Windows or from the system prompt?
- Have you connected any special devices the disc requires, such as a joystick or a keyboard?
- Do you have the required information (such as serial number) available to answer any questions during the setup program?

Enhanced Business Audio

Your workstation has an Enhanced Business Audio subsystem that provides sound capabilities for increased productivity in the Microsoft Windows operating environment.

The audio system allows you to integrate voice messages and music directly into your files. Using the supplied microphone, you can record sounds as data on the hard drive. This sound data may be used in many ways, for example; you can enhance presentation data with voice and music.

If you choose to upgrade your audio system, you must disable the integrated audio controller:

 Do not remove the ESS 1868 driver from the Drivers window in the Control Panel. Follow the instructions below.

1. From the Control Panel in Windows NT, select Devices.
2. From the Devices window, select the auddrive device.
3. Select the Stop button to stop the auddrive device.
4. Select the Startup button.
5. Select Disabled as the Startup Type for the auddrive.

6. Select OK.
7. Close the Devices window.
8. Restart the workstation for the changes to take effect.
9. Proceed with the installation process for your upgrade audio controller board.

Using Audio Compact Discs

If you have loaded an audio compact disc and you want to advance the disk to either the first track or the next track:

1. Select Programs from the Start button.
2. Then select Multimedia from the Accessories menu.
3. Click on CD Player, found in the Accessories group box, to control audio compact disc play.

Information on using CD Player can be found in the online help for that utility.

 Some software compact discs take control of the hardware volume controls. If this occurs, adjust the sound before starting the software.

CD Drive Precautions

Be sure to observe the following guidelines while operating or cleaning your CD-ROM drive:

Operation

- Do not move the drive during operation. This may cause it to malfunction during reading.
- Avoid exposing the drive to sudden changes in temperature, as condensation may form inside the unit. If the temperature suddenly changes while the drive is on, wait at least one hour before you turn off the power. If you operate the unit immediately, it may malfunction while reading.
- Avoid placing the drive in a location that is subject to high humidity, extreme temperatures, mechanical vibration, or direct sunlight.

Cleaning

- Clean the panel and controls with a soft, dry cloth or a soft cloth lightly moistened with a mild detergent solution. Never spray cleaning fluids directly on the unit.
- Avoid using any type of solvent, such as alcohol or benzene, which may damage the finish.

Safety

If any object or liquid falls into the disc tray, immediately unplug the workstation and have it checked by an authorized Compaq service provider.

chapter 6

UPGRADING THE WORKSTATION

This chapter explains how to remove the workstation cover and install the following optional, upgrade equipment:

- Expansion board
- Additional graphics memory
- Optional drive
- Additional memory
- Additional processor
- Upgrade processor

This chapter also includes information about when to reconfigure the workstation to ensure that it recognizes the newly installed equipment.

Installation Sequence

To familiarize you with the installation process, this chapter begins with an overview of the installation and configuration sequence. It is very important that you follow this sequence of steps to ensure the proper installation of any optional equipment.

1. If the workstation is already on, turn it off and disconnect the power cord from the wall outlet.



WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacles.



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



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. Refer to Appendix F for more information.

2. Open the workstation by removing its outside cover and front bezel. Refer to the sections "Removing the Workstation Cover" and "Removing the Front Bezel" in this chapter for instructions.
3. Install any optional equipment (ISA or PCI expansion board, processor upgrade, memory, drive). Refer to the applicable sections or the documentation that comes with the optional equipment for instructions.
4. Replace the front bezel and workstation cover.
5. Plug in the power cord.
6. Turn on the monitor, workstation, and any devices you want to test.
7. Reconfigure the workstation, if necessary. Refer to Chapter 3, "Using Compaq Software," for instructions.
8. Test the workstation (optional) using the TEST utility.

When to Reconfigure the Workstation

System configuration is the process of specifying the devices and programs that make up a system. When you add or remove optional equipment, you must reconfigure the workstation to recognize these changes.

 Run the Computer Setup utility *after* you complete the installation. To configure in Windows NT, go to the Control Panel and configure your specific option.

If configuration settings are incorrect, one or more devices may not work properly, and you may receive an error message. If this occurs, run the Computer Setup utility again. Refer to Chapter 3, "Using Compaq Software," for more information.

Serviceability Features

The Compaq Professional Workstation includes new features that make it easier to upgrade or service your workstation.

Removing the Workstation Cover

To install optional equipment, you must remove the workstation cover to gain access to the drive positions or expansion slots you want to use.

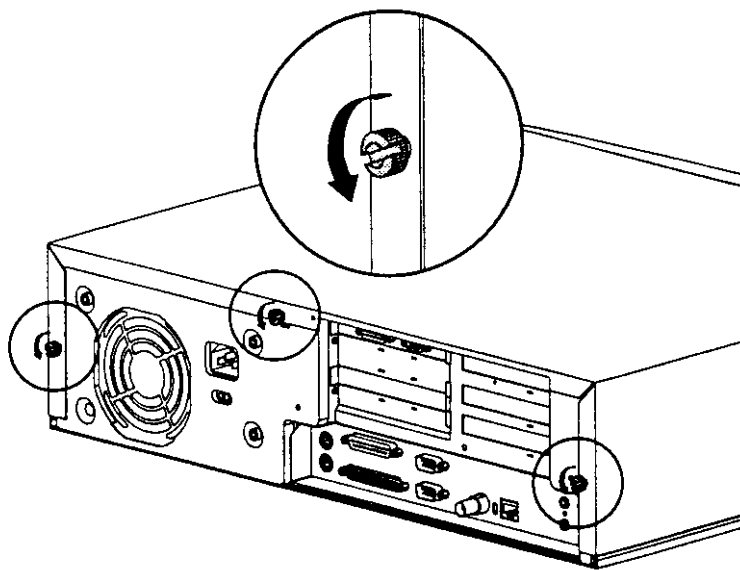


CAUTION: Before removing the workstation cover, ensure that the workstation is turned off and that the power cord is disconnected from the electrical outlet.

To remove the workstation cover, complete the following steps:

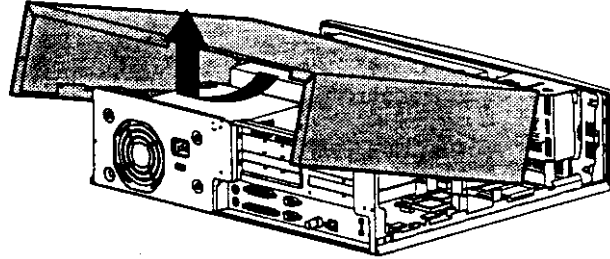
Turn off the workstation and any external devices.

2. Disconnect the power cord from the power outlet.
3. Remove the three thumbscrews located on the rear panel of the workstation.



Loosening the Thumbscrews

4. Rotate the back of the workstation cover up and remove the front lip of the cover from under the front bezel to lift the cover off the unit.



Removing the Workstation Cover

-  The configuration label located on the drive cage inside the workstation provides additional expansion slot and switch setting information.

Removing the Front Bezel

To install optional drives, you must remove the front bezel to gain access to the slide-out drive cage.

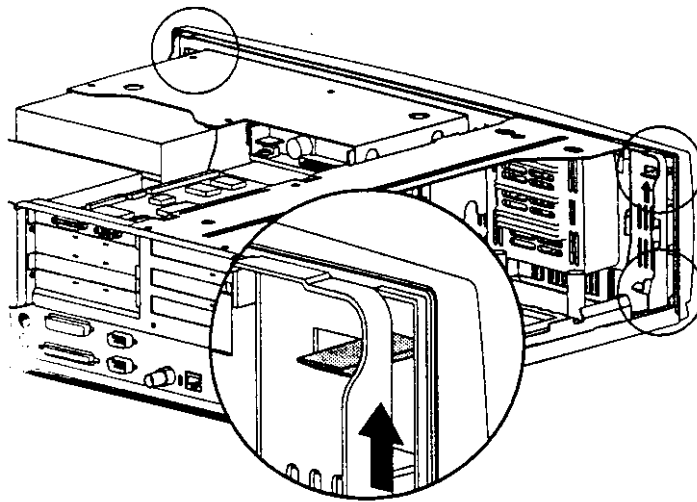


CAUTION: Before removing the workstation cover and front bezel, ensure that the workstation is turned off and that the power cord is disconnected from the electrical outlet.

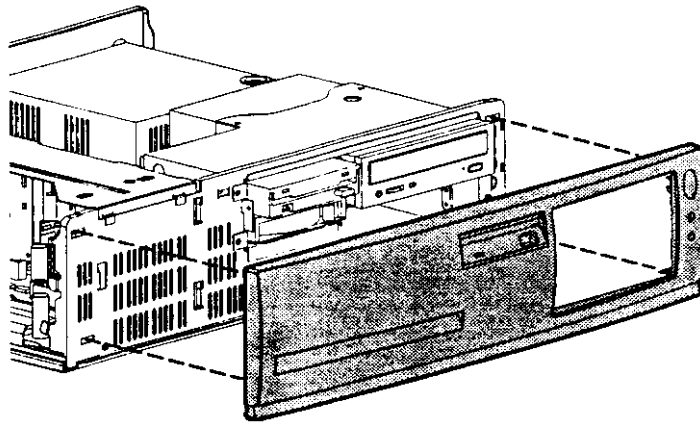
To remove the front bezel, complete the following steps:

1. Turn off the workstation and any external devices.
2. Disconnect the power cord from the power outlet.
3. Remove the workstation cover.

4. Press down on the release latches at the outer edges of the front bezel.
5. Swing the bezel up from the bottom of the chassis and remove the bezel.



Front Bezel Tabs



Removing the Front Bezel

Sliding Out the Drive Cage

The slide-out drive cage allows access to all drive positions for easy installation of additional drives, with no drive rails or brackets required. With the drive cage pulled out from the chassis, you can easily connect the drive power and signal cables.

-  When installing optional drives, you must install one guide screw to ensure the drive will line up correctly in the drive cage. Compaq has provided extra guide screws, installed in the front of the workstation chassis, under the front bezel.



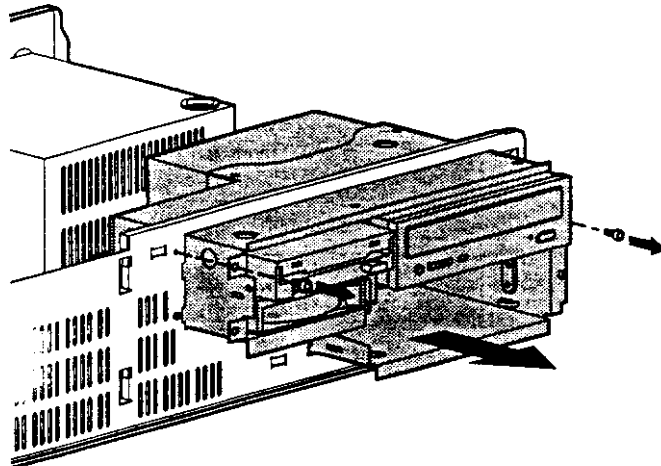
CAUTION: Before removing the workstation cover and front bezel, ensure that the workstation is turned off and that the power cord is disconnected from the electrical outlet.

To slide out the drive cage, follow these steps:

1. Turn off the workstation and any external devices.
2. Disconnect the power cord from the power outlet.
3. Remove the workstation cover and front bezel.
4. Remove the screws securing the drive cage to the front of the workstation chassis.

5. Grasp the front of the drive cage and pull to slide the drive cage out of the chassis.

 The drive cage will slide out halfway and stop.



Sliding Out the Drive Cage

Removing the Expansion Board Cage

The removable expansion board cage allows quick removal of expansion boards, without disconnecting the cables attached to the connectors on the boards, and without the use of tools. With the expansion board cage removed from the chassis, you can easily access the system board.

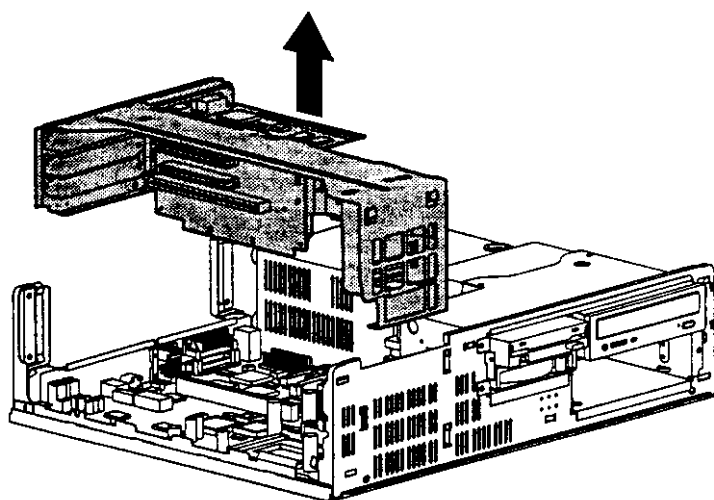


CAUTION: Before removing the workstation cover, ensure that the workstation is turned off and that the power cord is disconnected from the electrical outlet.

To remove the expansion board cage, follow these steps:

1. Turn off the workstation and any external devices.
2. Disconnect the power cord from the power outlet.
3. Remove the workstation cover.
4. Disconnect the internal speaker cable from the system board.

5. Grasp the expansion board cage by placing one hand on the back lip of the cage and two fingers of the other hand in the finger hole near the front of the cage.
6. Pull up and out to remove the expansion board cage.



Removing the Expansion Board Cage

7. Rest the removed expansion board cage upside down on the power supply and drive cage.

Sliding Out the System Board Tray

The slide-out system board tray allows you to quickly remove the system board, without using tools.



CAUTION: Before removing the workstation cover, ensure that the workstation is turned off and that the power cord is disconnected from the electrical outlet.

To remove the system board tray, follow these steps:

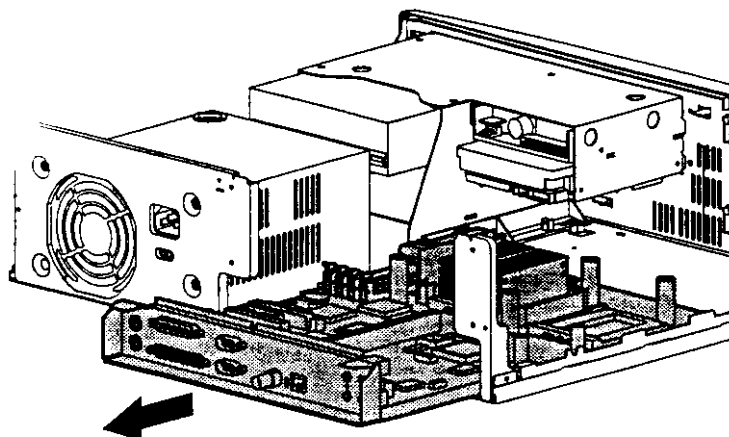
1. Turn off the workstation and any external devices.
2. Disconnect the power cord from the power outlet.
3. Remove the workstation cover.
4. Remove the expansion board cage.
5. Disconnect the power supply and all cables from the system board, and disconnect any external device cables from the rear panel.

6. Slide the system board halfway out.



CAUTION: Sliding the system board more than halfway out of the chassis may result in damage to the DIMM modules.

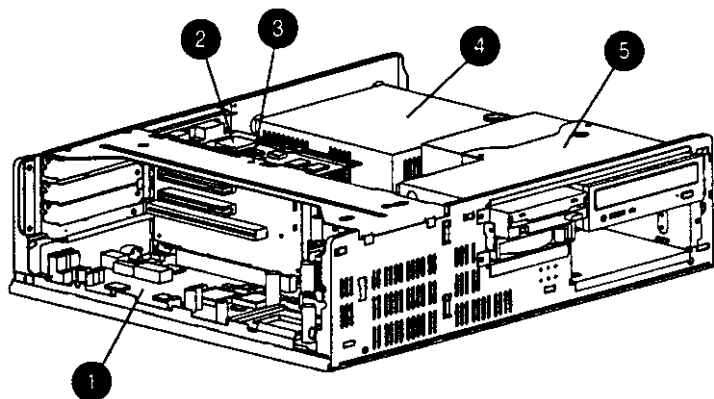
7. Remove the DIMM modules from the sockets on the system board. Refer to "Removing a DIMM Module" later in this chapter for specific instructions.
8. Remove the voltage regulator module, in a socket adjacent to the Pentium Pro processor.
9. Grasp the back edge of the system board tray and slide it out of the chassis.



Sliding Out the System Board Tray

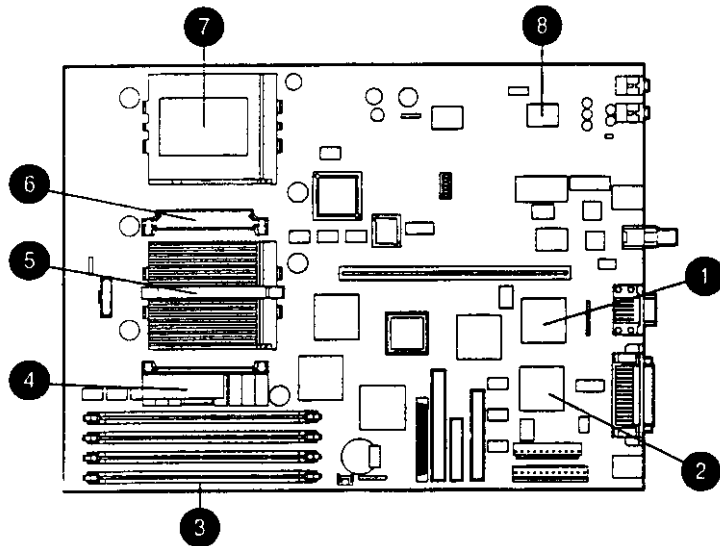
Internal Components

The following illustrations and tables identify the internal components of your workstation.



Internal Components

Internal Components	
Reference	Component
❶	System Board
❷	Graphics Controller Board
❸	Smart Cover Sensor
❹	Power Supply
❺	Configuration Label

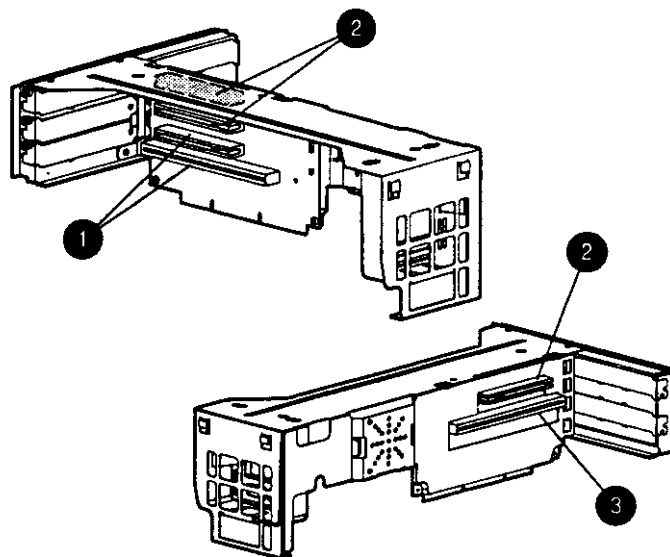


System Board Components

System Board Components	
Reference	Component
①	Network Interface Controller
②	Ultra-Wide SCSI Controller
③	Memory Module (DIMM) Sockets
④	Voltage Regulator (Primary)
⑤	Processor (Primary or Processor 0)
⑥	Voltage Regulator (Secondary)
⑦	Processor (Secondary or Processor 1)
⑧	Audio Controller

Installing an Expansion Board

Your workstation contains five expansion slots, which are configured as follows:



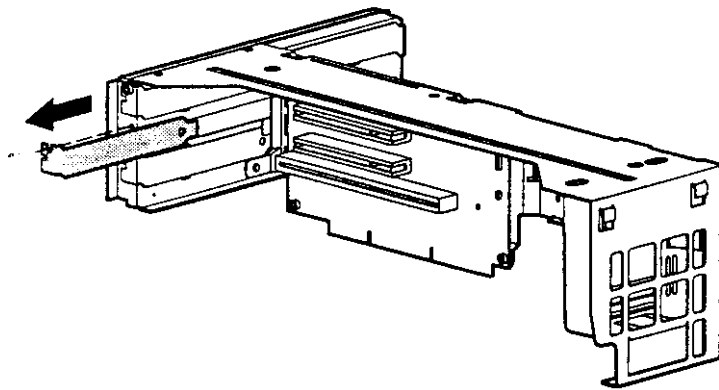
Expansion Slots

- ❶ One PCI/ISA (Peripheral Component Interconnect) shared expansion slot
- ❷ Three PCI (Peripheral Component Interconnect) expansion slots
- ❸ One ISA (Industry Standard Architecture) expansion slot

Removing an Expansion Slot Cover

To remove an expansion slot cover, follow these steps:

1. Remove the expansion board cage from the workstation chassis.
2. Locate the correct vacant slot in the expansion board cage.
3. Remove the screw at the side of the expansion slot, then remove the expansion slot cover from the slot as illustrated.



Removing the Screw and Expansion Slot Cover

Installing an Expansion Slot Cover

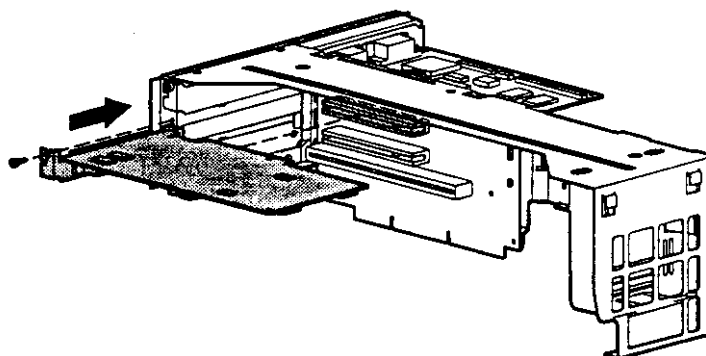
To install an expansion slot cover, follow these steps:

1. Slide the expansion slot cover into place over the slot opening.
2. Install the screw at the side of the expansion slot to secure the slot cover.

Installing a PCI or ISA Board

To install a PCI or ISA expansion board, complete the following steps:

1. Remove the expansion board cage from the workstation chassis.
2. Remove the expansion slot cover.
3. Slide the expansion board into the expansion slot and press it firmly into place.



Installing an Expansion Board

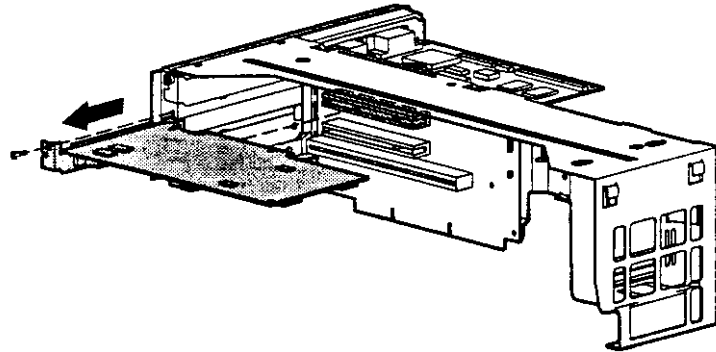
 When you install an expansion board, make sure you press firmly on the board so that the whole connector seats properly in the expansion board slot.

4. Replace the screw at the side of the expansion slot.
5. Replace the expansion board cage into the workstation chassis.
6. Replace the workstation cover.
7. Connect external cables to the installed board, if needed.
8. Reconfigure the workstation. Refer to Chapter 3, "Using Compaq Software," for instructions.
9. Test the workstation (optional) using the Computer Checkup (TEST) utility. Refer to Chapter 3, "Using Compaq Software."

Removing an Expansion Board

To remove an expansion board, follow these steps:

1. Remove the expansion board cage.
2. Disconnect any cables attached to the expansion board.
3. Remove the screw at the side of the expansion slot.
4. Hold the board at each end and carefully rock it back and forth until the connectors pull free from the slot. Be sure not to scrape the board against other components.



Removing an Expansion Board

5. Store the board in antistatic packaging.
6. Install an expansion slot cover over the open slot.

Upgrading Graphics Capabilities

The Compaq Professional Workstation comes with one of the following graphics controllers, depending on the model:

- Matrox MGA Millennium graphics controller
- Gloria-L graphics controller

The MGA Millennium controller is a high-performance graphics controller with a maximum 1600 × 1200 noninterlaced resolution. It comes equipped with 2 megabytes of WRAM (Windows Random Access Memory) and is implemented to use a PCI bus. An optional 2 or 6 megabytes of memory may be added to the graphics controller board for greater color depth.

The Gloria-L graphics controller offers workstation 3D performance with a 3D graphics processor, large-scale memory size, and upgradable DRAM memory.

Upgrading the Graphics Controller

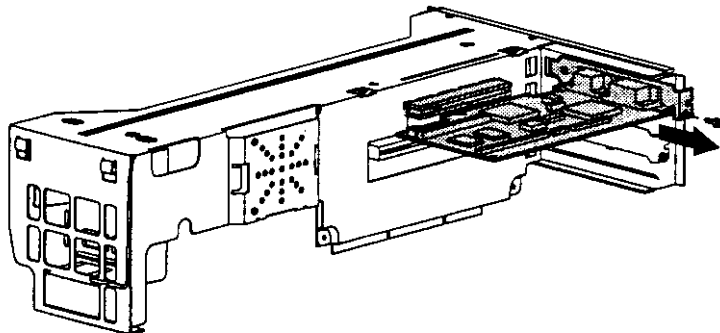
To install an additional upgrade module onto the MGA Millennium or Gloria-L graphics board:

1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover.



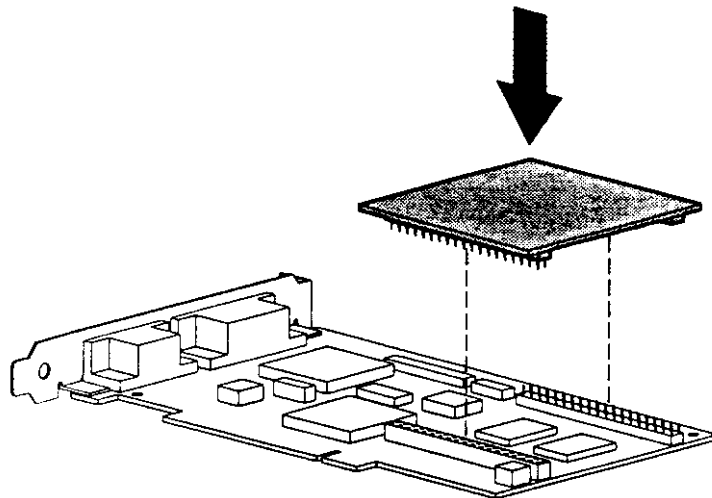
CAUTION: Static electricity can damage the electronic components of the workstation or optional boards. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. Refer to Appendix F for more information.

2. Remove the expansion board cage.
3. Remove the screw at the side of the expansion slot and remove the graphics controller board.

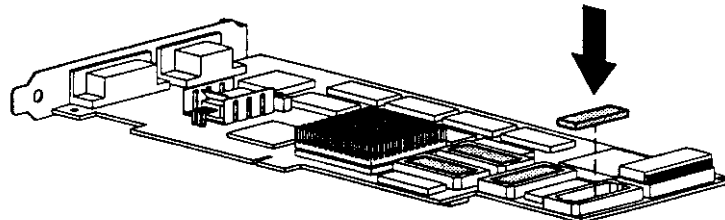


Removing the Graphics Board from the Expansion Slot

4. Place the graphics board on a grounded, flat surface and install the upgrade memory module as illustrated below.



Installing an Upgrade Memory Module on the MGA Millennium Graphics Controller Board



Installing an Upgrade Memory Module on the Gloria-L Graphics Controller Board

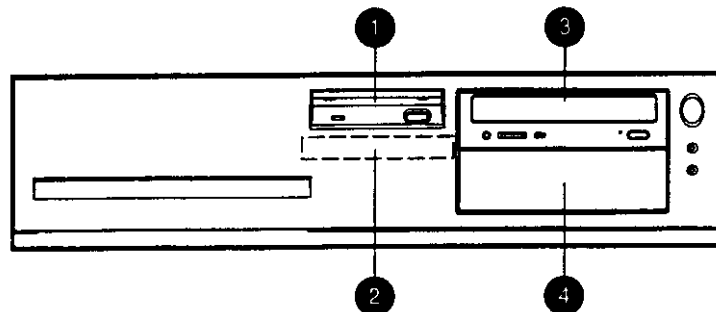
5. Replace the graphics board into the same expansion slot.
6. Replace the screw into the expansion slot.
7. Replace the expansion board cage into the workstation chassis.
8. Replace the workstation cover.
9. Change the resolution to take advantage of the additional display modes now available with the upgraded memory. Refer to the Compaq SmartStart for Workstations Installation Reference (install.hlp), for specific instructions.
10. Test the system (optional) using the Computer Checkup (TEST) utility. Refer to Chapter 3, "Using Compaq Software."

Installing Additional Drives

The Compaq Professional Workstation supports up to four drives. They may be installed in various configurations.

- ❶ A standard 3.5-inch diskette drive (drive position 1 is a third-height bay).
- ❷ A standard primary hard drive (drive position 2 is a third-height bay).
- ❸ A standard CD-ROM drive (drive position 3 is a half-height bay).
- ❹ An optional PD-CD drive, CD-ROM drive, diskette drive (3.5-inch or 5.25-inch), or tape drive in the bottom position (drive position 4 is a half-height bay).

✎ Additional hard drives may be installed in drive positions 3 and 4, but these positions are more often used for devices requiring user access.



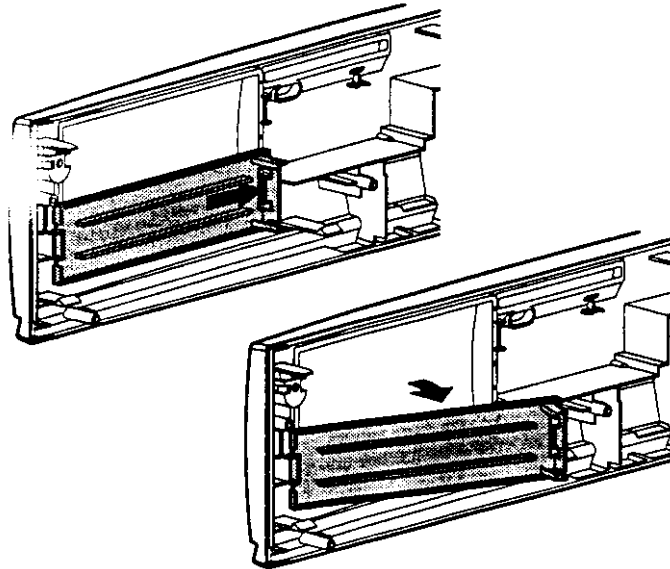
Drive Configurations

✎ Either a third-height or a half-height drive may be installed into a half-height bay.

Removing a Blank Drive Bezel

To remove a blank drive bezel, complete the following steps:

1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover and front bezel.
2. Release the appropriate drive bezel by releasing the tab on one side of the drive bezel from the latch inside the front bezel.



Removing a Drive Bezel

Installing a 5.25-Inch Diskette, CD-ROM, Tape, or PD-CD Drive

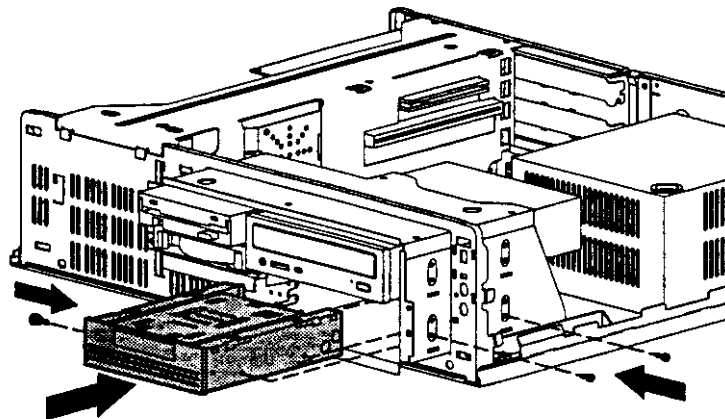
To install an optional 5.25-inch diskette drive, CD-ROM drive, tape drive, or PD-CD, complete the following steps:

1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover and front bezel.
2. Remove the screws securing the drive cage and slide the drive cage forward out of the chassis.
3. Install the guide screw into the first screw hole on the left-hand side of the drive.

 Some options use M3 metric thread hardware. Extra guide screws are provided on the front of the chassis, under the front bezel. The Compaq-supplied metric screws are black.

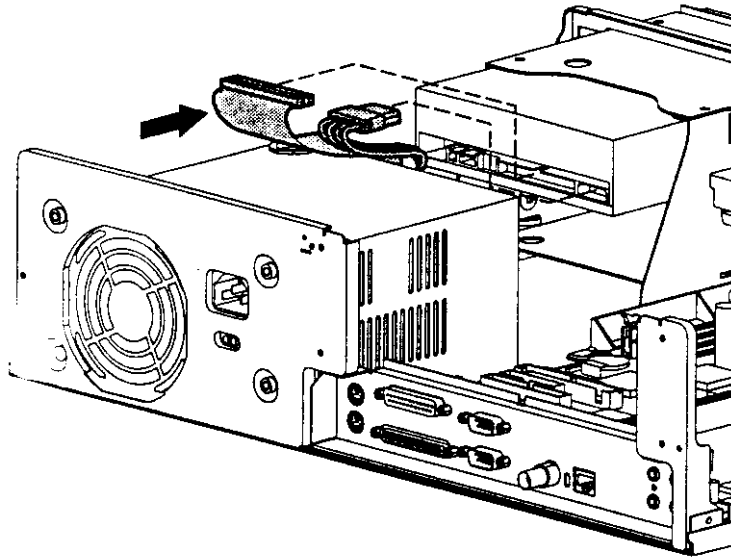
4. Install the drive in the desired drive position and secure the drive with two screws through the side of the drive cage.

Be sure the guide screw lines up with the guide slot in the drive cage.

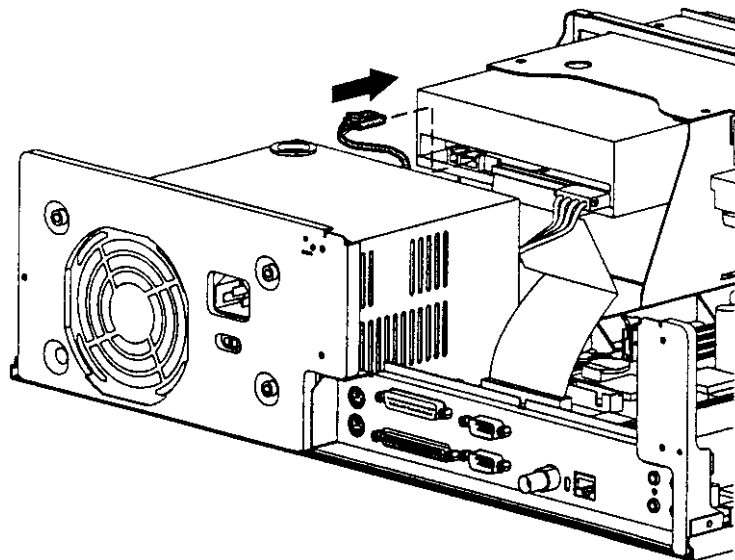


Installing an Optional 5.25-Inch Drive

5. Connect the drive power and signal cables. If the drive you are installing is a CD-ROM drive or PD-CD Drive, connect the audio cable. The other end of the audio cable should be routed under the expansion board cage and connected to the riser board.



Connecting the Signal and Power Cables



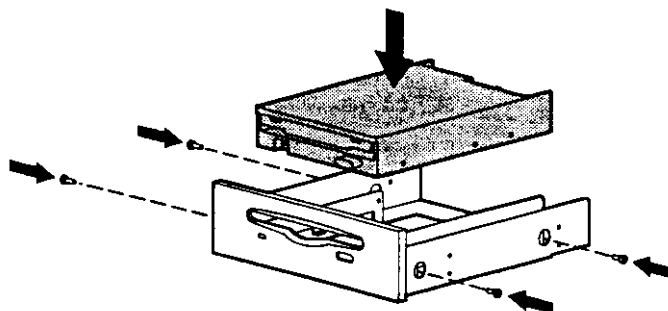
Connecting the Audio Cable

6. Push the drive cage back into the workstation chassis and secure it with the two screws through the front of the chassis.
7. Remove the blank drive bezel from the inside of the front bezel.
8. Replace the front bezel and workstation cover.
9. Reconfigure the workstation. Refer to Chapter 3, "Using Compaq Software," for more information.

Installing a 3.5-Inch Drive into a 5.25-Inch Drive Bay

To install a 3.5-inch drive into a 5.25-inch drive bay, complete the following steps:

1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover and front bezel.
2. Remove the screws securing the drive cage and slide the drive cage forward out of the chassis.
3. Attach the 3.5-inch drive to the 5.25-inch bracket and secure the drive to the bracket with the screws provided.

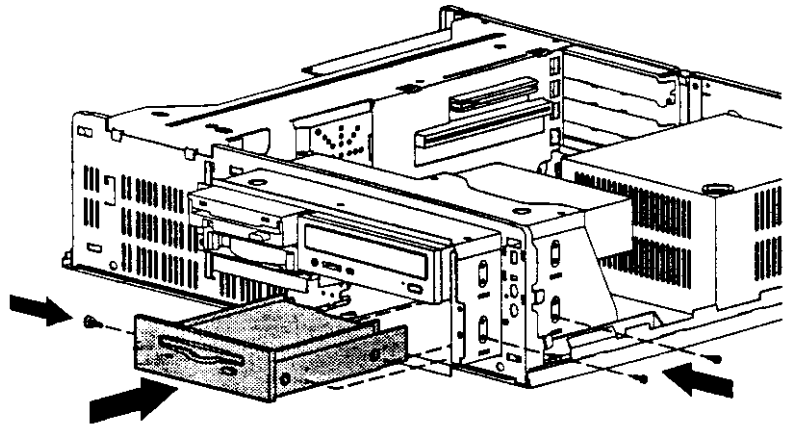


Attaching a 3.5-Inch Drive to the 5.25-Inch Bracket

4. Install the guide screw into the first screw hole on the left-hand side of the bracket.

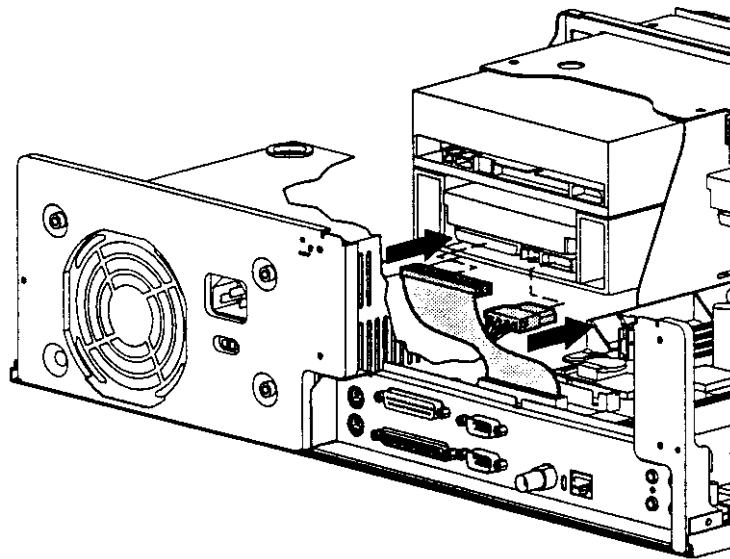
 Some options use M3 metric thread hardware. Extra guide screws are provided on the front of the chassis, under the front bezel. The Compaq-supplied metric screws are black.

5. Install the bracket and drive into the desired drive position and secure the bracket with two screws through the side of the drive cage. Be sure the guide screw lines up with the guide slot in the drive cage.



Installing a Bracket and 3.5-Inch Drive

6. Connect the drive power and signal cables.



Connecting the Drive Cables

7. Push the drive cage back into the workstation chassis and secure it with the two screws through the front of the chassis.
8. Remove the blank drive bezel from the inside of the front bezel, if necessary.
9. Replace the front bezel and workstation cover.
10. Reconfigure the workstation. Refer to Chapter 3, "Using Compaq Software," for more information.

Installing SCSI Devices

The Compaq Professional Workstation features a wide SCSI host adapter that supports up to fifteen internal and external SCSI devices. All models come with an internal SCSI hard drive preinstalled. Additional high-performance SCSI devices can be added to all models.

Guidelines for Installing Optional SCSI Devices

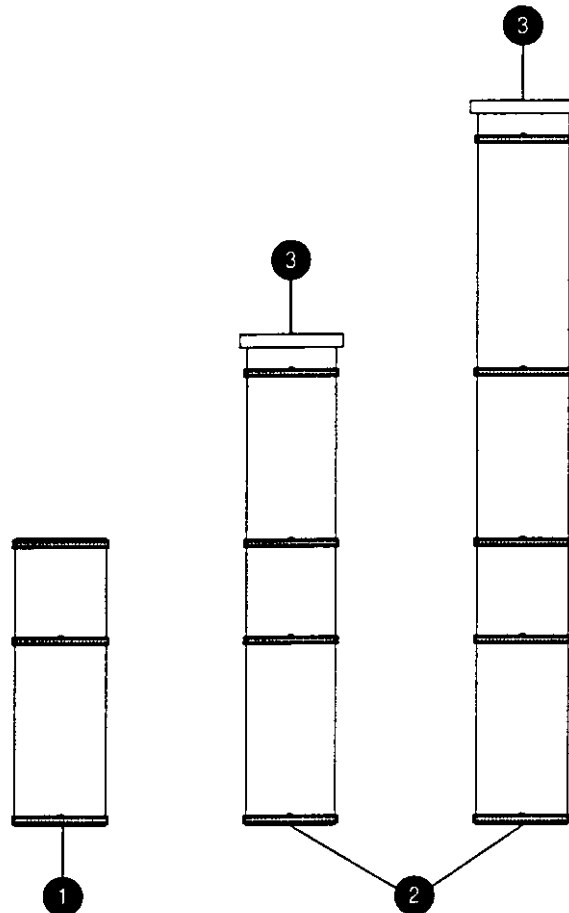
When installing additional SCSI devices, you must adhere to the following guidelines:

- **A wide SCSI host adapter supports up to 15 SCSI devices.**
- **Every SCSI device must have a unique identification (ID) number (0 - 15).** The SCSI host adapter identifies signals to and from 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 the communication between the controller and the SCSI device. The reserved and available SCSI ID numbers for SCSI devices are as follows:
 - ☐ 0 is reserved for the hard drive.
 - ☐ 1 through 14 are available.
 - ☐ 15 is reserved for the SCSI host adapter.

- **Every SCSI chain or circuit must be terminated (closed) at both ends.** Termination can be accomplished by using the terminating feature on the device or by using a terminated cable.
- **SCSI devices may not have terminating jumpers on the device.** Termination on these devices must be achieved with terminated cable.
- **Turn on an external SCSI device before turning on power to the workstation.** This enables the system board controller to recognize the external SCSI device and automatically reset. When an external SCSI device is connected to the external SCSI connector on the rear panel of the workstation, that device becomes the end of the SCSI chain and must be terminated.
- **All SCSI hard drives must be either internal or external, but never both.** However, the system accommodates a combination of other internal and external SCSI devices, such as SCSI tape and CD-ROM drives.

Cabling for Optional SCSI Devices

Depending on the model, your workstation may include one of the SCSI cables shown in the next illustration.



SCSI Cable Options

Because your workstation comes preconfigured, cable configuration does not become a consideration until you decide to add an optional SCSI device.

 If you are installing a narrow SCSI device, you will need to attach a 68 to 50 pin adapter to the optional SCSI device.

Computers with 2-peripheral SCSI cables ❶ (without termination) must have termination enabled on the last device.

Computers with 3- and 4-peripheral SCSI cables ② come with a terminator ③ on the end of the cable. The connector on the opposite end of the cable always connects to the system board. All SCSI devices connected with these cables must have their termination disabled.

For additional information about installing optional SCSI devices, refer to the documentation that comes with the device or contact your Compaq authorized dealer, reseller, or service provider.

Installing a SCSI Device

Before you can install a SCSI device, you must first verify the SCSI ID of the drive and, if necessary, set the SCSI ID to a new number. Be sure that each SCSI device on the SCSI chain has a unique SCSI ID number. Refer to the section "Guidelines for Installing Optional SCSI Devices" in this chapter or refer to the documentation that comes with the device.

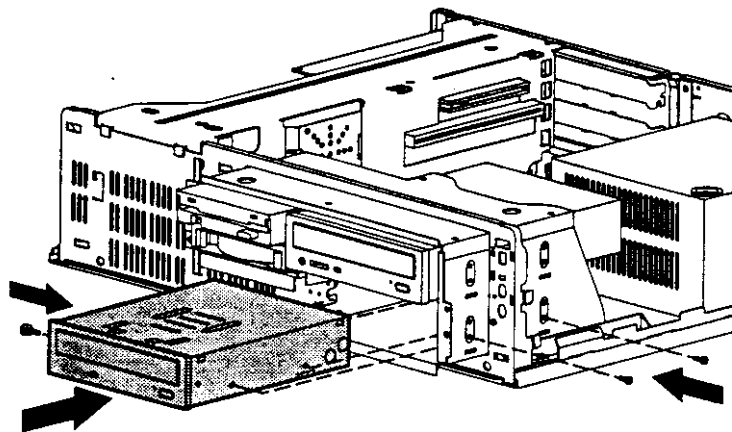
Second, you must determine if the device ought to have termination enabled or disabled. Set the termination if necessary. Refer to the section "Cabling for Optional SCSI Devices" in this chapter or refer to the documentation included with the device.

To install a SCSI device, complete the following steps:

1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover and front bezel.
2. Remove the screws securing the drive cage and slide the drive cage forward out of the chassis.
3. Install the guide screw into first screw hole on the left-hand side of the drive.

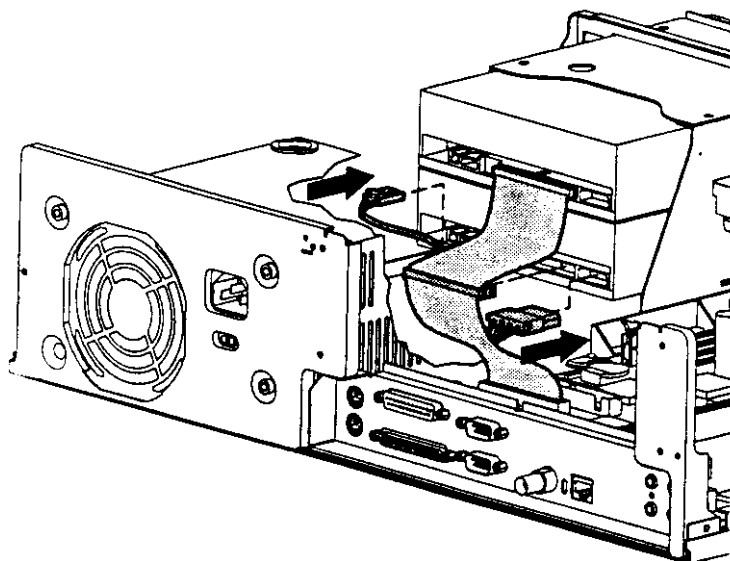
 Some options use M3 metric thread hardware. Extra guide screws are provided on the front of the chassis, under the front bezel. The Compaq-supplied metric screws are black.

4. Install the drive in the desired drive position and secure the drive with two screws through the side of the drive cage. Be sure the guide screw lines up with the guide slot in the drive cage.



Installing a SCSI Drive

5. Connect the drive power and signal cables. If the drive you are installing is a CD-ROM drive, connect the audio connector.



Connecting Cables to the SCSI Drive

6. Remove the blank drive bezel from inside the front bezel, if necessary.
7. Replace the front bezel and workstation cover.
8. Reconfigure the workstation. Refer to Chapter 3, "Using Compaq Software," for more information.

Installing Additional Memory

You can expand the memory on your workstation by installing industry standard DIMMs (dual inline memory modules) on the system board. DIMM sizes can be mixed and the DIMMs must be unbuffered. Standard DIMM speed is 60 ns DIMMs, but the system board also supports 50 ns DIMMs. If DIMM speeds are mixed, the entire system will run at the slowest DIMM speed.

 The DIMMs shipped with the workstation support error checking and correcting (ECC). Do not install DIMMs that do not support ECC. DIMMs must also have a 4 KHz refresh rate.

Standard	Expandable To:
32 MB, 64 MB, 96 MB, or 128 MB (depending on your model)	*512 MB

* In order to install the maximum memory, replace the standard memory with a 128-megabyte memory module for a maximum base memory of 512 megabytes.



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

Refer to Appendix F, "Electrostatic Discharge," for more information.



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

 If you must replace a DIMM module to upgrade your memory, refer to "Removing DIMM Modules" later in this chapter for instructions.

Installing DIMM Modules

To install a memory module, complete the following steps:

1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover.
2. Disconnect the diskette drive, hard drive, audio, and power cables from the system board.
3. Remove the expansion board cage.
4. Slide the system board halfway out of the chassis.



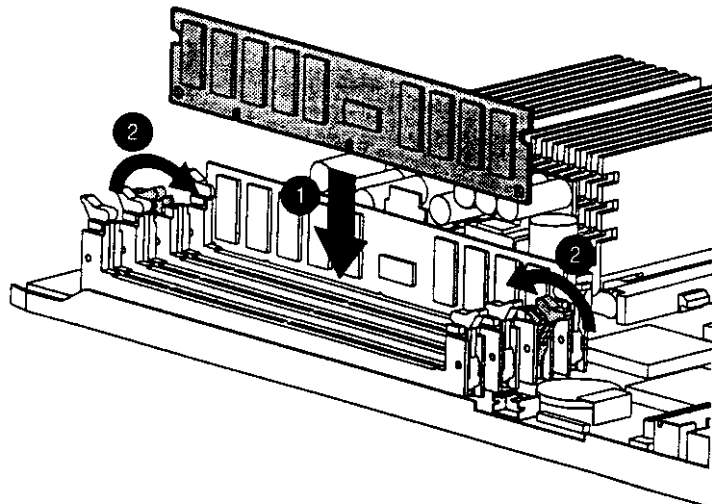
CAUTION: Sliding the system board more than halfway out of the chassis may result in damage to the DIMM modules.

5. Position the memory module ❶ in the memory socket on the system board, making sure that the two gaps between the contacts are in alignment with the two spaces in the socket.



The DIMMs may be installed one module at a time, but should be installed starting at the inmost socket on the board out toward the board edge.

Press down on both ends of the module simultaneously to seat it in the socket. When the module is fully seated, the latches ❷ automatically lock it in position.



Installing a DIMM Module

6. Repeat step 5 for each module that you want to install.
7. Slide the system board back in.
8. Reconnect the cables to the system board.
9. Replace the expansion board cage.
10. Replace the workstation cover.
11. Test the system (optional) using the Computer Checkup (TEST) utility. Refer to Chapter 3, "Using Compaq Software."

Removing DIMM Modules

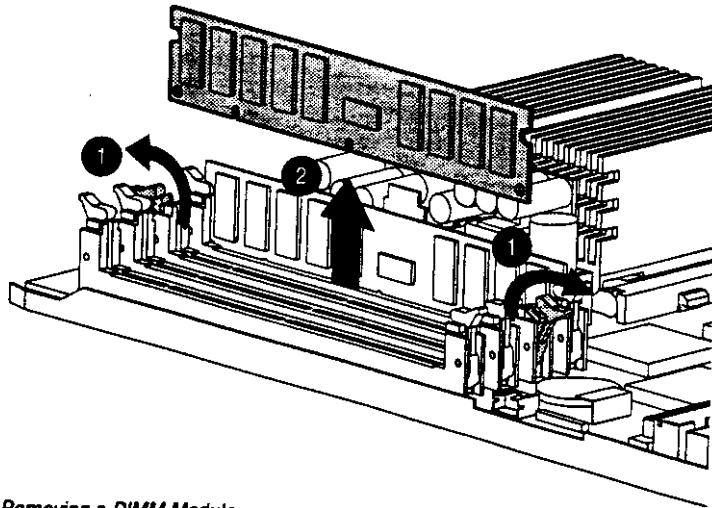
To remove a memory module, complete the following steps:

1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover.
2. Disconnect the diskette drive, hard drive, audio, and power cables from the system board.
3. Remove the expansion board cage.
4. Slide the system board halfway out.



CAUTION: Sliding the system board more than halfway out of the chassis may result in damage to the DIMM modules.

5. Press outward on both latches ❶ of the DIMM module at the same time. This releases the DIMM and partially pushes it out of the socket. Lift the DIMM ❷ straight out of the socket.



Removing a DIMM Module

6. Repeat step 5 for each module that you want to remove.
7. Slide the system board back in.
8. Reconnect the cables.
9. Replace the expansion board cage.
10. Replace the workstation cover.
11. Test the system (optional) using the Computer Checkup (TEST) utility. Refer to Chapter 3, "Using Compaq Software."

Installing an Additional Processor

You can upgrade your workstation system board that contains a single processor by installing a second Pentium Pro processor of the same speed, type, and revision in the secondary processor position.



CAUTION: Installing the processor incorrectly may cause damage to the processor board. Compaq recommends that you have a Compaq authorized reseller or service provider install the processor. If you plan to install it yourself, read all the instructions carefully before you begin.

To install a second Pentium Pro processor, complete the following steps:

1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover.
2. Remove the expansion board cage.



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

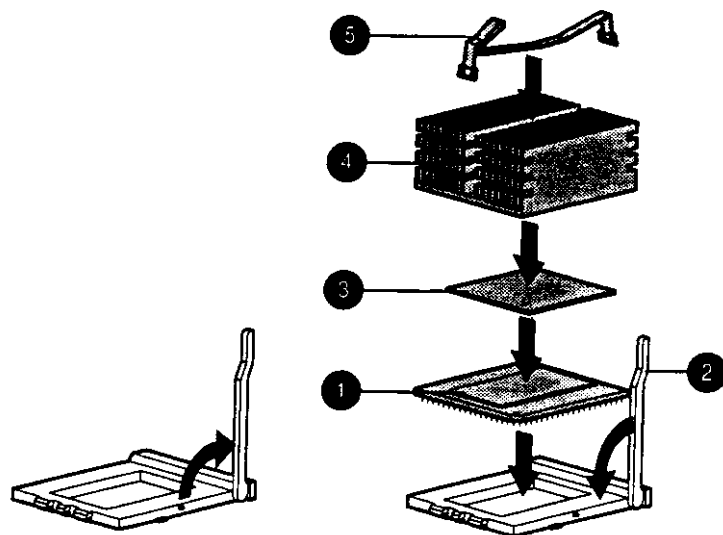
3. Lift the handle on the zero insertion force (ZIF) socket.
4. Align the new processor so that the diagonal corner of the processor aligns with the upper-left corner of the socket (viewing the workstation from the front bezel).



The handle on the ZIF socket in your workstation may not look identical to the handle shown in the drawing. All handle types perform the same function.

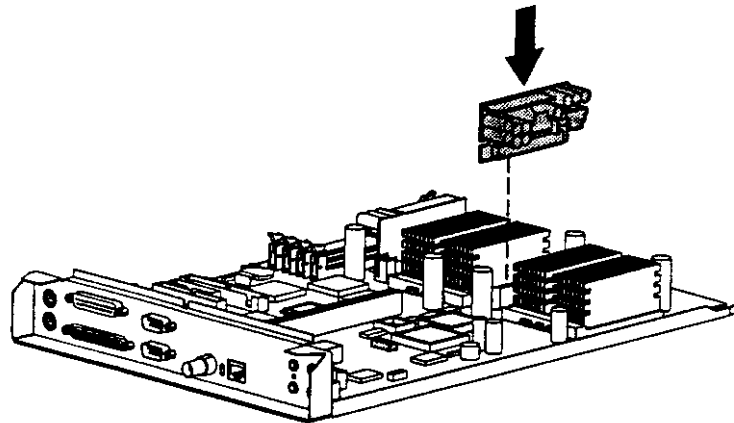
5. Install the processor ❶ by lowering it into the ZIF socket.
6. Push the handle ❷ on the ZIF socket back into place to secure the processor.
7. Place and center the thermal pad ❸ on the top of the processor.
8. Install the heat sink ❹ and retaining clip ❺.

 The heat sink retaining clip in your upgrade kit may not look identical to the clip shown in the drawing. All clip types perform the same function.



Installing a Second Pentium Pro Processor

9. Install the voltage regulator module (VRM) into the socket adjacent to the processor.



Installing the Voltage Regulator Module

10. Replace the expansion board cage.
11. Replace the workstation cover.
12. Test the system (optional) using the Computer Checkup (TEST) utility. Refer to Chapter 3, "Using Compaq Software."

Installing an Upgrade Processor

You can also upgrade your workstation system board by replacing an existing processor with an upgrade processor.



CAUTION: Installing the processor incorrectly may cause damage to the processor board. Compaq recommends that you have a Compaq authorized reseller or service provider install the processor. If you plan to install it yourself, read all the instructions carefully before you begin.

To install an upgrade processor, complete the following steps:

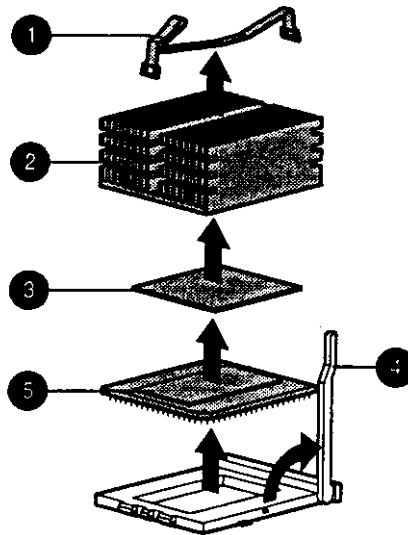
1. Turn off the workstation, disconnect the power cord from the electrical outlet, and remove the workstation cover.
2. Remove the expansion board cage.



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

3. Remove the retaining clip ❶, heat sink ❷, and thermal pad ❸ from the existing processor.
4. Lift the handle ❹ on the zero insertion force (ZIF) socket.
5. Lift the existing processor ❺ out of the processor socket.

 The handle on the ZIF socket in your workstation may not look identical to the handle shown in the drawing. All handle types perform the same function.

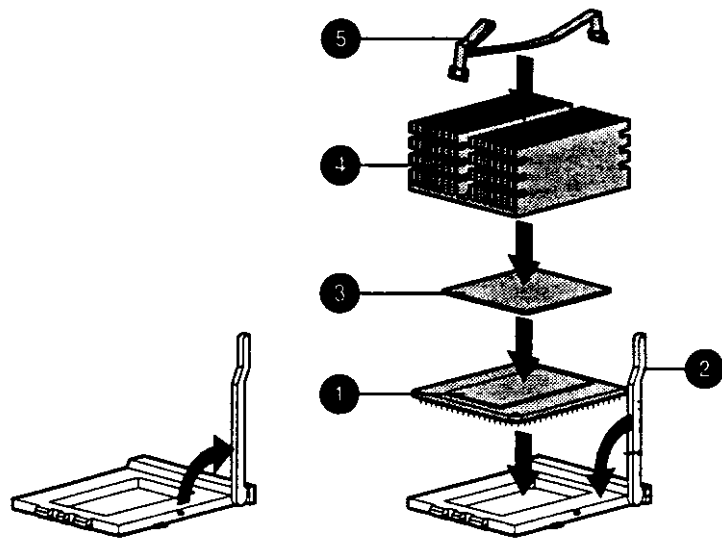


Removing the Existing Processor

6. Align the new upgrade processor so that the diagonal corner of the processor aligns with the upper-left corner of the socket (viewing the workstation from the front bezel).

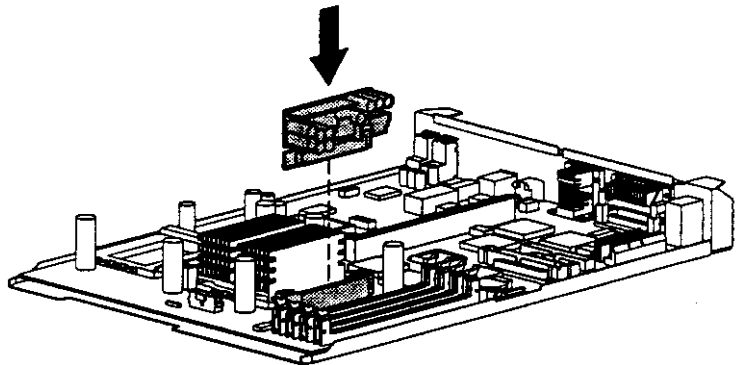
7. Install the processor ❶ by lowering it into the ZIF socket.
8. Push the handle ❷ on the ZIF socket back into place to secure the processor.
9. Place and center the thermal pad ❸ on the top of the processor.
10. Install the heat sink ❹ and retaining clip ❺.

 The heat sink retaining clip in your upgrade kit may not look identical to the clip shown in the drawing. All clip types perform the same function.



Installing an Upgrade Processor

11. Install the voltage regulator module (VRM) into the socket adjacent to the processor.



Installing the Voltage Regulator Module

12. Replace the expansion board cage.
13. Replace the workstation cover.
14. Test the system (optional) using the Computer Checkup (TEST) utility. Refer to Chapter 3, "Using Compaq Software."

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chapter 7

TROUBLESHOOTING

This chapter provides information on how to identify and correct some common disk, display, memory, network, SCSI, and software problems. It also identifies and explains some common messages you may receive on the screen.

Consult Appendix C, "Error Messages," for an explanation of specific messages that may display during the power-on self-test (POST) at startup.

Helpful Hints

If you encounter some minor problem with your workstation, monitor, or software, refer to the following list of general suggestions before taking further action:

- Check that the workstation and monitor are plugged into a working electrical outlet.
- Check to see that the workstation is turned on and the green power light is on.
- Check to see that the monitor is turned on and the green monitor light is on.
- Turn up the brightness and contrast controls of the monitor if the monitor is dim.
- Press and hold any key. If the system beeps, then your keyboard is operating correctly.
- Check all cable connections for loose connections or incorrect connections.
- Make sure you ran the Setup utility *after installing* an expansion board, ISA board, or other option (memory, disk drives).
- Check that all switch settings have been set as instructed by the Setup utility.
- Be sure that all the needed device drivers have been installed (for example, if you are using a mouse, you need a mouse device driver).
- Make sure that all printer drivers have been installed for each application.

- Take out all diskettes from the diskette drives before you turn on your system.
- If you have corrupted your Windows NT configuration, reboot the workstation. When the startup program prompts you to press the spacebar to invoke the last known good menu, press the spacebar. Windows NT remembers your last working configuration and runs it.

Solving Minor Problems

Although your workstation is configured for your particular hardware and software, problems you encounter while working may not be unique. Eliminating the typical problems described in this section may save you time and money. If you do have a problem with your workstation, consider the problems and possible solutions outlined in the following series of tables. You may discover something you can resolve easily for yourself. If the condition persists, contact your Compaq authorized reseller or service provider.

Problem	Cause	Solution
Workstation won't turn on	Workstation is not connected to an external power source.	Connect to an external power source.
	Cables to the external power source are unplugged.	Ensure that cables connecting the workstation and the external source are plugged in properly.
	A defective PCI or ISA card has been installed.	Remove any adapter card that was just installed.
Workstation doesn't automatically display the date and time	RTC (real-time clock) battery may need to be replaced. Battery life is approximately 5 years.	Replace the RTC battery. Refer to Appendix G, "Installing a New Battery," for installation instructions, or contact your Compaq authorized reseller or service provider for RTC battery replacement.
Workstation does not beep during the power-on self-test (POST)	Speaker cable is not properly attached or speaker volume has been turned down.	Ensure that speaker cable is connected. In Windows NT, select Volume Control under Accessories.
Workstation powered off automatically	The unit temperature was exceeded. The fan may be blocked.	1. Unit is in an exceedingly hot environment. Let it cool down. 2. Contact your Compaq authorized reseller or service provider.

Solving Disk Problems

If you encounter disk problems, some common causes and solutions for these problems are listed in the following table.

Problem	Cause	Solution
Diskette drive light stays on	Diskette is damaged.	Run CHKDSK on the diskette.
	Diskette is incorrectly inserted.	Remove diskette and reinsert.
	Drive button is not pushed in.	Push in drive button.
	Software program is damaged.	Check the program diskettes or reinstall software from original media.
	Drive cable is not properly connected.	Reconnect drive cable.
Diskette drive cannot write to a diskette	Diskette is not formatted.	Format the diskette.
	Diskette is write-protected.	Use another diskette or remove the write protection.
	Writing to the wrong drive.	Check the drive letter in your path statement.
	Not enough space is left on the diskette.	Use another diskette.
	Diskette write control is enabled.	Check your security feature settings by running the Setup utility.
A problem has occurred with a disk transaction	The directory structure is bad, or there is a problem with a file.	Run CHKDSK to check for fragmentation.
Diskette drive cannot read a diskette	Diskette is not formatted.	Format the diskette.
	You are using the wrong diskette type for the drive type.	Check the type of drive you are using and use the correct diskette type.
Drive not found	Cable is loose.	Check connections.
Nonsystem disk message	The system is trying to start from a diskette that is not bootable.	Remove the diskette from the drive.

7-4 Troubleshooting

Solving Display Problems

If you encounter display problems, refer to the documentation that came with your monitor and to the common causes and solutions listed in the following table.

Problem	Cause	Solution
Blank screen	Monitor is not turned on and the monitor light is not on.	Turn on the monitor and check that the monitor light is on.
	The cable connections are not correct.	Check the cable connection from the monitor to the workstation and to the electrical outlet.
	The QuickBlank feature has been enabled through Computer Setup.	Run Computer Setup and disable the QuickBlank feature.
	The energy saver feature has been enabled.	Hit any key or type your password.
	The RGB (Red, Green, Blue) input switch on the back of the monitor is incorrectly set.	Set the monitor's RGB input switch to 75 ohms and, if there is a sync switch, set it to External.
	You are using a fixed-sync monitor and it won't sync at the resolution chosen.	Be sure that the monitor can support the selected resolution and refresh rate.
Monitor does not function properly when used with energy saver features	Monitor without energy saver capabilities is being used with energy saver features enabled.	Disable monitor energy saver feature.
Video colors are wrong	This indicates that either the cabling or monitor impedance is incorrect.	1. Ensure that the Red, Green, and Blue BNC cables are connected to the corresponding monitor connectors. 2. Be sure your monitor's RGB inputs are set to 75 ohms.

Continued

Solving Display Problems *Continued*

Problem	Cause	Solution
Dim characters	The brightness and contrast controls are not set properly.	Adjust the monitor brightness and contrast controls.
	Cables are not properly connected.	Check that the video cable is securely connected to the video card and the monitor.
	The RGB switch on the back of the monitor is incorrectly set.	Set the RGB switch (and sync options, if this option is available) to 75 ohms, with the sync set to External. Refer to the documentation included with the monitor.
Blurry display or requested resolution cannot be set	If the graphics controller was upgraded, the correct display drivers may not be loaded.	Install the display drivers on the diskette included in the upgrade kit.
Screen goes blank	You may have a screen blanking utility installed, or energy saver features are enabled.	Press any key or type password.
The picture is broken up, or it rolls, jitters, or blinks	The monitor connections may be incomplete or the monitor may be incorrectly adjusted.	1. Be sure the monitor cable is securely connected to the workstation. 2. In a 2-monitor system or if another monitor is in close proximity, be sure the monitors are not interfering with each other's electromagnetic field by moving them apart.
Monitor overheats	There is not enough ventilation space for proper airflow.	Leave at least 3 inches (7.6 cm) of ventilation space. Be sure there is nothing sitting on top of the monitor obstructing the air flow.
Cursor will not move using the arrow keys on the keypad	The Num Lock key may be on.	Press the Num Lock key. The light should not be on if you want to use the arrow keys.

7-6 Troubleshooting

Solving Audio Problems

If you encounter audio problems, some common causes and solutions for these problems are listed in the following table.

Problem	Cause	Solution
Sound does not come out of the speaker	Software volume control is turned down in Microsoft Sound System Control Panel, or CD-ROM volume control on the front or back of the workstation is turned down.	In Windows NT, select Volume Control under Accessories. Turn the CD-ROM volume control knob on front or back of workstation to increase the volume.

Solving Printer Problems

If you encounter printer problems, refer to the documentation that came with your printer and to the common causes and solutions listed in the following table.

Problem	Cause	Solution
Printer will not print	Printer is not turned on and online.	Turn the printer on and make sure it is online.
	The correct printer drivers for your application are not installed.	Install the correct printer drivers for your application.
	If you are on a network, you may not have made the connection to the printer.	Make the proper network connections to the printer.
Printer will not turn on	The cables may not be connected properly.	Reconnect all cables and check the power cord and electrical outlet.
Prints garbled information	The correct printer drivers for your application are not installed.	Install the correct printer driver for your application.
	The cables may not be connected properly.	Reconnect all cables.
Printer is offline	The printer may be out of paper.	Check the paper tray and refill it if it is empty. Select online.

Solving Hardware Installation Problems

If you encounter hardware installation problems, refer to the documentation that came with the hardware option and to the common causes and solutions listed in the following table.

Problem	Cause	Solution
A new device is not recognized as part of the system	Computer Setup or the SCSI software utility has not been run to configure the new device.	Run Computer Setup or the SCSI software utility.
	Cable(s) of new external device are loose or power cables are unplugged.	Ensure that all cables are properly and securely connected and that pins in the cable or connector are not bent down.
	Power switch of new external device is not turned on.	Turn off the workstation, turn on the external device, then turn on the workstation to integrate the device with the system.

Solving Network Problems

Some common causes and solutions for network problems are listed in the following table. These guidelines do not discuss the process of debugging the network cabling.

Problem	Cause	Solution
Setup utility does not detect a network controller.	Possible I/O address conflict with another expansion board.	Factory default is 300h to 30Fh for Ethernet. Either remove and reconfigure the conflicting expansion board, or reconfigure the network controller. If the address is changed, ensure that the drive parameters match the new I/O address for the network controller.

Continued

Solving Network Problems *Continued*

Problem	Cause	Solution
Setup utility reports unprogrammed EEPROM.	Possible I/O address conflict with another expansion board.	Factory default is 300h to 30Fh for Ethernet. Either remove and reconfigure the conflicting expansion board, or reconfigure the network controller. If the address is changed, ensure that the drive parameters match the new I/O address for the network controller.
	The network controller is defective.	Contact your Compaq authorized service provider.
	Network drivers are loaded.	Boot the workstation without the network drivers, using a system boot diskette, and reconfigure the network controller.
Diagnostics reports a failure.	Possible I/O address conflict with another expansion board.	Factory default is 300h to 30Fh for Ethernet. Either remove and reconfigure the conflicting expansion board, or reconfigure the network controller. If the address is changed, ensure that the drive parameters match the new I/O address for the network controller.
	The cable is not securely connected.	Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
	The cable is attached to the incorrect connector.	Ensure that the cable is attached to the correct connector.
	There is a problem with the cable or a device at the other end of the cable.	Ensure that the cable and device at the other end are operating correctly.
	The network controller is defective.	Contact your Compaq authorized service provider.
	Network controller interrupt overlaps the interrupt of an expansion board.	Run the Setup utility and modify the network controller memory value.

Continued

Solving Network Problems *Continued*

Problem	Cause	Solution
Diagnostics passes, but the workstation does not communicate with the network.	Network drivers are not loaded, or driver parameters do not match current configuration.	Make sure the network drivers are loaded and that the driver parameters match the configuration of the network controller.
	The network controller is not configured for this workstation.	In Windows NT, select the Network icon at the Control Panel.
	Network controller interrupt overlaps the interrupt of an expansion board.	Run the Setup utility and modify the network controller memory value.
Network controller stopped working when an expansion board was added to the workstation.	Network drivers are not loaded, or driver parameters do not match current configuration.	Make sure the network drivers are loaded and that the driver parameters match the configuration of the network controller.
	The cable is not securely connected.	Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
Network controller stopped working when an expansion board was added to the workstation.	Network controller interrupt overlaps the interrupt of an expansion board.	Run the Setup utility and modify the network controller memory value.
	The network controller requires drivers.	Verify that the drivers were not accidentally deleted when the drivers for a new expansion board were installed.
	The files containing the network drivers are corrupted.	Reinstall the network drivers, using your backup diskettes.

Continued

7-10 Troubleshooting

Solving Network Problems *Continued*

Problem	Cause	Solution
Network controller stopped working without apparent cause.	The files containing the network drivers are corrupted.	Reinstall the network drivers, using your Compaq SmartStart for Workstations CD.
	The cable is not securely connected.	Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
	The network controller is defective.	Contact your Compaq authorized service provider.

Solving Memory Problems

If you encounter memory problems, some common causes and solutions are listed in the following table.

Problem	Cause	Solution
Out of Memory error	Memory configuration may not be set up correctly.	Run Computer Setup.
	You have run out of memory to run the application.	Check the application documentation to determine the memory configuration requirements.
Memory count during POST is wrong	The memory modules may not be installed correctly.	Check that the memory modules have been installed correctly and run the Setup utility.
Insufficient memory error during operation	You have run out of memory for your application.	Check the memory requirements for the application, or add more memory to the workstation.

Solving CD-ROM Problems

If you encounter CD-ROM problems, refer to the common causes and solutions listed in the following table or to the documentation included with the optional CD-ROM.

Problem	Cause	Solution
System will not boot from CD-ROM drive	The CD-ROM boot is not enabled through the Setup utility.	Run the Setup utility and set the drive priorities.
CD-ROM devices are not detected, driver is not loaded	CD-ROM drive is not connected properly or not properly terminated.	Refer to the documentation included with the CD-ROM.

Solving Software Problems

Most software problems occur as a result of the following:

- The application was not installed correctly.
- Memory was not allocated correctly.
- There is a conflict between applications.

Worldwide Telephone Numbers

Locate your geographical area from the following table and use one of the telephone numbers for Compaq assistance.

General Information Numbers—Product information, technical assistance, and the location of your nearest Compaq authorized dealer, reseller, or service provider.

Technical Support Numbers—Hardware technical support in analyzing system configuration and diagnostic problems or troubleshooting.

Customer Support Numbers—Information on service and support programs including warranty, product catalogs, and white papers.

PaqFax Numbers—Automatic facsimile response system for technical and product specific information that is transmitted to any fax machine. PaqFax is available 24 hours a day.

 Telephone numbers are subject to change without notice.

Worldwide Telephone Numbers

Location	Country Code	Telephone Number
Argentina		
General Information	+54	-1-796-1616
Technical Support	+54	-1-796-1717
Australia		
General Information		61-2-9911-1999
Technical Support		61-2-9911-1955
PaqFax		61-2-9911-1982
Austria		
General Information		0222/8 78-16 16
Technical Support		0222/8 78-16-16
Ordering Backup Software	+31	-55-38-43-39
Belgium		
General Information	+32	-2-716-95-11
Compaq Care Center	+32	-2-716-96-96
Compaq Care Center Fax	+32	-2-716-95-85
General Fax	+32	-2-725-22-13
FaxPaq	+32	-2-716-96-99
QuickLine	+32	-2-716-95-92
Ordering Backup Software	+32	-2-716-96-78
Ordering Backup Software Fax	+32	-2-716-96-79
Brazil		
General Information		55-11-246-7866
Canada		
General Information		905-707-1715
Technical Support		1-800-OKCOMPAQ (1-800-652-6672)
Customer Support		1-800-263-5868
Ordering Backup Software		1-800-952-7689
Battery Pack Recycling		1-800-263-5868
Caribbean		
General Information		011-713-514-4220
Technical Support		011-713-518-2200

Continued

Worldwide Telephone Numbers *Continued*

Location	Country Code	Telephone Number
Chile		
General Information		56-2-274-1911
Technical Support		56-2-274-3007
China		
General Information		861-68313399
Technical Support		861-68346721
Colombia		
General Information		57-1-312-0201
Technical Support		57-1-345-0266
Czech Republic		
General Information	+42	-2-232-8772
Technical Support	+42	-2-232-8772
Denmark		
General Information	+45	-45-90-45-90
Technical Support	+45	-45-90-45-45
Finland		
General Information	+358	-0-615-599
Technical Support		9800-206-720
QuickLine (BBS)	+358	-0-6155 9870
France		
General Information	+33	-1-41-33-41-33
Technical Support	+33	-1-41-33-44-55

Continued

Worldwide Telephone Numbers *Continued*

Location	Country Code	Telephone Number
Germany		
Menu Selection		0190/88 80 80 (0,12 DM/2 sec. or 3,60 DM/min.)
Presario Hotline		0190/88 80 81 (0,12 DM/2 sec. or 3,60 DM/min.)
Notebook Hotline		0190/88 80 82 (0,12 DM/2 sec. or 3,60 DM/min.)
Desktop Hotline		0190/88 80 83 (0,12 DM/2 sec. or 3,60 DM/min.)
Server Hotline		0190/88 80 84 (0,12 DM/2 sec. or 3,60 DM/min.)
QuickLine		0180/5 21 21 18 (0,48 DM/min.)
FaxPaq		0180/5 21 21 19 (0,48 DM/min.)
Hong Kong		
General Information		852-28681382
Technical Support		852-90116633
PaqFax		852-28671648
Hungary		
General Information	+36	-1-201-8776
Technical Support	+36	-1-201-8776
India		
General Information		91-80-559-6023
PaqFax		91-80-559-8989
BBS		91-80-559-8900
Italy		
General Information	+39	-2-57-59-03-61
Technical Support	+39	-2-57-59-03-00
Customer Support	+39	-1-67-82-50-12

Continued

Worldwide Telephone Numbers *Continued*

Location	Country Code	Telephone Number
Japan		
General Information		0120-101-589
Technical Support		0120-101-589
Presario		0120-099-589
Windows 95 Support		0120-505-589
Ordering Backup Software		0120-250-589
FaxStation		81-3-5402-0991
Korea		
General Information		82-2-3470-07001
Technical Support		82-2-523-3575 82-082-902-77774
Malaysia		
General Information		603-717-1188
Technical Support		603-718-1636
Mexico		
General Information		525-229-7900
Technical Support		525-229-7910
PaqFax		525-229-7920

Continued

Worldwide Telephone Numbers *Continued*

Location	Country Code	Telephone Number
Netherlands		
General Information		0182-565805
Presario		
Customer Support		06-32023091 (Dfl. 0.75/min)
Fax		06-8212391 (Dfl. 0.40/min)
All other products		
Customer Support		06-91681616 (Dfl. 0.75/min)
Fax		06-8991116 (Dfl. 0.40/min)
QuickLine Bulletin Board		0182-572366
New Zealand		
General Information		64-9-307-3969
Norway		
General Information	+47	-22-07-20-00
Technical Support	+47	-22-07-20-20
Poland		
General Information	+48	-2-630-3535
Technical Support	+48	-2-630-3535
Portugal		
General Information	+351	-1-4120132
Technical Support	+351	-1-4120132
Singapore		
General Information		65-753-6688
Customer Support Center		65-750-3030
PaqFax		65-750-4514
South Africa		
General Information		27-11-728-6999
Technical Support		27-11-728-6999
Spain		
General Information	+34	-1-640-1500
Technical Support	+34	-1-640-1302

Continued

Worldwide Telephone Numbers *Continued*

Location	Country Code	Telephone Number
Sweden		
General Information	+46	-8-703-5240
Technical Support	+46	-8-703-5240
PaqFax (h�rmtfax)	+46	-8-703-5225
QuickLine (BBS)	+46	-8-703-5220
Switzerland		
Technical Support		157/64-00
QuickLine Bulletin Board		01/8 38-24 21
Ordering Backup Software		155/62-06
PaqFax		01/8 38-22 38
Taiwan		
General Information		886-2-7351000
Technical Support		886-2-3761170
BBS		886-2-3761175
Thailand		
General Information		62-2-679-6222
United Arab Emirates (Dubai)		
General Information	+97	14 -818100
United Kingdom		
General Information		0990-134456
FaxPaq		0181-332-3550
QuickLine Bulletin Board		0181-332-9499
United States		
General Information		1-713-514-6864
Technical Support		1-800-OKCOMPAQ (1-800-652-6672)
Customer Support		1-800-345-1518
PaqFax		1-800-345-1518, Option 1
Download Facility (modem access only)		1-713-518-1418
Ordering Backup Software		1-800-952-7689
Battery Pack Recycling		1-800-524-9859
Venezuela		
General Information		58-2-953-6944

appendix A

AGENCY REGULATORY NOTICES

Federal Communications Commission Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Compaq Computer Corporation may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods to maintain compliance with FCC Rules and Regulations.

Mouse Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Declaration of Conformity - United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding this declaration, contact:

Compaq Computer Corporation

P.O. Box 692000, Mail Stop 510101

Houston, Texas 77269-2000

Or call:

(712) 514-3333

To identify this product, refer to the Series number found on the product.

European Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms:

- EN55022 (CISPR 22)—Radio Frequency Interference
- EN50082-1 (IEC801-2, IEC801-3, IEC801-4)—Electromagnetic Immunity
- EN60950 (IEC950)—Product Safety

Canadian Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Avis Canadien

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

German Ergonomics Notice

The Compaq Professional Workstation, when combined with Compaq Brand keyboards and monitors that bear the "GS" approval mark, meet the requirements of ZH 1/618 (German Safety Regulations for Display Work Places in the Office Sector.) The installation guides included with the monitor provide configuration information.

Japanese Notice

本装置は、第二種情報装置（住宅地域またはその隣接した地域において使用されるべき情報装置）で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。
しかし、本装置をラジオ、テレビジョン受信機に、近接してご使用になると、受信障害の原因となることがあります。本書の説明にしたがって正しい取り扱いをしてください。

Laser Safety

All Compaq systems equipped with CD-ROM drives, LS-120 diskette drives, or PD-CD drives comply with the appropriate safety standards, including IEC 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. It does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

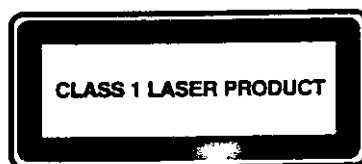


WARNING: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



WARNING: Because the internal laser beam may cause eye damage, do not open the cabinet. Wearing glasses and contact lenses, etc., increases the hazard. All maintenance should be performed by an authorized Compaq service provider.

The removable laser product is classified as a CLASS 1 LASER PRODUCT. These labels are located on the outside of the laser product:



This system is classified as a CLASS 1 LASER PRODUCT. This label is located on the outside of your system. A similar label also appears on the internal laser product installed in your system.

Laser Information

- Laser Type: Semiconductor GaAlAs
- Wave Length: 780 +/- 35 nm
- Divergence Angle: 53.5 Degree +/- 5 Degree
- Output Power: 0.4 mW - 2.9 mW
- Polarization: Circular
- Numerical Aperture: 0.45 +/- 0.04

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.

Battery Notice



WARNING: This workstation contains an internal lithium battery-powered real-time clock circuit. There is a risk of explosion and injury if the battery is incorrectly replaced or handled improperly. Do not attempt to recharge, disassemble, immerse in water, or dispose of it in fire. Replacement should be done by a Compaq authorized service provider using the Compaq spare part for this workstation.

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.

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.



Power Cord Set Requirements

Line switching allows the workstation to operate from either a 100-120V or 220-240V input line.

The power cord set (power cord) you received with your workstation meets the requirements of the country where you purchased the system. If you use the workstation in another country, you must use a power cord that meets the requirements of that country. For more information on power cord set requirements, contact your Compaq authorized dealer, reseller, or service provider. The following information explains the requirements for power cord set selection:

General Information

1. The cord set must be approved for the country where it will be used.
2. The appliance coupler (that is, the connector to the device itself, not the wall plug) must have a configuration for mating with a EN60 320 appliance inlet (Standard Sheet C14).

3. The length of the cord set must be as follows:

- ☐ Minimum 6.50 ft (2.0 m)
- ☐ Maximum 9.75 ft (3.0 m)

U.S. and Canada

1. The cord set must be UL-Listed and CSA-Certified.
2. The minimum specifications for the flexible cord are:
 - ☐ No. 18 AWG
 - ☐ Type SJ
 - ☐ 3-conductor
3. The cord set must have a rated current capacity of at least 10 A.
4. The attachment plug must be an earth-grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

Japan

1. All components of the cord set (cord, connector, and plug) must bear a "T" mark and registration number in accordance with the Japanese Dentori Law.
2. The minimum specifications for the flexible cord are:
 - ☐ 0.75 mm² conductors
 - ☐ Type VCT or VCTF
 - ☐ 3-conductor
3. The cord set must have a minimum rated current capacity of 7 A.
4. The attachment plug must be a two-pole, grounded type with a Japanese Industrial Standard C8303 (15 A, 125 VAC) configuration.

Other Countries

1. The cord set fittings must bear the certification mark of the agency responsible for evaluation in a specific country. Acceptable agencies include:
BSI (United Kingdom) OVE (Austria)
CEBEC (Belgium) SEMKO (Sweden)

DEMKO (Denmark) SETI (Finland)
EANSW (Australia) SEV (Switzerland)
IMQ (Italy) UTE (France)
KEMA (The Netherlands) VDE (Germany)
NEMKO (Norway)

2. The flexible cord must be of a HAR (harmonized) type HO5VV-F 3-conductor cord with a minimum conductor size of 0.03 square inches (1.0 square millimeters).
3. The cord set must have a current capacity of at least 10 A and a nominal voltage rating of 125 or 250 VAC.

appendix **B**

SPECIFICATIONS

This appendix provides physical and performance specifications for the workstation, keyboard, and mass storage devices.

Workstation		
Dimensions		
Height	5.05 in	12.83 cm
Width	19.96 in	50.70 cm
Depth	17.50 in	44.45 cm
Weight	35.65 lb	12.85 kg
Temperature Range		
Operating	50° to 95°F	10° to 35°C
Shipping	-4° to 140°F	-20° to 60°C
Power Supply		
Operating Voltage Range	90-132 VAC	180-264 VAC
Rated Voltage Range	100-120 VAC	220-240 VAC
Rated Line Frequency	50 - 60 Hz	50 - 60 Hz

Continued

Workstation		
Rated Input Current (maximum)	5 A	3 A
Power Output	240 W	240 W
Relative Humidity (noncondensing)		
Operating	8% to 90%	8% to 90%
Nonoperating	5% to 95%	5% to 95%
Heat Dissipation (nominal)	770 Btu/hr	3.23 kg-cal/min

Compaq Enhanced Keyboard		
Dimensions		
Height	1.50 in	3.81 cm
Width	18.00 in	45.72 cm
Depth	6.50 in	16.51 cm
Weight	3.5 lb	1.59 kg

B-2 Specifications

Diskette Drives	
1.44 MB	
Size and Capacity	
Size (in)	3.5
High Density (MB)	1.44
Low Density (KB)	720
Light	Green
Height	One-third
Bytes per Sector	512
Sectors per Track	
High Density	18
Low Density	9
Tracks per Side	
High Density	80
Low Density	80
Read/Write Heads	2
Average Access Time (ms)	
Track-to-Track (high/low)	3/3
Average (high/low)	94/94
Latency Average	100
CD-ROM Drive	
Transfer Rate	1.2 Mbytes/second
Average Access Time	261 ms

Hard Drives		
	2.0 GB	4.0 GB
Formatted Capacity		
Physical (MB)	2.18	4.36
Logical (MB)	2.10	4.29
Compaq Part Number	269215-001	269216-001
Transfer Rate		
Media (Mb/s)	70-106	70-106
Interface (MB/s)	40.0	40.0
Seek Time (including setting)		
Single Track (ms)	1.0	1.0
Average (ms)	8.0	8.0
Full Stroke (ms)	<18	<18
Disk Rotational Speed (RPM)		
	7,200	7,200
Cylinders		
Physical	5952	5952
Logical	LBA=4109999	LBA=8375999
Data Heads		
Physical	5	10
Logical	n/a	n/a
Sectors per Track		
Physical	108-180	108-180
Logical	n/a	n/a
Buffer Size (KB)	512	512

B-4 Specifications

Audio System	
Sampling rate	5.51 KHz to 44 KHz (adjustable)
Maximum Voltage (rms)	
Microphone-in	0.030
Line-in	0.7
Headphone-out	n/a
Line-out	0.7
Impedance (nominal)	
Microphone-in	1-K ohm
Line-in	20-K ohms
Headphone-out	16 ohms (min.)
Line-out	20-K ohms
Speaker	
Frequency response	450 Hz to 4000 Hz
Data Types	
alaw	8-/16-bit
ulaw	8-/16-bit
mono/stereo	16-bit

Ethernet Network Interface Controller (NIC)

Physical

Connectors

RJ-45

BNC (thin coax; available in select geographic regions)

Operating Environment

Temperature

10° to 35°C

Humidity

10% to 90%, noncondensing

Electrical

Bus

32-bit PCI bus

Network Cable Specifications

The RJ-45 and the BNC connectors require different cables. Following are the specifications for the cable required for each type of connector.

Cable for RJ-45 Connections

The RJ-45 connections use an unshielded twisted pair (UTP) cable of 22, 24, or 26 gauge. The cable must comply with the IEEE 802.3 10BASE-T standard. The maximum distance between the device and the hub is 100 meters.

Cable for BNC Connections

The BNC connection requires RG-58 coaxial cable conforming to the IEEE 10BASE-2 specification. The maximum trunk length with repeaters in the network is 300 meters. The maximum trunk length with no repeaters in the network is 185 meters.

appendix **C**

ERROR MESSAGES

This appendix lists the error codes that you may encounter during the power-on self-test (POST) or after restarting the workstation, the probable source of the problem, and what steps you can take to resolve the error condition.

POST Error Messages and Codes		
Error Code	Probable Source of Problem	Action
101-ROM Error	System ROM checksum.	Contact your Compaq authorized service provider.
101-Option ROM Checksum Error	Options ROM checksum.	Contact your Compaq authorized service provider.
102-System Board Failure	DMA, timers, etc.	Replace the processor board. Run the Computer Setup utility.
162-System Options Error	No diskette drive or mismatch in drive type.	Run Computer Setup.
162-System Options Not Set	Configuration incorrect.	Run Computer Setup.

Continued

POST Error Messages and Codes *Continued*

Error Code	Probable Source of Problem	Action
163-Time & Date Not Set	Invalid time or date in configuration memory.	Run Computer Setup.
164-Memory Size Error	Configuration memory incorrect.	Run Computer Setup.
170-Expansion Device Not Responding	Board not ready after power-on delay.	Run Computer Setup.
172-ISA Configuration Nonvolatile Memory	Nonvolatile configuration memory corrupt.	Run Computer Setup.
172-Configuration Nonvolatile Memory Invalid	NVRAM Configuration Error	Allow system to complete boot. Reboot. If condition persists, contact your Compaq authorized service provider.
173-PCI Slot ID Mismatch	PCI Board replaced. Configuration not updated.	Run Computer Setup.
174-PCI Configuration Slot Mismatch	PCI board not found.	Run Computer Setup.
174-ISA Configuration Slot Mismatch	Plug and Play ISA board not found.	Run Computer Setup.
175-PCI Configuration Slot Mismatch	PCI board added, configuration not updated.	Run Computer Setup.
175-ISA Configuration Slot Mismatch	Plug and Play ISA board added, configuration not updated.	Run Computer Setup.

Continued

C-2 Error Messages

POST Error Messages and Codes *Continued*

Error Code	Probable Source of Problem	Action
201-Memory Error	RAM failure.	Contact your Compaq authorized service provider.
203-Memory Address Error	RAM failure.	Contact your Compaq authorized service provider.
205-Memory Error	Cache memory error.	Run the Computer Checkup or Diagnostics utility.
207-ECC Corrected Single Bit Errors in DIMM/SIMM Pair(s)	A memory error on one of the installed DIMMs has been detected and corrected with the system's ECC logic. The workstation will continue to operate correctly with this error.	Run Diagnostics to get more information; then contact your Compaq authorized service provider.
301-Keyboard Error	Keyboard failure.	Check that you do not have a key stuck or something on the keyboard. Ensure that the keyboard is plugged in. Replace the keyboard if necessary.
303-Keyboard Controller Error	I/O keyboard controller.	Contact your Compaq authorized service provider.
304-Keyboard or System Unit Error	Keyboard.	Contact your Compaq authorized service provider.

Continued

POST Error Messages and Codes *Continued*

Error Code	Probable Source of Problem	Action
40X-Parallel Port X Address Assignment Conflict	Both external and internal ports are assigned to parallel port X.	Run Computer Setup.
402-Monochrome Adapter Failure	Monochrome display controller.	Replace the monochrome display controller.
501-Display Adapter Failure	Graphics display controller.	Replace the memory upgrade module.
601-Diskette Controller Error	Diskette controller circuitry.	Contact your Compaq authorized service provider.
605-Diskette Drive Error	Mismatch in drive type.	Run Computer Setup.
607-No Response Received at Primary Address from External Floppy Controller. Internal Floppy Controller Has Been Enabled	Configuration error.	Run Computer Setup.
611-Primary Floppy Port Address Assignment Conflict	Configuration error.	Run Computer Setup.
612-Secondary Floppy Port Address Assignment Conflict	Configuration error.	Run Computer Setup.
702-A coprocessor has been detected that is not reported in CMOS.	Configuration error.	Run Computer Setup.
703-CMOS reports a coprocessor that has not been detected by POST.	Configuration error.	Run Computer Setup.

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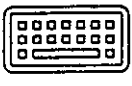
POST Error Messages and Codes *Continued*

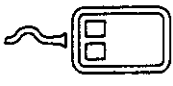
Error Code	Probable Source of Problem	Action
1155-COM Port Address Assignment Conflict	Both external and internal serial ports.	Run Computer Setup.
1610-Temperature violation detected	The system is too hot.	Turn off the workstation and let it cool off. If the condition persists, Run Diagnostics to get more information; then contact your Compaq authorized service provider.
1611-Fan failure detected	The fan is not operating properly.	Run Diagnostics to get more information; then contact your Compaq authorized service provider.
1793-Secondary Controller or Disk Failure	An error has been detected with the CD-ROM interface.	Run the Diagnostics utility.
A Critical Error Occurred Prior to this Power-Up	Critical failure (POST) recorded into the wellness log.	None.
A Collectable Memory Error Occurred Prior to this Power-Up	Single-bit ECC during POST.	None.
Audible (beep)	Power-on successful.	None.
Invalid Electronic Serial Number	The electronic serial number is corrupt.	Run the Setup and Diagnostics utilities.
(RESUME= "F1" KEY)	As indicated to continue.	Press the F1 key.

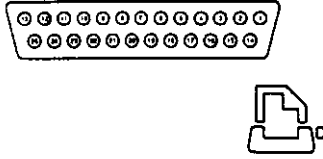
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appendix **D**

CONNECTOR PIN ASSIGNMENTS

Enhanced Keyboard		
Connector and Icon	Pin	Signal
 	1	Data
	2	Not Used
	3	Ground
	4	+5V
	5	Clock
	6	Not Used

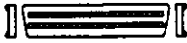
Pointing Device (Mouse)		
Connector and Icon	Pin	Signal
 	1	Data
	2	Not Used
	3	Ground
	4	+5V
	5	Clock
	6	Not Used

Parallel		
Connector and Icon	Pin	Signal
	1	Strobe
	2	Data Bit 0
	3	Data Bit 1
	4	Data Bit 2
	5	Data Bit 3
	6	Data Bit 4
	7	Data Bit 5
	8	Data Bit 6
	9	Data Bit 7
	10	Acknowledge
	11	Busy
	12	Paper End
	13	Select
	14	Auto Line Feed
	15	Error
	16	Initialize
	17	Printer
	18	Select In
	19	Signal Ground
	20	Signal Ground
	21	Signal Ground
	22	Signal Ground
	23	Signal Ground
	24	Signal Ground
	25	Signal Ground

Serial		
Connector and Icon	Pin	Signal
 	1	Carrier Detect
	2	Receive Data
	3	Transmit Data
	4	Data Term Ready
	5	Ground
	6	Data Set Ready
	7	Request to Send
	8	Clear to Send
	9	Ring Indicator

Monitor		
Connector and Icon	Pin	Signal
 	1	Red
	2	Green
	3	Blue
	4	Not Used
	5	Ground
	6	Red Return
	7	Green Return
	8	Blue Return
	9	Optional +5 Volts
	10	Ground
	11	Not Used
	12	SDA (for DDC channel)
	13	Horiz. Sync
	14	Vert. Sync
	15	SCL (for DDC channel)

BNC		
Connector and Icon	Pin	Signal
	1	Signal
	2	Ground
Ethernet RJ-45		
Connector and Icon	Pin	Signal
 	1	(+) Transmit Data
	2	(-) Transmit Data
	3	(+) Receive Data
	4	Not Used
	5	Not Used
	6	(-) Receive Data
	7	Not Used
	8	Not Used

Ultra SCSI Connector		
Connector and Icon	Pin	Signal
 	1-11	Ground
	12	Reserved
	13	Open
	14	Reserved
	15-25	Ground
	26	DB0
	27	DB1
	28	DB2
	29	DB3
	30	DB4
	31	DB5
	32	DB6
	33	DB7
	34	DBP
	35	Ground
	36	Ground
	37	Reserved
	38	TERMPWR
	39	Reserved
	40	Ground
	41	ATN #
	42	Ground
	43	BSY #
	44	ACK #
	45	RST #
	46	MSG #
	47	SEL #
	48	C/D
	49	REQ #
	50	Input/Output

Ultra-Wide SCSI Connector				
Connector and Icon	Pin	Signal	Pin	Signal
	1	Ground	35	DB12*
	2	Ground	36	DB13*
	3	Ground	37	DB14*
	4	Ground	38	DB15*
	5	Ground	39	DB Parity 2*
	6	Ground	40	DB0*
	7	Ground	41	DB1*
	8	Ground	42	DB2*
	9	Ground	43	DB3*
	10	Ground	44	DB4*
	11	Ground	45	DB5*
	12	Ground	46	DB6*
	13	Ground	47	DB7*
	14	Ground	48	DB Parity*
	15	Ground	49	Ground
	16	Ground	50	Ground
	17	TERMPWR	51	TERMPWR
	18	TERMPWR	52	TERMPWR
	19	Ground	53	Int_Out*
	20	Ground	54	Ground
	21	Ground	55	ATN*
	22	Ground	56	Ground
	23	Ground	57	BSY*
	24	Ground	58	ACK*
	25	Ground	59	RESET*
	26	Ground	60	MSG*
	27	Ground	61	SEL*
	28	Ground	62	C/D*
	29	Ground	63	REQ*
	30	Ground	64	I/O*
	31	Ground	65	DB8*
	32	Ground	66	DB9*
	33	Ground	67	DB10*
	34	Ground	68	DB11*

* - Active low signals

D-6 Connector Pin Assignments

Line in-Connector

Connector and Icon



Line out-Connector

Connector and Icon



Microphone Connector

Connector and Icon



Stereo 1/8-inch Miniphone

Headphone Connector

Connector and Icon



Stereo 1/8-inch Miniphone

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appendix **E**

SETTING SYSTEM BOARD SWITCHES

When you add a component to the system board, it may be necessary to reconfigure the workstation to recognize these changes. If the system configuration is incorrect, your workstation may not work properly and you may receive error messages on the screen. Setting the system board switches are part of the reconfiguration process.

 To change the system board switches, you must remove the workstation cover. For information about removing the workstation cover, refer to Chapter 6, "Upgrading the Workstation."

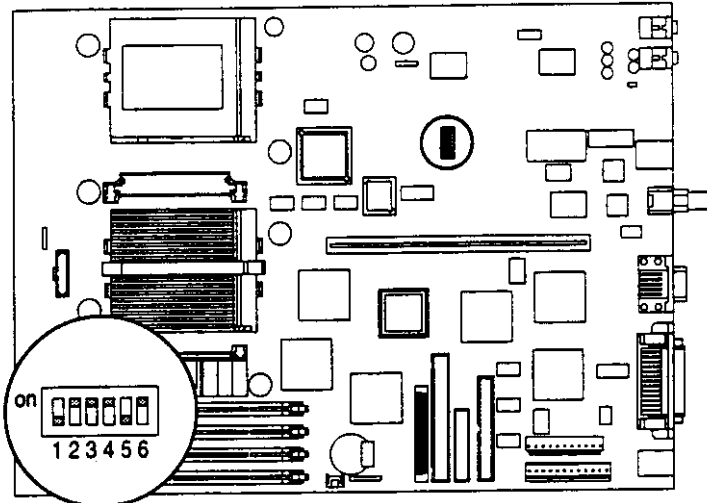
This chapter provides information for enabling and disabling the setup password and for setting microprocessor operating frequencies.



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

Your system board has one switch module (SW1). SW1 is used to enable or disable the setup password and set microprocessor operating frequencies. For more information about the setup password function of SW1, refer to Chapter 2, "Protecting Information on Your Computer."

The following illustration shows the switch location.



Switch Module Location

SW1 Switch Settings (S1) Setup Password

S1	Setup Password
OFF	Enabled
ON	Disabled

SW1 Switch Settings (S2) CPU Bus Frequency

S2	CPU Bus Frequency
OFF	60 MHz
ON	66 MHz

SW1 Switch Settings (S3-S6) Bus/CPU Core Frequency Ratio

S3	S4	S5	S6	Bus/CPU Core Frequency Ratio
ON	ON	ON	ON	2/4
ON	ON	ON	OFF	2/5
ON	ON	OFF	ON	2/6
ON	ON	OFF	OFF	2/7
ON	OFF	ON	ON	2/8
ON	OFF	ON	OFF	2/9
ON	OFF	OFF	ON	2/10
ON	OFF	OFF	OFF	2/11

E-2 Setting System Board Switches

appendix *F*

ELECTROSTATIC DISCHARGE

A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Preventing Electrostatic Damage

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 Mohm $\pm$ 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heelstraps, toestraps, or bootstraps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, contact your Compaq authorized dealer, reseller, or service provider.

 For more information on static electricity, contact your Compaq authorized dealer, reseller, or service provider.

appendix G

INSTALLING A NEW BATTERY

When your workstation no longer automatically displays the correct date and time, it may mean the battery providing power to the real-time clock needs to be replaced. Battery life is usually about five years. Before replacing the battery in a workstation, perform the steps in "Running Computer Setup" and "Preparing the Workstation for Installation."

Running Computer Setup

Computer Setup automatically detects and configures most Compaq components, including Compaq hard drives. If the machine you are servicing has a Compaq hard drive, go to the next section "Preparing the Workstation for Installation."

If the workstation being serviced has a third-party hard drive, you must complete the following steps before installing the battery:

1. Run Computer Setup and record the drive type displayed in the System Configuration Summary.
2. If the drive type number is 65 or 66, record the drive parameters.

Drives with these designators are user-defined types, also called soft-drive types. Whenever the nonvolatile memory (CMOS) has become invalid, such as after the installation of a new battery, drive parameters must be entered manually for these user-defined drives.

After you have completed the battery installation, run Computer Setup and use the drive table parameters recorded earlier to reconfigure the system.

 Drive parameters must be reentered after battery installation in order to reconfigure the hard drive. The hard drive is inoperable until this is done.

Preparing the Workstation for Installation

To prepare the workstation, complete the following steps:

1. If the workstation is on, turn it off.
2. Unplug the workstation.
3. Remove the workstation cover.
4. Remove the expansion board cage.
5. Refer to the appropriate section for specific battery installation steps that apply to the workstation you are servicing.

Installation Procedures

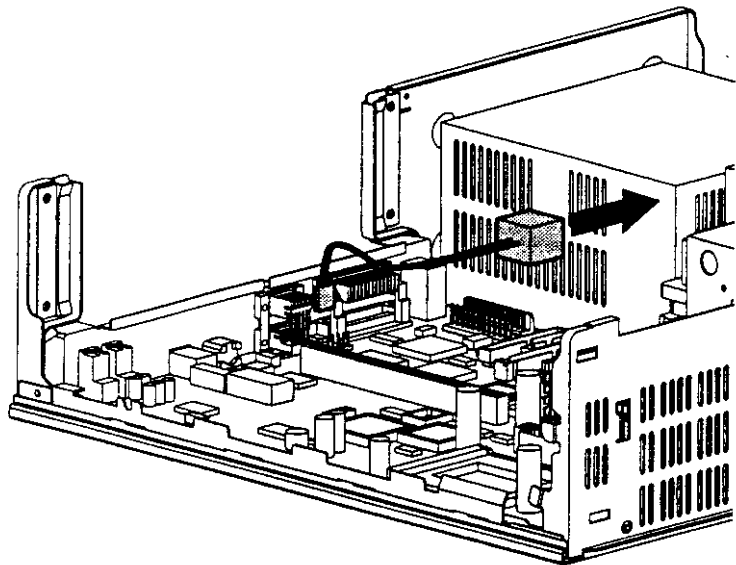
The battery that came with this workstation is non-removable and is permanently installed on the system board. A second battery is installed when the first becomes inoperative.



WARNING: The system board contains a clock/CMOS lithium battery. The lithium battery may explode if mistreated. The battery is soldered in place and may not be removed. Do not abuse or disassemble. Use only replacement batteries supplied by Compaq Computer Corporation (spare part number 160274-001).

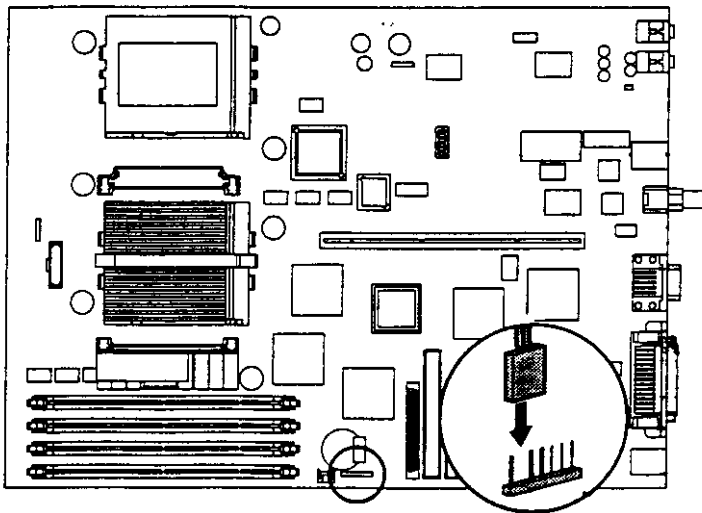
To install the replacement battery, complete the following steps:

1. Remove and discard the protective covering from the adhesive backing on the hook-and-loop connector on the back of the battery.
2. Attach the battery to the workstation chassis as shown in the following illustrations.



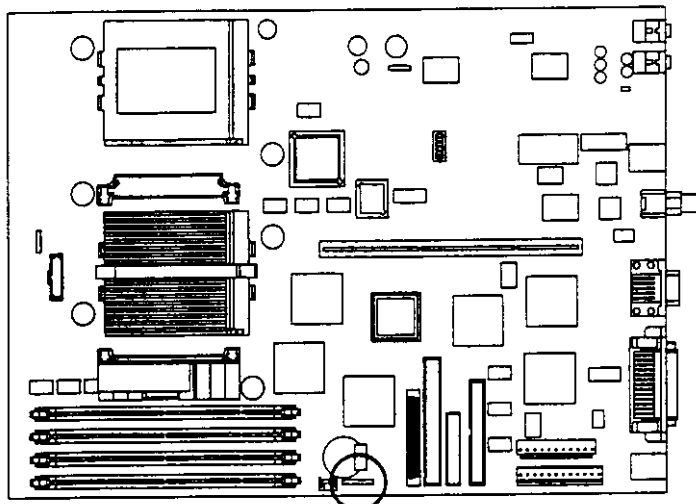
Attaching the Replacement Battery

3. Plug the battery connector onto pins 1-4 at E2 on the system board.



E2 Connector and Jumper Location

4. Change the jumper at E2 from pins 6-7 to pins 5-6 and continue to step 5.



Changing the Jumper at E2 from pins 6-7 to pins 5-6

5. Place the pale blue sticker included with the battery kit above the power connector on the back of the workstation
6. Replace the expansion board cage and workstation cover.
7. Plug in the workstation.
8. Turn on the workstation.
9. Run Computer Setup to reconfigure the system.
10. If the workstation has a Compaq hard drive, you have now successfully completed the installation.
11. If the workstation has a third-party hard drive, you must reconfigure the hard drive using the parameters you recorded before you began the installation procedure.

appendix **H**

SHIPPING PREPARATION

In preparation for shipping the workstation, complete the following steps:

1. Back up the hard drive files onto tape cartridges or diskettes. Be sure that the tape cartridges or diskettes are not exposed to electrical or magnetic impulses while stored or in transit.

 The hard drive locks automatically when the system power is turned off.

2. Remove and store any program diskettes from the diskette drives.
3. Insert a blank diskette into the diskette drive to protect the drive while in transit. Do not use a diskette on which you have stored or plan to store data.
4. Turn off the workstation and external devices.
5. Disconnect the power cord from the electrical outlet, then from the workstation.
6. Disconnect the system components and external devices from their power sources, then from the workstation.

 Ensure that all boards are seated properly and secured in the board slots before shipping the workstation.

7. Pack the system components and external devices in their original packing boxes or similar packaging with sufficient packing material to protect them.

 For environmental nonoperating ranges, refer to Appendix B, "Specifications."

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