Reference Guide

COMPAQ PORTABLE 486c

COMPAQ

NOTICE

The information in this guide is subject to change without notice.

COMPAQ COMPUTER CORPORATION SHALL NOT BE LIABLE FOR TECHNICAL OR EDITORIAL ERRORS OR OMISSIONS CONTAINED HEREIN; NOR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE FURNISHING, PERFORMANCE, OR USE OF THIS MATERIAL.

REFERENCE GUIDE
COMPAQ PORTABLE 486c Personal Computer

First Edition (November 1991)
Assembly Number 128821-001
Text Number 128984-001

Compaq Computer Corporation

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 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 could 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 in order to maintain compliance with FCC Rules and Regulations.

CANADIAN NOTICE

This equipment does not exceed the Class B limits for radiated emissions as described in the Radio Interference Regulations of the Canadian Department of Communications.

AVIS CANADIEN

Le présent appareil numerique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numeriques de la Classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

GERMAN NOTICE

The COMPAQ PORTABLE 486c Personal Computer, when combined with the Enhanced or Enhanced II Keyboard, Video Graphics Color Monitor, Video Graphics Monochrome Monitor, or Advanced Graphics Color Monitor from Compaq, meets the requirements of ZH 1/618 (German Safety Regulations for Display Work Places in the Office Sector). The installation guide included with the monitor provides configuration information.

HINWEIS

Hiermit wird bescheinigt, dass der COMPAQ Model 2711, in Übereinstimmung mit den Bestimmungen der Vfg 1046/1984 funkentstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen elngeräumt.

AIRLINE TRAVEL

Use of electronic equipment aboard commercial aircraft is at the discretion of the airline.

HOW TO USE THIS BOOK

This reference guide supplements the *Setup Instructions.* It presents detailed information and illustrations that help you with the following topics:

Topic	Location
Identifying external features	Chapter 1
Connecting external devices	Chapter 2
Identifying internal components	Chapter 3
Installing optional internal hardware	Chapter 3
Running the COMPAQ EISA Configuration Utility	Chapter 4
Installing an operating system	Chapter 5
Using operating system commands	Chapter 5
Setting up security	Chapter 6
Installing application software	Chapter 7
Improving computer performance	Chapter 8
Maintenance	Chapter 9
Troubleshooting	Chapter 10

The following format conventions distinguish elements of the text throughout the guide.

Guide Conventions

Convention	Description
KEYS	Key names (uppercase bold type)
KEY + KEY	Keys must be pressed at the same time (uppercase bold type) For example "press the **CTRL + ALT + DEL** keys" means to press and hold the **CTRL** key while pressing the **ALT** and **DEL** keys.
FILENAMES	Names of files (uppercase italic type)
COMMANDS, DIRECTORY NAMES, DRIVE NAMES	Names of commands, directories, or drives (uppercase type) Commands to be entered at the command line (operating system prompt) are shown on a separate line.
WARNING	Failure to follow directions in the statement could result in bodily harm. (uppercase bold type)
CAUTION	Failure to follow directions in the statement could result in damage to equipment or loss of data. (uppercase bold type)
IMPORTANT	Clarifying information or specific instructions. (uppercase bold type)
NOTE	Commentary information (uppercase bold type)
Type	Direction to type information without pressing the **ENTER** key
Enter	Direction to type information and press the **ENTER** key

CONTENTS

Chapter 6
SECURITY FEATURES

Chapter 7
INSTALLING APPLICATION SOFTWARE

Chapter 8
GETTING THE BEST PERFORMANCE FROM THE COMPUTER

Chapter 9
MAINTAINING AND TRAVELING WITH THE COMPUTER

Chapter 10
TROUBLESHOOTING

INTRODUCTION

This chapter summarizes the standard features of the computer and describes the software that can be used with the computer.

Many of the features described in this chapter are covered in more detail in subsequent chapters of this guide.

STANDARD FEATURES

The COMPAQ PORTABLE 486c Personal Computer, a full-function AC-powered portable, offers the following high-performance features:

- 33-MHz 486 microprocessor with an integrated numeric coprocessor and 8 Kbytes of cache memory
- 4 megabytes of 32-bit system memory expandable to 32 megabytes
- Active matrix VGA display with 256 simultaneous colors
- Two full-sized internal Extended Industry Standard Architecture (EISA) expansion slots
- Enhanced option slot for a modem or serial interface board
- One 3½-Inch 1.44-Megabyte Diskette Drive
- 210- or 120-Megabyte Fixed Disk Drive
- Full-function, detachable keyboard
- Standard interfaces:
  - –Parallel
  - –Serial
  - –Pointing device (mouse)
  - –External keyboard
  - –External display
  - –External storage
  - –CD-ROM drive
  - –Audio input jack

- Three types of security:
  –Software-controlled (COMPAQ EISA Configuration Utility)
  –Switch-controlled (switch on I/O Board)
  –Physically controlled (keylock and cable lock provision)
- One-year worldwide limited warranty

MODELS

The model configurations are based on the mass storage device capacity.

Model	RAM	Mass Storage Devices
120	4 Megabytes	1.44-Megabyte Diskette Drive 120-Megabyte Fixed Disk Drive
210	4 Megabytes	1.44-Megabyte Diskette Drive 210-Megabyte Fixed Disk Drive

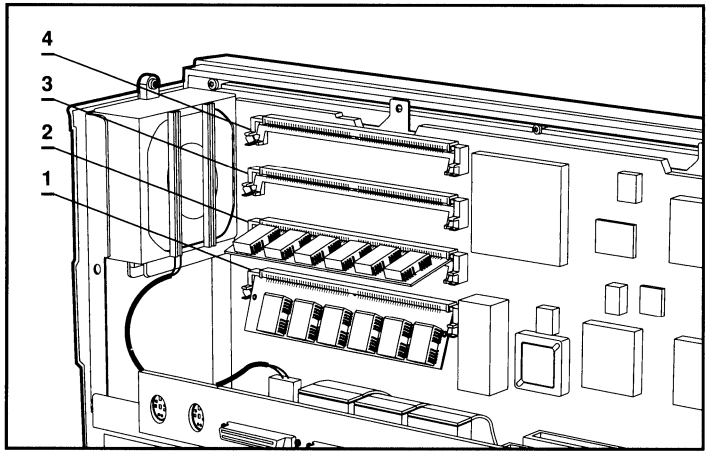
MICROPROCESSOR

The 486 microprocessor integrates a 387-compatible numeric coprocessor and a cache memory controller with 8 Kbytes of high-speed static RAM in a single chip. It provides advanced 32-bit processing power and features while maintaining full compatibility with 286- and 386-based software.

MEMORY

System Memory The system uses enhanced-page memory installed on the system processor board.

Memory Expansion The 4 megabytes of system memory can be expanded by using 2-, 4-, or 8- megabyte memory modules. Maximum system memory is 32 megabytes.



Memory Module Positions

OPERATING SYSTEMS

This computer supports key operating systems, including the following:

- Banyan VINES Version 4.10
- Microsoft Windows
- Microsoft MS-DOS Version 5.0 as published by Compaq
- Microsoft MS-DOS Version 3.31 as published by Compaq
- Microsoft LAN Manager Version 2.0
- Microsoft MS OS/2 Standard Version 1.21 as published by Compaq
- Novell NetWare v3.11
- Novell NetWare v2.2
- SCO UNIX System V/386
- SCO UNIX Open Desktop

UTILITIES

Several software utilities included with the computer assist with tasks such as configuration of the system and its memory, enhancing the performance of the computer, and diagnosing potential problems.

COMPAQ EISA Configuration Utility

The COMPAQ EISA Configuration Utility comes on a diskette and can be installed on the fixed disk drive. This utility assists you in configuring the system.

User Programs

The User Programs utilities and device drivers are specifically designed to enhance the performance of COMPAQ computers. These utilities customize the system for your operating system and application requirements.

Diagnostics

The TEST and INSPECT diagnostic utilities assist in testing the hardware and providing information about the MS-DOS operating environment.

EXTERNAL FEATURES AND OPTIONAL EXTERNAL DEVICES

This chapter explains how to use the following external features of the computer:

- Keyboard
- Display
- Diskette drive
- Volume control
- Physical security

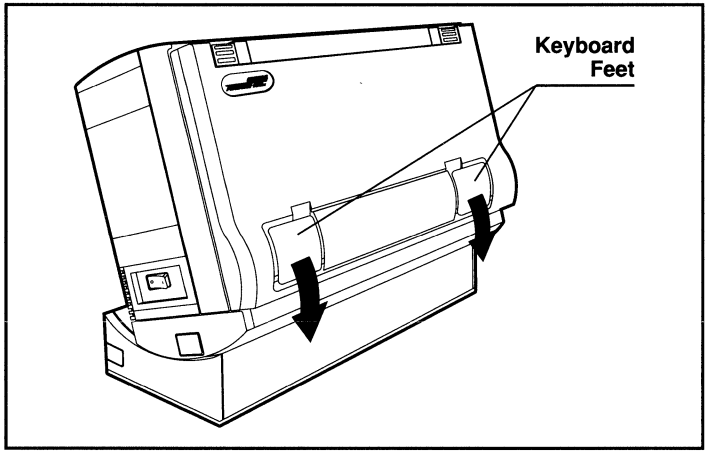
It also explains how to connect the following external devices to the computer:

- Mouse
- External keyboard
- CD-ROM drive
- Printer
- Monitor
- Audio input jack

KEYBOARD

The keyboard acts as a cover for the front of the computer.

Two hinged feet at the base of the keyboard slant the keyboard at an angle for working comfort.



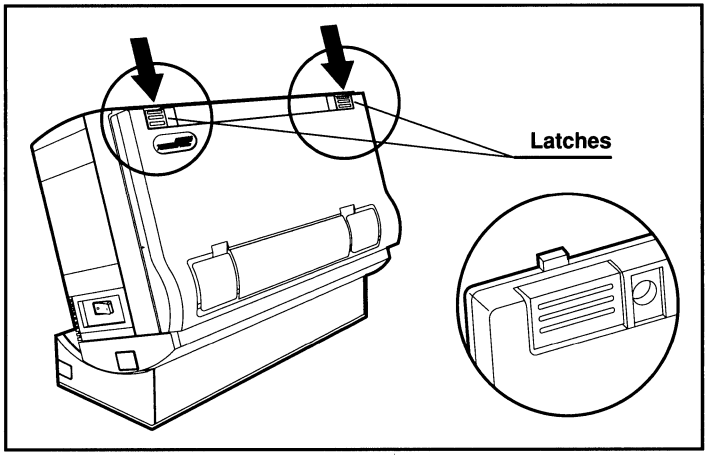
Keyboard in the Closed Position

Positioning the Keyboard for Operation

Two latches on the top of the keyboard unlock the keyboard.

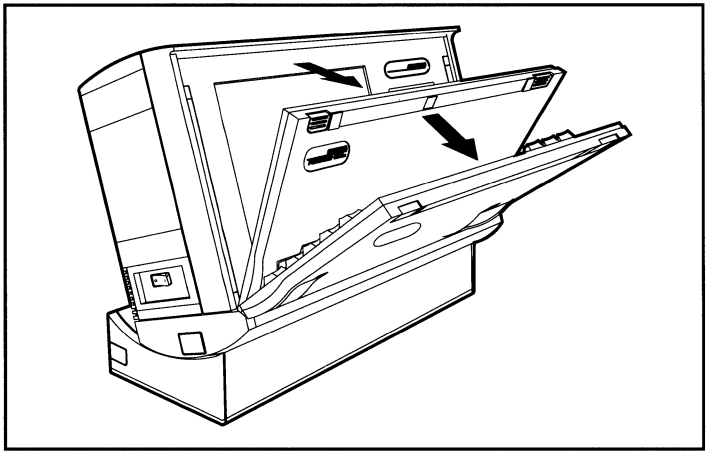
To release the keyboard from the closed position:

1. Slide down both keyboard latches.



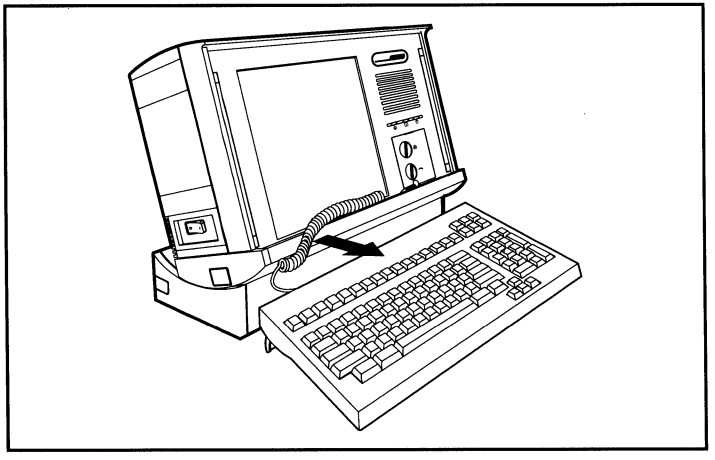
Unlocking the Keyboard from the Closed Position

2. Remove the keyboard from the front of the computer and place it on the work surface.



Removing the Keyboard from the Computer

3. Remove the coiled portion of the keyboard cable from the storage tray beneath the display.



Removing the Coiled Portion of the Keyboard Cable

4. *Optional* Remove the uncoiled portion of the keyboard cable from the groove in the keyboard.
5. *Optional* Unfold the feet on the bottom of the keyboard.

Placing the Keyboard in the Closed Position

To place the keyboard in the closed position:

1. Place the display in the vertical (untilted) position.

   NOTE: You hear a click when the display reaches the correct position.

2. Place the coiled portion of the keyboard cable in the storage tray.
3. Route the uncoiled portion of the keyboard cable through the groove in the back of the keyboard.
4. Place the keyboard in front of the display with the lip on the keyboard resting inside the cable tray.
5. Push up the keyboard latches to lock the keyboard to the computer.
6. Fold in the keyboard feet, if applicable.

Using Keys on the Keyboard

Special functions are provided by some of the keys on the keyboard. The functions described in the following table may change depending on the software you are using.

Key Functions	
ALT	Used in conjunction with another key to produce a designated function. (The function depends on the application being used.)
BACKSPACE	Moves the cursor to the left and deletes characters as it moves.
CAPS LOCK	Displays letters in uppercase. (This is a toggle key. When the light on the key is on, the key function is activated.)
CTRL	Used in conjunction with another key to produce a designated function. (The function depends on the application being used.)
ESC	Commonly exits a function or moves backwards in a program. (The function may differ depending on the application being used.)
F1 through **F12**	Produces functions designated by the operating system or application.
NUM LOCK	Activates the numeric keypad and deactivates the cursor- and screen-control keys on the keypad. (This is a toggle key. When the light on the key is on, the key function is activated.)
PAUSE	Temporarily suspends screen scrolling or an operation. (The function may differ depending on the application being used.)
PRINT SCREEN	Prints an image of the displayed screen to a local printer.
SCROLL LOCK	Stops the screen from scrolling. (This is a toggle key. When the light on the key is on, the key function is activated.)
CTRL + **ALT** + >	Activates or deactivates the active matrix color display.
CTRL + **ALT** + <	Activates or deactivates the external display.

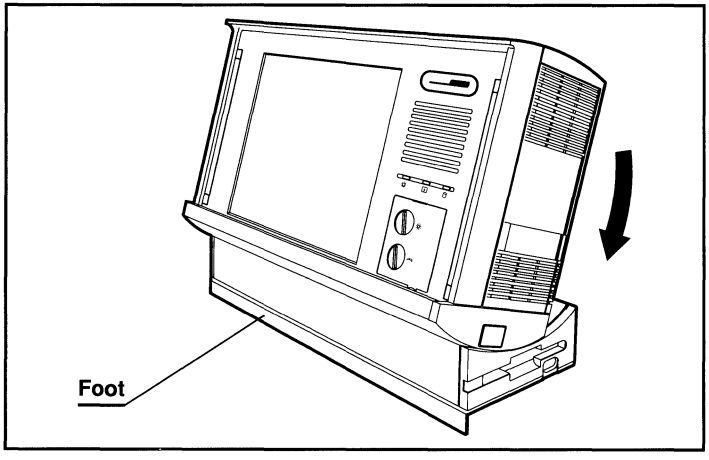
DISPLAY

The Active Matrix Color VGA Display supports VGA, EGA, and CGA graphics resolutions. It displays up to 256 colors simultaneously and provides the ability to view 132 columns of text on an external display.

Tilting the Display

You can tilt the display to provide a comfortable viewing angle, reduce glare, and provide maximum clarity of images.

1. Press and hold the tilt controls on both sides of the computer.
2. Tilt the display.



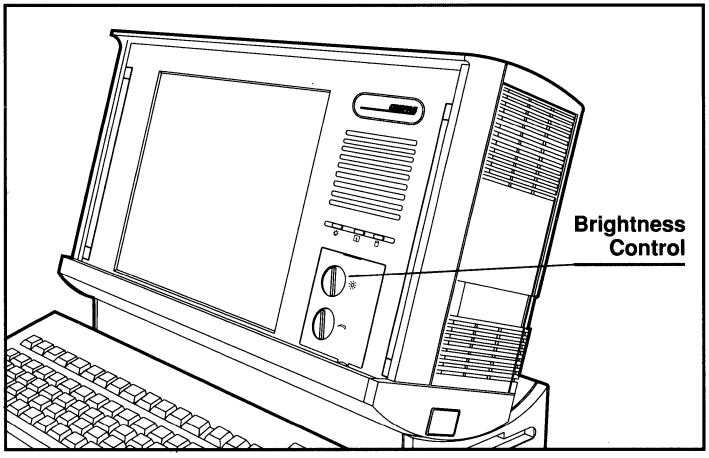
Adjusting the Display

NOTE: To modify the viewing angle, tilt back the computer and pull down the foot.

Adjusting the Brightness

The brightness control is located to the right of the display.

Adjust the display brightness for a comfortable viewing intensity.



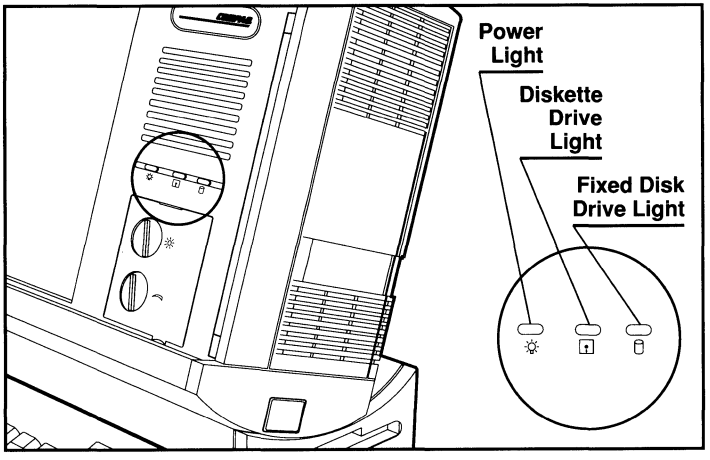
Adjusting the Display Brightness

SYSTEM LIGHTS

Lights on the front of the computer indicate when a mass storage device is in use and when the computer is on. Icons (picture representations) help you identify the purposes of the lights. The lights are described in the following table and shown in the following illustration.

System Lights

Light	Color	Description
Power	Green	Turns on when the power to the computer is turned on
Diskette Drive	Green	Turns on when a 1.44-megabyte high-density diskette is accessed
	Orange	Turns on when a 720-Kbyte double-density diskette is accessed
Fixed Disk Drive	Green	Turns on when the fixed disk drive is accessed



Lights and Icons on the Front of the Computer

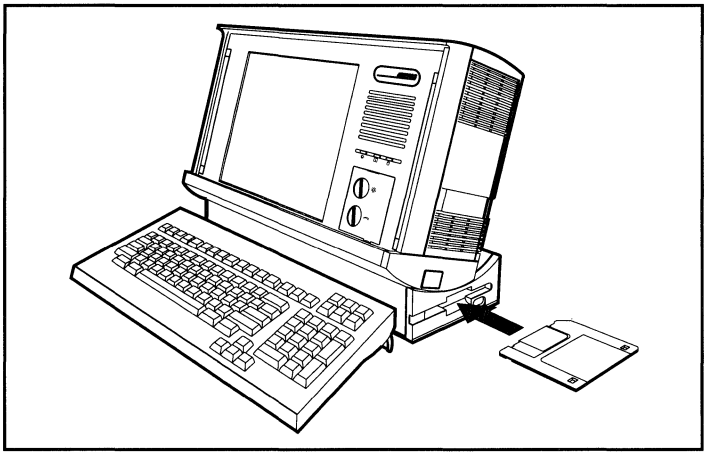
DISKETTE DRIVE

The diskette drive is located on the right side of the computer.

Inserting a Diskette

To insert a 3½-inch diskette into the diskette drive, insert the diskette, label-side up, into the diskette drive until the drive clicks.

NOTE: If the diskette has been inserted correctly, it drops into position in the drive and the diskette drive button pops out.

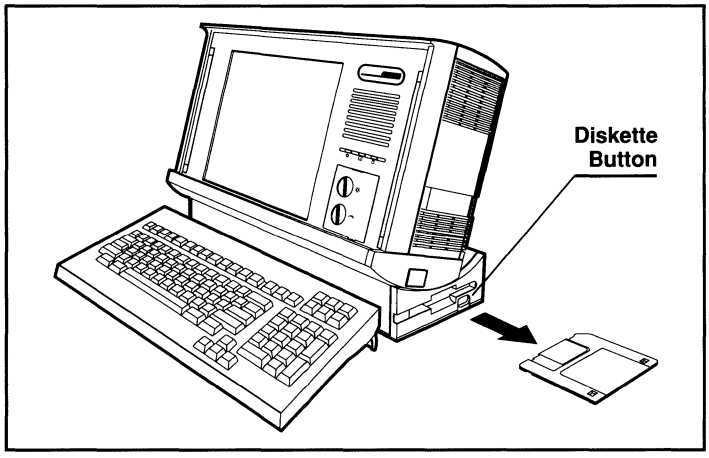


Inserting a 3½-Inch Diskette

Removing a Diskette

To remove a diskette from the diskette drive:

1. Press the diskette drive button to eject the diskette.
2. Remove the diskette from the diskette drive.

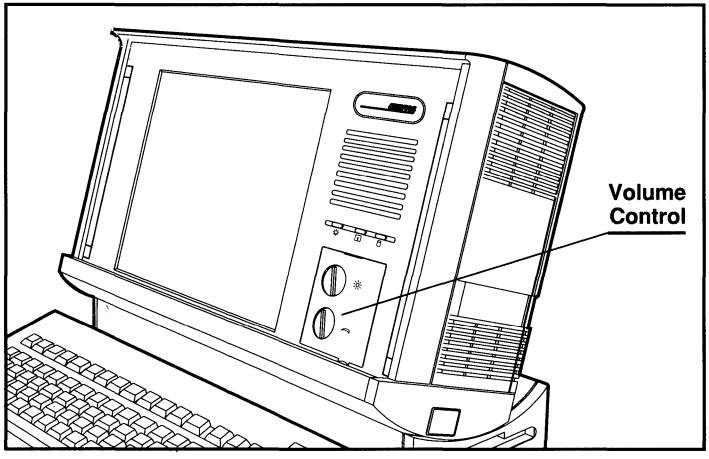


Removing a 3½-Inch Diskette

VOLUME CONTROL

The volume control regulates all sounds, including key clicks and warning beeps.

When an optional sound adapter is installed in an expansion slot and connected to the audio input jack, you can turn the volume control to increase the internal speaker sound.



Adjusting the Volume

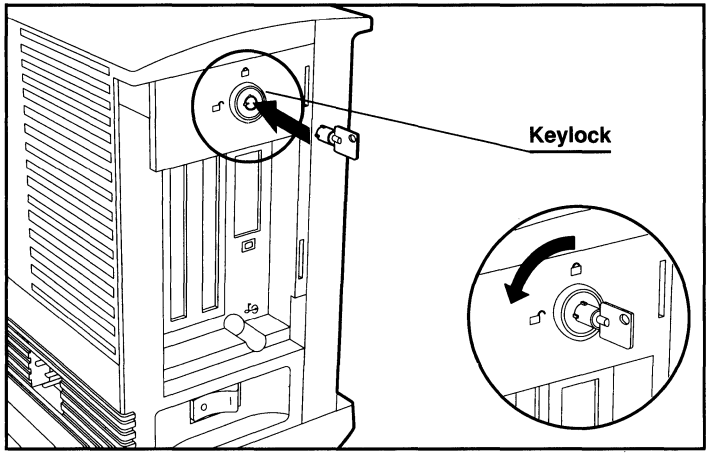
PHYSICAL SECURITY

Two types of physical security are available:

- Keylock
- Cable lock

Securing Internal Components with the Keylock

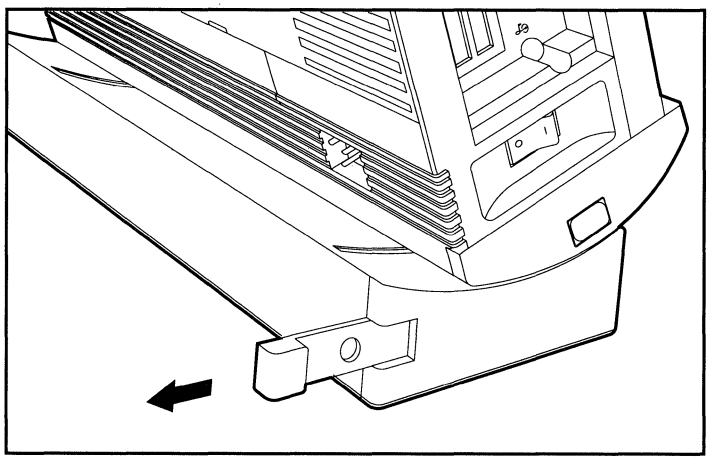
The keylock prevents unauthorized access to the internal system components by preventing the removal of the back panel and the sheet-metal options cover, which lies directly beneath the back panel.



Keylock Security for Rear Panel and Options Cover

Securing the Computer with a Cable

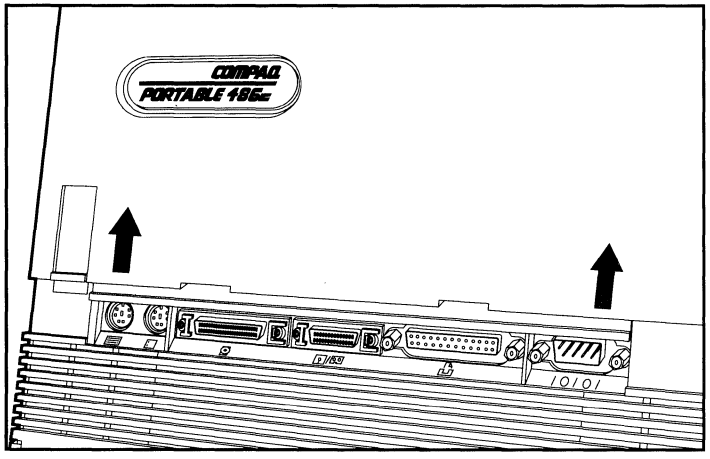
If you wish to physically secure the computer to a desk or workstation, insert a cable through the cable arm shown below, then around the object you are securing the computer to.



Pulling Out the Cable Arm

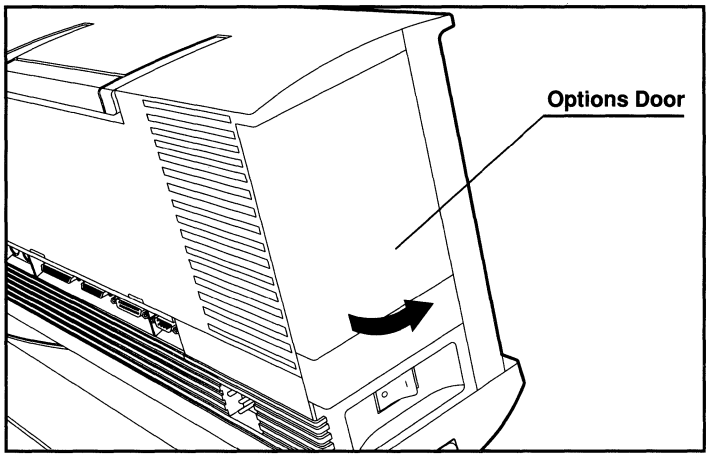
EXTERNAL CONNECTORS

The external connectors are located in two areas: behind the connector cover on the rear panel and behind the options door on the left side of the computer.



Connector Cover

Slide up the connector cover on the back of the computer to expose the connectors.

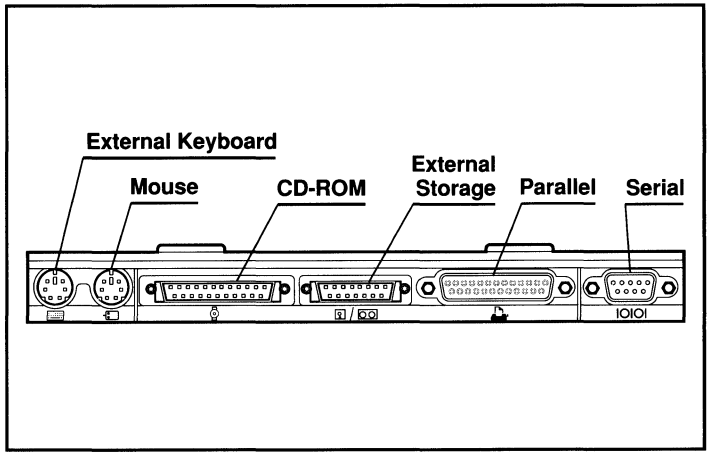


Options Door

Open the options door on the left side of the computer.

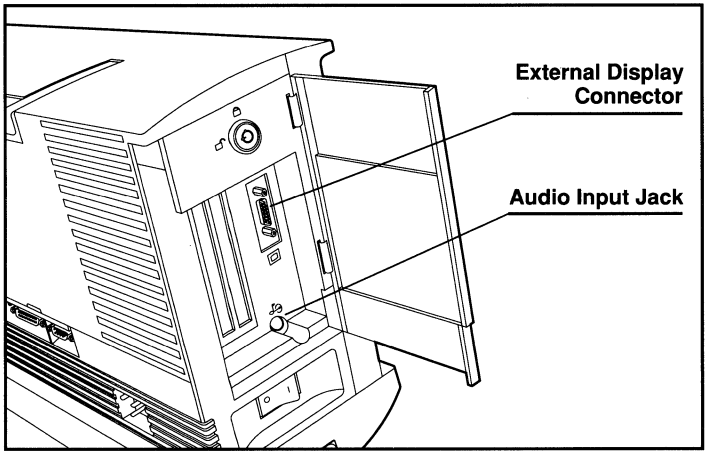
The following external device connectors are on the rear panel of the computer. Icons (picture representations) help you identify the connectors.

- External Keyboard
- Mouse
- CD-ROM drive
- External Storage Module
- Parallel
- Serial



External Device Connectors and Icons on the Back of the Computer

The external display connector and the audio input jack are behind the options door.



External Display Connector and Audio Input Jack

OPTIONAL EXTERNAL DEVICES

CAUTION: To prevent electrical damage to the computer and the external device, turn off the computer before connecting an external device.

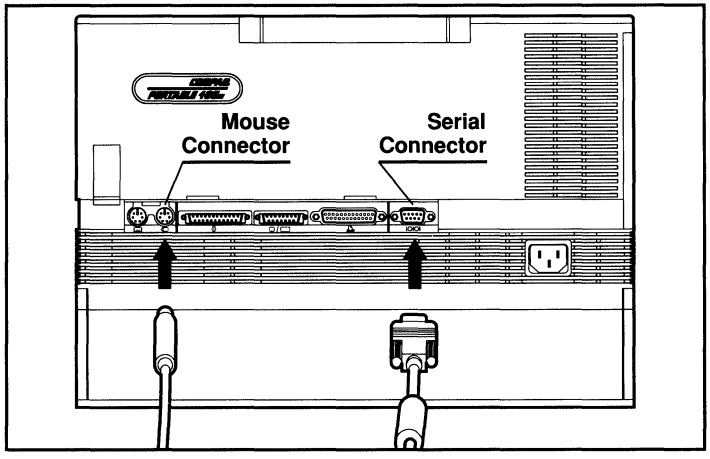
The computer and external devices that use AC power must be electrically grounded. To ensure proper operation of the computer and external devices, plug the power cords into properly grounded AC outlets only.

IMPORTANT: In addition to the following procedures in this guide, consult the documentation accompanying the external device you are connecting for more detailed instructions.

Mouse

There are several ways to connect a mouse, depending on mouse type:

- PS/2 mouse–Has a round 6-pin connector that plugs into the pointing device connector on the computer.
- Serial mouse–Has a D-shaped 9-pin serial connector that plugs into the serial connector on the computer.
- Bus mouse–Plugs into an interface card that plugs into an EISA or ISA connector.



Mouse and Serial Connectors

Connecting a Mouse To connect a mouse to the computer:

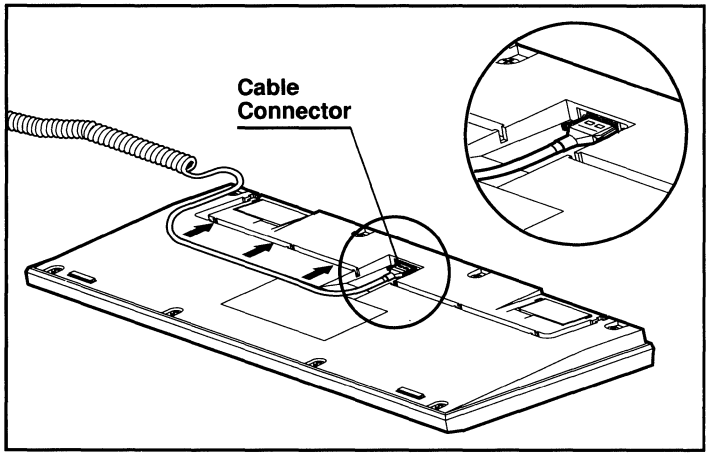
1. Turn off the computer.
2. Turn off the external devices with power switches.
3. Slide up the connector cover on the rear panel.
4. Depending on the type of mouse you are connecting, plug the mouse into either the mouse connector or the serial connector on the back of the computer.
5. Turn on the external devices that have power switches.
6. Turn on the computer.

Installing the Mouse Software The mouse needs a software device driver for it to operate. The driver comes on a diskette when you purchase the mouse. Consult the documentation accompanying the mouse for instructions on installing the mouse driver and configuring your system.

External Keyboard

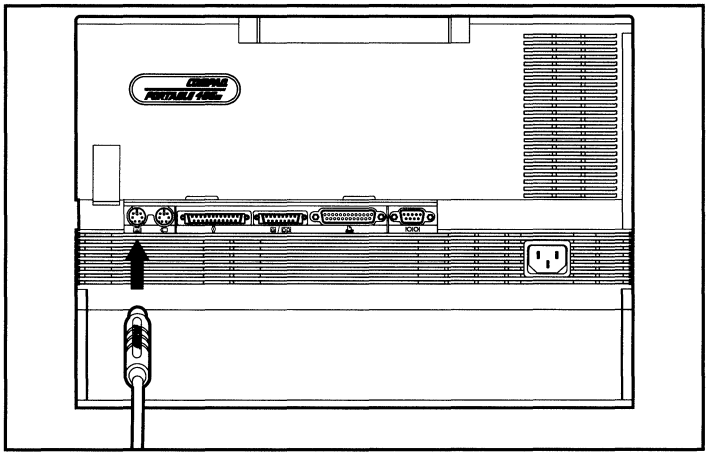
You can connect an external keyboard to the back of the computer. The following procedure explains how to connect a COMPAQ Enhanced Keyboard to the computer.

1. Turn off the computer.
2. Turn off any external devices with power switches.
3. Plug the rectangular keyboard cable connector into the connector on the underside of the keyboard.



Connecting the Keyboard Cable to the Keyboard and Routing the Cable

4. Route the cable through the groove in the direction most convenient for your workplace.
5. Slide up the connector cover on the rear panel.
6. Plug the round keyboard cable connector into the keyboard connector on the rear panel.



Connecting an External Keyboard

7. Turn on the external devices that have power switches.
8. Turn on the computer.

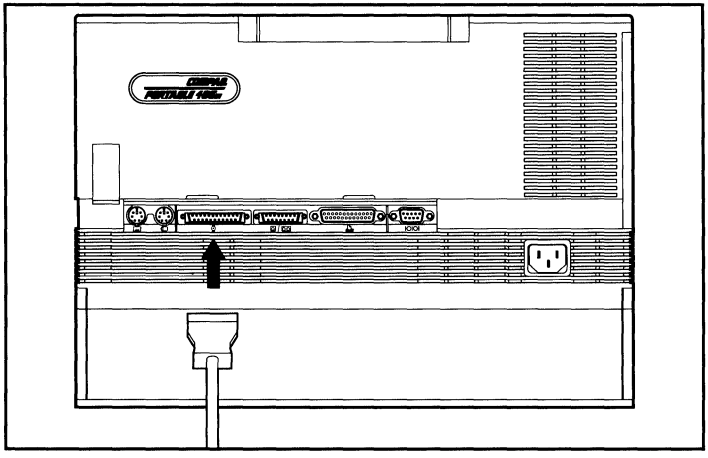
NOTE: When an external keyboard is connected to the computer, the standard keyboard is deactivated when you turn the computer on.

CD-ROM

The following procedures explain how to use the COMPAQ CD-ROM Cable Kit to connect a CD-ROM drive to the computer.

Connecting a CD-ROM Drive To connect a CD-ROM drive:

1. Turn off the computer.
2. Turn off the external devices with power switches.
3. Lift up the connector cover on the rear panel of the computer.
4. Connect the cable to the CD-ROM player.
5. Plug the CD-ROM signal cable into the CD-ROM connector.



Connecting the CD-ROM Cable to the Connector

! IMPORTANT: To ensure that the computer recognizes the CD-ROM drive, turn on the CD-ROM drive before you turn on the computer.

6. Turn on the external devices that have power switches, including the CD-ROM drive.
7. Turn on the computer.

Installing the CD-ROM Software Consult the documentation accompanying the CD-ROM Cable Kit for instructions on installing the software drivers and utilities.

Printer

The way a printer is connected depends on the way it receives data: through either a parallel interface or a serial interface. (An interface is an information interchange path through which the computer and an external device communicate or interact.) Most printers have a parallel interface, however, some printers use either method of receiving data.

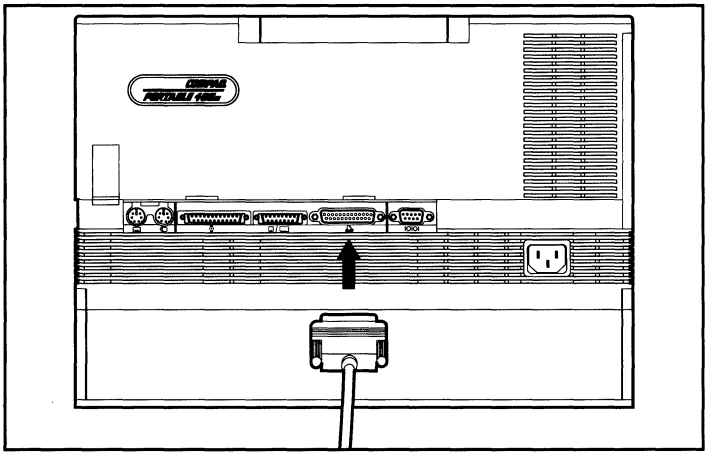
- Parallel interface–The printer receives information from the computer character by character simultaneously through eight data lines.
- Serial (asynchronous) interface–The printer receives information from the computer bit by bit through a single data line.

Connecting a Printer To connect a printer:

1. Turn off the computer.
2. Turn off the external devices with power switches.
3. Plug the printer-end of the printer signal cable into the printer. (You can visually determine which connector plugs into the printer by choosing the one that matches the connector on the printer.)
4. Slide up the connector cover on the rear panel of the computer.

5. Depending on the type of printer you are connecting, plug the printer signal cable into either the parallel connector or the serial connector. (A connector adapter may be required to connect a serial printer.)

   NOTE: The following illustration shows plugging a parallel printer signal cable into the parallel connector.



Connecting a Printer Signal Cable to the Parallel Connector on the Computer

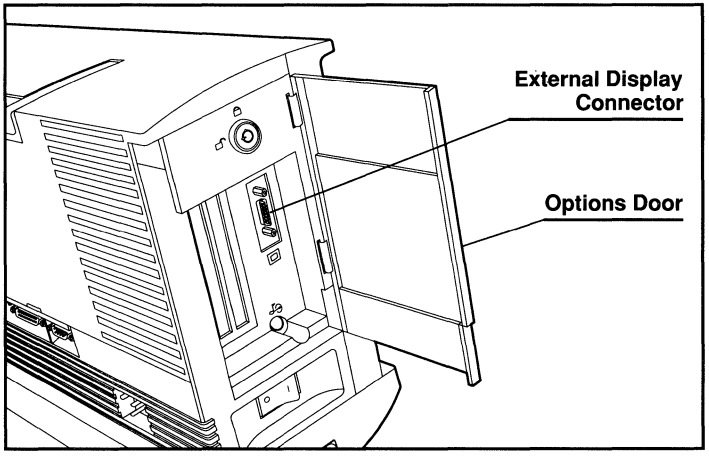
6. Plug the printer power cord into a grounded AC outlet.
7. Turn on the external devices that have power switches, including the printer.
8. Turn on the computer.

Setting Printer Configuration Switches Some printers have internal switches for certain operating modes. The factory (default) switch settings are standard for most situations and may not need to be changed. Consult the documentation accompanying the printer to see if it contains internal switches and if you need to change the default settings for your printing requirements.

Choosing Printer Support Through Application Software Application software comes with software device drivers for many kinds of printers. You must choose your printer, special printer capabilities, and connection (such as LPT or COM) through your applications for the printer to operate. Consult both your printer and applications documentation for information on supporting the printer through your applications.

Monitor

The external display connector is behind the options door on the left side of the computer.

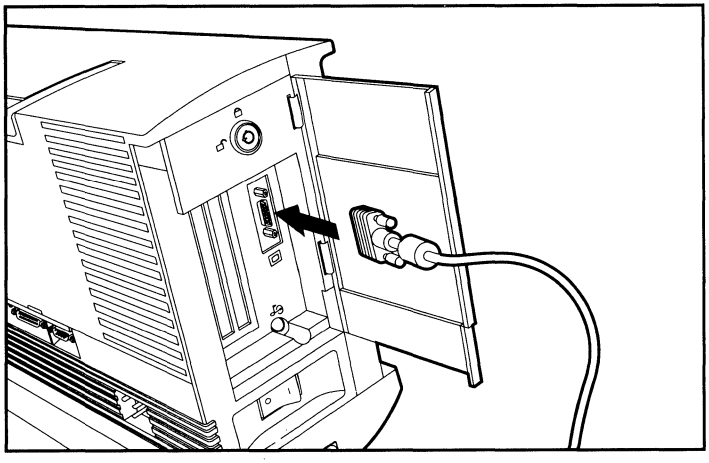


External VGA Connector

NOTE: The following procedures explain how to connect a COMPAQ VGA monitor to the computer.

Connecting an External Monitor To connect an external VGA monitor:

1. Turn off the computer.
2. Turn off the external devices with power switches.
3. Open the options door to expose the external monitor connector.
4. Plug the monitor signal cable into the external display connector.



Connecting an External VGA Monitor Signal Cable

5. Plug the monitor power cord into a grounded AC outlet.

! IMPORTANT: To ensure that the computer recognizes the external monitor, turn on the external monitor before you turn on the computer.

6. Turn on the external devices that have power switches, including the external monitor.
7. Turn on the computer.

NOTE: When an external monitor is connected, the internal display is inactive.

Viewing the External Monitor Display and the Active Matrix Color VGA Display When an external monitor is connected to the computer, the displays can be viewed in the following three ways:

- External monitor display only
- Active matrix color VGA display only
- Simultaneous active matrix color and external monitor displays

The displays are activated and deactivated in the following ways:

- External Monitor Display

  The following key combination allows you to toggle between activating and deactivating the External Monitor Display:

  CTRL + ALT + <

- Active Matrix Color Display

  The following key combination allows you to toggle between activating and deactivating the Active Matrix Color Display:

  CTRL + ALT + >

  Deactivate:

  Turn on the computer with an external monitor connected.

  Permanently deactivate:

  Set through the COMPAQ EISA Configuration Utility.

- Simultaneous Active Matrix Color and External Monitor Displays

  1. Press the CTRL + ALT + > keys to activate the internal display.
  2. Press the CTRL + ALT + < keys to activate the external display.

NOTE: MS-DOS as published by Compaq supports the above key combinations. When using MS OS/2 as published by Compaq, refer to the MS OS/2 documentation for these commands.

IDENTIFYING INTERNAL COMPONENTS AND INSTALLING OPTIONAL INTERNAL DEVICES

This chapter identifies the internal components of the computer and explains how to install optional internal devices.

Although COMPAQ portable computers are designed to be upgraded easily, Compaq strongly recommends that an Authorized COMPAQ Computer Dealer install all optional hardware. All Authorized Dealers are trained and can ensure that the option is installed correctly and is functioning properly.

INSTALLATION SEQUENCE

A summary of the installation and configuration sequence follows to familiarize you with the process covered in this chapter.

1. If the computer is on, turn it off and disconnect the AC power cord.
2. Unlock the keylock.
3. Turn off any external devices that have ON/OFF switches, then disconnect the external device cables from the computer.
4. Remove the rear panel and options compartment cover.
5. Install all internal options except ISA expansion boards. If you install ISA boards now, you may need to remove them to change the switch and jumper settings.
6. Replace the rear panel and options compartment cover.
7. Turn on the computer.
8. Run the COMPAQ EISA Configuration Utility. Refer to Chapter 4, "Running the COMPAQ EISA Configuration Utility," for information.
9. Turn off the computer.

10. Remove the rear panel and options compartment cover.
11. Set the switches and jumpers and install the ISA boards.
12. Replace the rear panel and options compartment cover.
13. Turn on the computer.
14. Test the system.
15. Install the operating system(s).

WHEN TO CONFIGURE THE COMPUTER

System configuration is the process of setting certain hardware and software to recognize the options installed in the computer. When you add or remove an internal option, you must reconfigure the computer to recognize these changes. For example, if you add memory to the system, you must run the COMPAQ EISA Configuration Utility so that your computer recognizes that additional memory has been installed.

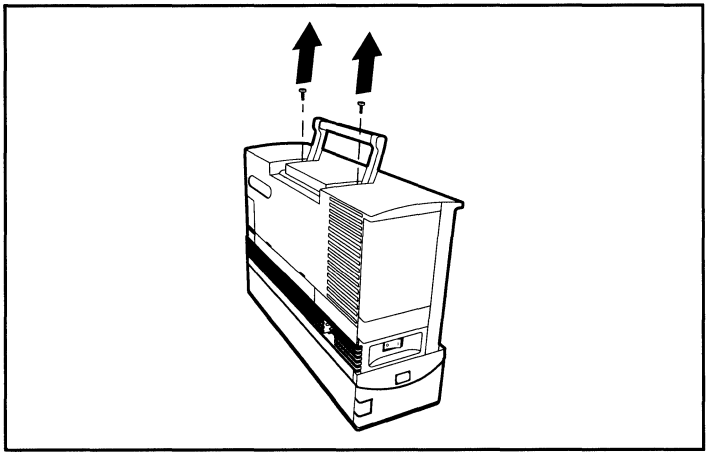
If configuration settings are incorrect, one or more devices may not work properly and you may receive an error message on the screen. If this occurs, run the Configuration utility.

NOTE: Refer to Chapter 4, "Running the COMPAQ EISA Configuration Utility," for more information.

OPENING THE COMPUTER TO INSTALL OPTIONS

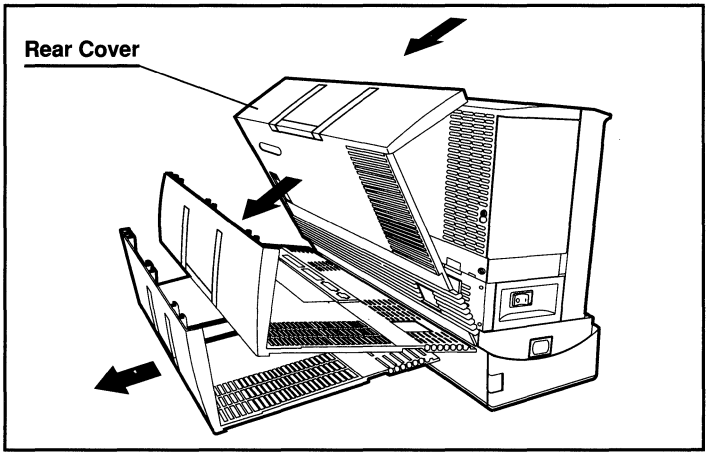
Before options can be installed in the computer, the rear panel (plastic) and options cover (metal) must be removed to gain access to the options compartment. To remove the rear panel and options cover, follow these steps.

1. Turn off the computer and disconnect the AC power cord.
2. Disconnect all external devices.
3. Turn the computer so the rear is facing you.
4. Open the options cover door.
5. Remove the two Torx T-15 screws on the top of the rear panel.



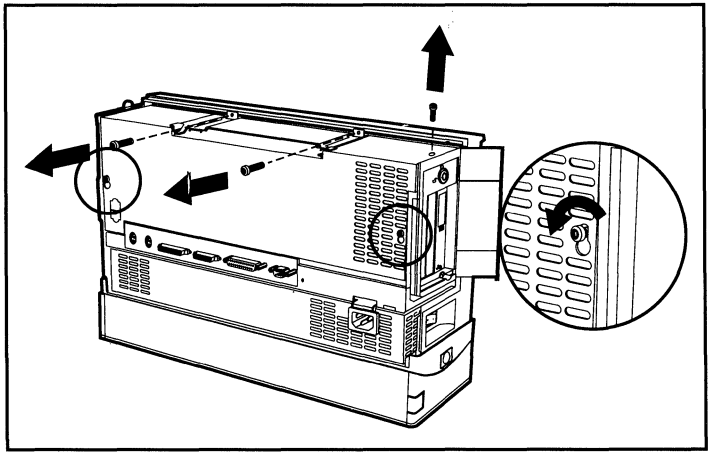
Removing the Rear Panel Screws

6. Tilt the rear cover toward you, then lift it off and lay it down.



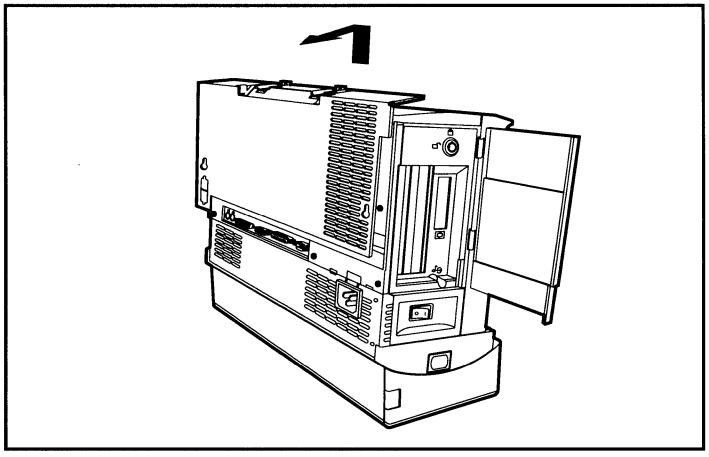
Removing the Rear Cover

7. Remove the options cover Torx T-15 top screws and loosen the two Torx T-15 screws on the rear.



Removing the Options Cover Top Screws and Loosening the Rear Screws

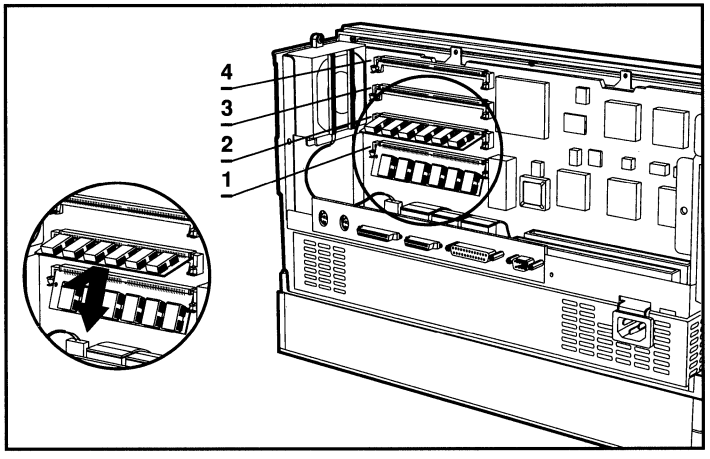
8. Slide the options cover up and off.



Removing the Options Compartment Cover

INSTALLING MEMORY

The computer comes standard with four megabytes of enhanced page memory. Using a combination of 2-, 4-, and 8-megabyte modules, system memory can be expanded to a maximum of 32 megabytes. In all cases, slot 1 must contain a memory module. Additional memory may be placed in slots 2 through 4 in any order and in any combination.

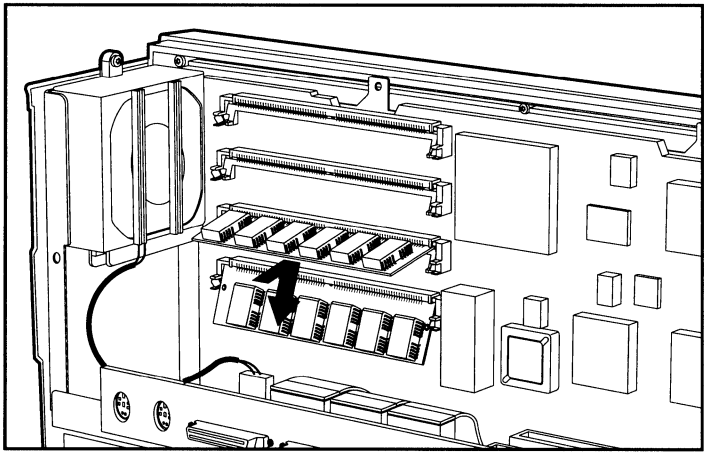


Memory Slots

Follow these steps to install memory module(s). Refer to the documentation accompanying the memory module(s) for detailed installation procedures.

CAUTION: The memory board is sensitive to static electricity. Before touching the board, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

1. Turn off the computer and disconnect the AC power cord.
2. Disconnect all external devices.
3. If a modem is installed, disconnect the telephone line from the computer.
4. Remove the rear panel and options cover. (Refer to the "Opening the Computer to Install Options" section in this chapter.)
5. Rotate the module gently as you insert it, allowing the latches to snap securely into place.



Installing Memory on the Processor Board

6. Replace the rear panel and options cover.
7. Run the COMPAQ EISA Configuration Utility to ensure that the memory module is recognized by the system.

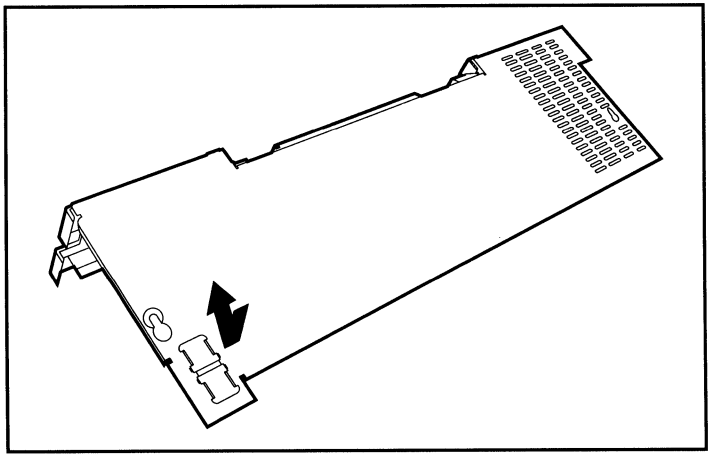
INSTALLING A MODEM

To install a modem in the Enhanced Options Slot, complete the steps below. For detailed instructions on installing a modem, refer to the documentation accompanying the modem.

NOTE: This procedure also applies to the installation of other options, such as a second serial interface, in the Enhanced Options Slot.

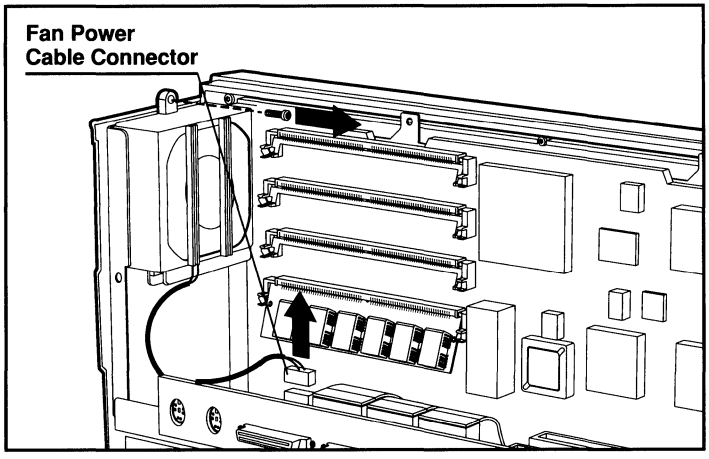
1. Turn off the computer and disconnect the A/C power cord.
2. Remove the rear panel and options cover. Refer to the "Opening the Computer to Install Options" section in this chapter for instructions.
3. Push out the metal clip(s) on the part of the options cover that will align with the options door.

CAUTION: The metal clips may be sharp.



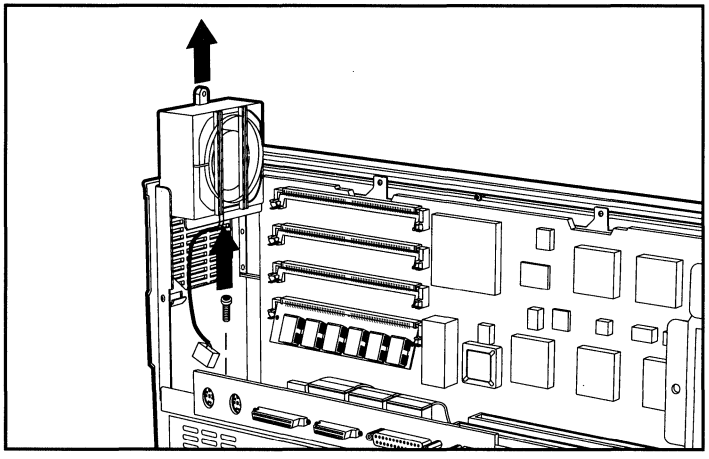
Removing the Metal Clips

4. Remove the options boards from option slots 1 and 2.
5. Unplug the fan power cable.
6. Remove the Torx T-15 fan screw.



Removing the Fan Screw

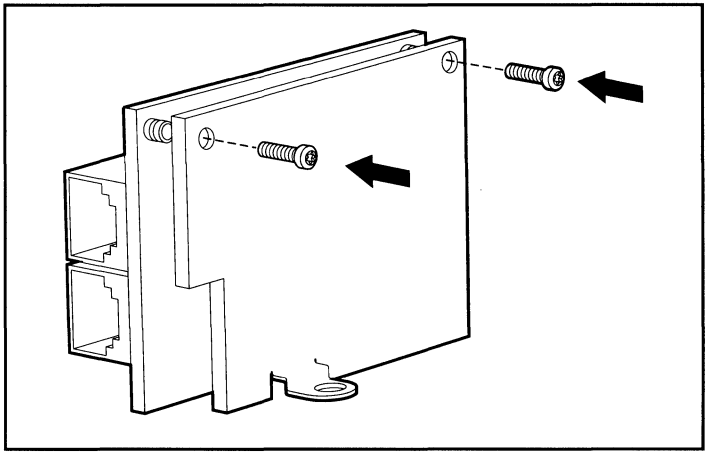
7. Pull the fan straight up from the top and lay it aside.
8. Remove the Torx T-15 screw located on the I/O board directly behind the external keyboard connector.



Removing the Fan and Torx T-15 Screw

CAUTION: Static electricity can damage the components on the modem. Before touching the modem, be sure that you are discharged of static electricity by briefly touching a grounded metal object.

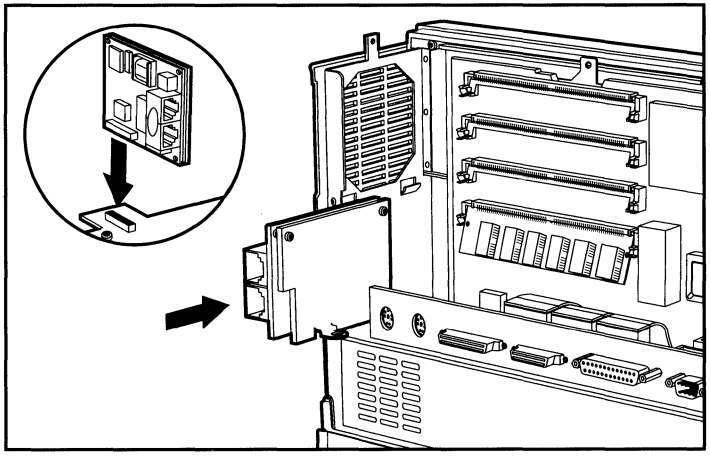
9. Place the enhanced option shield that came with the computer on the back of the modem board, making sure the shield top holes align with the modem top holes.
10. Using a Torx T-8 screwdriver, screw in the two Torx T-8 screws that came in the modem kit.



Installing the Enhanced Option Shield

11. With the connector on the bottom and the shield facing the inside of the computer, slide the modem from the back, pressing down gently until the connectors are engaged.

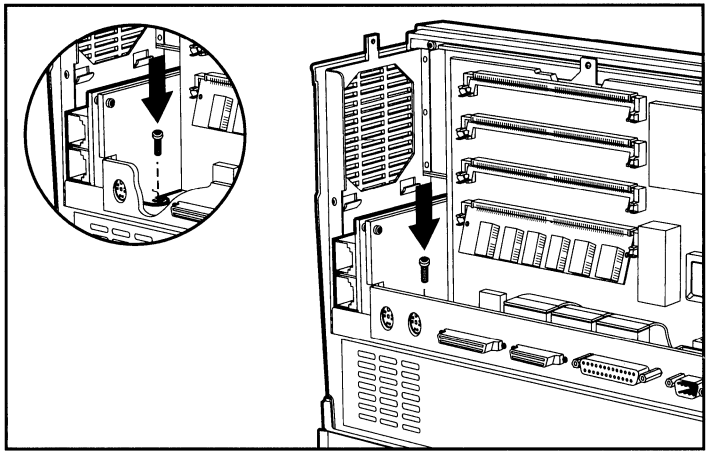
CAUTION: Handle the modem carefully, as some of its components are fragile.



Inserting the Modem

IMPORTANT: The modem must be securely connected to operate properly.

12. Reinsert the Torx T-15 screw (removed earlier) through the Enhanced Option Shield tab, then screw it to the I/O board.



Securing the Enhanced Option Shield Tab

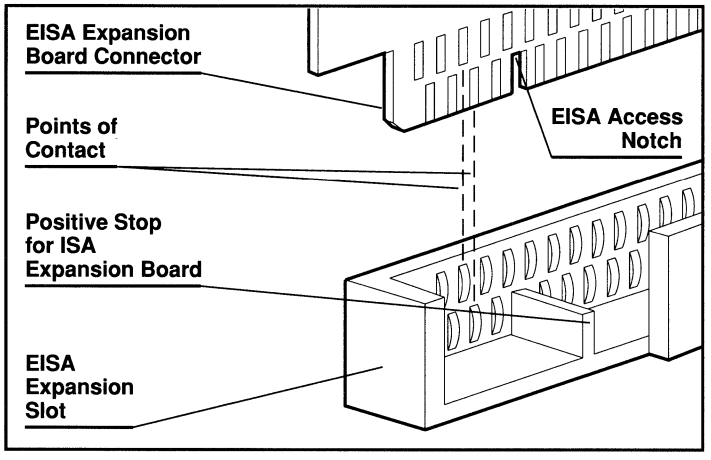
13. Reverse steps 1 through 7 to reassemble the computer.

INSTALLING AN EXPANSION BOARD

The system is equipped with two 8-/16-/32-bit EISA expansion slots. The two levels of design of dual level connectors provides full ISA compatibility.

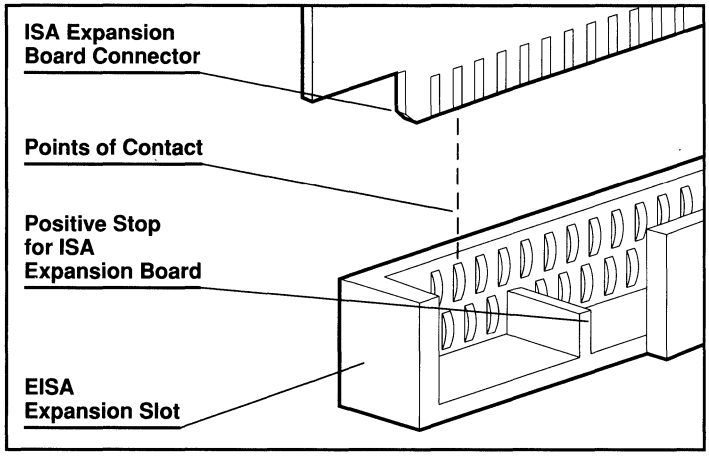
The upper level aligns and connects an ISA expansion board; the lower level connects an EISA expansion board.

An EISA expansion board contains a notch that allows it to bypass the tab in the expansion slot that stops ISA boards. This allows it to accomplish the extended connection. The following figure shows the connection of an EISA expansion board in an EISA expansion slot on the system board.



EISA Expansion Board Connection

The following figure shows the connection of an ISA expansion board in an EISA expansion slot on the system board.



ISA Expansion Board Connection

NOTE: If you are installing an EISA board and an ISA board, install the EISA board first. You should run the COMPAQ EISA Configuration Utility before installing the ISA board. If you install the EISA board and ISA board at the same time, you may have to remove the ISA board later to change switch and jumper settings.

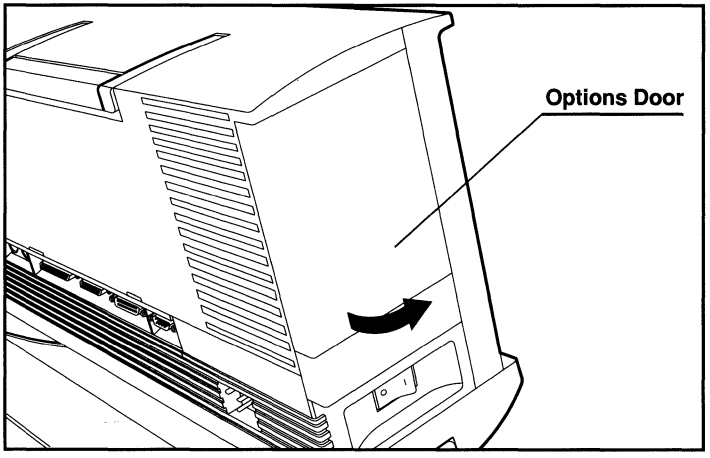
Software-Assisted System Configuration

The EISA configuration specification provides standards for developing software that automatically configures software-programmable EISA expansion boards. The configuration utility also assists you in selecting an available slot and in setting switches and jumpers for switch-programmable ISA expansion boards. The configuration utility, working in combination with the configuration (*.CFG*) files, allocates system resources among the boards and identifies any resource conflicts.

Installing an EISA Expansion Board

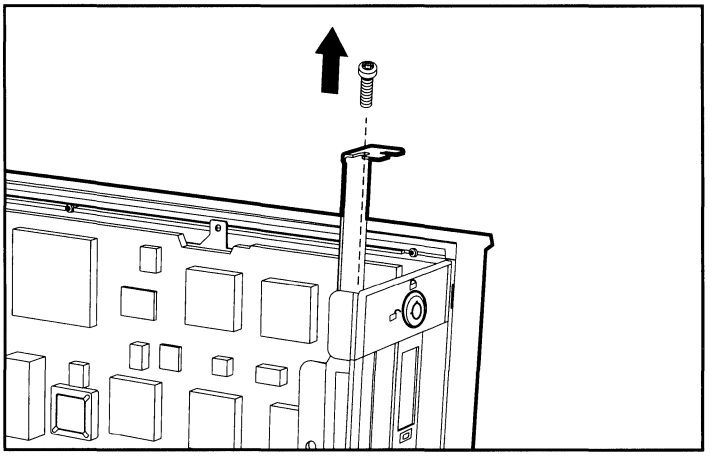
To install an EISA expansion board, complete the following steps:

1. Turn off the computer and disconnect the AC power cord.
2. Open the options door.



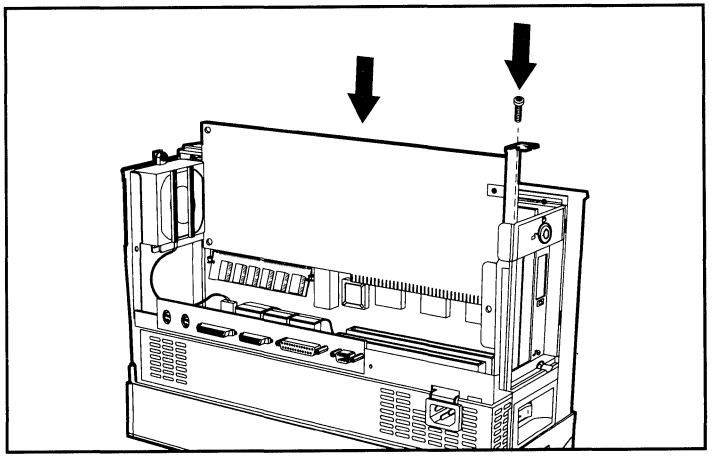
Opening the Options Door

3. Select either expansion slot. If you select slot 2 (the slot next to the processor board), you may need to rotate the keylock to the unlocked position before you can install the expansion board.
4. Using a Torx T-15 screwdriver, remove the screw at the top of the expansion slot and lift the expansion slot cover out of the computer.



Removing the Expansion Slot Cover

5. Lower the EISA board into the expansion slot and press it firmly into place until both rows of connectors seat.



Lowering an Expansion Board into Place

6. Close the option door.
7. Run the COMPAQ EISA Configuration Utility.

Installing an ISA Board

ISA expansion boards are fully compatible with EISA-based computers and can be installed in either expansion board slot on the system board. To install an ISA board, complete the following steps.

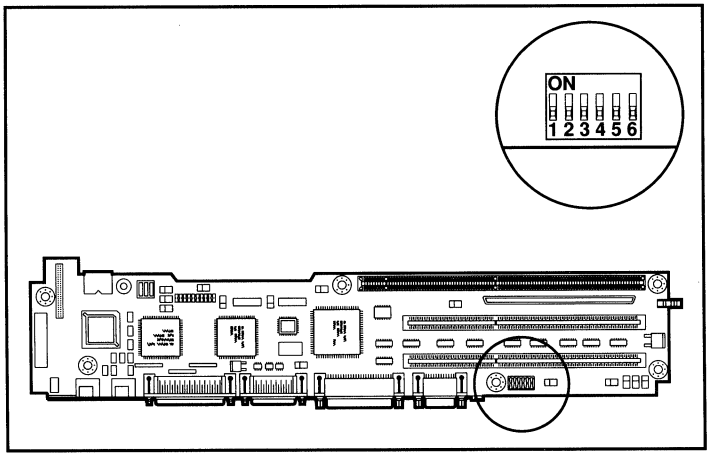
1. Run the COMPAQ EISA Configuration Utility.

NOTE: Refer to Chapter 4, "Running the COMPAQ EISA Configuration Utility" for information about how to run this utility and add ISA boards to your configuration.

2. Follow steps 2 to 6 in "Installing an EISA Board."
3. To set switches or jumpers on your ISA card, refer to the documentation that came with your board.

SWITCH SETTINGS

A switch is a device on the I/O board that allows *you* to change specified functions through a hardware function rather than a software program. The computer contains a bank of 6 switches for setting system configuration and security features.



Switch Locations

The computer works correctly without changing any of the default settings. However, by setting the switches differently than the default factory setting, you can configure the system to meet your needs. The following table lists each switch and the function of that switch when on.

Switch Settings

Switch	Function
1	Disable the Integrated Video Graphics Controller
2	Lock EISA Configuration
3	Set Diskette Drive to Read Only
4	Boot from Diskette (Override EISA Configuration)
5	Erase Power-On Password
6	Erase EISA Configuration

All of the switches are set in the factory to the OFF position.

Switch 1–Disable the Integrated Video Graphics Controller

Use switch 1 to prevent the integrated video graphics controller from conflicting with a third-party video graphics expansion board. In many cases no conflict is caused by a third-party video board; however, the switch is available for cases where a conflict exists.

OFF Cannot disable the integrated video graphics controller (default)
ON Disables the integrated video graphics controller

Switch 2–Lock EISA Configuration

Use switch 2 to prevent updating of the current EISA configuration. By using switch 2, you can prevent the configuration information from accidentally being overwritten, and a system administrator can restrict access to restricted resources.

OFF	Can update and change the EISA configuration (default)
ON	Cannot update or change the EISA configuration (locks)

NOTE: While you cannot update or change the EISA configuration when this switch is ON, you can run the COMPAQ EISA Configuration Utility and read the current configuration.

Switch 3–Set Diskette Drive to Read Only

Use switch 3 to disable the write function of the diskette drive. With this switch ON, you can only read from, not write to, the diskette drive. A network administrator may use this switch to prevent data from being written to a diskette or from being removed from a secure network.

OFF	Permits data to be written to a diskette (default)
ON	Prevents data from being written to a diskette

Switch 4–Boot from Diskette

Use switch 4 to reactivate the diskette boot feature that may have been deactivated during EISA configuration. Reactivating the diskette boot feature allows you to boot from the diskette drive. If the diskette drive was disabled in EISA configuration, using this switch allows you to reenable the diskette drive without having to reset it through the COMPAQ EISA Configuration Utility. This feature allows a diskette drive that was disabled as a security feature to be reenabled without changing the EISA configuration contents.

OFF	EISA configuration (diskette boot is active) selections are used (default)
ON	Override EISA configuration selections (allows booting from diskette)

Switch 5–Clear Power-On Password

Use switch 5 to clear the power-on password. When the switch is OFF, the Power-On-Self-Test (POST) routine determines if password protection is enabled. POST displays an icon that looks like a key in the upper-left corner of the screen. You must type in the password before the system will start. If the switch is ON, POST clears password protection and removes the old password.

OFF	Power-on password protection enabled (default)
ON	Power-on password is erased

Switch 6–Erase EISA Configuration

Use switch 6 to erase the current setup of the EISA configuration. This switch (often called the maintenance switch) is required if the EISA configuration is corrupted. A corrupted configuration may contain unreadable data.

OFF	Current EISA configuration is used (default)
ON	Current EISA configuration is erased and a default configuration is used

NOTE: If you turn on this switch and turn on the computer to erase the EISA configuration, you must turn off the computer and turn off this switch before running the COMPAQ EISA Configuration Utility.

RUNNING THE COMPAQ EISA CONFIGURATION UTILITY

This chapter describes the COMPAQ EISA Configuration Utility and explains how to use it. It also explains the advanced features of this utility and what to do when a configuration file for a board is not supplied.

System configuration is accomplished by running the COMPAQ EISA Configuration Utility and setting the ISA expansion board jumpers and switches. System configuration is only one feature of this utility. You can benefit from the following features by selecting the appropriate main menu item:

- Learn about setting up your computer
- Set power-on features
- Configure computer
- Test or inspect your computer
- Install your operating system
- Maintain the configuration utility

PURPOSE OF THE COMPAQ EISA CONFIGURATION UTILITY

The COMPAQ EISA Configuration Utility does the following:

- Explains the differences between EISA and ISA options
- Configures EISA boards
- Provides switch and jumper settings for ISA boards
- Resolves resource conflicts
- Manages the installation of options (such as tape and diskette drives, memory, system processors, and numeric coprocessors)

- Stores the configuration information in extended nonvolatile RAM
- Assists with the installation of the operating system
- Assists in running such diagnostic tools as TEST and INSPECT

ISA boards do not have the automatic configuration capabilities of EISA boards, but the COMPAQ EISA Configuration Utility allocates system resources to these boards in most cases and provides instructions on how to set their switches and jumpers.

Supplying Resource Requirements to the COMPAQ EISA Configuration Utility

Each EISA or ISA expansion board should be shipped with a diskette that contains a configuration (*.CFG*) file. The configuration file provides the utility with the resource requirements for the board including switch and jumper settings for many ISA boards.

The COMPAQ EISA Configuration Utility reads these files and compares them to the expansion board requirements. The system resources are then allocated accordingly.

The COMPAQ EISA Configuration Utility stores the system configuration information in battery-powered extended nonvolatile RAM where it can be read by various software programs. This information is used to set the system configuration each time the computer is turned on.

NOTE: If the board you are installing does not include a configuration file diskette, the configuration file for your EISA or ISA board may be contained on one of the Option Configuration Files diskettes. If a configuration file is not available, refer to the "Configuring an ISA Board Without a Configuration File" section in this chapter.

Helpful Hints on Using the COMPAQ EISA Configuration Utility

Following is a brief list of hints on how to use the COMPAQ EISA Configuration Utility.

- Select the menu item that teaches you about setting up your computer.
- After selecting the menu item to configure your computer, view the section on EISA configuration information.
- Read the help screens by pressing the **F1** key. A detailed explanation of help is available by selecting the *Using Help* menu item. Help is available on any screen where the message, "Help = F1," displays in the upper right corner of the screen.
- Look for scroll bars on the right side of the screens. Many of the help topics are several screens in length. Use the **UP** and **DOWN** arrow keys, or the **PgUp** and **PgDn** keys to scroll through the screens.

INSTALLING AND RUNNING THE COMPAQ EISA CONFIGURATION UTILITY

You have the choice of running this utility from the fixed disk or from the System Configuration diskette.

Running the COMPAQ EISA Configuration Utility from the fixed disk requires two megabytes of fixed disk space, is faster than running the utility from the diskette, and eliminates the need to carry a System Configuration diskette with you.

Preliminary Steps

1. Install all EISA options.
2. Connect the external devices.

NOTE: Do not install ISA boards now. If you do, you may have to remove the board to change the switch and jumper settings.

3. As a safety precaution, replace the rear panel and options cover.

Installing the COMPAQ EISA Configuration Utility

To install the configuration utility on the fixed disk before you run the COMPAQ EISA Configuration Utility the first time, complete the following steps.

1. Insert the System Configuration diskette in Drive A.
2. Turn on the computer.
3. Follow the instructions on the screen.

   Pressing the **Enter** key installs the COMPAQ EISA Configuration Utility on the fixed disk. Pressing the **Esc** key runs the COMPAQ EISA Configuration Utility from the System Configuration diskette.

   NOTE: If you later wish to install the COMPAQ EISA Configuration Utility on the fixed disk, you must repartition and reformat your fixed disk. Refer to the "Maintain the configuration utility" menu on the System Configuration diskette.
4. Follow steps 3 through 9 in the "Running the Configuration from the Fixed Disk" subsection in this chapter.

Running Configuration from the Fixed Disk

If the COMPAQ EISA Configuration Utility has been installed on the fixed disk and you wish to change the configuration, complete the following steps.

1. Turn on the computer.
2. When the large block cursor moves to the upper right corner of the screen, press the **F10** key.

   NOTE: Press the **F10** key immediately after the block cursor moves to the upper-right corner of the screen, otherwise the system will boot your operating system.

3. Select the main menu item that allows you to configure your computer, then answer any questions you may be asked about your configuration. A screen displays, showing five steps involved in completing the system configuration. If you have only EISA boards in your computer and do not plan to install any ISA boards, you only need to complete Step 5. If you have installed or plan to install ISA boards, complete the following steps:

   Step 1 Displays a series of screens that explain system configuration and the differences between EISA and ISA systems.

   Step 2 Allows you to add, move, or remove an expansion board from the system configuration. EISA boards are automatically added to the list. When you add an ISA board, note the slot number that you select. When you install the ISA board later in this procedure, it must go in that slot.

   Step 3 Displays the details of all of the configuration items and allows you to view or edit the selections. If you choose to edit a selection, you must perform Step 4 to check the switch and jumper settings for any changes.

   Step 4 Gives switch and jumper settings for ISA boards. Use the UP and DOWN arrow keys to scroll through the entire list. Note or print the settings as indicated by the utility, but do not install the ISA boards or change switches and jumpers within the system now.

   Step 5 Saves the new configuration and exits the utility.

4. To install ISA boards, turn off and unplug the system.
5. Remove the rear panel and options cover.
6. Set the switches and jumpers on your ISA boards to match the settings indicated by the utility.
7. Refer to the installation guide that came with your ISA board for instructions on how to install the board.
8. Replace the rear panel and options cover.
9. Reconnect all cables and plug the computer into a grounded AC outlet.

Running Configuration from the System Configuration Diskette

1. Insert the System Configuration diskette in drive A.
2. Turn on the computer.
3. Follow steps 3 through 9 in the "Running Configuration from the Fixed Disk" subsection.

Testing the Configuration

After all internal options are installed and your configuration has been saved, complete the configuration process by testing the system.

1. Run the COMPAQ EISA Configuration Utility.
2. Select the menu item that allows you to test the system.
3. After testing is complete, install the operating system. You can use the COMPAQ EISA Configuration Utility or, if you are installing Microsoft MS-DOS as published by Compaq, you can use FASTART. To use the COMPAQ EISA Configuration Utility, select the main menu item that allows you to install the operating system.

OTHER CONFIGURATION FEATURES

Some of the additional features of the COMPAQ EISA Configuration Utility are:

- Set power-on features

  This feature allows you to set the date, time, speed, and numlock state.

- Maintain the system configuration utility

  This feature allows you to back up (copy) the configuration utility, upgrade to a newer version of the configuration utility, and perform other types of diskette maintenance.

  This feature also allows you to install the COMPAQ EISA Configuration Utility partition on or delete it from the fixed disk. Select the appropriate option under the "Manage your fixed disk partition" submenu.

  NOTE: If your operating system is installed at this point, it will be necessary to run the operating system's partition utility to reclaim the

ADVANCED CONFIGURATION FOR COMPLEX FUNCTIONS

The COMPAQ EISA Configuration Utility offers some advanced features for complex configurations.

To reach a working configuration, you may have to change the function of a particular board, the resources required by a function, or both. A *function* is a capability provided to the system by an expansion board. Some common functions provided by expansion boards are parallel printer interface, serial interface, disk controllers, network interfaces, memory, and video control. Some expansion boards may have multiple functions.

The functions provided by an expansion board require resources. Examples of resources are memory, interrupt request (IRQ) lines, direct memory access (DMA) channels, and port addresses.

Using the Advanced Menu

The advanced menu is accessed through the "Configure computer" menu. The following features or submenus assist you in completing a complex configuration.

Lock/Unlock Boards

The COMPAQ EISA Configuration Utility allows you to lock a configuration with the current settings. The resources of "locked" boards will not change when new boards are added to the system. This feature is valuable when you want to add an expansion board and make certain that the settings of an installed and configured board are not changed by the COMPAQ EISA Configuration Utility.

NOTE: If you are adding a new board to a locked configuration, a resource conflict may occur that will prevent you from using the new board. By unlocking the configuration, all resources are made available to the COMPAQ EISA Configuration Utility, and a solution may be possible.

View Additional System Information

Board specifications shows more information about the physical properties of each expansion board.

System specifications shows more information about the physical properties of the system board. This includes information on the slots in the computer and what type of board each slot accepts.

NOTE: Remember to use the UP and DOWN arrow keys or the PgUp and PgDn keys to view the entire list.

Available resources shows a list of resources that are not being used in the current configuration.

Used resources shows a list of the resources (resource map) that are being used in the current configuration. Each resource being used is followed by the slot and function using it.

Set Verification Mode

By default, the COMPAQ EISA Configuration Utility runs in automatic verification mode. This means that any time a change is made to the configuration, the utility automatically verifies that the computer is free of resource conflicts and that a valid configuration is maintained.

The mode can be changed to manual verification. Manual verification mode is useful when you are making several changes to your configuration and you don't want the utility to automatically resolve conflicts each time a change is made. When manual verification mode is selected, the configuration is verified only when you select the "verify" command in the Step 3 screen. This command only displays when a manual verification mode is selected.

Maintain System Configuration Information (SCI) Files

Save As creates a backup of the current configuration. These files can be used for future reference or to help in configuring a similar computer. The default is *System.SCI*.

Open brings in a previously created configuration backup file. These files are created with the Save As command and can be identified by the *.SCI* extension.

CONFIGURING AN ISA BOARD WITHOUT A CONFIGURATION FILE

If a configuration file (*.CFG*) is not available for an ISA board, use the COMPAQ EISA Configuration Utility and the documentation included with the board to correctly configure the system.

First ensure that you do not have a configuration file for the board. This can be done through the "Configure computer" menu by selecting the option that allows you to add an expansion board. Then select the option that leads you through configuring an expansion board without a configuration file. Next, choose the option that helps you look for the configuration file.

If you cannot find a configuration file for the board, configure the system using one of the following methods.

Method 1 Configure using available resources. This method is used to add a single expansion board without a configuration file.

Method 2 Configure using a generic configuration file. This method is used to add more than one expansion board without a configuration file or when resources are unavailable in Method 1.

NOTE: You should add all the expansion boards for which you have configuration files before attempting to add an expansion board without a configuration file.

Method 1: Configure Using Available Resources

1. Run the COMPAQ EISA Configuration Utility.
2. Select the main menu option that allows you to configure the computer.
3. Add all boards with configuration files.
4. Select the option that allows you to add a board. Then choose the option that allows you to configure a board without a configuration file.
5. Select the menu item that allows you to configure using available resources.
6. Select the command to view the available resources.
7. Use the documentation that came with the ISA board to determine the resources needed. Check to see if these resources are listed on the available resources screen.
8. If all resources needed by the board are available, use the documentation that came with the board to set switches and/or jumpers for those resources. If one or more resources are not available, you must use Method 2.
9. When all of the resources for the board are available and you have set the switches and/or jumpers, the board is configured.

   NOTE: Since there is no configuration file for your expansion board, the COMPAQ EISA Configuration utility still denotes the slot as "(Empty)."
10. Exit the program, turn off the computer, and install the board.

Method 1 Example

You want to add a modem that can be configured at COM1 or COM2. The documentation indicates that COM1 requires IRQ4 and eight port addresses from 3F8 to 3FF. COM2 requires IRQ3 and eight port addresses from 2F8 to 2FF. After looking at the available resources through the COMPAQ EISA Configuration Utility and seeing that only resources for COM2 are available, set the switches and/or jumpers on the modem to use COM2.

! IMPORTANT: If you add a board to your computer in the future, you may have to reconfigure the board that does not have a configuration file.

Method 2: Configure Using a Generic Configuration File

1. Run the COMPAQ EISA Configuration Utility.
2. Select the main menu option that allows you to configure the computer.
3. Add all boards that have configuration files first.
4. In Step 2, select the option that allows you to add a board. Then choose the option to configure a board without a configuration file.
5. Select the menu item that allows you to configure using a generic configuration file.

6. Insert the Non-Compaq Options Configuration Files diskette in drive A.
   - If you are running the COMPAQ EISA Configuration Utility from the diskette, press the ENTER key to display a list of *.CFG* files.
   - If you are running the COMPAQ EISA Configuration Utility from the fixed disk, press the F7 key, select drive A, then press the ENTER key to display a list of *.CFG* files.
7. Select the generic ISA adapter definition board from the displayed list, press the ENTER key at the confirmation screen, and select a slot. Do not physically install the board now.
8. Return to the configure your computer menu and select Step 3.
9. Use the documentation included with the ISA board to determine the resources needed.
10. Use the UP and DOWN arrow keys to move the cursor to the generic ISA adapter definition. Follow the instructions at the top of the Step 3 screen to edit the settings of the generic board so that it uses the resources specified in the manufacturer's documentation.
11. Select the advanced command, then select the *Lock/Unlock* menu item. Follow the instructions on the screen to lock the generic ISA adapter definition board. A symbol is displayed to indicate that your board is locked.

    NOTE: After editing, it is important to lock the expansion board so that the COMPAQ EISA Configuration Utility will not try to change the settings of the board if other boards are added or modified.
12. Set the switches and/or jumpers on the board according to the board manufacturer's documentation.
13. Use Step 4 to view the required switch and jumper settings on the other boards. Note or print the required settings.
14. Use Step 5 to save the configuration. Turn off the computer and install the board. If required, make any switch and/or jumper changes to the other boards in the system.

Method 2 Example

You want to add an internal modem that can be configured at COM1 or COM2. The documentation for the expansion board indicates that COM1 requires IRQ4 and eight port addresses from 3F8 to 3FF. COM2 requires IRQ3 and eight port addresses from 2F8 to 2FF. After looking at available resources, you decide to use COM1, even though resources used by COM1 and COM2 are not available. Add the generic ISA adapter definition board, and edit the port address and IRQ resources and lock the board. Then set the switches and jumpers on the modem to use COM1.

The COMPAQ EISA Configuration Utility will try to reallocate system resources so that the expansion board which is using the resources associated with COM1 will be assigned other available resources.

INSTALLING AND USING AN OPERATING SYSTEM

This chapter describes what an operating system is, how to use FASTART, how to use the command line, frequently used commands, and how to back up data.

WHAT IS AN OPERATING SYSTEM?

An operating system is a program that controls the flow of information in the computer from the diskette or fixed disk to computer memory, and from computer memory back to the diskette or fixed disk. It instructs your personal computer how to interact with the hardware and software.

Some of the operating systems your computer can use include the following:

- MS-DOS
- OS/2
- UNIX

In determining which operating system(s) you will use, consider the following:

1. What operating system your application is written for
2. The type and amount of available software supported by the operating system
3. The desired user interface (what you see on the screen)
4. The ability to multitask (run more than one application at the same time)

An operating system is required to do the following:

- Direct all input (keyboard, mouse) and output (monitor, printer) devices. These devices are referred to as external devices.
- Allow you to install and start programs.
- Control the operation of the computer when you use application software, such as word processors, databases, and spreadsheets.
- Manage data storage and system memory.

INSTALLING AN OPERATING SYSTEM

You must install the operating system before installing any other software in the computer. This ensures that the software is recognized by the hardware.

Most operating systems have an installation utility to assist you in installation. MS-DOS as published by Compaq Computer Corporation includes an installation and configuration utility called FASTART.

USING FASTART TO INSTALL MS-DOS

FASTART is an MS-DOS installation, configuration, and maintenance program that simplifies the procedures required to prepare (or initialize) the computer for MS-DOS and User Programs. User Programs are COMPAQ software utilities designed to increase the performance of the computer. Refer to Chapters 7 and 8 for more information on these programs.

FASTART allows you to do the following:

- Partition and format the fixed disk.
- Copy MS-DOS files to a fixed disk.
- Copy the utilities from the User Programs diskettes to a fixed disk.
- Edit the *AUTOEXEC.BAT* and *CONFIG.SYS* files.
- Configure MS-DOS and User Programs for the computer.

If you already have MS-DOS and the User Programs utilities installed, FASTART allows you to update these utilities with the latest versions. FASTART also provides a fast and easy way to change the *AUTOEXEC.BAT* and *CONFIG.SYS* files without using a text editor.

To install FASTART, complete the following steps:

1. Insert the FASTART diskette that came in your MS-DOS package into drive A.
2. Turn on the computer. If the computer is on, press the CTRL + ALT + DEL keys to reset the system.
3. Follow the instructions on the screen.

Installing MS OS/2

The installation program included with MS OS/2 makes it easy to set up MS OS/2 on your personal computer.

To install and set up MS OS/2 on your system, complete the following steps:

1. Insert the MS OS/2 Program/Install diskette into drive A.
2. Turn on the computer. If the computer is on, reset it by pressing the CTRL + ALT + DEL keys.
3. Work through the installation program by following the instructions on each screen.

Using MS-DOS and MS OS/2 on the Same Drive

You can install MS-DOS and MS OS/2 on the same fixed disk drive by installing the DUAL BOOT utility located on the MS OS/2 diskettes or the diskettes in MS-DOS Version 5 as published by Compaq.

The DUAL BOOT utility configures your computer to start either with MS-DOS or MS OS/2 from the same fixed disk drive. Refer to your OS/2 documentation for information on the DUAL BOOT utility.

THE CONFIG.SYS FILE

The *CONFIG.SYS* file is used by the operating system (MS-DOS or MS OS/2) to give the computer important configuration information. Without this file, the computer would be unable to complete the startup sequence after you turn the computer on. It provides information to tell the computer about installed external devices and instructs the computer how to find the drivers for the devices. A driver is a program that includes information about a device.

A *CONFIG.SYS* file is created by the operating system with default configuration values. While many programs will work with these default values, it may be necessary to edit or change them to accommodate an application. Refer to the operating system documentation for information on how to edit the *CONFIG.SYS* file.

The operating system accesses the *CONFIG.SYS* file every time you turn on or reset your computer.

THE AUTOEXEC.BAT FILE

A batch file is any MS-DOS or MS OS/2 file that contains a series of commands in the file. By placing these commands in a batch file, you are not required to type the command every time you turn on the computer. The *AUTOEXEC.BAT* file is a special batch file that executes each time the computer is turned on or reset. For example, you may have a directory that you want to access often. By putting this directory in a batch file, you can access the application by typing the name of the batch file at the system prompt. Refer to the following pages for a definition of system prompt.

The extension for MS-DOS batch files is *.BAT*, for MS OS/2 the extension is *.CMD*. You do not need to type this extension when you type the name of the file.

The *AUTOEXEC.BAT* file for MS OS/2 provides information for the DOS session, while the *STARTUP.CMD* batch file provides information for full-screen OS/2 sessions. For MS-DOS, use the *AUTOEXEC.BAT* file to access certain programs each time you start the operating system. For OS/2, use the *STARTUP.CMD* file to access programs each time you start the operating system. Refer to the operating system documentation for more information on how to use these files.

USING THE COMMAND LINE

The command line is the area on the screen where you type MS-DOS or OS/2 commands. The command line is represented by the system prompt. The default system prompt for MS-DOS is *c>* (greater-than sign). The system prompt for MS OS/2 is *a:* . These system prompts can be changed using the PROMPT command.

Entering MS-DOS commands at the command line is not the only way to enter commands. You can also use an interface, such as MS-DOS Shell. You must have MS-DOS Version 5.0 to use the Shell.

MS OS/2 supplies a graphical interface to enter commands so that it is not necessary to use the command line.

You can use a graphical interface such as Windows if you prefer a graphics interface with your applications.

FREQUENTLY USED MS-DOS AND MS OS/2 COMMANDS

While there are many commands in MS-DOS and MS OS/2, some are used much more often than others. Refer to the MS-DOS or MS OS/2 documentation for more information. A list and description of each of these frequently used commands follows:

BACKUP

Makes a copy of your files. You can make backup copies of one file or all your files. The files can be copied to diskettes or a tape drive.

CD (Change Directory)

Changes to a different directory or displays the current path of the directory. To change to another directory, enter the following:

CD*new directory name*

CHKDSK (Check Disk)

Reports information about the status of your disk and will show how much disk space is remaining.

CLS (Clear Screen)

Clears the screen and positions the cursor at the top left corner of the screen. This is an MS-DOS command only.

COPY

Copies one or more files to the same disk or another disk. Use this command to copy files from a diskette to a fixed disk.

DEL (Delete)

Deletes one or more files from a disk.

DIR (Directory)

Lists the files in a directory. Use this command to see which files are in each directory. If there are too many files to fit on one screen, use the DIR /P command to stop the screen from scrolling after each full screen of text.

FORMAT

Prepares a diskette or fixed disk partition to accept files. You must format the fixed disk before installing the operating system, and you must format a diskette before copying files onto it.

CAUTION: Formatting a fixed disk will destroy the data on that disk. You should not need to format the fixed disk after you initially format and partition the disk. If you are formatting a diskette, remember to type the drive letter designator of the diskette drive, NOT the drive letter for the fixed disk drive.

MD (Make Directory)

Creates a new directory or subdirectory.

RD (Remove Directory)

Removes a directory. The directory you are removing must be empty (contain no files or subdirectories) before you can remove it. Also, you cannot be in the directory you plan to remove. If you are in the directory you want to remove, change directories (CD); then remove the directory you changed from.

XCOPY (Extended Copy)

Copies files and directories, optionally including any lower-level directories. To copy a directory and all of its subdirectories from one disk to another, use the XCOPY command.

COPYING THE OPERATING SYSTEM DISKETTES

Once you have completed the installation process for your operating system, you should make copies of your operating system and User Programs diskettes and store the originals in a safe place. Use the copies of these diskettes so that if they are ever damaged, the original diskettes are available.

To copy MS-DOS and User Programs onto diskettes, complete the following steps:

1. Insert the MS-DOS SYSTEM diskette into drive A.
2. Enter the following:

   ```
   A:
   ```

3. Enter the following:

   ```
   DISKCOPY A: A:
   ```

4. Insert the source diskette into drive A.

   NOTE: The original MS-DOS diskette you inserted into drive A is the source diskette. The target diskette is the blank diskette that you will use to make a copy of MS-DOS. The source and target diskettes must be the same type of media. For example, if one diskette is a 1.44-megabyte diskette, the other must also be a 1.44-megabyte diskette.

5. Press any key to continue. During the procedure, information is copied from the diskette into system memory. When the computer has copied as much information as it can into memory, the message, "Insert TARGET diskette in drive A:" is displayed.

6. Remove the source diskette from drive A.

7. Insert the blank (target) diskette into drive A.

8. Press any key to continue. The information that was copied into system memory from the source diskette is now transferred to the target diskette.

9. Remove the target diskette from the drive. Using a felt tip pen, label the new copy of MS-DOS as your working copy.

10. If you have more diskettes to copy, press Y when the "Copy another diskette (Y/N)?" message is displayed. This allows you to continue the DISKCOPY procedure with the remaining diskettes. Repeat Steps 4 through 10 with each of the diskettes to be copied.

11. When you have copied all of the original diskettes, press N when the "Copy another diskette (Y/N)?" message is displayed.

12. Store the original diskettes in an upright position where they will be protected from static electricity, magnetic fields, extreme temperatures, and humidity.

ESTABLISHING A BACKUP STRATEGY

It is always a good idea to have a regular backup strategy to prevent permanent loss of stored data. Backing up the fixed disk regularly can prevent data loss if anything destructive were to happen to the fixed disk. Establish a procedure that you perform regularly.

Here are a few guidelines to follow in creating a backup strategy:

- How often do you work on the computer?
- How critical is the data?
- How often do you have power surges in your workplace?
- Could you recover the data if you were to lose it from the fixed disk?

Answering these questions may help you decide how often you want to back up the fixed disk.

Included in a backup strategy is the procedure you use to back up. Some examples of ways to back up the system follows:

- Use a tape drive to back up the fixed disk drive.
- Back up your data onto a diskette. The amount of data that can be stored on a diskette, however, is limited and several diskettes may be required.
- If the computer is connected to a network, back up your data to a network drive.

SECURITY FEATURES

OVERVIEW

This computer offers multilevel security control to provide solutions for a variety of security needs. The following table identifies these features, their purposes and how they are established. Detailed descriptions and procedures for using these features are covered later in this chapter.

NOTE: This chart indicates how the utilities and switches function together. In most cases, you will not need to set a switch.

Security Features

Feature	Purpose	How it is Established
Power-On Password	Prevents use of the computer unless the password is entered	COMPAQ EISA Configuration Utility (Set power-on password = Enabled, Switch 5 on I/O board = OFF)
DriveLock Password	Prevents use of the fixed disk drive unless the password is entered	COMPAQ EISA Configuration Utility (Set DriveLock password = Enabled)
Keyboard Password	Disables keyboard input and the pointing device interface while computer is running at the system prompt	User Programs (KP Utility)
Quicklock/Quickblank	Disables keyboard without exiting an application, then enables it through a password. Quickblank allows user to blank the screen when invoking Quicklock	COMPAQ EISA Configuration Utility (Set quicklock password state = Enabled, Set quickblank state = Enabled)
Network Server Mode	Allows system startup from fixed disk drive or network while keyboard is disabled	COMPAQ EISA Configuration (Set network server mode = Enabled)

Continued

Security Features *Continued*

Feature	Purpose	How it is Established
Diskette Boot Control	Prevents system startup from the diskette drive	COMPAQ EISA Configuration Utility (Diskette boot control = Disabled, Switch 4 on I/O board = OFF)
Diskette Drive Control	Disables diskette drive	COMPAQ EISA Configuration Utility (Integrated Diskette Controller Standard Interface = Disabled)
Fixed Disk Drive Control	Disables integrated fixed disk drive	COMPAQ EISA Configuration Utility (Integrated Fixed Disk Controller Standard Interface = Disabled)
Serial Interface Control	Prevents transfer of data through the integrated serial interface	COMPAQ EISA Configuration Utility (Serial Interface = Disabled)
Parallel Interface Control	Prevents transfer of data through the integrated parallel interface	COMPAQ EISA Configuration Utility (Parallel Interface = Disabled)
Lock EISA Configuration	Locks the EISA configuration	Switch 2 on I/O board = On
Diskette Write Control	Prevents writing to diskette drive while allowing reads	Switch 3 on I/O board = On
External Keylock	Prevents access to internal components of computer	Key in locked position
Cable Lock Provision	Allows system to be physically secured to the desk	U-bolt and cable

USING A NATIONAL KEYBOARD WITH THE PASSWORD SECURITY FEATURES

If you are using one of the national keyboards listed in the following table, the command syntax may be different from that described in the following pages.

Use one of the characters below in place of the slash mark (/) in the command syntax.

National Keyboard Delimiters

Keyboard	Main Keypad Character	Numeric Keypad Character
Belgian	=	/
Danish	-	/
French	!	/
French Canadian	e	/
German	-	÷
Italian	-	/
Latin American	-	/
Norwegian	-	/
Spanish	-	/
Swedish/Finnish	-	/
Swiss	-	/

POWER-ON PASSWORD

Establishing a power-on password through the COMPAQ EISA Configuration Utility prevents unauthorized access to the computer at power-on, until the password is entered. The password must be entered each time the system is turned on, when the key icon ( ) appears on the monitor. Once the power-on password is established, the password also becomes the initial network server mode password and initial keyboard password.

The power-on password can be changed or deleted only at power-on. See the following pages for information on how to do this.

If you forget your password, you must disable the power-on password feature by using Switch 5 on the I/O board. Refer to the section, "Disabling the Password," in this chapter.

Establishing Power-On Password

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

1. Run the COMPAQ EISA Configuration Utility.
2. Select the main menu option to configure the computer.
3. Select Step 3.
4. Locate the power-on password on the screen and follow the instructions on the screen to establish it. The power-on password can be a maximum of seven characters.

   NOTE: After you establish the power-on password you may want to establish the DriveLock password, located on the same menu. If you use the same password for both power-on and DriveLock password, you only have to enter one password when you turn on the computer. However, if both passwords are the same, when you change or delete the power-on password, you also change or delete the DriveLock password.

5. Save the configuration and exit the utility.

   NOTE: The key icon appears only when the computer is turned on. Resetting the system using the CTRL + ALT + DEL keys does not require entering the password.

Entering the Power-On Password

To enter the password, complete the following steps:

1. Turn the computer on.
2. When the key icon appears on the monitor, enter the current password.

NOTE: If you have established both a power-on password and a DriveLock password, you will be prompted twice: first for the power-on password (key icon), then for the fixed disk drive password (cylinder followed by key icon). If both passwords are the same, you will be prompted only once, at the power-on password icon.

If you enter the password incorrectly, a broken key icon () is displayed. Try again. After three unsuccessful tries, you must turn the computer off and on again before you can continue.

NOTE: You must use the same keys each time you enter the password.

Changing the Power-On Password

To change the password, complete the following steps:

1. Turn the computer on.
2. When the key icon appears, enter

   current password/new password/new password

   Example: If *north* is the current password and *south* is the new password, enter

   north/south/south

The new password must be typed twice: the second time for verification. The new password takes effect the next time you turn on the computer.

NOTE: If both the power-on password and the DriveLock password are the same, when you change the power-on password, you also change the DriveLock password.

Deleting the Power-On Password

To delete the password, complete the following steps:

1. Turn the computer on.
2. When the key icon appears, enter

   current password/

   Example: If *north* is the current password, enter

   north/

The password is now deleted until you establish a new password through the COMPAQ EISA Configuration Utility.

NOTE: If both the power-on password and the DriveLock password are the same, when you delete the power-on password you also delete the DriveLock password.

Disabling the Power-On Password

If you forget your password and cannot access the computer, you can clear the power-on password by turning off the computer and setting Switch 5 on the I/O board to ON. This switch setting change does not take effect until the computer is turned on.

NOTE: If both the power-on password and the DriveLock password are the same, disabling the power-on password through Switch 5 does not disable the DriveLock password.

Reenabling the Power-On Password

To reenable the power-on password feature, turn off the computer and return the switch to the OFF position. You must also run the COMPAQ EISA Configuration Utility.

DRIVELOCK PASSWORD

Establishing a DriveLock password protects the information on the fixed disk drive, and is useful if you have sensitive or confidential information on your computer. The DriveLock password prevents access to information stored on the fixed disk drive until the password is entered. If you establish a DriveLock password, you must enter it each time you turn on the system, when the cylinder and key icon ( ) appears on the monitor.

There are two security levels:

- Maximum security. No password override is available with maximum security. This level is recommended for extremely sensitive data only. With maximum security, you can access the fixed disk only after the DriveLock password is entered.

CAUTION: If you select maximum security and forget the password, you must reformat the fixed disk drive to access it, and all data stored on the drive will be lost.

- High security. Password override is available with high security. As with maximum security, you can access the fixed disk only after the DriveLock password is entered. However, if you forget your password, you can contact your Authorized COMPAQ Computer Dealer for assistance.

Establishing the DriveLock Password

To establish the DriveLock password, complete the following steps:

1. Run the COMPAQ EISA Configuration Utility.

   NOTE: The icon ( ) appears only when the computer is turned on. Resetting the system using the CTRL + ALT + DEL keys does not require entering the password.

2. Select the main menu option to configure the computer.
3. Select Step 3.
4. Locate the DriveLock password on the screen and follow the instructions on the screen to establish it. The DriveLock password can be a maximum of seven characters.

   NOTE: You may want to establish both a DriveLock password and a power-on password, located on the same menu, at the same time. If you use the same password for both power-on and DriveLock passwords, you will only have to enter one password when you turn on the computer. However, if both passwords are the same, when you change or delete the power-on password, you change or delete the DriveLock password also.

5. Select level of security.

   NOTE: A warning screen will be displayed and you will be asked to confirm your selection.

6. Save the configuration and exit the utility.

Entering the DriveLock Password

To enter the DriveLock password, complete the following steps:

1. Turn the computer on.
2. When the icon ( ) appears, enter the current password.

NOTE: If both the power-on and DriveLock password are different, you will be prompted first for the power-on password (key icon), then for the DriveLock password. If both passwords are the same, you will be prompted only once, at the power-on password icon.

If you enter the password incorrectly, a broken key and cylinder icon ( ) is displayed. Try again. After three unsuccessful tries, you must turn the computer off and on again before you can continue.

NOTE: You must use the same keys each time you enter the password.

Changing the DriveLock Password

To change the password, complete the following steps:

1. Turn the computer on.
2. When the icon (cylinder and key) appears, enter

   current password/new password/new password

   Example: If *east* is the current password and *west* is the new password, enter

   east/west/west

The new password takes effect the next time you turn on the computer. If the power-on password and DriveLock password were the same, they are now different. Changing the DriveLock password does not change the power-on password.

Deleting the DriveLock Password

To delete the DriveLock password, complete the following steps:

1. Turn the computer on.
2. When the icon appears, enter

   current password/

   Example: If *east* is the current password, enter

   east/

The screen displays an unlock icon (∩).

The password is now deleted until you establish a new password through the EISA Configuration Utility.

NOTE: If both the DriveLock and power-on passwords were the same, the power-on password is still established; only the DriveLock password is deleted.

Changing the DriveLock Password Security Level

To change the security level of the DriveLock password, you must first delete the current DriveLock password as explained in the "Deleting the DriveLock Password" subsection of this chapter. Then establish a new DriveLock password and new security level through the COMPAQ EISA Configuration Utility.

KEYBOARD PASSWORD

The keyboard password feature enables or disables the keyboard and pointing device interface while the computer is running. This security feature prevents use of the keyboard and pointing device until you enter a keyboard password or turn the computer off.

To enable the keyboard password feature, the Keyboard Password (KP) utility, located on the User Programs diskette, must first be installed. Consult the *User Programs Reference* for procedures on how to install the KP utility. Once the keyboard password feature is enabled, you must go to the MS-DOS prompt to disable the keyboard and pointing device.

The keyboard password can be established in the following three ways:

- You can use an established power-on password as the keyboard password.
- You can change the keyboard password to be different from the established power-on password.
- You can set a keyboard password without establishing a power-on password.

Installing the KP Utility

Before you can use the keyboard password feature, the KP utility must be copied to the fixed disk of your computer or to the network server or host to which your computer is connected. Consult the *User Programs Reference* for procedures on how to copy KP to the fixed disk.

Using the Power-On Password as the Keyboard Password

If you established a power-on password using the COMPAQ EISA Configuration Utility, it becomes the keyboard password.

To disable the keyboard and pointing device, go to the MS-DOS or OS/2 prompt and enter the following:

```
KP
```

To enable the keyboard and pointing device, type your password and press the ENTER key.

Setting the Keyboard Password Without a Power-On Password

To establish the keyboard password and disable the keyboard and pointing device, complete the following steps:

1. Go to the MS-DOS or OS/2 prompt and enter the following:

   KP

2. Follow the instructions on the screen for establishing the password.
3. Press the ENTER key to disable the keyboard and pointing device.

To enable the keyboard and pointing device, type your keyboard password and press the ENTER key.

NOTE: When you turn off the computer, the keyboard password is cleared.

Changing the Keyboard Password

You can change the keyboard password to be different from the established power-on password by completing the following steps:

1. Go to the MS-DOS or OS/2 prompt and enter the following:

   KP/C

2. Follow the instructions on the screen for establishing the new password and disabling the keyboard and pointing device.

To enable the keyboard and pointing device interface, type the new keyboard password and press the ENTER key.

NOTE: When you turn off the computer, the keyboard password reverts to the current power-on password, if any.

QUICKLOCK/QUICKBLANK

By enabling quicklock and quickblank through the COMPAQ EISA Configuration Utility, the keyboard and the pointing device interface connected to the built-in mouse connector can be disabled and the screen blanked while within an application. Entering a quicklock hot-key combination (CTRL + ALT + L) disables the keyboard and the pointing device interface. If quickblank is not activated, the application remains in view on the monitor screen, but cannot be accessed.

NOTE: The quicklock hot-key combination can be changed if it conflicts with your application software. To change the hot-key combination, the KP utility must be used. Consult the *User Programs Reference* for procedures on how to use the KP utility.

To reenable the input device interface, make the application reappear on the screen, and access the application, you must enter the keyboard password or power-on password that you established in the KP utility or COMPAQ EISA Configuration Utility.

Enabling Quicklock and Quickblank

To enable quicklock and quickblank, complete the following steps:

1. Run the COMPAQ EISA Configuration Utility.
2. Select the main menu option that allows you to configure the computer.
3. Select Step 3.
4. Locate the quicklock password and quickblank items on the screen and follow the instructions on the screen to enable them.
5. Save the configuration and exit the utility.

The quicklock hot-key combination is now in effect. For quickblank to work, a COMPAQ video board must be installed.

Changing the Quicklock Hot-Key Combination

You can change the hot-key combination using the KP utility.

Go to the operating system prompt and enter the following:

KP/Q*n*

The value of ***n*** can be any alphabetic key from A to Z or numeric key from 0 to 9.

NOTE: You must use the same keys each time you enter the password.

When you turn off the computer, the changed hot-key combination reverts to CTRL + ALT + L. To preserve the change, add the KP/Q*n* command to your *AUTOEXEC.BAT* file. Refer to your operating system documentation for instructions on how to edit the *AUTOEXEC.BAT* file.

Disabling the Keyboard and Pointing Device Interface

Once in an application, press and hold the CTRL and ALT keys while pressing the value for ***n***.

The keyboard and input device connected to the mouse connector are disabled. The application cannot be accessed now, but remains in view on the monitor screen, unless the quickblank feature was enabled through the COMPAQ EISA Configuration Utility.

Enabling the Keyboard and Pointing Device Interface

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

NOTE: For security, x's appear in place of the characters you type on the screen. The application will not be affected by the characters typed.

NETWORK SERVER MODE

Enabling the network server mode feature through the COMPAQ EISA Configuration Utility allows the computer to be started from a fixed disk drive, network server, or host while the keyboard and pointing device interface are disabled. This provides security if the computer operates unattended. To enable the input devices, a power-on password must be established and entered.

NOTE: The password remains in effect as a power-on password when the network server mode is disabled.

Enabling the Network Server Mode

To enable the network server mode, complete the following steps:

1. Run the COMPAQ EISA Configuration Utility.
2. Select the main menu option that allows you to configure your computer.
3. Select Step 3.
4. Locate the network server mode item(s) on the screen and follow the instructions on the screen to enable it.
5. Save your configuration and exit the utility.

The network server mode is now in effect.

NOTE: The network server mode cannot be enabled when the DriveLock Password is set.

Disabling the Network Server Mode and Retaining Power-On Password

To disable the network server mode and retain the power-on password, complete the following steps:

1. Run the COMPAQ EISA Configuration Utility.
2. Select the main menu option that allows you to configure your computer.
3. Select Step 3.
4. Locate the network server mode item(s) on the screen and follow the instructions on the screen to disable it.
5. Save your configuration and exit the utility.

Disabling the Network Server Mode and Deleting Power-On Password

To disable the network server mode and delete the power-on password, complete the following steps:

1. Do one of the following:
   - Insert the System Configuration diskette into drive A and turn the computer on.
   - If running configuration from the fixed disk, turn on the computer, press the **F1** key, then the **F10** key.
2. When the key icon displays, enter the following:

   current password/

   Example: If *north* is the current password, enter

   north/

3. Select the main menu option that allows you to configure your computer.
4. Select step 3
5. Locate the network server mode item(s) on the screen and follow the instructions on the screen to disable the configuration.
6. Save your configuration and exit the utility.

The network server mode and the power-on password are now disabled.

OTHER SECURITY FEATURES

The following features are set through the COMPAQ EISA Configuration Utility or the system switches located on the I/O board.

Diskette Boot Control

This feature enables and disables system startup from the diskette drive. Disabling diskette boot prevents the drive from being used to start the computer. The drive, however, remains active for all other functions such as reading from or writing to a diskette.

Diskette Drive and Fixed Disk Drive Controls

These features enable and disable the read and write operations of the diskette drive and the fixed disk drive. By disabling the drives, a system with drives installed is logically converted into a diskless model.

Serial Interface and Parallel Interface Controls

These features enable and disable the integrated serial and parallel interfaces. Disabling the serial and parallel interfaces prevents data from being transferred through these interfaces.

Lock EISA Configuration

Enabling the lock on EISA Configuration prevents accidental or unauthorized modification of the system configuration information. Once disabled, the system configuration information can be viewed and printed, but the system configuration cannot be changed. This control feature is established through Switch 2 on the system board.

Diskette Write Control

This feature enables and disables the write operation to the diskette drive. Disabling diskette write prevents data from being written onto a diskette. Data can, however, still be read from the diskette. Diskette write control is similar to the function of a write-protect tab on a diskette, except that it is accomplished through Switch 3 on the I/O board.

PHYSICAL SECURITY

External Keylock

The external keylock protects the internal components of the computer. Turn the key clockwise to its locked position to prevent removal of the system unit cover.

Cable Lock Provision

The cable lock provision allows you to secure the computer to your desk using a lock and cable.

INSTALLING APPLICATION SOFTWARE

This chapter provides general information on installing applications, installing COMPAQ device drivers, configuring memory for your applications, and installing a mouse driver.

INSTALLING AN APPLICATION

Application software are programs that perform specific tasks, such as database management, word processing, financial management, and graphic illustration. This is unlike system software or operating systems that maintain and organize the system.

Each application program usually includes its own installation program and/or documentation that explains the procedures required to install the application. However, there are certain considerations that should be made before installing the application. They are as follows:

- How much disk space is required?
- How much random access memory (RAM) is required to run the application?
- What type of memory does the application use? Expanded or extended?
- What type of operating system (MS-DOS, MS OS/2, UNIX) is required?
- What type of monitor and video board is required?
- What printers are supported by the application?
- Are any other programs required to run the application?

During the installation process on MS-DOS systems, some applications ask if you would like them to update your *AUTOEXEC.BAT* and *CONFIG.SYS* files. The application will update the *CONFIG.SYS* file to configure memory in the best way to run the application. However, be cautious because while this application may want all expanded memory, you may have another application that requires extended memory. The application you just installed may run well, while another application may not even run after the configuration change.

You can edit the *AUTOEXEC.BAT* file to add the application to the PATH statement so that you can access the program from any directory on your fixed disk.

If you do not want your files automatically changed, you can edit them with a text editor and make all necessary changes. Remember to reset your computer (CTRL + ALT + DEL) whenever you make changes to either the *CONFIG.SYS* or the *AUTOEXEC.BAT* files. Refer to the documentation that came with the application for specific installation and configuration procedures.

COMPAQ DEVICE DRIVERS

Device drivers are programs that extend the capabilities of the operating system by enabling the operating system to work with specific hardware and software. The device drivers described in this section are designed to enhance the performance of COMPAQ personal computers.

Most of the COMPAQ device drivers are located on the User Programs diskettes. Following is a partial list of the software programs for which device drivers are supplied on User Programs:

- Microsoft Windows 3.0
- Novell NetWare (refer to the User Programs documentation for specific supported versions)
- Autodesk Version 10 and 11 products (for the Advanced VGA system)
- MS OS/2 Version 1.2 (for the Advanced VGA system)
- MS-DOS device drivers (for example, CEMM, CACHE, VDISK)

Microsoft Windows Device Drivers

The Windows device drivers enable certain applications to take full advantage of the Advanced Video Graphics System. Graphics operations, such as menu scrolling, pop-up menus, and pull-down menus, have improved performance with these COMPAQ drivers.

To install and use these device drivers, you will need a working copy of Microsoft Windows Version 3.0.

NOTE: If you have loaded an application on your system with a run-time version of Windows, you should delete the application and reinstall it. Take care not to delete your data files.

For complete instructions on how to install the Windows device drivers, refer to the *User Programs Reference*.

Advanced VGA Device Drivers

Advanced VGA is a 16-bit, 256-color video graphics system that comes standard with the computer. To take advantage of Advanced VGA, you must install the Advanced VGA device drivers located on the User Programs diskette. Device drivers are supplied to support the Autodesk Version 10 and 11 products (AutoCAD, AutoShade, AutoSketch), Windows Version 3.0, and MS OS/2 Version 1.2.

Many other applications also support 256 colors. If your application supports 256 colors and a driver that is not supplied on the User Programs diskette, refer to the documentation that came with the application for information on the device driver.

Refer to the *User Programs Reference* for information on how to install these device drivers.

MEMORY-RESIDENT AND MEMORY-NONRESIDENT SOFTWARE

Any program that is currently running is memory-resident software. When the software stops running, the memory it occupied is released back to the operating system for other programs to use. Terminate-and-stay-resident (TSR) software is memory-resident software that does not release memory back to the operating system. It stays in memory in a dormant state until activated.

This simply means that the TSR is designed to remain in memory at all times, enabling you to access it with a keystroke combination, even if another program is in memory. For example, you may be working in a word processing program and wish to check your schedule on a TSR scheduling program. With a TSR, you would simply press a key and the TSR would display on the screen while the word processing package continues to stay in memory.

When device drivers and TSRs are loaded in base memory, they are loaded at the lowest available address space. Each device driver or TSR uses the next available address space until base memory is full. Device drivers and TSRs occupy memory even when they are not being used. This memory remains unavailable to other programs until you remove the device driver or TSR from base memory.

Caution should be taken using TSRs with MS-DOS because MS-DOS needs the same base memory that the TSRs use. MS-DOS is unable to keep one program from using the memory of another program, possibly causing a system crash. Protected mode operating systems can protect programs that are running simultaneously from invading each other's memory space. MS-DOS runs under real mode, an operating mode that allows a program to have a definite storage location in memory.

You should also use TSRs with caution because of the amount of memory they use in an MS-DOS environment. If, for example, you have an application that requires 640 Kbytes to run, and you only have that amount of memory available, then you cannot load a TSR into base memory. You can, however, load the TSR into upper memory using a User Programs utility called RUNHI. Refer to the section, "Configuring Memory for Your Applications," in this

CONFIGURING MEMORY FOR YOUR APPLICATIONS

To configure memory to run with an application, you must first be familiar with the way the system memory is partitioned. Following is a description of system memory.

Base, upper, high, extended, and expanded memory are the main types of memory in an MS-DOS environment. Each type is accessed from different areas of system memory and different techniques are used to access each type of memory.

Memory falls into two categories: read only memory (ROM) and random access memory (RAM). ROM is memory that is used for system hardware. ROM is permanent and will not be erased when you turn off the computer.

RAM is the area your computer uses to run applications. The contents of RAM is not permanent and will be lost when you turn off the computer, unless you save the information to a storage media. All reference to memory in this chapter refers to RAM, unless otherwise stated.

Base Memory Area

Base memory, or conventional DOS memory, is the memory between 0 and 640 Kbytes. MS-DOS uses some of this memory to operate, and the rest is used to run MS-DOS applications.

Upper Memory Area

The Upper Memory Area ranges from 640 to 1024 Kbytes. System hardware, such as video buffers and system ROM use upper memory.

Since the need to run several programs at once has increased, hardware devices and software utilities have been created that allow MS-DOS to use available sections of upper memory. With these utilities, you can load device drivers and TSRs into upper memory. This frees base memory for use by other programs, such as word processors and databases. The RUNHI utility for MS-DOS provides the ability to use upper memory. Refer to the *User Programs Reference* for more information.

High Memory Area

Memory beyond the first megabyte is called extended memory. The first 64-Kbyte section of extended memory is called the High Memory Area (HMA), and the rest is called the Extended Memory Area (EMA).

The High Memory Area can be used to load portions of system files. This frees base memory for other programs. The HIMEM utility on the User Programs diskette manages this memory area. Refer to the *User Programs Reference* for more information.

Extended Memory Area

Memory beyond the High Memory Area is called the Extended Memory Area. Because extended memory has a higher address range than most MS-DOS applications, these applications cannot usually use extended memory. To access this memory, the system must switch to one of two different modes, protected or virtual.

Different methods of accessing extended memory have been created. For example, many applications use DOS extenders that allow MS-DOS applications to access extended memory using the protected mode. DOS extenders are often built into memory-intensive MS-DOS applications, such as spreadsheets and desktop publishing systems. The HIMEM utility manages this memory area. Refer to the *User Programs Reference* for more information.

There are other methods of accessing extended memory that are explained fully in the *MS-DOS Reference Guide*. Also refer to the documentation that came with your application to see if it uses extended memory.

You can access extended memory using the User Programs utilities CACHE, VDISK, and HIMEM.

Expanded Memory

Expanded memory does not physically reside in system memory address space. You need a memory manager (for example CEMM) to access expanded memory. Also expanded memory does not physically reside in the 640-Kbyte address space. Expanded memory can be accessed through sections of available upper memory using the Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS). CEMM adheres to this specification.

Using EMS Version 3.2, MS-DOS applications can access expanded memory through a 64-Kbyte section of upper memory called a page frame. The page frame consists of four 16-Kbyte sections of memory. Each section is called an EMS page. Using EMS Version 4.0, the EMS 3.2 page frame still exists, but MS-DOS applications can also access memory through additional EMS pages. The COMPAQ utility CEMM supports EMS 4.0.

Mapping memory through EMS pages makes it available for use by MS-DOS applications. To map memory, a computer needs a memory manager, such as CEMM. CEMM converts available extended memory so that it can be used as expanded memory.

Determining the Kind of Memory Required by an Application

To find out which memory type your application requires, look at the documentation that came with the application. If it recommends using expanded memory, then use CEMM. If the application requires extended or expanded memory, you may need to load HIMEM before CEMM. Refer to the next page for information on HIMEM.

Following is a description of each of the memory utilities that are available on the User Programs diskette.

CEMM.EXE

The COMPAQ Expanded Memory Manager (CEMM) is a utility that extends the 640-Kbyte memory limit imposed by MS-DOS and allows MS-DOS applications to use more memory. This utility is useful when you want to load a large application or run more than one program at the same time.

Before using the CEMM commands, you must add the *CEMM.EXE* device driver to your system's *CONFIG.SYS* file.

As CEMM supports the eXtended Memory Specification (XMS), CEMM can provide access to extended memory in virtual mode. CEMM takes this extended memory and can map it into upper memory, creating Upper Memory Blocks (UMBs). These UMBs may then be used by MS-DOS applications. CEMM does not require any additional memory hardware.

Refer to the *User Programs Reference* for detailed information on how to install and use CEMM.

HIMEM.EXE

The HIMEM utility allows MS-DOS programs to access extended memory using the eXtended Memory Specification (XMS). It allows MS-DOS programs to use the high memory area (HMA) and the Upper Memory Blocks (UMBs).

Before using the HIMEM command, add the *HIMEM.EXE* device driver to your system's *CONFIG.SYS* file. Refer to your MS-DOS documentation for instructions on how to add commands to the *CONFIG.SYS* file. Once *HIMEM.EXE* is added, you can use the HIMEM command to display information about the memory on your system.

Refer to the *User Programs Reference* for detailed information on how to install and configure HIMEM.

RUNHI

The RUNHI utility helps optimize the way your system uses memory by loading and running device drivers and TSRs in upper memory (640 to 1024 Kbytes). Normally, MS-DOS applications use base memory (0 to 640 Kbytes), and system hardware devices use upper memory. RUNHI loads programs, such as CACHE and VDISK, in available sections of upper memory, letting MS-DOS use base memory for additional applications.

By adding RUNHI to the *CONFIG.SYS* file, you can load other device drivers in upper memory. When you use RUNHI as a command, you can load TSRs in upper memory. The RUNHI command also provides statistics on system memory.

Refer to the *User Programs Reference* for detailed installation and configuration information on RUNHI.

CACHE.EXE

The disk CACHE utility can improve performance by decreasing the time needed to access fixed disk data. Copies of the most recently accessed data and the data expected to be accessed next are placed in a portion of memory called the disk cache. Each time a sector of data is requested, the system checks to see if the data is already in the disk cache. If it is there, the data is transferred to main memory without performing a disk-read operation. This greatly reduces the amount of time needed to retrieve data in applications that are disk-read intensive.

The CACHE utility allows you to use the queued writes option. A queued write consists of writing one sector of data into the queue. Once queued, control is returned to the application you are using. The queued writes option improves performance in applications that perform single sector writes.

Before using the CACHE command, add the *CACHE.EXE* device driver to your system's *CONFIG.SYS* file. Refer to the *User Programs Reference* for detailed installation and configuration information on CACHE.

VDISK.SYS

VDISK allows you to use a portion of the computer memory as a disk drive. These disks are referred to as virtual disks (VDISKs) and are much faster than mechanical disk drives as they operate at the speed of the computer memory. VDISKs provide the same function as RAM drives. Any files on the VDISK are lost when power to the computer is interrupted. Therefore, any data that is to be retained must be stored on a physical diskette or fixed disk before turning off or resetting the computer.

You must install the *VDISK.SYS* device driver in the *CONFIG.SYS* file to set the size of the virtual disk. This also establishes whether the VDISK is created in base, extended, or expanded memory.

Refer to the *User Programs Reference* for detailed installation and configuration information on VDISK.

MEMORY CONFIGURATION EXAMPLE

An example is presented here to help you set up your *CONFIG.SYS* file using eight megabytes of standard memory. The example is set up according to the type of applications you may be running and is only a suggestion on how you could configure memory.

If you are using a spreadsheet and a database, you may set up the memory configuration of your system by editing the *CONFIG.SYS* file to include the following lines:

```
DEVICE = HIMEM.EXE
DEVICE = CEMM.EXE RAM 2560
DEVICE = RUNHI.EXE VDISK.SYS 3072 /E:8
DEVICE = RUNHI.EXE CACHE.EXE 2560 /EXT
```

Each line of the previous file is explained below:

- DEVICE = HIMEM.EXE–Manages the use of extended memory by applications. It allows programs to access extended memory using the XMS.
- DEVICE = CEMM.EXE RAM 2560–Loads CEMM and specifies that CEMM map extended memory into upper memory creating Upper Memory Blocks. It sets the amount of extended memory that CEMM provides as expanded memory to 2560 Kbytes.
- DEVICE = RUNHI.EXE VDISK.SYS 3072 /E:8–Loads VDISK into upper memory using the RUNHI command with a virtual disk size of 3072 Kbytes in extended memory (/E). The 8 represents the maximum number of sectors to transfer to extended memory at one time.
- DEVICE = RUNHI.EXE CACHE.EXE 2560 /EXT–Loads CACHE into upper memory using the RUNHI command with a disk cache of 2560 Kbytes in extended memory (/EXT).

INSTALLING A MOUSE DRIVER

Many applications today have mouse support included. However, that does not always mean that you can load the program and a mouse will work. You may first have to install a mouse driver that comes with the mouse and add a DEVICE command to your *CONFIG.SYS* file. Next, you must remember to connect the mouse to the rear of the system unit. The type of mouse you purchase will determine if you plug the mouse into a serial connector or the pointing device connector. Refer to the subsection, "Connecting a Mouse," in Chapter 2 for more information.

Refer to the documentation that came with the mouse for installation instructions.

GETTING THE BEST PERFORMANCE FROM YOUR COMPUTER

This chapter provides information on how the operating system and the User Programs utilities can help to optimize the performance of your computer. It also provides information on how memory caching can increase performance.

Following is a table listing some of the User Programs utilities and COMPAQ device drivers that can assist you in optimizing the performance of the computer. For a complete list, refer to the *User Programs Reference*. Also listed in the table is a brief description of the command and a reference to where you can obtain detailed information on the utility or device driver. Following the table is a brief description of each of the utilities and how they can be used to optimize the computer.

Utilities to Optimize the Computer

Utility	Description
CACHE	Decreases the time it takes for applications to access data from the fixed disk.
CEMM	Lets MS-DOS applications use up to 32 megabytes of additional memory.
RUNHI	Lets you load and run device drivers and TSRs in memory between 640 and 1024 Kbytes, freeing base memory.
VDISK	Creates a disk drive in memory (a virtual disk) that speeds up data access.
Windows device drivers	Improves performance when using Microsoft Windows with the video graphics system for graphic operations.

IMPROVING DATA ACCESS TIME (CACHE)

The disk CACHE utility can improve system performance by decreasing the time it takes for applications to access data from the fixed disk. Applications that require several disk reads, such as data retrieval from databases, can improve performance when CACHE is used.

Queued writes is a disk CACHE feature that significantly speeds up memory applications. This feature allows you to write new data to your system without having to wait for disk writes to occur.

PROVIDING EXPANDED MEMORY USAGE (CEMM)

CEMM extends the 640-Kbyte memory limit imposed by MS-DOS and allows MS-DOS applications to use more memory. Entering the *CEMM.EXE* device driver to the *CONFIG.SYS* file adds up to 256 Kbytes of expanded memory. You can access even more expanded memory for your system by using the *size* parameter and entering the number of Kbytes of expanded memory you wish to use.

OPTIMIZING MEMORY MANAGEMENT (RUNHI)

The RUNHI utility helps optimize the way your system uses memory by loading and running device drivers and Terminate-and-Stay-resident (TSR) programs in upper memory (640 to 1024 Kbytes). Normally MS-DOS applications use base memory and system hardware devices use upper memory. RUNHI loads programs, such as CACHE and VDISK, in available sections of upper memory, letting MS-DOS use base memory for additional applications.

Using RUNHI you can do the following:

- Use programs that are too large to run in available base memory.
- Increase the memory available for other applications.
- Speed up the time it takes for large programs to operate and access data.
- Use programs you previously could not run because of memory limitations.
- Link upper memory to base memory so that MS-DOS applications can automatically access upper memory.

IMPROVING DISK ACCESS TIME (VDISK)

VDISK lets you use a portion of memory as a disk drive. These disk drives, known as virtual disks (VDISKs), are faster than mechanical disk drives since they operate at the speed of your computer memory. Because the VDISK is created from RAM, you lose any information in the VDISK when you turn off your computer or when the power is interrupted. To retain data from a VDISK, you must save it to a diskette or fixed disk.

You can create several VDISKs. VDISKs are created sequentially (one after the other), and up to 12 VDISKs can be installed by the FASTART utility.

ENHANCING WINDOWS PERFORMANCE (Windows Device Drivers)

The Windows device drivers supplied on the User Programs diskette enable certain applications to take advantage of the Advanced VGA system. Graphics operations, such as menu scrolling, pop-up menus, and pull-down menus show improved performance with these COMPAQ drivers.

CORRECTING DISK PROBLEMS (CHKDSK)

CHKDSK is an MS-DOS command that checks the directories and files on a disk for errors and provides a disk and memory status report. You should run CHKDSK on each diskette and occasionally on the fixed disk drive to verify that the directory structure is correct.

If you specify the /F switch, the CHKDSK command corrects errors if it finds any clusters allocated to the File Allocation Table (FAT) but not allocated to a file. The CHKDSK command does not correct errors on a disk unless you specify the /F switch. To use the CHKDSK command to correct errors, enter the following at the command line:

```
CHKDSK /F
```

MAINTAINING AND TRAVELING WITH THE COMPUTER

This chapter provides information on general cleaning and maintenance steps required to keep the computer working properly. It also gives suggestions on traveling with the computer and where to place the computer when operating it.

WHERE TO OPERATE THE COMPUTER

The location of the computer when being operated is very important to ensure that it functions properly.

- Operate the computer on a sturdy, level surface such as a desk or table. Leave a 3-inch (7.6 cm) clearance at the back and sides of the computer to permit required airflow.
- Ensure that the expansion slot covers are in place.
- To prevent strain on the cable connectors, place the computer so that all external device cables can easily reach the expansion slots.

ROUTINE CARE

Follow these suggestions to protect the computer and display.

- Keep the computer away from excessive moisture, direct sunlight, and extremes of heat and cold. See Appendix B for recommended temperature and humidity ranges.
- Keep liquids away from the computer and keyboard.
- Never cover the ventilation slots with any type of material.

! IMPORTANT: For the next two suggestions, be sure the computer is turned off.

- Occasionally wipe the exterior of the computer and display with a soft cloth moistened with water.

CAUTION. To prevent damage, do not use a cloth moistened with soap or window cleaner to clean the display.

- Occasionally clean the air vents on the back and sides of the computer. Lint and other foreign matter can block the vents and limit the airflow.

AUTOMATIC SYSTEM PROTECTION

The computer is designed to protect the hardware components by automatically turning off if the computer overheats.

CAUTION: Overheating occurs if the airflow is restricted or if the computer operates outside the specified environmental ranges. If the computer turns off, unsaved data may be lost.

If the computer overheats and turns off:

1. Turn off the computer.
2. Ensure that the system meets the environmental requirements described in the "Where to Operate the Computer" section in this chapter.
3. Allow time for the system to cool.
4. Turn on the computer.

TRAVEL

In preparation for traveling with the computer, complete the following steps:

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

   NOTE: The fixed disk drive heads automatically park when the system power is turned off.

2. Remove any diskettes from the diskette drive.
3. Turn off the computer and external devices.
4. Disconnect the AC power cord from the AC outlet, then from the computer.
5. Disconnect the system components and external devices from their power sources, then from the computer.

NOTE: See Appendix B, "System Specifications," and Appendix C, "Power Cord Set Requirements," for information about environmental operating ranges and power cord selection.

TROUBLESHOOTING

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

HELPFUL HINTS

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

- Check that the computer is plugged into a working outlet.
- Check to see that the computer is turned on and the power light is green.
- Press any key more than 15 times quickly. If the system beeps, then your keyboard should be operating correctly.
- Check all cable connections for loose connections or incorrect connections.
- Make sure you ran the COMPAQ EISA Configuration Utility after installing EISA boards and other options (memory, disk drives) and before installing ISA boards.
- Check that all switch settings have been set as dictated by the COMPAQ EISA Configuration Utility.
- Ensure that all the needed device drivers have been installed (for example, if you are using a mouse, you need a mouse device driver).
- Ensure that you have made all necessary changes to the *CONFIG.SYS* file.
- Ensure that you have made all necessary changes to the *AUTOEXEC.BAT* file.
- Make sure that all printer drivers have been installed for each application.
- Take out all diskettes from the diskette drives when you turn on your system.

MESSAGES ON THE SCREEN

Many times, a message or prompt is displayed on the screen. This message does not necessarily mean that an error condition occurs. It may simply be the system prompt or an information message.

Some examples of information messages follow:

- Backing up files to drive A:–This is an informational message to indicate that MS-DOS is backing up a file to the diskette in drive A.
- A>–This is a prompt indicating that you are working off drive A.
- C>–This is the prompt indicating that you are working off the fixed disk drive.

RUNNING DIAGNOSTICS

The Diagnostics software is used to help you identify a problem you may have with the operation of the computer. If you encounter an error condition, complete the following steps before starting problem isolation procedures:

NOTE: Ensure proper ventilation. The computer should have a 3-inch (7.6 cm) clearance at the front and back of the computer.

1. Turn off the computer and all external devices.
2. Disconnect any external devices other than the monitor and keyboard. Do not disconnect the printer if you want to test it or use it to log error messages.
3. Run the latest version of Diagnostics from diskette or fixed disk.

RUNNING THE INSPECT UTILITY

The Diagnostics diskette contains a utility called INSPECT. This utility provides information about your system once it has been configured. INSPECT operates with MS-DOS and in the MS-DOS emulation mode of MS OS/2.

The INSPECT utility provides information such as the contents of the operating system startup files, the current memory configuration, and the ROM version installed in the system. You can use INSPECT to display, print, or save this information. Your Authorized COMPAQ Computer Dealer may ask you to use this utility to assist in analyzing the system.

To run INSPECT from a diskette drive:

1. Insert the latest version of the DIAGNOSTICS diskette into drive A.
2. Turn the computer on or reset the system by pressing the CTRL + ALT + DEL keys.
3. Select the *Inspect* option from the menu.
4. Follow the instructions on the screen.

SOLVING DISK PROBLEMS

If you encounter disk problems, some common causes and solutions 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.
	Software program is damaged.	Check the program diskettes.
Diskette drive cannot write to a diskette	Diskette is not formatted.	Format the diskette.
	Diskette is write-protected.	Do not write to a write-protected diskette, use another diskette.
	Writing to the wrong drive.	Check the drive letter in your path.
	Not enough space is left on the diskette.	Use another diskette to write the information to.
	Diskette write control is disabled.	Check your security feature settings.
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.

SOLVING DISPLAY PROBLEMS

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

Problem	Cause	Solution
Garbled characters on the screen mixed with text	The *ANSI.SYS* driver is not in the *CONFIG.SYS* file.	You may need to add the *ANSI.SYS* driver to the *CONFIG.SYS* file. Add the following line to the file: DEVICE = C:\ANSI.SYS
Dim characters	The brightness control is not set properly.	Adjust the brightness control.
Screen goes blank	You may have a screen blanking utility installed.	Press any key. If the display reappears, then you have a screen blanking utility installed.
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 on the key should not be on.
Text does not display on internal display	External monitor is attached.	Either disconnect the external monitor or press **CTRL** + **ALT** + > in a DOS environment.

You can perform a self-test on the VGA color and monochrome monitors without the monitor being connected to the computer. Complete the following steps to run the self-test:

1. Turn off the monitor.
2. Turn off the computer.
3. Disconnect the monitor signal cable from the computer.
4. Turn on the monitor and allow it to warm up for one minute.

The screen should be white. A narrow black border may also appear on the left and right sides of the display. Either of these displays indicates that the monitor is working properly.

SOLVING PRINTER PROBLEMS

If you encounter printer problems, some common causes and solutions are 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 AC 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 off line	The printer may be out of paper.	Check the paper tray and refill it if it is empty. Select online.

Also, refer to the documentation that came with your printer for assistance on solving printer problems.

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.	Check your *CONFIG.SYS* file for the present memory configuration using FASTART and edit the file.
	You have run out of memory to run the application.	Check the application's documentation to determine the memory 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 Configuration utility.
Insufficient memory error during operation	Too many TSRs are installed.	Delete any TSRs that you do not need.
	You have run out of memory for your application.	Check the memory requirements for the application.

SOLVING SOFTWARE PROBLEMS

Most software problems occur as a result of the following:

- The application was not installed correctly.
- The *CONFIG.SYS* file was not configured correctly.
- Memory was not allocated correctly.
- The *AUTOEXEC.BAT* file was not edited correctly.
- There is a conflict between applications.

DEALER SERVICE

Your Authorized COMPAQ Computer Dealer is available to answer your questions, install options, and service your computer.

If you take the computer to your Authorized Dealer for service, remember to take the keylock key. If the DriveLock feature is set, back up your system, remove sensitive data, and clear the DriveLock password.

Record your Authorized Dealer's name, address, and telephone number on the System Information Record located in the *Setup Instructions* in this package.

The system board has a real-time battery/clock module that contains an integral lithium battery that may explode if it is mistreated or incorrectly replaced.

WARNING: The integral lithium battery must be replaced by your Authorized COMPAQ Computer Dealer only. There is a danger of explosion if the lithium battery is incorrectly replaced.

POST ERROR MESSAGES

This appendix provides a table of the Power-On Self-Test (POST) error messages, and a brief list of the common MS-DOS error messages.

The following table lists the error codes that you may encounter during POST. If an error code is displayed on the screen during POST or after resetting the system, follow the instructions in the chart.

POST Error Codes

Error Code	Probable Source of Problem	Action
101-ROM Error	System ROM checksum	Contact your Authorized COMPAQ Computer Dealer.
101-I/O ROM Error	Options ROM checksum	Contact your Authorized COMPAQ Computer Dealer.
102-System Board or System Memory Failure	Timer failure, DMA failure, memory refresh failure	Contact your Authorized COMPAQ Computer Dealer. Run the COMPAQ EISA Configuration Utility.
162-System Options Error Not Set	Configuration incorrect or no diskette drive	Run the COMPAQ EISA Configuration Utility.
163-Time & Date Not Set	Invalid time or date in configuration memory	Run the COMPAQ EISA Configuration Utility.
164-Memory Size Error	Configuration memory incorrect	Run the COMPAQ EISA Configuration Utility.
170-Expansion Device Not Responding	EISA board not ready after power-on delay	Run the COMPAQ EISA Configuration Utility.
172-EISA Configuration Nonvolatile Memory	Nonvolatile configuration memory corrupt, or jumper installed	Run the COMPAQ EISA Configuration Utility.
173-EISA Slot ID Mismatch	Board replaced. Configuration not updated	Run the COMPAQ EISA Configuration Utility.

Continued

POST Error Codes *Continued*

Error Code	Probable Source of Problem	Action
174-EISA Configuration Slot Mismatch	EISA board not found	Run the COMPAQ EISA Configuration Utility.
175-EISA Configuration Slot Mismatch	EISA board added, configuration not updated	Run the COMPAQ EISA Configuration Utility.
176-Slot with Unreadable ID	EISA board in slot that should contain ISA board	Run the COMPAQ EISA Configuration Utility.
177-Configuration Not Complete	Incomplete EISA configuration	Run the COMPAQ EISA Configuration Utility.
178-Processor Configuration Invalid	System board type invalid or step does not match configuration memory	Run the COMPAQ EISA Configuration Utility.
201-Memory Error	RAM failure	Contact your Authorized COMPAQ Computer Dealer.
203-Memory Address Error	RAM failure	Contact your Authorized COMPAQ Computer Dealer.
205-Memory Error	Cache memory error	Contact your Authorized COMPAQ Computer Dealer.
209-NCA RAM Error	RAM failure	Contact your Authorized COMPAQ Computer Dealer.
211-Memory Failure	RAM failure	Contact your Authorized COMPAQ Computer Dealer.
301-Keyboard Error	Keyboard failure	Reconnect keyboard with computer turned off.

Continued

POST Error Codes *Continued*

Error Code	Probable Source of Problem	Action
301-Keyboard Error or Text Fixture Installed	Keyboard failure	Check that you do not have a key stuck, or that something is not on the keyboard. Replace the keyboard, if necessary.
302-System Unit Keylock is Locked	Keylock	Unlock the keylock
303-Keyboard Controller Error	System board, keyboard, or mouse	Contact your Authorized COMPAQ Computer Dealer.
304-Keyboard or System Unit Error	Keyboard or system board	Contact your Authorized COMPAQ Computer Dealer.
40X-Parallel Port X Address Assignment Conflict	Both external and internal ports are assigned to parallel port X	Run the COMPAQ EISA Configuration Utility.
402-Monochrome Adapter Failure	Monochrome display controller	Replace the monochrome display controller.
501-Display Adapter Failure	Video display controller	Replace the video board.
601-Diskette Controller Error	Diskette controller circuitry	Contact your Authorized COMPAQ Computer Dealer.
602-Diskette Boot	Diskette in drive A not bootable	Replace the diskette.
605-Diskette Drive Error	Mismatch in drive type	Run the COMPAQ EISA Configuration Utility.

Continued

POST Error Codees *Continued*

Error Code	Probable Source of Problem	Action
607-No Response Received at Primary Address From External Diskette Controller. Internal Floppy Controller Has Been Enabled	Configuration error	Run the COMPAQ EISA Configuration Utility.
611-Primary Diskette Port Assignment Conflict	Configuration error	Run the COMPAQ EISA Configuration Utility.
612-Secondary Floppy Port Address Assignment Conflict	Configuration error	Run the COMPAQ EISA Configuration Utility.
701-Coprocessor Error	Coprocessor	Contact your Authorized COMPAQ Computer Dealer.
702-Coprocessor Detection Error	Installed coprocessor not configured	Contact your Authorized COMPAQ Computer Dealer.
703-Coprocessor Detection Error	Coprocessor removed; configuration not updated	Contact your Authorized COMPAQ Computer Dealer.
1125-Internal Serial Port Failure	Defective internal serial port	Run the COMPAQ EISA Configuration Utility. Contact your Authorized COMPAQ Computer Dealer.
1150-Comm Port Configuration Error	Added or removed modem or second asynchronous communications board	Run the COMPAQ EISA Configuration Utility.
1151-COM Port 1 Address Assignment Conflict	Both external and internal serial ports are assigned to COM1	Run the COMPAQ EISA Configuration Utility.
1152-COM Port 2 Address Assignment Conflict	Both external and internal serial ports are assigned to COM2	Run the COMPAQ EISA Configuration Utility.

Continued

POST Error Codes *Continued*

Error Code	Probable Source of Problem	Action
1771-Primary Disk Port Address Assignment Conflict	Internal and external fixed disk controllers are both assigned to the primary address	Run Diagnostics.
1772-Secondary Disk Port Address Assignment Conflict	Internal and external fixed disk controllers are both assigned to the secondary address	Run Diagnostics.
1780-Disk 0 Failure	Fixed disk drive/ format error	Run Diagnostics.
1781-Disk 1 Failure	Fixed disk drive/ format error	Run Diagnostics.
1782-Disk Controller	Fixed disk drive circuitry error	Run Diagnostics.
1783-Drive Array Controller Failure	Fixed disk drive controller error	Run Diagnostics.
1790-Disk 0 Failure	Fixed disk drive error or wrong drive type	Run the COMPAQ EISA Configuration Utility and Diagnostics.
1791-Disk 1 Error	Fixed disk drive error or wrong drive type	Run the COMPAQ EISA Configuration Utility and Diagnostics.
XXoooY ZZ Parity Check 2	Parity RAM failure	Run the COMPAQ EISA Configuration Utility and Diagnostics.
IOCHECK Active, Slot X	Defective board in slot X	Run Diagnostics.
Bus Master Timeout Slot X	Defective board in slot X	Run Diagnostics.
Audible	Power-on successful	None.
Audible	Power-on successful	None.
(RESUME = "F1" KEY)	As indicated to continue	Press the **F1** key.

SYSTEM SPECIFICATIONS

This appendix provides physical and performance specifications for the system unit, keyboard, monitors and mass storage devices.

SYSTEM SPECIFICATIONS

Computer		
	English	**Metric**
Dimensions		
Height	11.0 in	27.9 cm
Depth	5.5 in	13.9 cm
Width	15.6 in	39.6 cm
Weight		
Model 210	17.6 lb	8.0 kg
Model 120	17.6 lb	8.0 kg
Temperature Range		
Operating	41° to 104° F	5° to 40° C
Nonoperating	−40° to 185° F	−40° to 85° C
ALS Power Supply		
Operating Voltage	100-120 VAC	220-240 VAC
Line Frequency	60 Hz	50 Hz
Steady-State Power	125.0 W	
Maximum available through EISA expansion slots	60 W	
Input Current	4 A	2 A
Relative Humidity (noncondensing)		
Operating	5% to 95%	
Nonoperating	5% to 95%	

101-Key Keyboard (Standard)		
Dimensions		
Height	1.2 in	3.1 cm
Depth	7.4 in	18.8 cm
Width	15.7 in	39.9 cm
Weight	2.65 lb	1.2 kg
Number of keys	101 (US English)	102 (other)
Cable extended length	46.5 in	118.1 cm
System interface	6-pin circular mini-DIN connector	

Enhanced Keyboard		
Dimensions		
Height	1.7 in	4.3 cm
Depth	7.0 in	17.8 cm
Width	18.5 in	47.0 cm
Weight	4.0 lb	1.8 kg
Number of keys	101 (US English)	102 (other)

3½-Inch Diskette Drive	
Diskettes	
Size	3½-in
High Density (MB)	1.44
Low Density (KB)	720
Drives Supported	1
LED Indicators	
High Density	Green
Low Density	Orange
Height	One-third
Bytes per Sector	512
Sectors per Track	
High Density	18
Low Density	9
Read/Write Heads	2
Average Access Time (ms)	
High Density	80
Low Density	60
Transfer Rate (Kb/s)	
High Density	500
Low Density	250

Fixed Disk Drives		
	210-MB	**120-MB**
Model	210	120
Formatted Capacity (MB per Drive)	212.6	121.4
Number of Drives Supported Internally	1	1
Height	Third	Third
Size	1.0-in	1.0-in
Drive Type	51	50
Controller	Integrated	Integrated
Physical Configuration		
Cylinders	2119	1522
Heads	4	4
Sectors per Track	49	40
Bytes per Sector	512	512
Logical Configuration		
Cylinders	683	760
Heads	16	8
Sectors per Track	38	39
Bytes per Sector	512	512
Data Transfer Rate (Mbits/sec)	20	12
Interleave	1:1	1:1
Average Seek Time (ms)	12	19

POWER CORD SET REQUIREMENTS

The automatic line switching (ALS) feature permits the computer to operate from either a 100-120V or 220-240V input line.

The power cord set (power cord) you received with your computer meets the requirements of the country where you purchased the system. If you use the computer 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 Authorized Dealer.

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 CEE22/IEC 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 SV or SJ
   3-conductor

3. The cord set must have a rated current capacity of at least 10A.
4. The attachment plug must be an earth-grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.

Other Countries

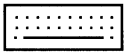
1. The cord set fittings must bear the certification mark of the agency responsible for evaluation in a specific country. Acceptable agencies include:

   BSI (United Kingdom)
   CEBEC (Belgium)
   DEMKO (Denmark)
   EANSW (Australia)
   IMQ (Italy)
   KEMA (The Netherlands)
   NEMKO (Norway)
   OVE (Austria)
   SEMKO (Sweden)
   SETI (Finland)
   SEV (Switzerland)
   UTE (France)
   VDE (Germany)

2. The flexible cord must be of a HAR (harmonized) type HO5VV-F 3-conductor cord with a minimum conductor size of .03 square inches (1.0 square millimeters).

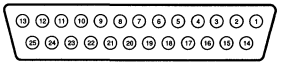
3. The cord set must have a current capacity of at least 10A and a nominal voltage rating of 100-120 or 220-240 VAC.

INTERFACES

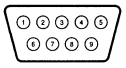
Enhanced Keyboard			
Connector	**Icon**	**Pin**	**Signal**
		1	Data
		2	Unused
		3	Ground
		4	+5VDC
		5	Clock
		6	Unused

Mouse			
Connector	**Icon**	**Pin**	**Signal**
		1	Data
		2	Unused
		3	Ground
		4	+5VDC
		5	Clock
		6	Unused

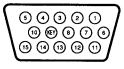
Parallel

Connector	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 Linefeed
		15	Error
		16	Initialize Printer
		17	Select In
		18	Signal Ground
		19	Signal Ground
		20	Signal Ground
		21	Signal Ground
		22	Signal Ground
		23	Signal Ground
		24	Signal Ground
		25	Signal Ground

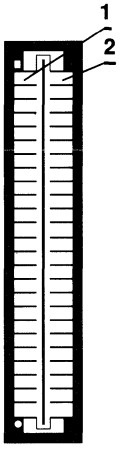
Serial

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

Video Graphics Controller

Connector	Icon	Pin	Signal
		1	Red
		2	Green
		3	Blue
		4	Unused
		5	Ground
		6	Ground
		7	Ground
		8	Ground
		9	Key
		10	Ground
		11	Unused
		12	Unused
		13	Horizontal Sync
		14	Vertical Sync
		15	Unused

Enhanced Options

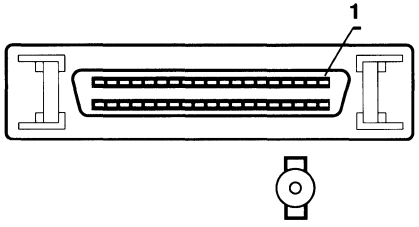
Connector	Pin	Signal
	1	Ground
	2	Data Bit <0>
	3	Data Bit <1>
	4	Data Bit <2>
	5	Data Bit <3>
	6	Data Bit <4>
	7	Data Bit <5>
	8	Data Bit <6>
	9	Data Bit <7>
	10	Select
	11	IOW
	12	IOR
	13	IRQ
	14	Bus Ready
	15	+5V
	16	+5V
	17	RST
	18	XA08
	19	Add 1
	20	Add 2
	21	McLock
	22	Reserve 1
	23	Reserve 2
	24	Slot-on
	25	SPKDRV
	26	Ground
	27	Ground
	28	DMA
	29	Data Bit <15>
	30	Data Bit <14>
	31	Data Bit <13>
	32	Data Bit <12>
	33	Data Bit <11>
	34	Data Bit <10>
	35	Data Bit <9>
	36	Data Bit <8>
	37	Add 3
	38	Add 4
	39	Add 5
	40	Add 6

Continued

Enhanced Options *Continued*

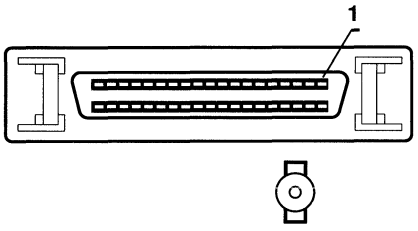
	Pin	Signal
	41	Add 7
	42	Add 8
	43	Add 9
	44	SLOT-DMA-
	45	T-C
	46	SLOT-IRQ8
	47	IO16
	48	SLOT-DRQ
	49	SLOT-IDEN
	50	SLOT-DAK

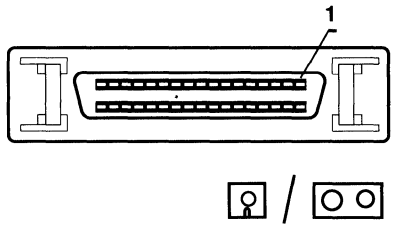
CD-ROM

Connector	Icon	Pin	Signal
		1	Ground
		2	Ground
		3	Ground
		4	Ground
		5	Ground
		6	Ground
		7	Ground
		8	Ground
		9	Ground
		10	Ground
		11	Ground
		12	Ground
		13	Reserved
		14	Ground
		15	Ground
		16	Ground
		17	Ground
		18	Ground
		19	Ground
		20	Ground
		21	Ground
		22	Ground
		23	Ground
		24	Ground

Continued

CD-ROM *Continued*

Connector	Icon	Pin	Signal
		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	Ground
		38	Reserved
		39	Ground
		40	Ground
		41	ATN-
		42	Ground
		43	BSY-
		44	ACK-
		45	SBRST-
		46	MSG-
		47	SEL-
		48	C+D-
		49	REQ-
		50	I+O-

External Storage			
Connector	**Icon**	**Pin**	**Signal**
		1	Ground
		2	LOWDEN-
		3	Ground
		4	LOWDENMEDIA-
		5	Ground
		6	DRVSEL4-
		7	Ground
		8	Index-
		9	Ground
		10	Reserved
		11	Ground
		12	DSEL-EV-
		13	Ground
		14	Reserved
		15	Ground
		16	MOTOR-
		17	Ground
		18	DIRIN-
		19	Ground
		20	STEP-
		21	Ground
		22	WRTDATA-
		23	Ground
		24	WRTGATE-
		25	Ground
		26	Track 00-
		27	Ground
		28	WRTPROT-
		29	Ground
		30	RDATA-
		31	Ground
		32	HEAD1SEL-
		33	Ground
		34	DSK CHNG-

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 work stations.
- 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 megohm ± 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, have an Authorized COMPAQ Computer Dealer install the part.

! IMPORTANT: For more information on static electricity, or assistance with product installation, contact your Authorized COMPAQ Computer Dealer.

GLOSSARY

A

AC	The abbreviation for alternating current power.
ADC	The abbreviation for amperes of direct current.
address space	All the memory addresses that a processor can reference.
ALS	Automatic line switching.
application	A program that performs a predefined task. For example, a spreadsheet program or word processor is an application. *Also* called an application program.
ASCII file	American Standard Code for Information Interchange file. A data or text file that contains conventional text characters of the ASCII character set. Because ASCII is standard for many systems, it can ease conversions between applications. For instance, if you have a document written using one word processor and you want to complete the document using another word processor, you can use an ASCII file to transfer text from one program to the other.
AUTOEXEC.BAT	An MS-DOS batch file that executes each time your system is turned on or reset. This file can initialize operating system settings and automatically start any MS-DOS program.
automatic line switching	A feature that allows the power supply to operate from either 120 or 220 to 240 VAC input line voltage without intervention by the operator.
automatic system protection	A feature that turns off the computer to protect the hardware components if the computer overheats.

B

backup — A copy of data on a diskette, tape, or other medium for recovery if the original medium is lost or destroyed.

backup diskette — A diskette that contains additional copies of data from another diskette or fixed disk. If a fixed disk or diskette encounters problems that cause data or program loss, data can be recovered from the backup diskette.

base memory — The section of memory between 0 and 640 Kbytes in which most MS-DOS applications run. *Also* called conventional memory.

Basic Input/Output System — The ROM-resident software that provides basic functionality for your computer. BIOS is located in upper memory ROM.

BIOS — An abbreviation for Basic Input/Output System.

bit — Binary digit. The smallest unit of information recognized by the computer. There are eight bits in a byte.

buffer — A section of memory reserved as a temporary holding place. The buffer size is the size of this section of memory.

burst operation — The transmission of data in a continuous stream, instead of discrete cycles, to achieve faster transfer rates.

bus arbitration — A feature that allows the CPU and direct memory access (DMA) and bus master I/O controllers to operate concurrently on the EISA bus. *See also* bus master, Extended Industry Standard Architecture.

bus master — A controller that works independently of the CPU, providing parallel processing to accommodate high-demand requests.

byte — A group of 8 adjacent Binary digit(s) (bits) that the computer processes as one unit. *See also* bit.

C

cache memory

An area of very fast static memory dedicated to storing data retrieved from main memory. Data is temporarily stored in the cache memory in anticipation of future use by the microprocessor. If data requested by a program is found in the cache memory, the data is transferred directly to the microprocessor, significantly increasing the speed of the operation.

CEMM

The abbreviation for COMPAQ Expanded Memory Manager.

CGA

The abbreviation for Color Graphics Adapter. A plug-in video display board that produces low resolution (320 x 200) graphics and text.

central processing unit

The part of a computer that includes circuits that control the interpretation and execution of computer instructions.

COMPAQ EISA Configuration Utility

The software by which a COMPAQ Extended Industry Standard Architecture (EISA) computer configures software-programmable EISA expansion boards and helps the user select the slots and the switch and jumper settings (if any) for ISA expansion boards. The utility allocates system resources among the expansion boards and identifies conflicts in requested board sequences.

COMPAQ Expanded Memory Manager

A utility that supports the Lotus/Intel/Microsoft (LIM) Expanded Memory Specification (EMS) Standard. The utility permits application programs that follow the LIM Standard to take advantage of expanded memory, rather than being limited by MS-DOS to 640 Kbytes of base memory. *See also* LIM Standard.

CONFIG.SYS

A file containing special commands that lets users provide software enhancements for their system. Using this file, you can set up or configure MS-DOS for use with devices and software applications. This file is accessed every time you turn on or reset your computer.

configuration	The amount and type of hardware in a computer system.
configuration memory	Nonvolatile memory that stores the date and time and system configuration. *See also* nonvolatile memory.
conventional memory	The sections of memory between 0 and 640 Kbytes in which most MS-DOS applications run. *Also* called base memory.
CPU	The abbreviation for central processing unit.
current directory	The directory in which you are presently working.

D

default	The value used by a computer system unless the user alters it to use another specified value.
delimiter	A character that separates or limits words or values in a line of input. A delimiter is not part of the string of characters it delimits. For example, a slash (/) is the delimiter used when changing or deleting the power-on password.
device	A piece of hardware that can perform a specific function, such as a printer or disk drive.
device driver	The software that provides an interface between an operating system and a device or subsystem of a computer. For example, the CEMM device driver enables utilities and applications to utilize physical expanded memory. Device drivers are either built into your operating system or they must be installed using the *CONFIG.SYS* file.
device name	The name assigned to hardware that represents its physical address. For example, LPT1 or COM1 are device names.
diagnostic tests	The test programs designed to detect and identify possible computer malfunctions. The programs are part of the Diagnostics software.

dialog box	In a software program, a box that appears after selecting certain menu options. The dialog box contains additional options required to perform the selected task.
direct memory access	The process by which information is transferred between two devices on a bus under the supervision of a direct memory access (DMA) controller. For example, a memory board and an I/O device transferring information.
directory	A way of grouping files. The directory contains the names of each file, the size of each file, and the date and time the file was created or last changed, as well as, names of other subdirectories.
disk cache	An area of memory used as a temporary holding place of data. Frequently used data is stored in a disk cache for fast access by an application.
disk caching	A process that takes frequently used data from the fixed disk drive and stores it in memory. Disk caching decreases data access time in some application programs because the data is available in main memory, reducing the number of disk reads required.
diskette drive	A mass storage device that reads from and writes to a diskette.
DMA	The abbreviation for direct memory access.
DOS	The abbreviation for Disk Operating System.
DRAM	The abbreviation for dynamic random access memory.
drive	A device that holds and turns a disk, diskette, or magnetic tape so that the computer can read data from or write data to the magnetic media.
drive array	A series of fixed disk drives connected to a drive array controller (an intelligent bus master device that permits the drives in the array to be accessed as one or two logical drives).

drive letter	The letter used to identify a device. Usually, the first diskette drive is considered A, the second B, and the first fixed disk partition is considered C.
drive type	A number that identifies the characteristics of the disk drives being used in the system unit.
dynamic random access memory	RAM that must be refreshed. Contrast with static random access memory. *See also* refresh.

E

EGA	The abbreviation for Enhanced Graphics Adapter.
EISA	The abbreviation for Extended Industry Standard Architecture.
EMB	The abbreviation for extended memory block.
EMM	The abbreviation for Expanded Memory Manager.
EMS	The abbreviation for Expanded Memory Specification.
EMS page	As defined by the Expanded Memory Specification (EMS), a page is a 16-Kbyte section of memory through which memory can be mapped using the EMS 4.0. Four contiguous pages make up the LIM EMS 3.2 page frame.
emulation	Using one system to imitate another system so that both systems accept the same programs or achieve the same end results. This process can ease conversions between two systems.
expanded memory	Memory beyond the 640 Kbytes of base memory that is accessible by hardware and software supporting the LIM standard. COMPAQ systems can access this additional memory with the COMPAQ Expanded Memory Manager (CEMM) utility without additional hardware.
Expanded Memory Manager	A utility designed to allow MS-DOS applications to access expanded memory using the Expanded Memory Specification (EMS).

Expanded Memory Specification
A technique used to access expanded memory. Three companies (Lotus, Intel, and Microsoft) joined to create the EMS so that MS-DOS applications could access more than 640 Kbytes of memory. Using EMS 3.2, MS-DOS could access memory mapped through a 64-Kbyte page frame. Using EMS 4.0, memory can be mapped through the page frame and through other 16-Kbyte sections of memory called pages.

Extended Industry Standard Architecture
A 32-bit extension to the Industry Standard Architecture (ISA) bus designed to deliver high-performance 32-bit I/O transmission. EISA accommodates existing 8- and 16-bit ISA expansion boards as well as 32-bit EISA expansion boards.

Extended Memory Area
The memory addressed above 1 megabyte that cannot normally be accessed by MS-DOS applications and that is made accessible through special utilities and other operating systems.

extended memory blocks
An area that consists of memory beyond the first 64 Kbytes of extended memory.

eXtended Memory Specification
Allows MS-DOS programs to use Upper Memory Blocks (UMBs), the High Memory Area (HMA), and Extended Memory Blocks (EMBs).

extension
Part of a filespec. It allows you to group files into categories by giving more information about the file. Some application packages create their own extensions depending on the type of file you are creating. For example, the *.DOC* extension for documents and *.BAK* extension for backup files are often used.

external device
A device, such as a printer or keyboard, that is connected to and controlled by the computer.

F

FASTART — A COMPAQ utility designed to partition and format your fixed disk, install MS-DOS and User Programs, and create and change the *CONFIG.SYS* and *AUTOEXEC.BAT* files.

fixed disk drive — A mass storage device that reads from and writes to a rigid magnetic disk enclosed in a permanently sealed housing.

486 microprocessor — An industry-standard electronic chip that is the main controller and data processor for the COMPAQ DESKPRO 486/50L Personal Computer.

function keys — Specific keys on the keyboard labeled F1 through F12 that instruct the application to perform a task. Function keys are set up by either the operating system or the application program.

H

handle — A number used to refer to a file or device. For instance, when an application refers to some MS-DOS files or devices, the program uses the handle so that it does not need to refer to the full name every time it uses these files or devices.

hardware — The physical equipment of a computer system, such as the system unit, monitor, modem, printer, keyboard, and disk drives.

hertz — A measure of frequency in which one hertz equals one cycle per second.

High Memory Area — As defined by the eXtended Memory Specification (XMS), the first 64 Kbytes of extended memory, which ranges from 1024 to 1088 Kbytes.

high-density diskette — A type of diskette that can store more data than low-density diskettes of the same type diskette. When you use high-density diskettes, you must format them differently than other diskettes.

HIMEM — A memory utility that allows MS-DOS applications to access extended memory. HIMEM supports the eXtended Memory Specification (XMS). Used as a command, HIMEM displays the current status of system memory.

HMA — The abbreviation for High Memory Area.

Hz — The abbreviation for hertz.

I

IDA Controller — The abbreviation for 32-Bit Intelligent Drive Array Controller. The IDA controller manages a drive array. It is a bus master device that takes full advantage of the COMPAQ Flex/MP architecture, providing a high-speed data path between the drive array and system memory.

initialization — The process of starting your system and configuring it to run.

INSPECT utility — A program that provides information to assist an Authorized Dealer in diagnosing the operating environment. The INSPECT program is part of the Diagnostics software.

interleave — The number of fixed disk drive revolutions required to read or write one complete track of data. For example, a 3:1 interleave requires three complete disk revolutions to read or write an entire track of data. A 1:1 interleave requires only one complete disk revolution to read or write an entire track of data. The lower the ratio, the faster the read/write operation.

K

KB or Kbyte — The abbreviation for kilobyte.

keyboard password — A software security feature that disables the keyboard and pointing device until the user enters a unique, preset password. *See also* power-on password.

kilobyte — The amount of storage equal to 1,024 bytes. *See also* byte.

KP — The keyboard password utility that is part of the USER PROGRAMS software. *See also* keyboard password.

L

LIM — The abbreviation for Lotus/Intel/Microsoft. These three companies designed the Expanded Memory Specification (EMS) used to allow MS-DOS to access expanded memory.

logical drive — (1) The portion of a fixed disk storage device that is perceived and treated as an independent physical drive by the operating system. (2) A partition of a physical fixed disk drive. *See also* partition.

low-density diskette — A type of diskette that can store less data than high-density diskettes of the same type diskette.

M

mass storage device — A mechanism that reads, writes, and stores programs and data files on devices such as diskettes, fixed disks, and tapes.

MB — The abbreviation for megabyte.

MDA — The abbreviation for Monochrome Display Adapter.

megabyte — The number *n* x 2 to the 20 power memory bytes, *n* x 10 to the 6 power mass storage bytes. The amount of storage equal to 1,000,000 bytes. *See also* bytes.

megahertz — (1) A unit of measure of frequency: 1 megahertz = 1,000,000 hertz. (2) A measure of the speed at which the system clock runs. *See also* hertz.

memory-resident — A memory-resident program occupies memory until the computer is turned off or until you remove it from memory. *Also* called a TSR.

menu bar — A bar at the top of the screen in a software program that lists the available menus by function key and menu name. *See also* pull-down menu.

MHz — The abbreviation for megahertz.

microprocessor — *See* 486 microprocessor.

modem — A device that connects a system to a communications network. Modems are usually connected to telephone lines where you can call and receive calls from other people who have modems.

mouse — A pointing device.

N

network server mode — The software security feature that permits secure operation of the computer as an unattended file server. When the network server mode is invoked, the computer disables the keyboard, preventing unauthorized data access and allowing convenient restarting of the network server after a power outage without intervention.

nonvolatile memory — A storage device that retains data without power applied (or when the computer is turned off). *Contrast with* volatile memory.

O

operating speed — The speed, expressed in megahertz, at which your system clock operates. The operating speed can be changed to accommodate the applications.

operating system — The software that controls instructions given by programs, input/output, scheduling, data management, and interaction with mass storage devices.

operating system prompt — The character or series of characters that appear on the screen requesting input from the user for the operating system.

option — Add-on hardware or software that expands or enhances computer system capabilities. For example, a mass storage device, expansion board, coprocessor, or modem are options.

P

parallel interface — A standard 25-pin interface that transmits and receives data in a parallel manner; that is, one byte at a time using a separate data line for each bit.

partition — A section of a fixed disk that can be distinguished by an operating system with a drive letter designator, such as C: or D:. *See also* logical drive.

path — The hierarchical route to a file on a diskette or fixed disk. For example, if you had a directory named \YEAR that contained a subdirectory named MONTH, and MONTH contained a file named *DAY*, then you would have to list the various directories and subdirectories when you wanted to use the file *DAY* on an MS-DOS command line. This listing of directories and subdirectories is known as the path. The path for this example is \YEAR\MONTH\DAY.

power-on password — A software security feature that can be enabled during power on to permit the operation of the computer only after entering a unique, preset password. *See also* keyboard password.

processor — The computer chip that controls your computer. The processor for the COMPAQ PORTABLE 486c Personal Computer is a 486.

protected mode — A processor mode in which extended memory may be directly accessed by DOS extenders. MS-DOS programs that include DOS extenders may use extended memory in this mode.

pull-down menu — In a software program, a menu activated when selecting an option from a menu bar at the top of the screen. *See also* menu bar.

Q

queue — A temporary holding place for data. A print queue temporarily stores data sent to the printer until the printer is free to print it.

queued write — A feature of the CACHE utility that reduces the time it takes to perform write operations. When data is written to a system, the written data is checked against the data in the disk cache to see if it is the same. If it is, nothing happens. If it is not, then the disk cache data will be overwritten with the new information. The new information will then be queued in the disk cache and later written to a diskette or fixed disk. This process allows new data to be written without causing the system to perform immediate disk-write operations, which are much slower.

R

RAM — The abbreviation for random access memory.

RAM disk — A virtual disk created in memory that allows you to access data more quickly than a physical disk. A RAM disk can be read from and written to, just like a diskette; however, since the disk is in memory, data retrieval is much faster. When you finish using a RAM disk, you must save the data in it to a fixed disk or diskette. If you do not, all the data in the RAM disk will be lost when you turn your computer off. *See also* virtual disk.

random access memory — Memory that can be used to load and run programs. However, data stored in RAM will be lost when you turn off the system. To preserve data stored in RAM, you must save it to a secondary storage device.

read only memory — A nonvolatile storage device that stores system instructions and retains information without power applied (or when the computer is turned off). Read only memory cannot be modified by the user except under special conditions. *See also* nonvolatile memory.

real mode — A processor mode that allows only the first megabyte of memory to be addressed. All processors support real mode.

refresh — A periodic rewrite of system memory contents to the same memory locations by the system logic so that the contents remain valid. Refresh is required by dynamic random access memory technology. *See also* dynamic random access memory.

ROM — The abbreviation for read only memory.

root directory — The main directory on a disk. It is represented on the screen by a backslash (\). The root directory is created when you format the disk. From the root directory, you can create other directories on disk.

S

serial interface — The link between two devices that transmits and receives data in a serial manner; that is, a single line transmitting data one bit at a time and another line receiving data one bit at a time.

source drive — The drive that specifies the current location of files or directories to be copied, moved, or diskcopied.

SRAM — The abbreviation for static random access memory.

static random access memory — A type of memory that does not need to be refreshed. The data stored in SRAM remains until changed or until the computer is turned off. *Also* called static RAM. Contrast with dynamic random access memory. *See also* refresh.

subdirectory — A directory that is below, and included, in another directory.

syntax — Rules that must be followed when entering information into the computer from the command line.

system memory — All random access memory in the computer.

system reset — A method of returning the system to the power-on state without turning off the computer power. The system is reset by pressing the CTRL + ALT + DEL keys simultaneously. You must save your data before resetting the system or it will be lost.

T

tape drive — A mass storage device that reads from and writes to a tape cartridge. In COMPAQ personal computers, the tape drive backs up data from the fixed disk drive.

target drive — The drive that specifies where data is to be copied when you use MS-DOS commands such as COPY, XCOPY, or DISKCOPY.

terminate-and-stay-resident	Programs that initialize or start themselves and can be accessed when you want them with a keystroke.
TSR	The abbreviation for terminate-and-stay-resident.

U

UMB	The abbreviation for Upper Memory Block.
upper memory	The section of memory between 640 and 1024 Kbytes. Upper memory is usually used for system hardware, although expanded memory may be mapped into available sections. Upper memory blocks may be created in upper memory also.
Upper Memory Area	Extended memory that has been mapped into unused portions of memory between 640 and 1024 Kbytes. Using the CEMM utility and the HIMEM utility, MS-DOS applications can access this memory.

V

VGA	The abbreviation for Video Graphics Array.
video board	A board that plugs into a computer and produces text and graphics on a monitor.
Video Graphics Array	The video graphics standard that supports 640 x 480 graphics resolution and 720 x 400 text resolution, displaying up to 256 colors.
virtual disk	A section of RAM that is set up as a disk drive. Read and write operations are faster to a virtual disk than they are to a fixed disk or to a diskette. *Also* called a VDISK and RAM drive.
virtual mode	A mode included by 386 and 486 processors. Using this mode, MS-DOS programs can access extended memory that has been mapped into the first megabyte of memory. This mode allows CEMM to work without additional EMS memory hardware.

volatile memory — A storage device that does not retain data without power applied (or when the computer is turned off). Contrast with nonvolatile memory.

volume label — The optional name given to a diskette when it is being formatted. When you format a diskette using the MS-DOS command FORMAT, the system asks you for a volume label. This can be up to 11 characters long. It should define what is on the disk. You can see or change the volume label by using the LABEL command. The volume label is optional.

W

wait state — A processing cycle in which nothing happens. Wait states are programmed into the computer to try and eliminate errors that may occur if the microprocessor is running too fast. Using cache memory, wait states can be eliminated, resulting in a 0 wait state.

write-protected — A diskette that has been physically modified so that data on the diskette cannot be changed or deleted. You can write-protect diskettes usually one of two ways. The method depends on the type of diskette you have. If it is a 5¼-inch diskette, use tape to cover the notch in the diskette cover. If it is a 3½-inch diskette, change the write-protect switch located on the back of the diskette.

X

XMS — The abbreviation for eXtended Memory Specification.

INDEX

A

B

C

D

E

F

H

I

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

System Information Record
COMPAQ PORTABLE 486c Personal Computer

This card is for recording information helpful to your Authorized COMPAQ Computer Dealer should you ever need to have your computer serviced. Please fill out this card and keep it for future reference.

Date Purchased: _____

Authorized Dealer: _____

System Unit Serial Number (on the back of the computer): _____

Keylock ID Number: _____

Model: _____ Amount of Memory: _____

Serial Numbers of Options*:

Option _____ Serial Number _____

Option _____ Serial Number _____

Option _____ Serial Number _____

Option _____ Serial Number _____

Option _____ Serial Number _____

Option _____ Serial Number _____

Option _____ Serial Number _____

*Modem, expansion boards, etc.