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MAINTENANCE AND SERVICE GUIDE
COMPAQ PORTABLE 486c Personal Computer

First Edition (October 1991)
Text Number 128987-001

Chapter 1. Specifications

Introduction

This chapter provides physical, environmental, and performance specifications for the following COMPAQ PORTABLE 486c Personal Computer subsystems:

- o System Unit
- o Full Function 101/102 Key Keyboard
- o Active Matrix Color VGA Display
- o Power Supply
- o 3 1/2 inch 1.44 Megabyte Diskette Drive
- o 210 and 120 Megabyte Fixed Disk Drives

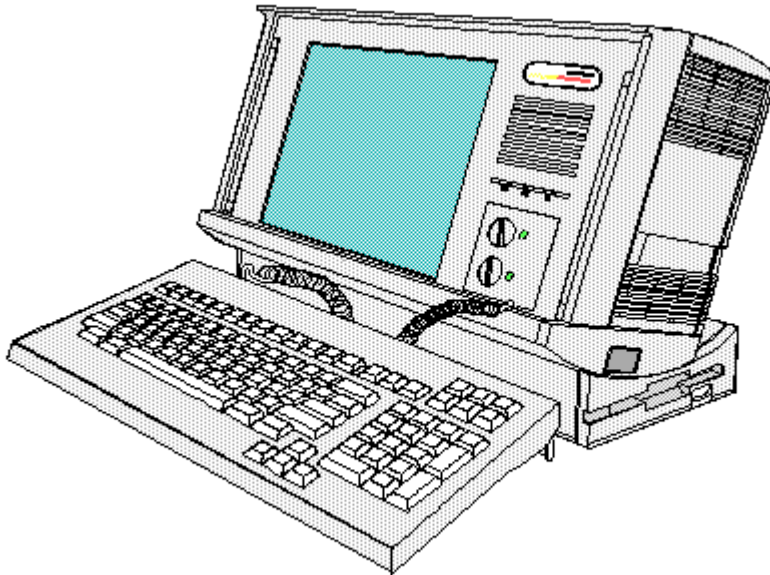


Figure 1-1. COMPAQ PORTABLE 486c Personal Computer

Chapter 1.1 System Unit

	U.S.	Other
Dimensions		
Height	11.0 inch	27.9 cm
Width	15.6 inch	39.6 cm
Depth	5.5 inch	13.9 cm
Weight (with keyboard)		
Model 210	17.6 lb	7.9 kg
Model 120	17.6 lb	7.9 kg
Environmental Requirements		

Temperature		
Operating	50oF to 104oF	10oC to 40oC
Nonoperating	-22oF to 140oF	-30oC to 60oC
Relative Humidity (noncondensing)		
Operating	20% to 80%	20% to 80%
Nonoperating	5% to 90%	5% to 90%
Maximum Unpressurized Altitude		
Operating	10,000 ft	3,050 m
Nonoperating	30,000 ft	9,150 m

Cooling	12 VDC fan	12 VDC fan

Shock	40g, 11 ms, half sine (nonoperating)	

Vibration		
Operating	0.25g, 5 to 500 Hz, 1/2 octave/min sweep	
Nonoperating	1.0g, 5 to 500 Hz, 1/2 octave/min sweep	
=====		

Chapter 1.2 Keyboard

	English	Other

Dimensions		
Height	1.2 inch	3.0 cm
Depth	7.4 inch	18.7 cm
Width	15.7 inch	39.8 cm

Weight	2.65 lb	1.2 kg

Number of Keys	101	102

Cable		
Compressed	24.0 inch	60.9 cm
Extended	46.5 inch	118.1 cm

Interface	6 pin mini DIN connector	6 pin mini DIN connector

Power		
Volts	4.5 to 5.5 VDC	4.5 to 5.5 VDC
Current	300 mA	300 mA
=====		

Chapter 1.3 Active Matrix Color Display

	U.S.	Other

Dimensions (viewing area)		
Height	6.2 inch	15.8 cm

Width	8.3 inch	21.1 cm
Diagonal Size	10.4 inch	26.4 cm
Mounting	Internal	Internal
Tilt Angle	-5oF to 32oF	-5oC to 32oC
Display	Active Matrix Color VGA, TFT	Active Matrix Color VGA, TFT
Color Capability	256, 16 shades per primary color	256, 16 shades per primary color
Brightness	Adjustable	Adjustable
Maximum Pixel Resolution (Text and Graphics)	640 x 480 640 x 400 640 x 350	640 x 480 640 x 400 640 x 350
Operating Frequency	25 MHz	25 MHz
VDC Input		
Nominal Voltage	5 VDC	12 VDC
Current Maximum	150 mA	420 mA
Power Maximum	0.75W	5.04W

Chapter 1.4 Power Supply

	U.S.	Other
Input Requirements		
Nominal Voltage	120 VAC	240 VAC
Maximum Range Voltage	100 to 120 VAC	220 to 240 VAC
Line Frequency	60 Hz	50 Hz
Current	4A	2A
Fuse	5A	5A
Operating Power	125W *	125W *
Line Voltage Switching	Automatic	Automatic
Cooling	2 speed fan, thermostatically controlled	2 speed fan, thermostatically controlled
Operating Temperature	41oF to 104oF	5oC to 40oC
VDC Output		
Nominal Voltage	5V	12V -12V
Current Minimum	1.5A	0.1A 0A
Current Maximum	12A	4.2A 1A
Maximum Peak Current	18A	6A 1A
Regulation Tolerance	3%	5% 5%

NOTE: These values are maximum values based on nominal operating conditions for temperature, line voltage, frequency, and altitude.

 * 60W maximum available through EISA expansion slots.
 =====

Chapter 1.5 Diskette Drive

	1.44 MB

Diskette Size	3 1/2 inch
Capacity Per Diskette (high/low)	1.44 MB/720 KB
LED Indicators	
Read/Write (high density)	Green
Read/Write (low density)	Orange
Drives Supported	One
Drive Height	0.75 inch (1.9 cm)
Drive Rotation (rpm)	300
Transfer Rate (bps) (high/low)	500K/250K
Bytes Per Sector	512
Sectors Per Track (high/low)	18/9
Tracks Per Side (high/low)	80/80
Access Times	
Track to Track	3 ms
Average	80 ms
Settling Time	15 ms
Latency Average	100 ms
Cylinders (high/low)	80/80
Read/Write Heads	2
=====	

Chapter 1.6 Fixed Disk Drives

	210 MB	120 MB

Standard Configurations	Model 210	Model 120
Formatted Capacity	212.6 MB	121.5 MB

Drives Supported	One	One
Form Factor	3 1/2 inch	3 1/2 inch
Drive Height	1 inch	1 inch
Drive Weight	1.3 lb	1.3 lb
Drive Type (logical)	51	50
Drive Speed	4500 rpm	3399 rpm
Transfer Rate (per second)		
Head	20 MB	12 MB
Buffer (max)	5 MB	4.5 MB
Sector Interleave	1:1	1:1
Seek Times		
Track to Track	3 ms	8 ms
Average	12 ms	19 ms
Maximum	30 ms	35 ms
Cylinders		
Physical	2119	1522
Logical	683	760
Read/Write Heads		
Physical	4	4
Logical	16	8
Sectors Per Track		
Physical	49	40
Logical	38 + 1 spare	39 + 1 spare
Bytes Per Sector	512	512
=====		

Chapter 2. Power On Self Test (POST)

Introduction

This chapter lists the subassemblies checked by the Power On Self Test (POST) and briefly describes the types of error codes that can occur. The chapter also includes problem isolation procedures and a flowchart for quick reference.

Chapter 2.1 POST

POST is a series of diagnostic tests that runs automatically on the COMPAQ PORTABLE 486c Personal Computer when it is turned on.

POST checks the following subassemblies to ensure that the computer system is functioning properly:

- o Processor Board
- o Memory Module
- o Keyboard
- o Controller Circuitry
- o Video Circuitry
- o Fixed Disk Drive
- o Diskette Drive

If POST finds an error in the computer, an error condition is indicated by an audible and/or visual message. See Chapter 3, "Error Messages and Codes," for an explanation of the error codes and a recommended course of action.

Chapter 2.2 Preliminary Steps

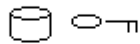
If you encounter an error condition, complete the following steps before starting the problem isolation procedures:

1. Turn off power to the computer.
2. Disconnect any external devices. Do not disconnect the printer if you want to test the printer or use it to log error messages.
3. Install all appropriate loopback plugs and terminating plugs for complete testing.
4. Clear the power on password, if it is preset by the user. You will know that the power on password is set when a key icon (0--m) appears on the screen when POST completes. If this occurs, you must enter the password to continue.

If you do not have access to the password, you must disable the power on password feature by setting the power on password switch (see section 2.3, "Clearing Power on Password").

5. Access the fixed disk drive.

You will know that the fixed disk drive password is set when the DriveLock icon (see illustration of DriveLock icon below) appears on the screen. If this occurs, you must enter the fixed disk drive password to continue.



DriveLock Icon

IMPORTANT: It is not necessary to access the fixed disk drive in order to run the Diagnostics diskette; however, complete system testing cannot be done without access to the complete system.

The user must clear the fixed disk drive password or give you access before servicing can be performed.

6. Position the brightness and volume controls approximately in the center of their range.
7. Insert the Diagnostics diskette into drive A.
8. Turn on the computer.
9. Follow the procedures of the Problem Isolation Flowchart, section 2.4.

Refer to Chapter 3, "Error Messages and Codes," for detailed information on problem isolation.

Chapter 2.3 Clearing Power On Password

To clear the power on password feature, reset the power on password switch (SW5) located on the I/O board. To do so, complete the following steps:

1. Disconnect the AC power.
2. Disassemble the computer to reach the I/O board (refer to Chapter 5).
3. Locate the power on password switch (SW5) on the I/O board; set the switch to ON (Figure 2-1).

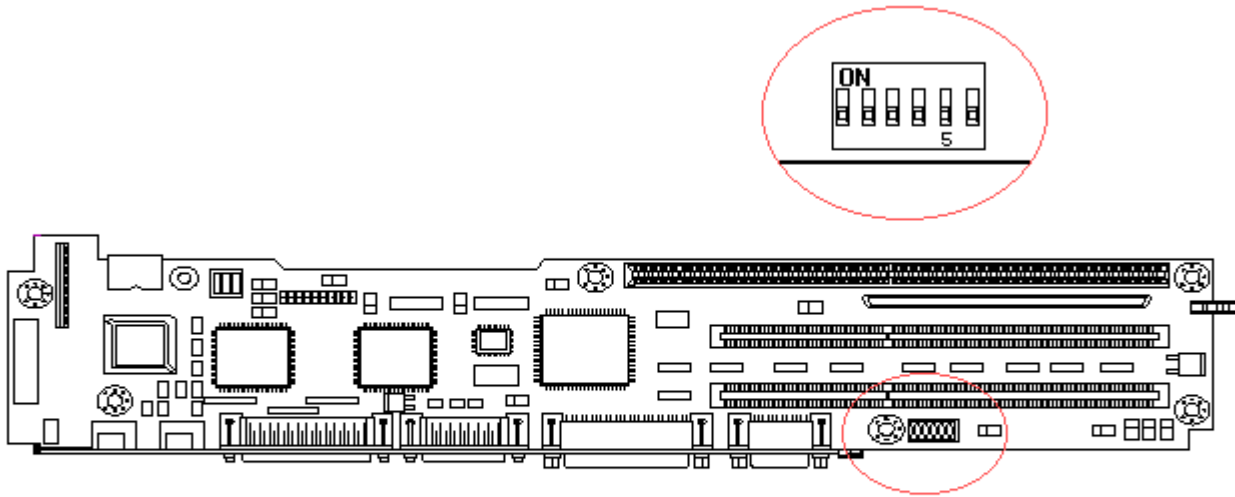


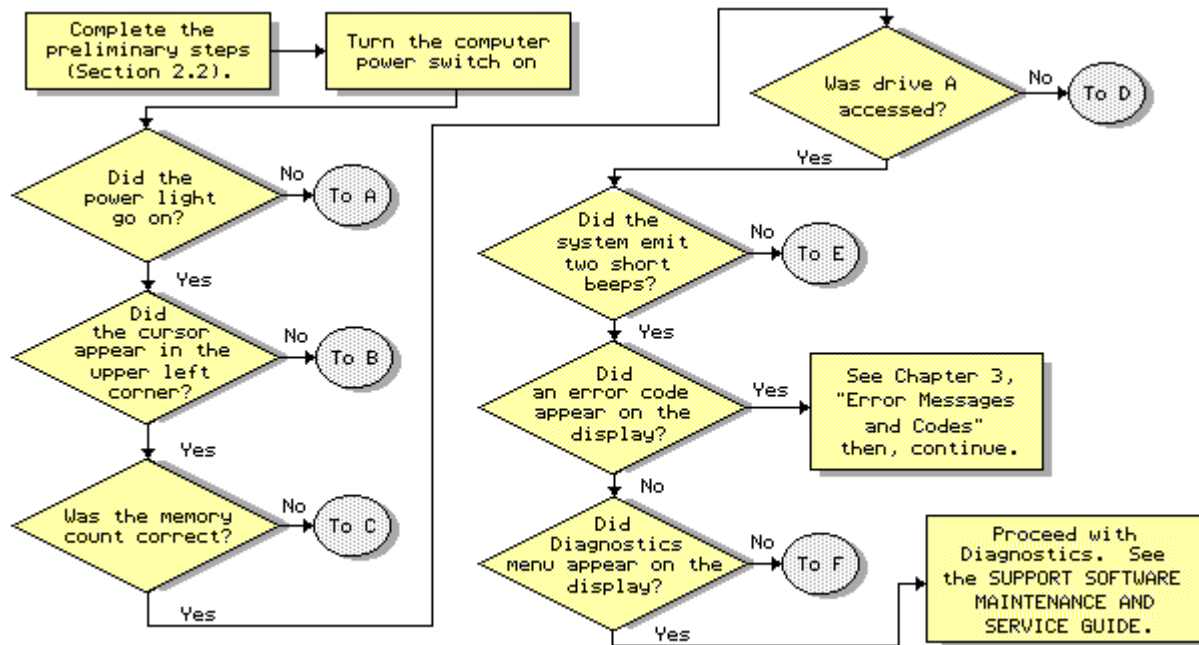
Figure 2-1. Power On Password Switch

4. Reconnect AC power.
5. Turn on the computer and allow it to complete POST.
6. Turn the computer off.
7. Set switch SW5 to OFF.
8. Disconnect AC power.
9. Reassemble the computer (refer to Chapter 5).
10. Reconnect the AC power.
11. Turn on the computer and allow it to complete POST. If the key icon (o--m) does not appear when POST completes, the power on password has been cleared.

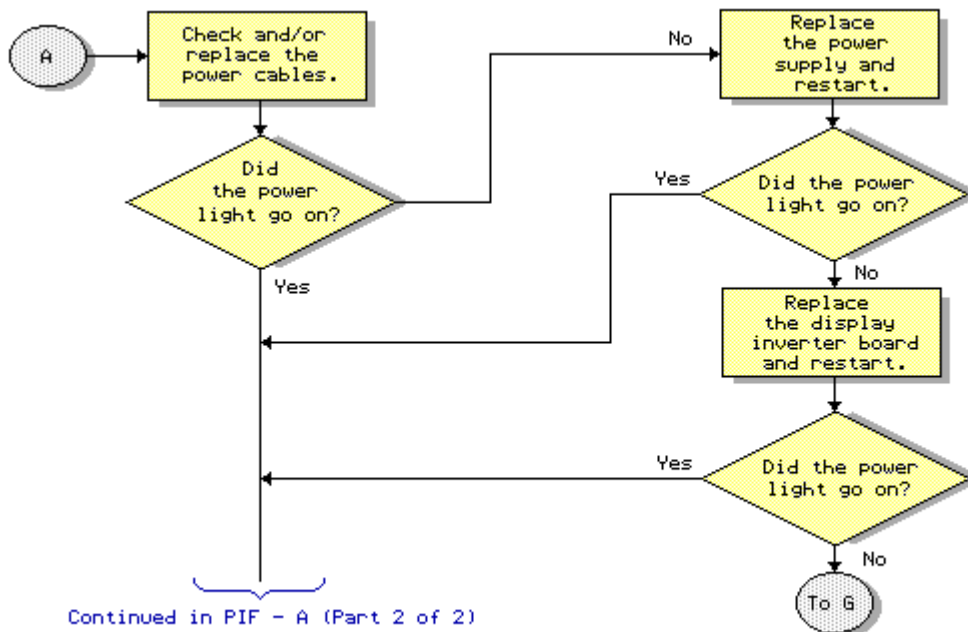
Chapter 2.4 Problem Isolation Flowchart

The problem isolation flowchart provides a quick reference for identifying and correcting problems that may occur during POST. The flowchart gives troubleshooting procedures for identifying malfunctions. It also directs you to the Diagnostics chapter in the SUPPORT SOFTWARE MAINTENANCE AND SERVICE GUIDE and to Chapter 3, "Error Messages and Codes," for more detailed

troubleshooting information.



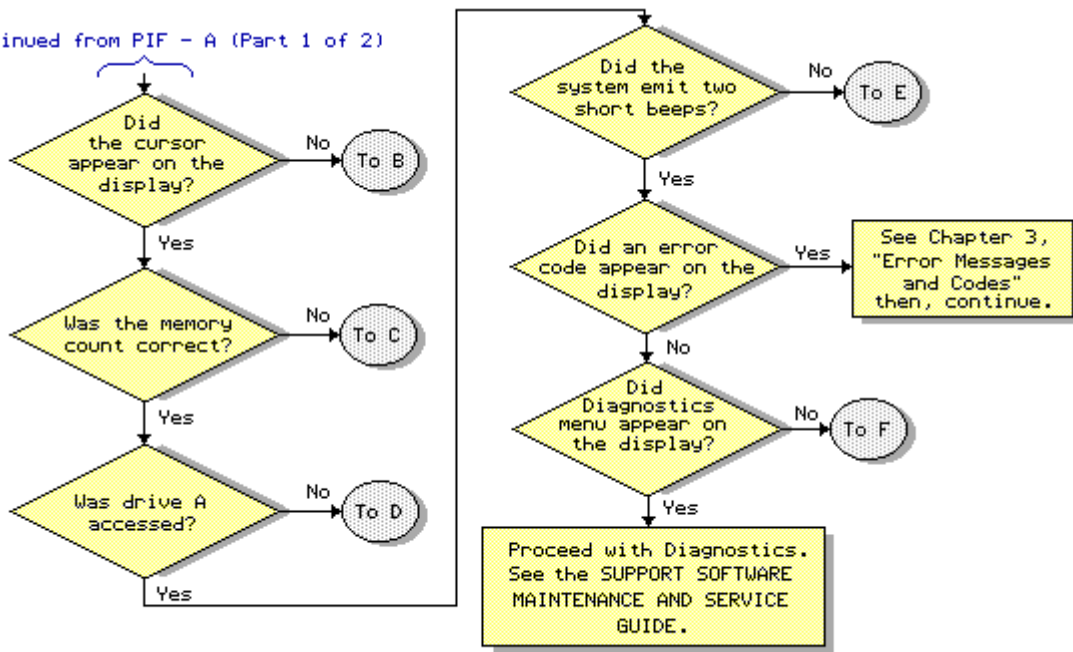
Problem Isolation Flowchart - Root



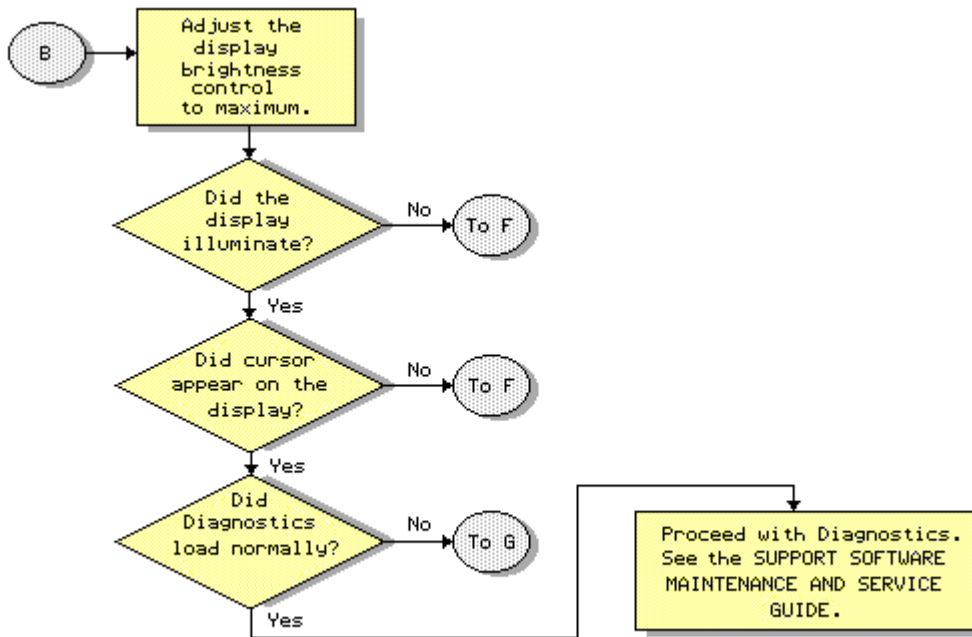
Continued in PIF - A (Part 2 of 2)

Problem Isolation Flowchart - A (Part 1 of 2)

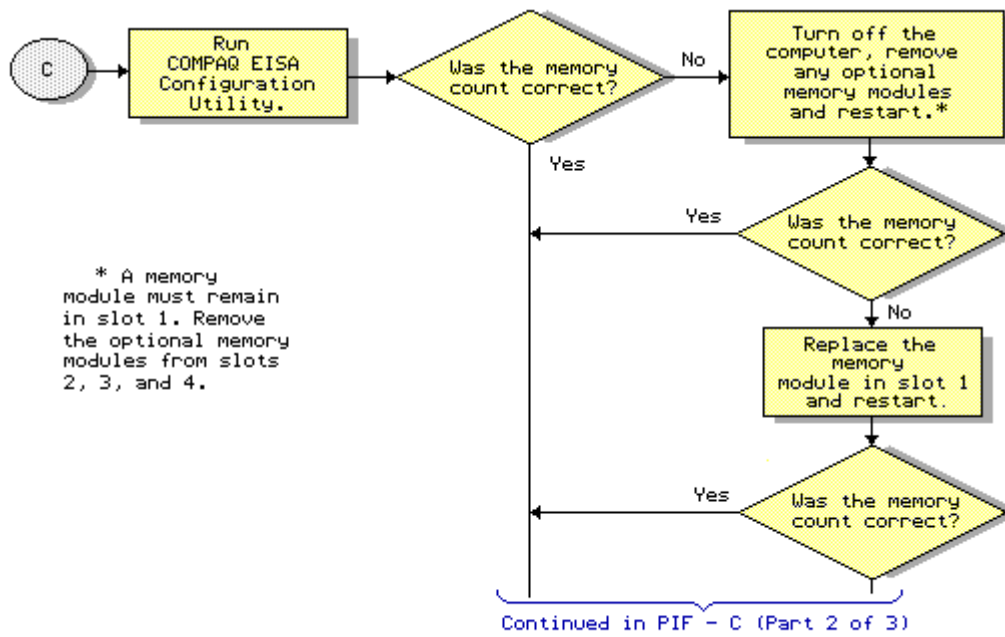
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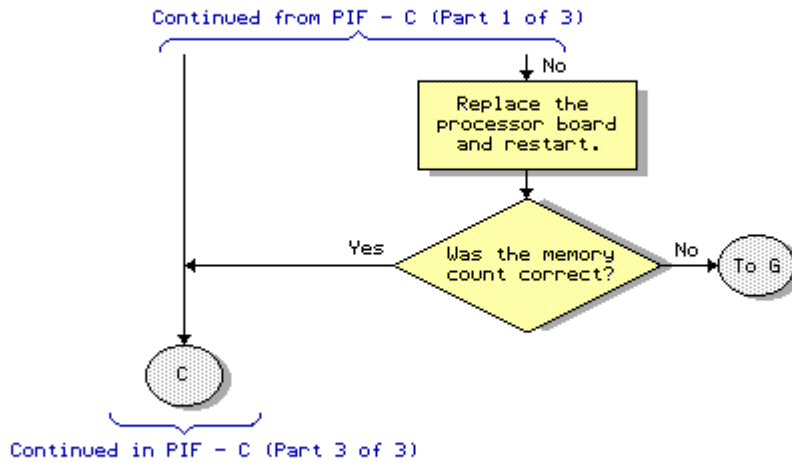
Problem Isolation Flowchart - A (Part 2 of 2)



Problem Isolation Flowchart - B

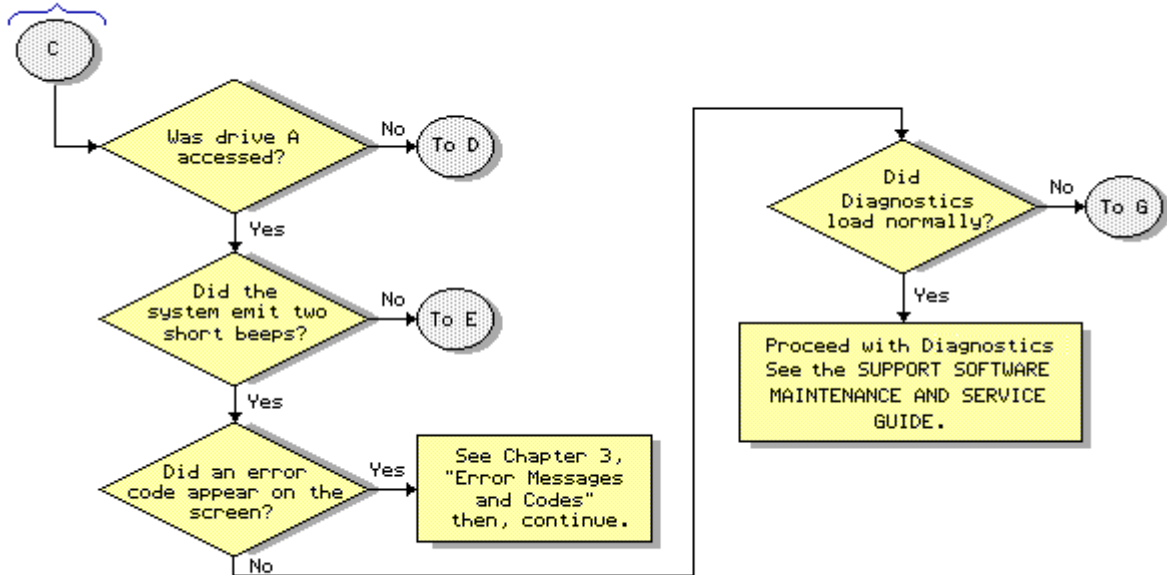


Problem Isolation Flowchart - C (Part 1 of 3)

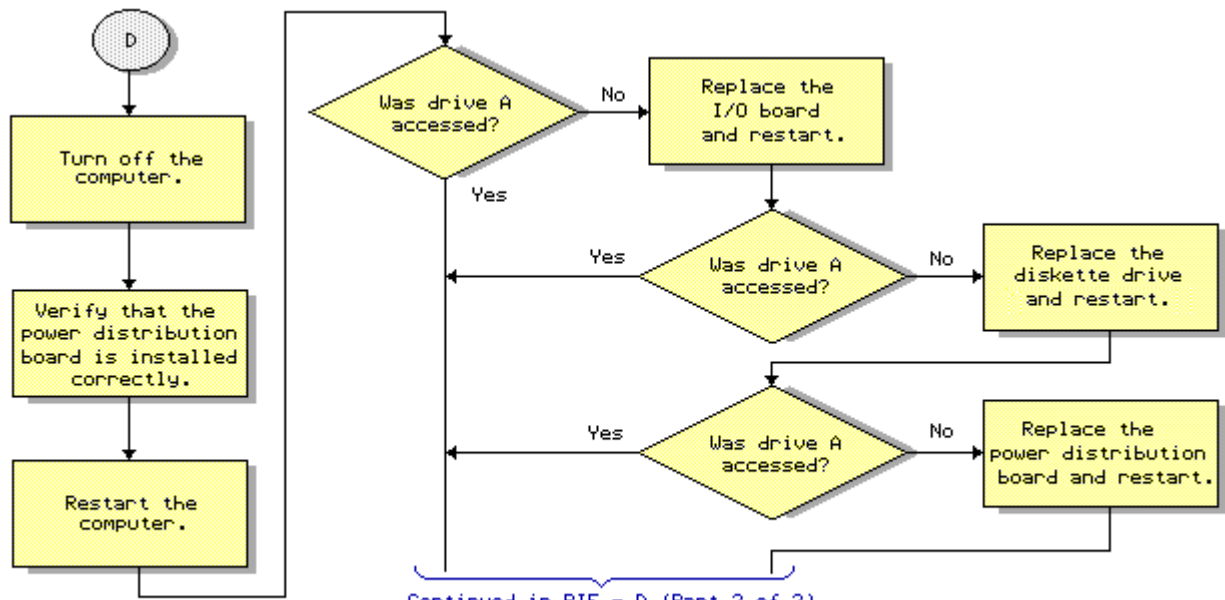


Problem Isolation Flowchart - C (Part 2 of 3)

Continued from PIF - C (Part 2 of 3)

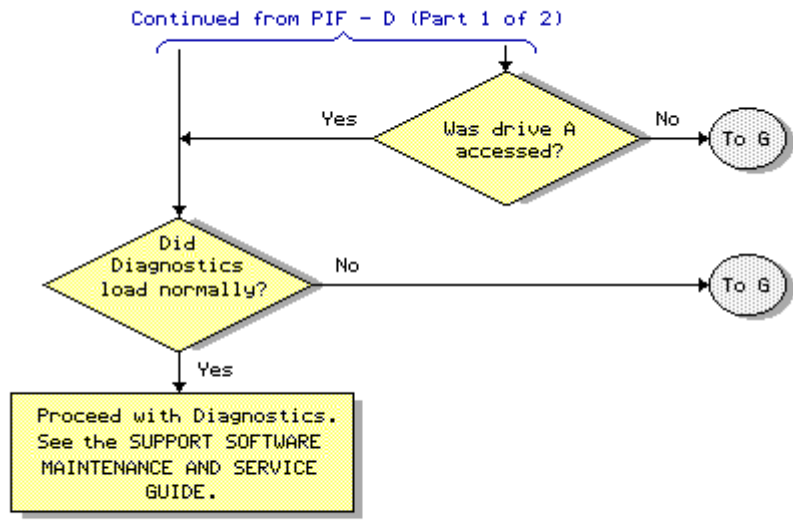


Problem Isolation Flowchart - C (Part 3 of 3)

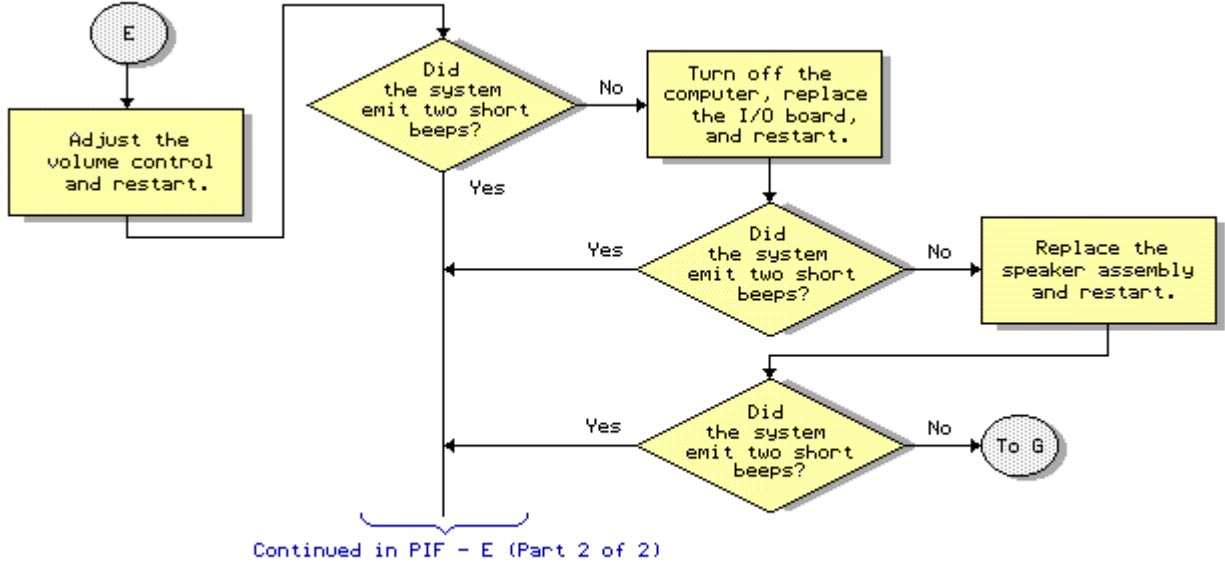


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Problem Isolation Flowchart - D (Part 1 of 2)

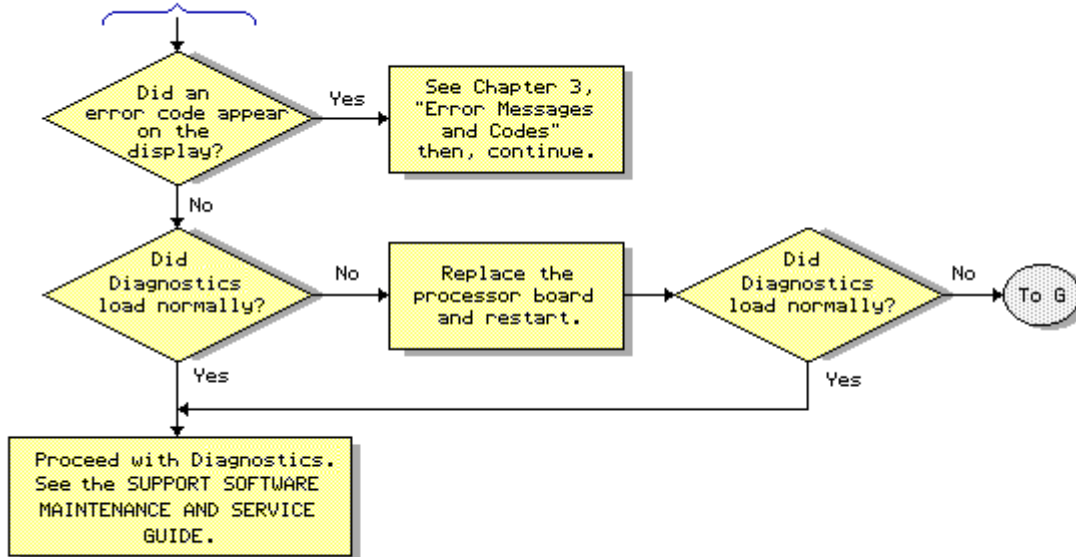


Problem Isolation Flowchart - D (Part 2 of 2)

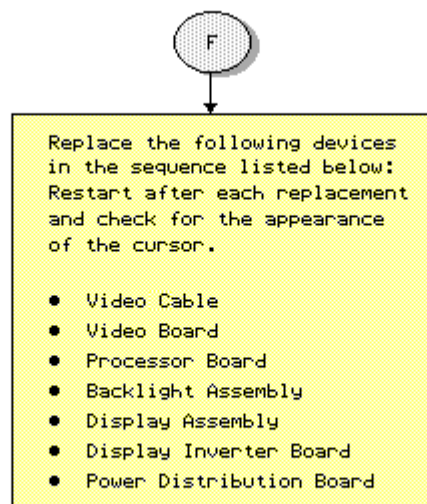


Problem Isolation Flowchart - E (Part 1 of 2)

Continued from PIF - E (Part 1 of 2)



Problem Isolation Flowchart - E (Part 2 of 2)



Problem Isolation Flowchart - F



Note: The keylock must be in locked position to allow removal of all expansion boards.

Remove all expansion boards.

Restart the computer and allow POST to run again.

If POST completes successfully, reinstall the expansion boards one at a time until the problem reoccurs; then replace the appropriate board and restart.

If POST does not complete successfully:

1. Verify that all power and signal cables are connected properly.
2. Replace the following devices in the appropriate order. Restart the computer after each replacement and check for the appearance of the cursor and/or the first screen of the Diagnostics.

- Backlight Assembly
- Display Assembly
- Diskette Drive
- Fixed Disk Drive
- Processor Board
- I/O Board
- Display Inverter Board
- Video Board
- Speaker Assembly

Problem Isolation Flowchart - G

Chapter 3. Error Messages and Codes

This chapter contains Power On Self Test (POST) messages, Diagnostic error codes, and memory error codes for the COMPAQ PORTABLE 486c Personal Computer.

The messages and codes appear in tables that list the message or error code, a description of the error or its probable cause, and the action recommended to resolve the error condition.

Chapter 3.1 Power On Self Test Messages

An error message results if a problem is encountered during POST, which runs automatically when the system is turned on.

Table 3-1 lists the messages for POST, the audible (beep) messages, probable causes, and recommended actions.

Table 3-1. Power On Self Test Messages

Message	Beeps	Probable Cause	Recommended Action
101 - ROM Error	1 Long, 1 Short	System ROM checksum	The following steps apply to error code 101:
101 - I/O ROM Error	1 Long, 1 Short	Option ROM checksum	1. Inspect the ROM placement. 2. Verify the correct ROM. 3. Replace the ROM.
102 - Processor Board Failure	None	Processor board: DMA timers, etc.	Replace the processor board.
162 - System Options Not Set	2 Short	Configuration incorrect or no diskette drive	Run COMPAQ EISA Configuration utility.
163 - Time and Date Not Set	2 Short	Invalid time or date in configuration memory	Run COMPAQ EISA Configuration utility.
164 - Memory Size Error	2 Short	Configuration memory size incorrect	Run COMPAQ EISA Configuration utility.
170 - Expansion Device	1 Short	EISA board not ready after power on delay	Run COMPAQ EISA Configuration utility
172 - EISA Configuration Nonvolatile Memory	1 Short	Nonvolatile configuration memory corrupt or jumper installed	Run COMPAQ EISA Configuration utility for error codes 172-xx through 177-xx.
173 - EISA Slot ID	1 Short	Board replaced,	

Mismatch		configuration not updated
174 - EISA Configuration/Slot Mismatch	1 Short	EISA board not found
175 - EISA Configuration/Slot Mismatch	1 Short	EISA board added, configuration not updated
176 - Slot with Unreadable ID	1 Short	EISA board in slot that should contain ISA board
177 - Configuration Not Complete	1 Short	Incomplete EISA configuration

Message	Beeps	Probable Cause	Recommended Action
178 - Processor Configuration	1 Short	System board type invalid or step does not match configuration memory	Run COMPAQ EISA Configuration utility.
XX000Y ZZ * 201 - Memory Error	None	RAM failure	1. Replace the memory module (see Figure 3-1). 2. Replace the processor board.
XX000Y ZZ * 203 - Memory Address Error	None	Memory failure	Replace the processor board.
205 - Memory Error XXYYYYY ZZZZZZZZ	None	Cache Memory controller or RAM failure	Run Diagnostics.
301 - Keyboard Error	None	Keyboard failure	1. Check that keyboard is connected. 2. Replace the keyboard.
303 - Keyboard Controller Error	None	Processor board, keyboard, or mouse	Replace the keyboard, mouse or I/O board.
304 - Keyboard or System Unit Error	None	Keyboard or processor board	1. Replace the keyboard. 2. Replace the processor board.
501 - Display Adapter Failure	1 Long, 2 Short	Video display controller	Replace the video board
Message	Beeps	Probable Cause	Recommended Action
601 - Diskette Controller Error	None	Diskette Controller circuitry	1. Replace the power distribution board

- and retest.
2. Run Diagnostics.
3. Replace the I/O board.

605 - Diskette Drive Type Error	2 Short	Mismatch in drive type	Run COMPAQ EISA Configuration utility.
610 - External Storage Module Failure. Hit F1 when ready.	None	External Storage Module connected but turned off	Turn on External Storage Module or disconnect from computer.
701 - Coprocessor Error	None	Coprocessor	Replace processor board.
1151 - Comm Port 1 Configuration Error	2 Short	Added or removed modem, or second modem board	Run COMPAQ EISA Configuration utility for error codes 1151 through 1154.
1152 - Comm Port 2 Configuration Error	2 Short	Added or removed modem, or second modem board	
1153 - Comm Port 3 Configuration Error	2 Short	Added or removed modem, or second modem board	
1154 - Comm Port 4 Configuration Error	2 Short	Added or removed modem, or second modem board	
Message	Beeps	Probable Cause	Recommended Action
1771 - Primary Disk Port Address Assignment Conflict	2 Short	Internal and external fixed disk drive controllers are assigned to the primary address	Run Diagnostics.
1772 - Secondary Disk Port Address Assignment Conflict	2 Short	Internal and external fixed disk drive controllers are assigned to the secondary address	Run Diagnostics.
1780 - Disk 0 Failure	None	Fixed disk drive/format error	<ol style="list-style-type: none"> 1. Run Diagnostics. 2. Check and/or replace the power distribution board. 3. Replace the fixed disk drive.
1781 - Disk 1 Failure	None	Fixed disk drive/format error	<ol style="list-style-type: none"> 1. Run Diagnostics. 2. Check and/or replace the power distribution board. 3. Replace the fixed disk drive.

1782 - Disk Controller Failure	None	Fixed disk drive controller error	<ol style="list-style-type: none"> 1. Run Diagnostics. 2. Check and/or replace the power distribution board. 3. Replace the fixed disk drive.
Message	Beeps	Probable Cause	Recommended Action
1790 - Disk 0 Error	None	Fixed disk drive error or wrong drive type	<ol style="list-style-type: none"> 1. Run Diagnostics. 2. Replace the drive.
1791 - Disk 1 Error	None	Fixed disk drive error or wrong drive type	<ol style="list-style-type: none"> 1. Run Diagnostics. 2. Replace the drive.
XX000Y ZZ Parity Check 2	None	Parity RAM failure	Run Diagnostics.
Audible	1 Short	Power on successful	None.
Audible	2 Short	Power on successful	None.
(RESUME = "F1" KEY)	None	As indicated	Press F1 key to continue.

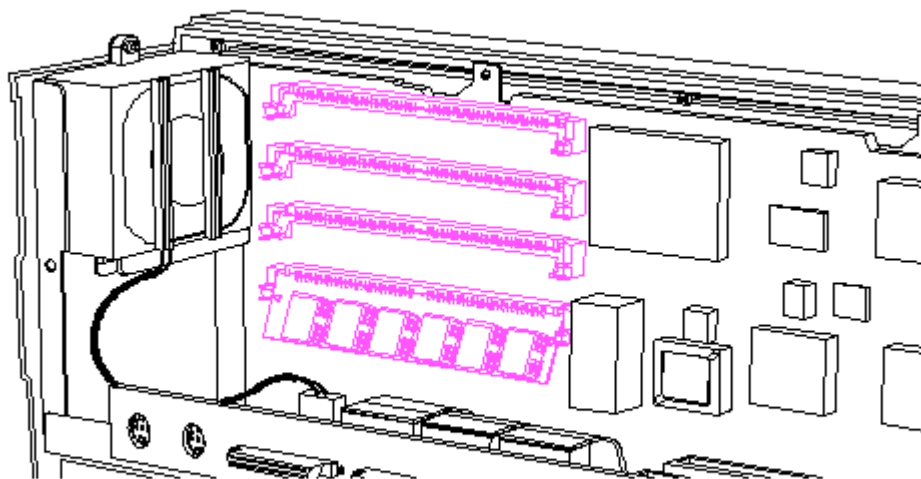


Figure 3-1. Memory Module Location

Chapter 3.2 Diagnostic Error Codes

Diagnostic error codes occur if the system recognizes a problem while running the Diagnostics program (refer to the SUPPORT SOFTWARE MAINTENANCE AND SERVICE GUIDE for additional information on running the Diagnostics software). These error codes help identify possible defective subassemblies. Tables 3-2 through 3-12 list possible error codes, a description of the error condition, and the action required to resolve the error condition.

In each case, the Recommended Action column lists steps necessary to correct the problem. After completing each step, run the Diagnostics program to verify whether the error condition has been corrected. If the error code reappears, perform the next step, then run the Diagnostics program again. Follow this procedure until the Diagnostics program no longer detects an error condition.

The error codes appear in an AYY XX or AAYY XX format.

A or AA = number that represents faulty assembly
 YY = test or action that failed
 XX = a specific problem

Example: Error code 610-21 shows that the diskette drive failed to get change line status.

For assistance in the removal and replacement of a particular subassembly, see Chapter 5, "Removal and Replacement Procedures."

Table 3-2. Processor Test Error Codes

Error Code	Description	Recommended Action
101 - 01	16 bit CPU failed	Replace the processor board and retest for error codes 101 - xx.
101 - 02	32 bit CPU failed	
101 - 50	BIOS dispatch of processor	
101 - 51	Processor is unavailable or non existent	
101 - 52	Time out waiting for completion of test	
101 - 53	Failure to terminate processor	
101 - 54	Time out waiting for serial semaphore	
101 - 56	Unexpected interrupt occurred during test	
101 - 91	16 bit multiplication, expected	
101 - 92	32 bit multiplication expected	
101 - 93	16 bit multiplication unexpected	
101 - 94	32 bit multiplication	

unexpected

- 101 - 95 Coprocessor and processor board conflict
- 101 - 96 Refer to Authorized Compaq Dealer Service Bulletin No. 84.

Error Code	Description	Recommended Action
102 - 01	Coprocessor initial status word incorrect	The following steps apply to error codes 102 - xx: 1. Run COMPAQ EISA Configuration utility. 2. Replace the processor board and retest.
102 - 02	Coprocessor initial control word incorrect	
102 - 03	Coprocessor tag word not all ones	
102 - 04	Coprocessor tag word not all zeros	
102 - 05	Coprocessor exchange command failed	
102 - 06	Coprocessor masked exception incorrectly handled	
102 - 07	Coprocessor unmasked exception incorrectly handled	
102 - 08	Coprocessor wrong mask bit set in status register	
102 - 09	Coprocessor unable to store real number	
102 - 10	Coprocessor real number calculation test failed	
102 - 11	Coprocessor speed test failed	
102 - 12	Coprocessor pattern test failed	
102 - 14	Switch indicates no numeric coprocessor present	
102 - 15	Coprocessor is inoperative	

Error Code	Description	Recommended Action
103 - 01	DMA page registers test failed	Replace the processor board and retest for error codes 103 - xx through 114 - xx.
103 - 02	DMA byte controller test failed	

103 - 03 DMA word controller test failed

104 - 01 Interrupt controller master test failed

104 - 02 Interrupt controller slave test failed

104 - 03 Interrupt controller software RTC is inoperative

105 - 01 Port 61 bit 6 not at zero

105 - 02 Port 61 bit 5 not at zero

105 - 03 Port 61 bit 3 not at zero

105 - 04 Port 61 bit 1 not at zero

105 - 05 Port 61 bit 0 not at zero

105 - 06 Port 61 bit 5 not at one

105 - 07 Port 61 bit 3 not at one

105 - 08 Port 61 bit 1 not at one

Error Code	Description	Recommended Action
105 - 09	Port 61 bit 0 not at one	Replace the processor board and retest for error codes 103 - xx through 114 - xx.
105 - 10	Port 61 I/O test failed	
105 - 11	Port 61 bit 7 not at zero	
105 - 12	Port 61 bit 2 not at zero	
105 - 13	No interrupt generated by failsafe timer	
105 - 14	NMI not triggered by failsafe timer	
107 - 01	CMOS RAM test failed	
107 - 02	NOVRAM failed	
107 - 03	Unable to restore extended non volatile memory contents	
108 - 02	CMOS interrupt test failed	
108 - 03	CMOS interrupt test, CMOS not properly initialized	
109 - 01	CMOS clock load data test failed	

109 - 02 CMOS clock rollover test failed
109 - 03 CMOS clock test, CMOS not properly initialized

Error Code	Description	Recommended Action
110 - 01	Programmable timer load data test failed	Replace the processor board and retest for error codes 103 - xx through 114 - xx.
110 - 02	Programmable timer dynamic test failed	
110 - 03	Programmable Timer No. 2 load data test failed	
111 - 01	Refresh detect test failed	
112 - 01	Speed test slow mode out of range	
112 - 02	Speed test mixed mode out of range	
112 - 03	Speed test fast mode out of range	
112 - 04	Speed test unable to enter slow mode	
112 - 05	Speed test unable to enter mixed mode	
112 - 06	Speed test unable to enter fast mode	
112 - 07	Speed test system error	
112 - 08	Speed test unable to enter auto mode	

Error Code	Description	Recommended Action
112 - 09	Speed test unable to enter high mode	Replace the processor board and retest for error codes 103 - xx through 114 - xx.
112 - 10	Speed test high mode out of range	
112 - 11	Speed test auto mode out of range	
112 - 12	Speed test variable speed mode inoperative	
112 - 13	Failed Cache speed test	

113 - 50 BIOS dispatch of processor

113 - 51 Processor is unavailable
or nonexistent

113 - 52 Time out waiting for
completion of test

113 - 54 Time out waiting for serial
semaphore

113 - 56 Unexpected interrupt
occurred during test

114 - 01 Speaker test failed

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Table 3-3. Memory Test Error Codes

Error Code	Description	Recommended Action
201 - 01	Memory machine ID test failed	The following steps apply to error codes 201 - xx through 202 - xx: 1. Replace the system ROM and retest. 2. Replace the processor board and retest.
201 - 02	Memory machine type test failed	
201 - 03	Memory machine ID and type test failed	
202 - xx	ROM checksum test failed	
202 - 01	Test failed	
202 - 02	Failed RAM/ROM map test	
202 - 03	Failed RAM/ROM protect test	
202 - 04	System RAM/ROM checksum test failed	
203 - xx	RAM write/read test failed	The following steps apply to error codes 203 - xx through 211 - xx: 1. Replace the memory module and retest. 2. Replace the processor board and retest.
203 - 01	Memory write/read test	
203 - 02	Error during saving program memory in write/read test	
203 - 03	Error during restore of memory in write/read test	
204 - xx	RAM address test failed	
204 - 01	Memory address test failed	

204 - 02 Error during saving
program memory in
address test

Error Code	Description	Recommended Action
204 - 03	Error during restore of program memory in address test	The following steps apply to error codes 203 - xx through 211 - xx: 1. Replace the memory module and retest. 2. Replace the processor board and retest.
204 - 04	A20 address test failed	
204 - 05	Page hit address test failed	
205 - 01	Walking 1/0 test failed	
205 - 02	Error during saving program memory in walking 1/0 test	
205 - 03	Error during restore of program memory in walking 1/0 test	
205 - 04	Insufficient memory to perform test	
206 - xx	Increment pattern test failed	
208 - 01	Memory refresh test failed	
208 - 02	Error during saving program memory in refresh test	
208 - 03	Error during restore program memory in fresh test	

Error Code	Description	Recommended Action
210 - xx	Random Pattern Test Failed	The following steps apply to error codes 203 - xx through 211 - xx: 1. Replace the memory module and retest. 2. Replace the processor board and retest.
210 - 01	Data read from block did not match data written	
210 - 02	Scan of test block prior to testing	
210 - 05	Inverted pattern compare, RAM correct	
210 - 10	Mapping LIM block, LIM	

page not present

211 - xx Random Pattern Test

211 - 01 Memory random pattern test failed

211 - 02 Error during saving program memory and random pattern in write/read test

211 - 03 Error during restore of program memory and random pattern in write/read test

211 - 04 Insufficient memory to perform test

211 - 05 Inverted pattern compare, but RAM correct

=====

Table 3-4. Keyboard Test Error Codes

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Error Code	Description	Recommended Action
301 - 01	Keyboard short test, 8042 self test failed	The following steps apply to error codes 301 - xx through 304 - xx: 1. Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard. 2. Replace the keyboard and retest. 3. Replace the I/O board and retest.
301 - 02	Keyboard short test, interface test failed	
301 - 03	Keyboard short test, echo test failed	
301 - 04	Keyboard short test failed	
302 - 01	Keyboard long test failed	
303 - 01	Keyboard LED test, 8042 self test failed	
303 - 02	Keyboard LED test, reset test failed	
303 - 03	Keyboard LED test, reset test failed	
303 - 04	Keyboard LED test, LED command test failed	
303 - 05	Keyboard LED test, LED command test failed	
303 - 06	Keyboard LED test, LED command test failed	
303 - 07	Keyboard LED test, LED command test failed	

Error Code	Description	Recommended Action
303 - 08	Keyboard LED test, command byte restore test failed	The following steps apply to error codes 301 - xx through 304 - xx: 1. Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard. 2. Replace the keyboard and retest. 3. Replace the I/O board and retest.
303 - 09	Keyboard LED test, LEDs failed to light	
304 - 01	Keyboard typematic test failed	
304 - 02	Unable to enter mode 3	
304 - 03	Incorrect scan code from keyboard	
304 - 04	No make code observed	
304 - 05	Unable to disable typematic feature	
304 - 06	Unable to return to normal mode	

Table 3-5. Parallel Printer Test Error Codes

Error Code	Description	Recommended Action
401 - 01	Printer failed or not connected	The following steps apply to error codes 401 - xx through 403 - xx: 1. If a printer is connected, be sure it is turned ON and in ONLINE mode. 2. Replace the printer cable and/or printer and retest. 3. Replace the I/O board and retest.
402 - xx	Printer port	
402 - 01	Printer data register failed	
402 - 02	Printer control register failed	
402 - 03	Printer data and control register failed	
402 - 04	Printer loopback failed	
402 - 05	Printer loopback and data failed	
402 - 06	Printer loopback and control register failed	
402 - 07	Printer loopback, data, and control register failed	
402 - 08	Printer interrupt test failed	

402 - 09 Printer interrupt and data register failed

402 - 10 Printer interrupt and control register failed

Error Code	Description	Recommended Action
402 - 11	Printer interrupt, data, and control register failed	The following steps apply to error codes 401 - xx through 403 - xx: 1. If a printer is connected, be sure it is turned ON and in ONLINE mode. 2. Replace the printer cable and/or printer and retest. 3. Replace the I/O board and retest.
402 - 12	Printer interrupt and loopback failed	
402 - 13	Printer interrupt, loopback, and data register failed	
402 - 14	Printer interrupt, loopback, and control register failed	
402 - 15	Printer interrupt, loopback, data, and control register failed	
402 - 16	Printer unexpected interrupt received	
402 - 25	Printer multiple interrupt	
402 - 26	Printer multiple interrupt	
403 - 01	Printer pattern test failed	

Table 3-6. Active Matrix Color Display Test Error Codes

Error Code	Description	Recommended Action
501 - 01	Video Controller Test Failed	Replace the video board and retest for error codes 501 - xx through 516 - xx.
502 - 01	Video Memory Test Failed	
503 - 01	Video Attribute Test Failed	
504 - 01	Video Character Set Test Failed	
505 - 01	Video 80 x 25 Mode 9 x 1 Character Cell Test Failed	
506 - 01	Video 80 x 25 Mode 8 x 8 Character Cell Test Failed	

507 - 01 Video 40 x 25 Mode
Test Failed

508 - 01 Video 320 x 200 Mode
Color Set 0 Test Failed

509 - 01 Video 320 x 200 Mode Color
Set 1 Test Failed

510 - 01 Video 640 x 200 Mode
Test Failed

511 - 01 Video Screen Memory
Page Test Failed

512 - 01 Video Gray Scale Test
Failed

514 - 01 Video White Screen Test
Failed

516 - 01 Video Noise Pattern Test
Failed

=====
Table 3-7. Diskette Drive Test Error Codes
=====

Error Code	Description	Recommended Action
600 - xx	Diskette ID drive types test failed	The following steps apply to error codes 600 - xx through 610 - xx: 1. Replace the diskette and retest. 2. Replace the diskette drive and retest. 3. Replace the I/O board and retest. 4. Replace the power distribution board and retest.
601 - xx	Diskette format failed	
602 - xx	Diskette read test failed	
603 - xx	Diskette write, read, compare test failed	
604 - xx	Diskette random seek test failed	
605 - xx	Diskette ID media failed	
606 - xx	Diskette speed test failed	
607 - xx	Diskette wrap test failed	
608 - xx	Diskette write protect test failed	
609 - xx	Diskette reset controller test failed	
610 - xx	Diskette change line test failed	
610 - 01	Exceeded maximum soft error limit	

610 - 02 Exceeded maximum
hard error limit

610 - 03 Previously exceeded
maximum soft error limit

Error Code	Description	Recommended Action
610 - 04	Previously exceeded maximum hard error limit	The following steps apply to error codes 600 - xx through 610 - xx:
610 - 05	Failed to reset controller	1. Replace the diskette and retest.
610 - 06	Fatal error while reading	2. Replace the diskette drive and retest.
610 - 07	Fatal error while writing	3. Replace the I/O board and retest.
610 - 08	Failed compare of write/read buffers	4. Replace the power distribution board and retest.
610 - 09	Failed to format a track	
610 - 10	Failed sector wrap test	
610 - 20	Failed to get drive type	
610 - 21	Failed to get change line status	
610 - 22	Failed to clear change line status	
610 - 23	Failed to set drive type in ID media	
610 - 24	Failed to read diskette media	
610 - 25	Failed to verify diskette media	
610 - 26	Failed to read media in speed test	
610 - 27	Failed speed limits	
610 - 28	Failed write protect test	

Error Code	Description	Recommended Action
697 - 00	Diskette type error	The following steps apply to error codes 697 - xx and 698 - xx:
698 - 00	Diskette drive speed not within limits	1. Replace the diskette and retest. 2. Replace the diskette drive and retest.

3. Check and/or replace drive cable and retest.
4. Replace the I/O board and retest.

699 - 00	Diskette drive/media ID error, rerun COMPAQ EISA Configuration utility	<ol style="list-style-type: none"> 1. Replace the media. 2. Run COMPAQ EISA Configuration utility.
----------	--	--

Table 3-8. Serial Test Error Codes

Error Code	Description	Recommended Action
1101 - 01	Serial Port Test: UART DLAB bit failure	Replace the I/O board and retest for error codes 1101 - xx through 1109 - xx.
1101 - 02	Serial Port Test; line input or UART fault	
1101 - 03	Serial Port Test; address line fault	
1101 - 04	Serial Port Test; data line fault	
1101 - 05	Serial Port Test; UART control signal failure	
1101 - 06	Serial Port Test; UART THREE bit failure	
1101 - 07	Serial Port Test; UART DATA READY bit failure	
1101 - 08	Serial Port Test; UART TX/RX buffer failure	
1101 - 09	Serial Port Test; INTERRUPT circuit failure	
1101 - 10	Serial Port Test; COM1 set to invalid interrupt	
1101 - 11	Serial Port Test; COM2 set to invalid interrupt	
<hr/>		
Error Code	Description	Recommended Action
1101 - 12	Serial Port Test; DRIVER/RECEIVER control signal failure	Replace the I/O board and retest for error codes 1101 - xx through 1109 - xx.
1101 - 13	Serial Port Test; UART control signal interrupt failure	

1101 - 14	Serial Port Test; DRIVER/RECEIVER data failure
1101 - 15	Serial port test modem detection
1101 - 16	Serial port test, modem ROM checksum
1101 - 17	Serial port test, tone detection
1101 - 18	Serial port test, COM3 set to invalid interrupt
1101 - 19	Serial port test, COM4 set to invalid interrupt
1109 - 01	Clock register initialization failure
1109 - 02	Clock register rollover failure

Error Code	Description	Recommended Action
1109 - 03	Clock reset failure	Replace the I/O board and retest for error codes 1101 - xx through 1109 - xx.
1109 - 04	Input line or clock failure	
1109 - 05	Address line fault	
1109 - 06	Data line fault	

Table 3-9. Modem Test Error Codes

Error Code	Description	Recommended Action
1201 - xx	Modem Internal Loopback Test	The following steps apply to error codes 1201 - xx through 1210 - xx:
1201 - 01	UART DLAB bit failure	1. Refer to modem documentation for Configuration utility procedures.
1201 - 02	Line input or UART failure	2. Check the modem line.
1201 - 03	Address line fault	3. Replace the modem and retest.
1201 - 04	Data line fault	
1201 - 05	UART control signal failure	
1201 - 06	UART THREE bit failure	
1201 - 07	UART DATA READY bit failure	

1201 - 08 UART TX/RX buffer failure

1201 - 09 INTERRUPT circuit
failure

1201 - 10 COM1 set to invalid
interrupt

1201 - 11 COM2 set to invalid
interrupt

1201 - 12 DRIVER/RECEIVER
control signal failure

Error Code	Description	Recommended Action
1201 - 13	UART control signal interrupt failure	The following steps apply to error codes 1201 - xx through 1210 - xx:
1201 - 14	DRIVER/RECEIVER data failure	1. Refer to modem documentation for Configuration utility procedures.
1201 - 15	Modem detection failure	2. Check the modem line.
1201 - 16	Modem ROM; checksum failure	3. Replace the modem and retest.
1201 - 17	Tone detection failure	
1202 - xx	Internal Modem Test	
1202 - 01	Modem timed out waiting for SYNC (local loopback mode)	
1202 - 02	Modem timed out waiting for response (local loopback mode)	
1202 - 03	Modem exceeded data block retry limit (local loopback mode)	
1202 - 11	Modem timed out waiting for SYNC (analog loopback originate mode)	
1202 - 12	Modem timed out waiting for modem response (analog loopback originate mode)	

Error Code	Description	Recommended Action
1202 - 13	Modem exceeded data block retry limit (analog loopback originate mode)	The following steps apply to error codes 1201 - xx through 1210 - xx: 1. Refer to modem

1202 - 21	Modem timed out waiting for SYNC (analog loopback answer mode)	documentation for Configuration utility procedures.
1202 - 22	Modem timed out waiting for modem response (analog loopback answer mode)	2. Check the modem line. 3. Replace the modem and retest.
1202 - 23	Modem exceeded data block retry limit (analog loopback answer mode)	
1203 - xx	Modem External Termination Test	
1203 - 01	Modem external TIP/RING failure	
1203 - 02	Modem external DATA TIP/RING failure	
1203 - 03	Modem line termination failure	
1204 - xx	Modem Auto Originate Test	
1205 - xx	Modem Auto Answer Test	

Error Code	Description	Recommended Action
1206 - xx	Dial Multifrequency Tone Test	The following steps apply to error codes 1201 - xx through 1210 - xx:
1210 - xx	Modem Direct Connect Test	1. Refer to modem documentation for Configuration utility procedures.
1210 - 01	Modem timed out waiting for SYNC	2. Check the modem line.
1210 - 02	Modem timed out waiting for response	3. Replace the modem and retest.
1210 - 03	Modem exceeded data block retry limit	
1210 - 04	RCV exceeded carrier lost limit	
1210 - 05	XMIT exceeded carrier lost limit	
1210 - 06	Time out waiting for dial tone	
1210 - 07	Dial number string too long	

1210 - 08 Modem timed out waiting
for remote response

1210 - 09 Modem exceeded
maximum redial limit

1210 - 10 Line quality prevented
remote connection

1210 - 11 Modem timed out waiting
for remote connection

1210 - 17 Tone detection failure

=====

Table 3-10. Fixed Disk Drive Test Error Codes

Error Code	Description	Recommended Action	
1700 - xx	Fixed disk ID drive types test failed	The following steps apply to error codes 1700 - xx through 1719 - xx: 1. Replace the fixed disk drive and retest. 2. Replace the power distribution board and retest. 3. Replace the I/O board and retest.	
1701 - xx	Fixed disk drive format test failed		
1702 - xx	Fixed disk drive read test failed		
1703 - xx	Fixed disk drive write read compare test failed		
1704 - xx	Fixed disk drive random seek test failed		
1705 - xx	Fixed disk drive controller test failed		
1706 - xx	Fixed disk drive ready test failed		
1707 - xx	Fixed disk drive recalibrate test failed		
1708 - xx	Fixed disk drive format bad track test failed		
1709 - xx	Fixed disk drive reset controller test failed		
1710 - xx	Fixed disk drive park head test failed		
1714 - xx	Fixed disk drive file write test failed		The following steps apply to error codes 1700 - xx through 1719 - xx: 1. Replace the fixed disk
1715 - xx	Fixed disk drive head		

	select test failed	drive and retest.
1716 - xx	Fixed disk drive conditional format test failed	2. Replace the power distribution board and retest.
1717 - xx	Fixed disk drive Error Correction Code test failed	3. Replace the I/O board and retest.
1719 - xx	Fixed disk drive power mode test	
1719 - 01	Exceeded maximum soft error limit	
1719 - 02	Exceeded maximum hard error limit	
1719 - 03	Previously exceeded maximum soft error limit	
1719 - 04	Previously exceeded maximum hard error limit	
1719 - 05	Failed to reset controller	
1719 - 06	Fatal error while reading	
1719 - 07	Fatal error while writing	

Error Code	Description	Recommended Action
1719 - 08	Failed compare of write/read/compare	The following steps apply to error codes 1700 - xx through 1719 - xx:
1719 - 09	Failed to format a track	1. Replace the fixed disk drive and retest.
1719 - 10	Failed sector wrap test	2. Replace the power distribution board and retest.
1719 - 19	Controller failed to deallocate bad sector	3. Replace the I/O board and retest.
1719 - 40	Failed cylinder 0	
1719 - 41	Drive not ready	
1719 - 42	Recalibrate failed	
1719 - 43	Failed to format bad track	
1719 - 44	Failed fixed disk drive controller diagnostics	
1719 - 45	Failed to get drive parameters from ROM	
1719 - 46	Invalid drive parameters found in ROM	

1719 - 47 Failed to park heads

1719 - 48 Failed to move disk
table to RAM

Error Code	Description	Recommended Action
1719 - 49	Failed to read media in file write test	The following steps apply to error codes 1700 - xx through 1719 - xx:
1719 - 50	Failed file I/O write test	1. Replace the fixed disk drive and retest.
1719 - 51	Failed file I/O read test	2. Replace the power distribution board and retest.
1719 - 52	Failed file I/O compare test	3. Replace the I/O board and retest.
1719 - 53	Failed drive/head register test	
1719 - 54	Failed digital input register test	
1719 - 55	Failed cylinder 1	
1719 - 56	Fixed disk drive controller RAM diagnostics failed	
1719 - 57	Fixed disk drive controller to drive test failed	
1719 - 58	Failed to write sector buffer	
1719 - 59	Failed to read sector buffer	
1719 - 60	Failed to compare sector buffer	
1719 - 61	Failed uncorrectable Error Correction Code error	

Error Code	Description	Recommended Action
1719 - 62	Failed correctable Error Correction Code error	The following steps apply to error codes 1700 - xx through 1719 - xx:
1719 - 63	Failed soft error rate	1. Replace the fixed disk drive and retest.
1719 - 65	Exceeded maximum bad sector per track	2. Replace the power distribution board and retest.
1719 - 66	Failed initial drive parameter	3. Replace the I/O board and retest.
1719 - 67	Failed to write long	

1719 - 68 Failed to read long

1719 - 69 Failed to read drive size
from controller

1719 - 70 Failed translate mode

1719 - 71 Failed nontranslated mode

1719 - 72 Bad track limit exceeded

1719 - 73 Previously exceeded bad
track limit

1719 - 74 Failed sleep mode

1719 - 75 Failed idle mode

1719 - 76 Failed standby mode

1719 - 77 Failed to change mode

1719 - 78 Exceeded spinup time limit

=====

Table 3-11. Tape Drive Test Error Codes

Error Code	Description	Recommended Action
1900 - xx	Tape ID failed	The following steps apply to error codes 1901 - xx through 1906 - xx:
1901 - xx	Tape servo write failed	
1902 - xx	Tape format failed	
1903 - xx	Tape drive sensor test failed	
1904 - xx	Tape BOT/EOT test failed	
1905 - xx	Tape read test failed	
1906 - xx	Tape write/read/compare test failed	
1906 - 01	Drive not installed	
1906 - 02	Cartridge not installed	
1906 - 03	Tape motion error	
1906 - 04	Drive busy error	
1906 - 05	Track seek error	
1906 - 06	Tape write protected error	
1906 - 07	Tape already servo written	

1906 - 08 Unable to servo write

Error Code	Description	Recommended Action
1906 - 09	Unable to format	The following steps apply to error codes 1901 - xx through 1906 - xx: 1. Replace the tape cartridge and retest. 2. Replace the tape drive and retest. 3. Replace the I/O board and retest.
1906 - 10	Format mode error	
1906 - 11	Drive recalibration error	
1906 - 12	Tape not servo written	
1906 - 13	Tape not formatted	
1906 - 14	Drive timeout error	
1906 - 15	Sensor error flag	
1906 - 16	Block locate (block ID) error	
1906 - 17	Soft error limit exceeded	
1906 - 18	Hard error limit exceeded	
1906 - 19	Write (probably ID) error	
1906 - 20	NEC fatal error	
1906 - 21	Received servo pulses second time but not first	
1906 - 22	Never got to EOT after servo check	

Error Code	Description	Recommended Action
1906 - 23	Change line not set	The following steps apply to error codes 1901 - xx through 1906 - xx: 1. Replace the tape cartridge and retest. 2. Replace the tape drive and retest. 3. Replace the I/O board and retest.
1906 - 24	Write protect error	
1906 - 25	Unable to erase cartridge	
1906 - 26	Cannot identify drive	
1906 - 27	Drive not compatible with controller	
1906 - 28	Format gap error	
1906 - 30	Exception bit not set	
1906 - 31	Unexpected drive status	
1906 - 32	Device fault	
1906 - 33	Illegal command	

1906 - 34 No data detected
 1906 - 35 Power on reset occurred
 1906 - 91 Power lost during test

=====

Table 3-12. Video Test Error Codes

Error Code	Description	Recommended Action	
2402 - 01	Video memory test failed	Replace the video board and retest for error codes 2402 - xx through 2432 - xx.	
2403 - 01	Video attribute test failed		
2404 - 01	Video character set test failed		
2405 - 01	Video 80 x 25 mode 9 x 14 character cell test failed		
2406 - 01	Video 80 x 25 mode 8 x 8 character cell test failed		
2407 - 01	Video 40 x 25 mode test failed		
2408 - 01	Video 320 x 200 mode color set 0 test failed		
2409 - 01	Video 320 x 200 mode color set 1 test failed		
2410 - 01	Video 640 x 200 mode test failed		
2411 - 01	Video screen memory page test failed		
2412 - 01	Video gray scale test failed		
2414 - 01	Video white screen test failed		
2416 - 01	Video noise pattern test failed		Replace the video board and retest for error codes 2402 - xx through 2432 - xx.
2418 - 01	Video memory test failed		
2418 - 02	Video shadow RAM test failed		
2419 - 01	Video ROM checksum test failed		

```

2420 - 01      Video attribute test failed
2421 - 01      Video 640 x 200 graphics
                mode test failed
2422 - 01      Video 640 x 350 16
                color set test failed
2423 - 01      Video 640 x 350 64
                color set test failed
2424 - 01      Video monochrome text
                mode test failed
2425 - 01      Video monochrome
                graphics mode test failed
2431 - xx      Video 640 x 480 graphics
                mode test failed
2432 - xx      Video 320 x 200 graphics
                mode test failed

```

Table 3-13. Pointing Device Interface Test Error Codes

Error Code	Description	Recommended Action
8601 - xx	Pointing Device Interface test failed	<ol style="list-style-type: none"> 1. Install new copy of mouse driver software. 2. Replace with a working pointing device and retest. 3. Replace the I/O board and retest.

Chapter 3.3 Memory Error Codes

Memory error codes appear when the system detects a memory fault during the Power On Self Test (201 or 203 error codes) or as a result of a diagnostic test. The TEST programs attempt to isolate the memory fault to a specific location, then generate a memory error code.

The memory error code points to a specific memory address. The physical location of the memory address depends on the number and type of memory modules installed and the type of memory device used.

Memory error codes are displayed in an eight digit format (XX000Y ZZ). The XX and Y alphanumeric codes are key identification points for defective memory isolation.

```

XX000Y  ZZ      Error Message
| | | | |      |----- 201 (ROM)
| | | | |      |
| | | | |      |----- Failed data bit. Values are: 00, 01, 02, 04,

```

08, 10, 20, 40, 80, ??

00 = parity bit

01 = data bit 0

02 = data bit 1

04 = data bit 2

08 = data bit 3

10 = data bit 4

20 = data bit 5

40 = data bit 6

80 = data bit 7

?? = unable to determine failed data bit.

----- Failed byte. Values are 0, 1.

----- Always 000.

----- Failed address. Values are 00 through 20.

0X = error in 1st megabyte

1X = error in 2nd megabyte

2X = error in 3rd megabyte

3X = error in 4th megabyte

Chapter 4. Illustrated Parts Catalog

This chapter provides an illustrated parts breakdown and identifies the spare parts for the standard features of the COMPAQ PORTABLE 486c Personal Computer.

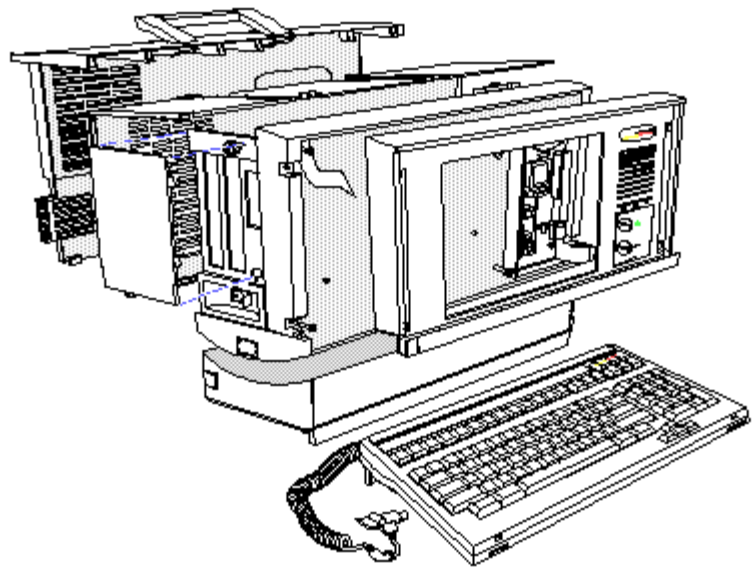


Figure 4-1. COMPAQ PORTABLE 486c Personal Computer

Chapter 4.1 Illustrated Parts Breakdown

System Unit

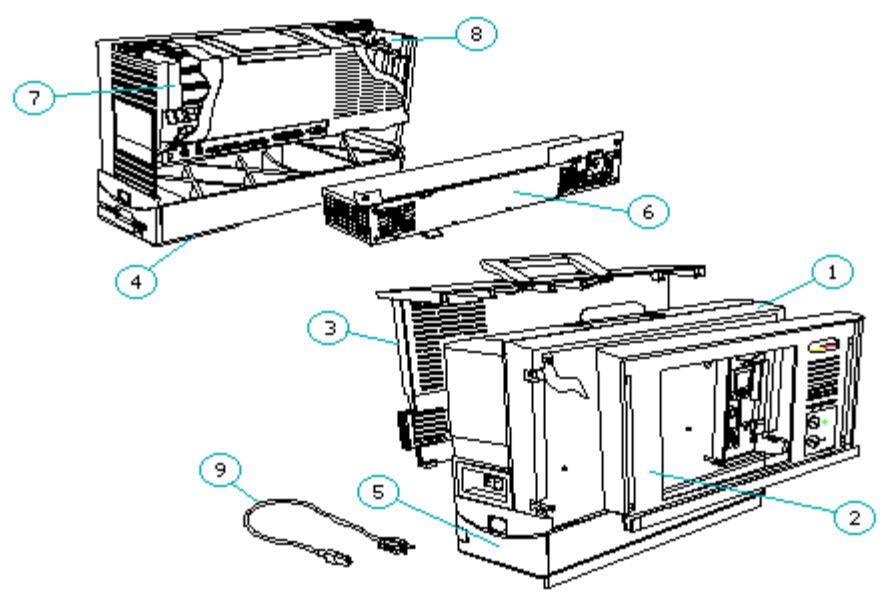


Figure 4-2. System Unit

Table 4-1. System Unit

Description	Spare Part Number
1. System Chassis	128937-001
2. Front Bezel	128946-001
3. Rear Panel Handle Connector Cover Enhanced Option Cover	128938-001
4. Base Panel	128948-001
5. Tilt Base	135999-001
6. Power Supply	128898-001
7. Fan Assembly	128901-001
8. Keylock	135901-001
9. AC Power Cord (U.S./Canada)	121258-001
(UK)	128943-001 *

* Not shown

Active Matrix Color Display

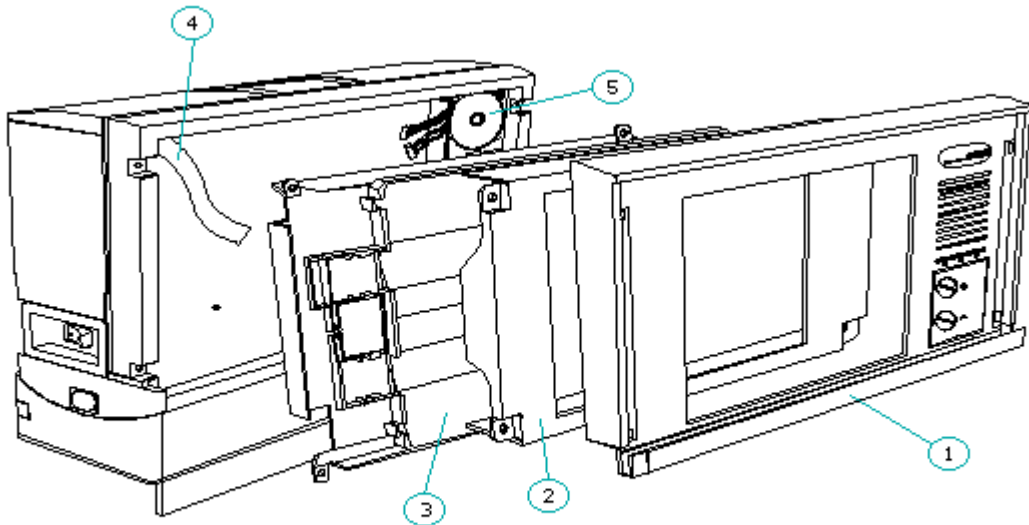


Figure 4-3. Active Matrix Color Display

Table 4-2. Active Matrix Color Display

Description	Spare Part Number
1. Front Bezel	128946-001
2. Display Assembly Display Shield	128902-001
3. Backlight Assembly Display Shield	136964-001
4. Video Cable	128903-001
5. Display Inverter Board	128900-001

Mass Storage Devices

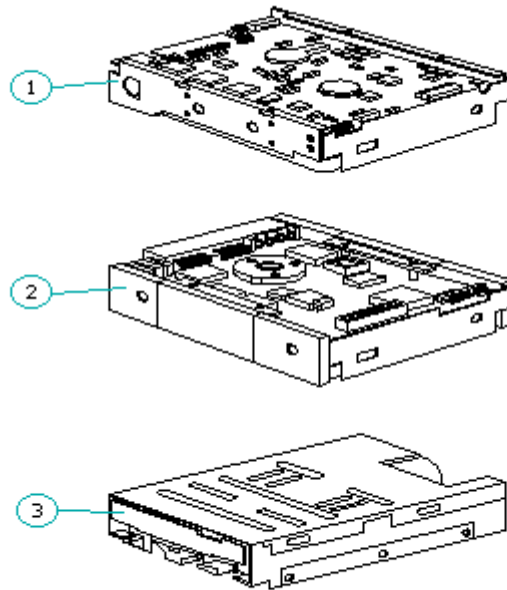


Figure 4-4. Mass Storage Devices

Table 4-3. Mass Storage Devices

Description	Spare Part Number
1. 210 Megabyte Fixed Disk Drive	128956-001
2. 120 Megabyte Fixed Disk Drive	128955-001
3. 3 1/2 inch 1.44 Megabyte Diskette Drive	123313-001

Cables

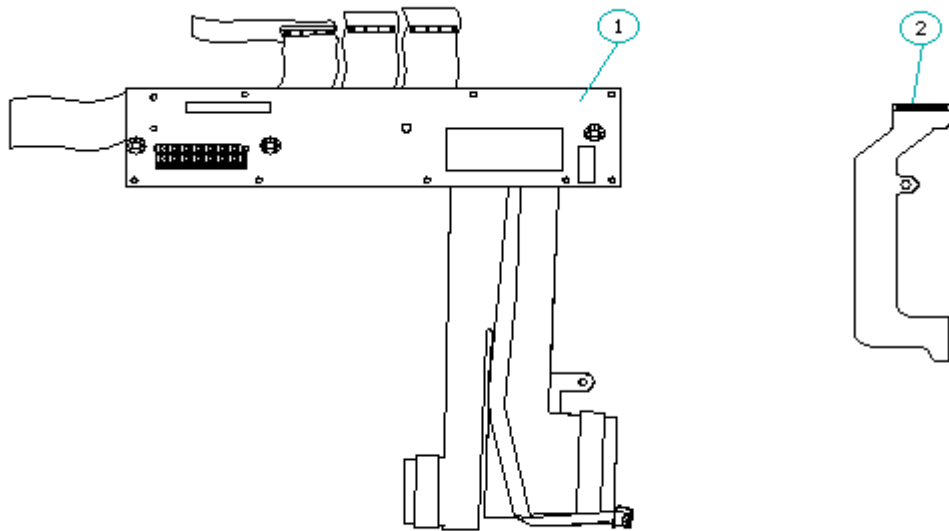


Figure 4-5. Cables

Table 4-4. Cables

Description	Spare Part Number
1. Power Distribution Board	128935-001
2. Video Cable	128903-001

Processor Board

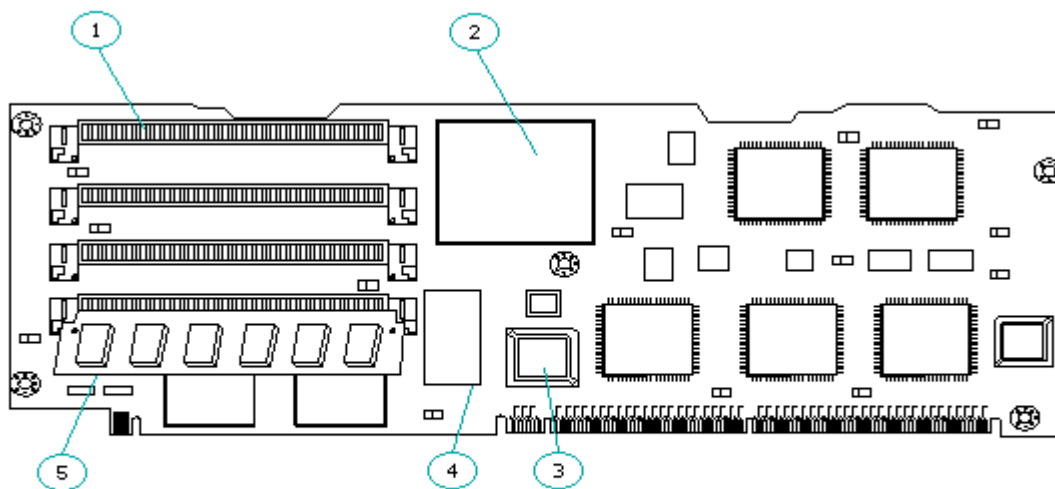


Figure 4-6. COMPAQ PORTABLE 486c Personal Computer Processor Board Connectors (Board Assy No. 002139)

Table 4-5. COMPAQ PORTABLE 486c Personal Computer Processor Board Connectors

-
1. Memory Module Connectors, Slots 2, 3, and 4
 2. Intel 486 33 MHz Microprocessor Connector
 3. System ROM Connector
 4. Real Time Clock/Battery Connector
 5. Memory Module Connector, Slot 1
-

I/O Board

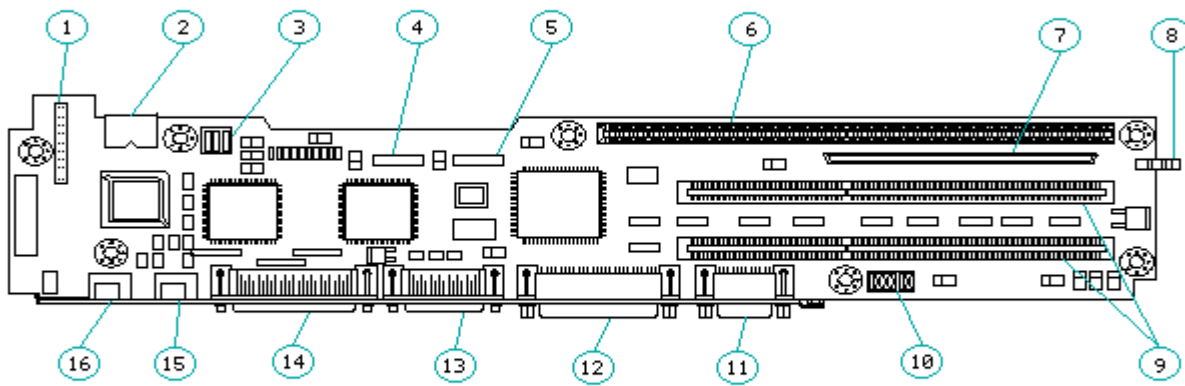


Figure 4-7. COMPAQ PORTABLE 486c Personal Computer I/O Board Connectors
(Board Assy No. 002142)

Table 4-6. COMPAQ PORTABLE 486c Personal Computer I/O Board Connectors

-
1. Enhanced Option Connector
 2. Internal Keyboard Connector
 3. Fan Assembly Connector
 4. Diskette Drive Connector
 5. Fixed Disk Drive Connector
 6. Processor Slot
 7. Video Slot
 8. Audio Input Jack
 9. EISA Slots
 10. I/O Board Switches
 11. Serial Connector
 12. Parallel Connector
 13. External Storage Module Connector
 14. CD-ROM Connector
 15. Pointing Device (Mouse) Connector
 16. External Keyboard Connector
-

Standard Boards

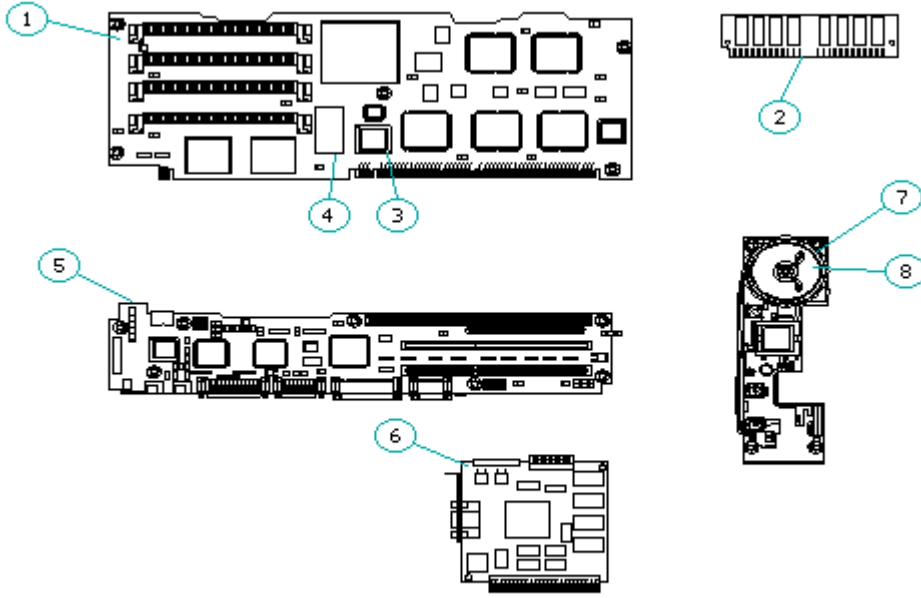


Figure 4-8. Standard Boards

Table 4-7. Processor and Standard Board Assemblies and Subassemblies

Item Description	Spare Part Number
1. Processor Board	128897-001
2. 4 Megabyte Memory Module	118741-001
3. System ROM	128939-001
4. Real Time Clock/Battery	126570-001
5. I/O Board	128949-001
6. Video Board	128899-001
7. Display Inverter Board	128900-001
8. Speaker Assembly	128966-001

Keyboard

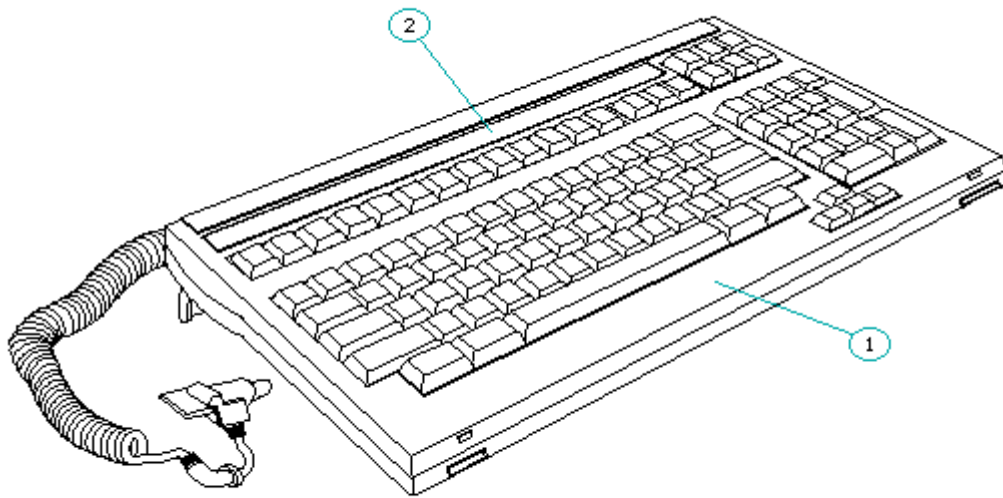


Figure 4-9. Keyboard

Table 4-8. Keyboards

Description	Spare Part Number
1. U.S. English	128958-001
2. Keyboard template	128934-001
3. UK English	128958-003 *
4. German	128958-004 *
5. French	128958-005 *
6. Italian	128958-006 *
7. Spanish	128958-007 *
8. Danish	128958-008 *
9. Norwegian	128958-009 *
10. Swedish/Finnish	128958-010 *
11. Swiss	128958-011 *
12. Portuguese	128958-013 *
13. Latin American	128958-016 *
14. Belgian	128958-018 *

* Not shown

Chapter 4.2 Spare Part Numbers

The following table provides a list of all of the spare part descriptions and part numbers for standard features of the COMPAQ PORTABLE 486c Personal Computer. Refer to the OPTIONS AND PERIPHERALS MAINTENANCE AND SERVICE GUIDE for spare part numbers to optional features.

Table 4-9. Spare Parts List

Description	Part Number
-------------	-------------

System Unit:

System Chassis	128937-001
Front Bezel	128946-001
Rear Panel	128938-001
Handle	
Connector Cover	
Enhanced Option Cover	
Base Panel	128948-001
Tilt Base	135999-001
Power Supply	128898-001
Fan Assembly	128901-001
Keylock	135901-001
AC Power Cord (U.S./Canada)	121258-001
AC Power Cord (UK)	128943-001

Active Matrix Color Display:

Front Bezel	128946-001
Display Assembly	128902-001
Display Shield	
Backlight Assembly	136964-001
Display Shield	
Video Cable	128903-001
Display Inverter Board	128900-001

Mass Storage Devices:

210 Megabyte Fixed Disk Drive	128956-001
120 Megabyte Fixed Disk Drive	128955-001
3 1/2 inch 1.44 Megabyte Diskette Drive	123313-001

Cables:

Power Distribution Board	128935-001
Video Cable	128903-001

Processor and Standard Board Assemblies
and Subassemblies:

Processor Board	128897-001
4 Megabyte Memory Module	118741-001
System ROM	128939-001
Real Time Clock/Battery	126570-001
I/O Board	128949-001
Video Board	128899-001
Display Inverter Board	128900-001
Speaker Assembly	128966-001

Keyboards:

U.S. English	128958-001
Keyboard template	128934-001
UK English	128958-003
German	128958-004
French	128958-005
Italian	128958-006
Spanish	128958-007
Danish	128958-008
Norwegian	128958-009
Swedish/Finnish	128958-010
Swiss	128958-011
Portuguese	128958-013
Latin American	128958-016

Belgian 128958-018

Documentation:

Service Aids Kit 105264-001
Maintenance and Service Guides:
COMPAQ PORTABLE 486c Personal Computer 128987-001
Options and Peripherals Volume 1 120577-001
Options and Peripherals Volume 2 120577-001
Options and Peripherals Volume 3 120577-001
Support Software 120576-001
Operations Guide 128940-001
COMPAQ PORTABLE 486c
PERSONAL COMPUTER TECHNICAL
REFERENCE GUIDE 128822-001
COMPAQ SERVICE QUICK REFERENCE
GUIDE 106854-001
Diagnostics
3 1/2 inch 720 Kbyte Diskette *
User Programs
3 1/2 inch 1.44 Megabyte Diskette *

* The software spare part numbers are subject to change. Please consult the current price list for the software spare part number before ordering.
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Table 4-10. Miscellaneous Hardware

Description	Part Number
Logo Labels	128944-001
Plastic Parts Kit	135900-001
Access Cover	
Brightness/Volume Controls	
Board Guide Assembly	
Keyboard Feet	
Options Door	
Options Bezel	
Screw Covers	
Switch Cover	
Hardware Kit	128945-001
Anti skid feet	
Backlight cable	
Diskette drive cage ground strap	
Display inverter board insulator	
Fixed disk drive ground strap	
Enhanced option cap	
Enhanced option shield	
Options cover	
Screw Kit	133982-001
4-40 x 3/16, PNHD, Torx	
Screw Kit	136965-001
6-19 x 1/4, PNHD, Torx, PT, CS	
Screw Kit	136973-001
6-19 x 1/2, PNHD, Torx, Plastite	

Screw Kit 6-32, MA, TH, T-15, CS	136967-001
Screw Kit 6-32 x 1/4, Torx, TT, HI, T/WSr	119548-001
Screw Kit 6-32 x 1/4, S-Torx, PNHD	136966-001
Screw Kit 6-32 x 1/4, TAPTITE, HT	128212-001
Screw Kit 6-32 x 1/2, S-Torx, TT	136974-001

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Chapter 5. Removal and Replacement Procedures

Introduction

This chapter provides module level removal and replacement procedures for the COMPAQ PORTABLE 486c Personal Computer.

After completing all removal and replacement procedures, run the Diagnostics program to verify that all components operate properly. Refer to the SUPPORT SOFTWARE MAINTENANCE AND SERVICE GUIDE for information on installing new or updated utilities when adding or removing options.

Chapter 5.1 Electrostatic Discharge

Before beginning to remove and replace a component in the COMPAQ PORTABLE 486c Personal Computer, be sure you are discharged of static electricity.

A sudden discharge of static electricity from a finger or other conductor can destroy static sensitive devices or micro circuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not be affected at all and will work perfectly throughout a normal cycle. Or it may function normally for awhile, then degrade in the internal layers, reducing its life expectancy.

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

Generating Static

Table 5-1 shows how different methods generate static electricity and at different electrostatic voltage levels.

Table 5-1. Typical Electrostatic Voltages

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

NOTE: 700 volts can degrade a product.

Preventing Electrostatic Damage to Equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. Proper packaging and

grounding are necessary precautions to prevent damage. Use the following precautions to protect equipment from static damage:

- o To avoid hand contact, transport products in static safe containers such as tubes, bags, or boxes.
- o Protect all electrostatic parts and assemblies by conductive or approved containers or packaging.
- o Keep electrostatic sensitive parts in their containers until they arrive at static free stations.
- o Place items on a grounded surface before removing them from their container.
- o Always be properly grounded when touching a sensitive component or assembly.
- o Place reusable electrostatic sensitive parts from assemblies in protective packaging or conductive foam.

Use transporters and conveyors made of antistatic belts and metal roller bushings. Mechanized equipment used for moving materials must be wired to ground and proper materials selected to minimize static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Preventing Damage to Drives

To prevent static damage to diskette drives and fixed disk drives, handle drives gently and perform the following static guarding techniques:

- o Store drives in their original shipping containers.
- o Avoid dropping the drive from any height onto any surface.
- o Handle drives on surfaces which have at least one inch of shock proof foam.
- o Always place drives PCB assembly side down on the foam.

Grounding Methods

Methods for grounding must include either a wrist strap or a foot strap at a grounded workstation. When seated, wear a wrist strap connected to a grounded system. When standing, use footstraps and a grounded floor mat.

Table 5-2 lists different antistatic materials and their shielding protection levels.

Table 5-2. Static Shielding Protection Levels

Method	Voltages
Antistatic plastic	1,500
Carbon loaded plastic	7,500
Metallized laminate	15,000

Grounding Workstations

To provide a grounded workstation, do the following:

- o Cover workstations with approved static dissipating material. Provide a wrist strap connected to work surface and properly grounded tools and equipment.
- o Use static dissipating mats, heel straps, or air ionizers to give added protection.
- o Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static free workstations.
- o Avoid contact with pins, leads, or circuitry.
- o Turn off power and input signals before inserting and removing connectors or test equipment to the computer.
- o Use fixtures made of static safe materials when fixtures must directly contact dissipating surfaces.
- o Keep work area free of non conductive materials such as ordinary plastic assembly aids and Styrofoam.
- o Use field service tools, such as cutters, screwdrivers, vacuums, that are conductive.
- o Use a portable field service kit with a static dissipating vinyl pouch that folds out to a work mat. Also use a wrist strap and a ground cord for the work surface. Ground the cord to the chassis of the equipment undergoing test or repair.

Grounding Equipment

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

Wrist Straps are flexible straps with a minimum of 1 megohm \pm 10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against the skin. On grounded mats without banana plug connectors, connect a wrist strap with alligator clips.

Heelstraps/Toestraps/Bootstraps can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a minimum of 1 megohm resistance between operator and ground. To be effective the conductive strips must be worn in contact with the skin.

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

- o Antistatic tape
- o Antistatic smocks, aprons or sleeve protectors
- o Conductive bins and other assembly or soldering aids

- o Conductive foam
- o Conductive table top workstations with ground cord of 1 megohm resistance
- o Static dissipating table or floor mats with hard tie to ground
- o Field service kits
- o Static awareness labels
- o Wrist straps and footwear straps providing 1 megohm ñ 10% resistance
- o Material handling packages
 - Conductive plastic bags
 - Conductive plastic tubes
 - Conductive tote boxes
 - Metal tote boxes
 - Opaque shielding bags
 - Transparent metallized shielding bag
 - Transparent shielding tubes

Chapter 5.2 Tool and Software Requirements

To service the COMPAQ PORTABLE 486c Personal Computer, you need the following:

- o Case utility tool
- o Flathead screwdriver
- o Modem terminating plug
- o Nonconductive probe
- o ROM removal tool
- o Torx screwdrivers, sizes T-10 and T-15
- o 9 pin serial interface loopback plug
- o 25 pin parallel interface loopback plug

Chapter 5.3 Disassembly/Assembly Sequence Chart

Use the following chart as a reference along with the procedures in this chapter for removing and replacing the subassemblies of the COMPAQ PORTABLE 486c Personal Computer.

5.4	PREPARATION PROCEDURES
5.5	-- KEYBOARD
5.6	-- REAR PANEL
5.7	-- OPTIONS COVER
5.8	-- STANDARD BOARDS
	-- Video Board
	-- Processor Board
	-- System ROM

				-- Real Time Clock/Battery
5.9				-- POWER SUPPLY
5.10				-- FAN ASSEMBLY
5.11				-- I/O BOARD
5.12		--		BASE PANEL
5.13		--		MASS STORAGE DEVICES
				-- Diskette Drive
				-- Fixed Disk Drive
5.14		--		ACTIVE MATRIX COLOR DISPLAY
				-- Front Bezel
				-- Display Assembly
				-- Backlight Assembly
				-- Display Inverter Board
				-- Speaker Assembly
5.15		--		POWER DISTRIBUTION BOARD
5.16		--		KEYLOCK

Chapter 5.4 Preparation Procedures

Before beginning the removal and replacement procedures, complete the following steps:

1. Turn off the computer.
2. Disconnect the AC power cord from the AC outlet and from the computer (Figure 5-1).

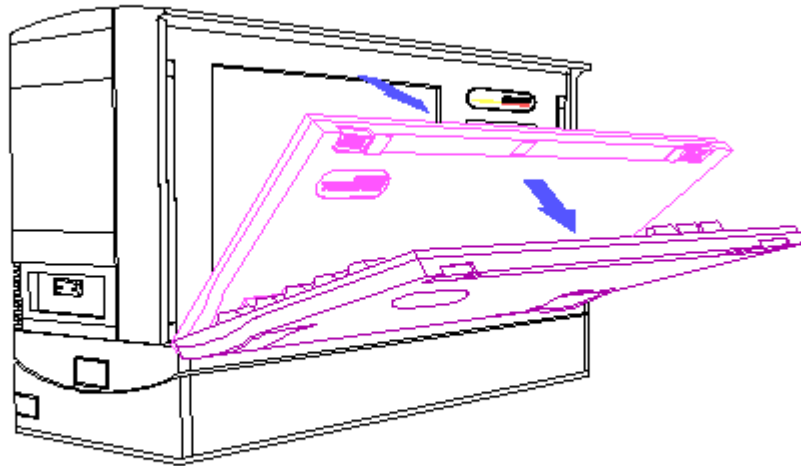


Figure 5-2. Removing the Keyboard from Storage Position

2. Using a nonconductive probe, remove the access cover (Figure 5-3).

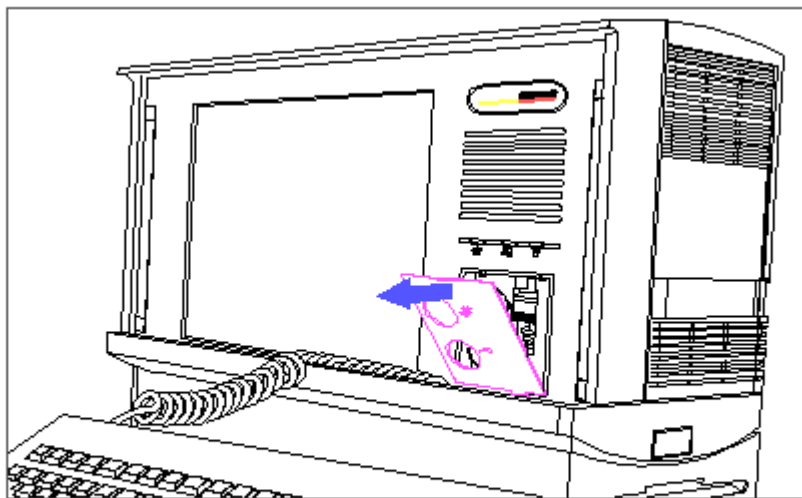


Figure 5-3. Removing the Access Cover

3. Disconnect the keyboard cable by gently pulling the keyboard connector tab (Figure 5-4).

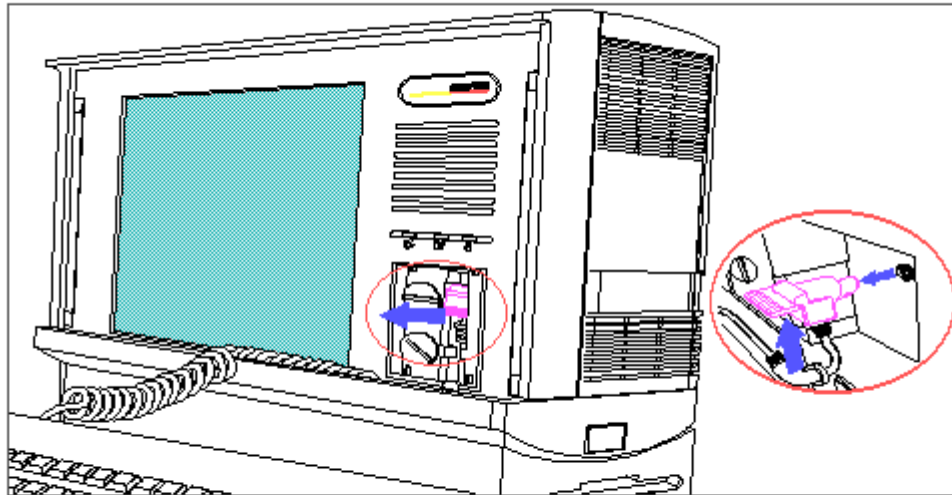


Figure 5-4. Removing the Keyboard Cable

4. Carefully remove the keyboard cable from the cable slot (Figure 5-4).

To replace the keyboard, reverse the steps in the above illustrations.

Chapter 5.6 Rear Panel

To remove the rear panel, complete the following steps:

1. Push the tilt adjustment buttons on the sides of the computer in and tilt the display assembly forward (Figure 5-5).

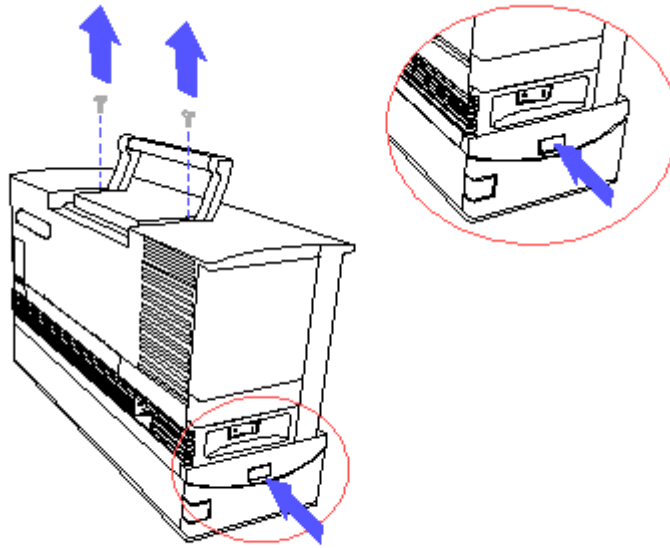


Figure 5-5. Removing the Rear Panel Screws

2. Lift the handle and remove two screws, using a Torx T-15 screwdriver (Figure 5-5).
3. Pull the rear panel out and up, until the bottom latches are released from the slots (Figure 5-6).

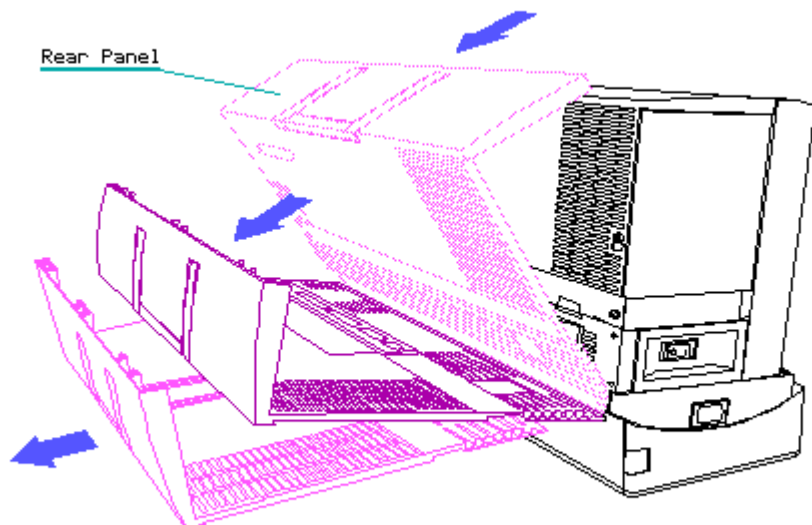


Figure 5-6. Removing the Rear Panel

To replace the rear panel, complete the following steps:

1. Position the rear panel on the computer by aligning the bottom latches

with the appropriate slots.

2. Slide the rear panel down and forward, and secure with the two screws using a Torx T-15 screwdriver.

Chapter 5.7 Options Cover

To remove the options cover, complete the following steps:

1. Remove the rear panel (Section 5.6).
2. Using a Torx T-15 screwdriver, remove three screws from the top of the options cover (Figure 5-7).

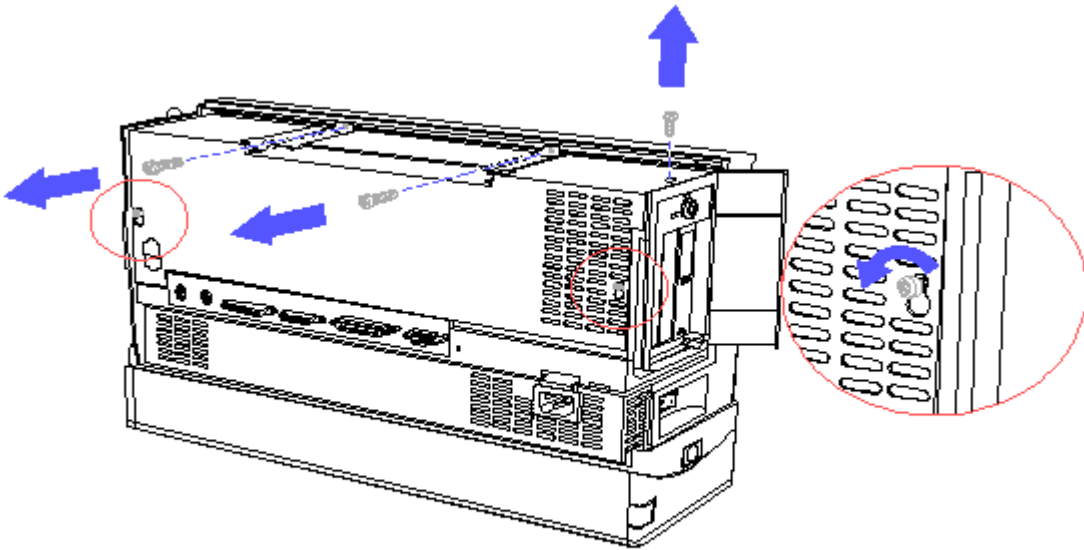


Figure 5-7. Removing the Options Cover Screws

3. Loosen two slotted screws (Figure 5-8).
4. Lift the options cover off of the slotted screws (Figure 5-8).

(Figure 5-9).

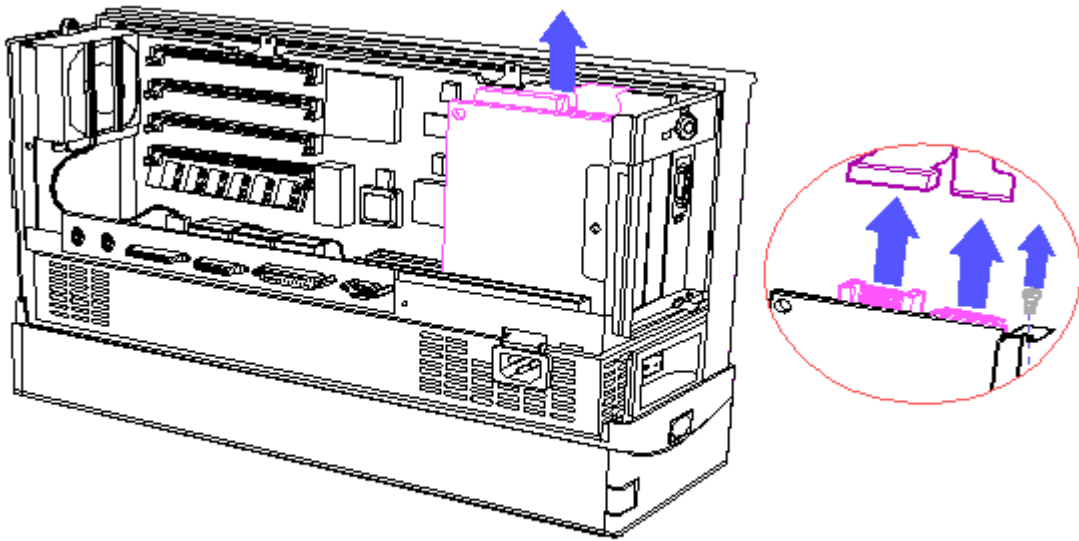


Figure 5-9. Removing the Video Board

5. Carefully disconnect the video cable from the video board (Figure 5-9).
6. Using a Torx T-10 screwdriver, remove the screw securing the video board (Figure 5-9).
7. Carefully pull the video board out of the slot (Figure 5-9).

To replace the video board, reverse the steps in the above illustration.

Processor Board

To remove the processor board, complete the following steps:

1. Remove the rear panel (Section 5.6).
2. Remove the options cover (Section 5.7).
3. Remove the video board (Section 5.8).
4. Using a Torx T-15 screwdriver, remove five screws securing the processor board to the display pan (Figure 5-10).

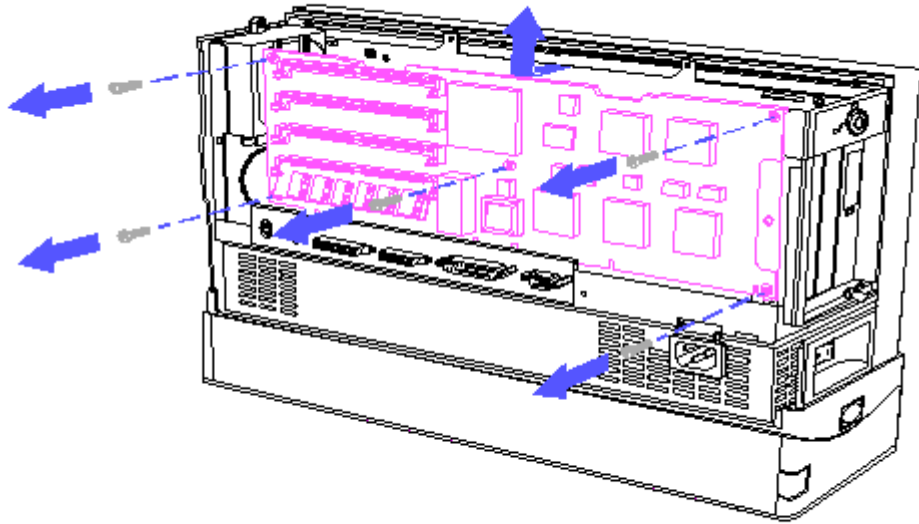


Figure 5-10. Removing the Processor Board

5. Carefully pull the processor board out of the slot (Figure 5-10).

To replace the processor board, reverse the steps in the above illustration.

System ROM

To remove the system ROM from the processor board, complete the following steps:

1. Remove the rear panel (Section 5.6).
2. Remove the options cover (Section 5.7).
3. Remove the video board (Section 5.8).
4. Remove the processor board.
5. Locate the system ROM on the processor board (Figure 5-11).

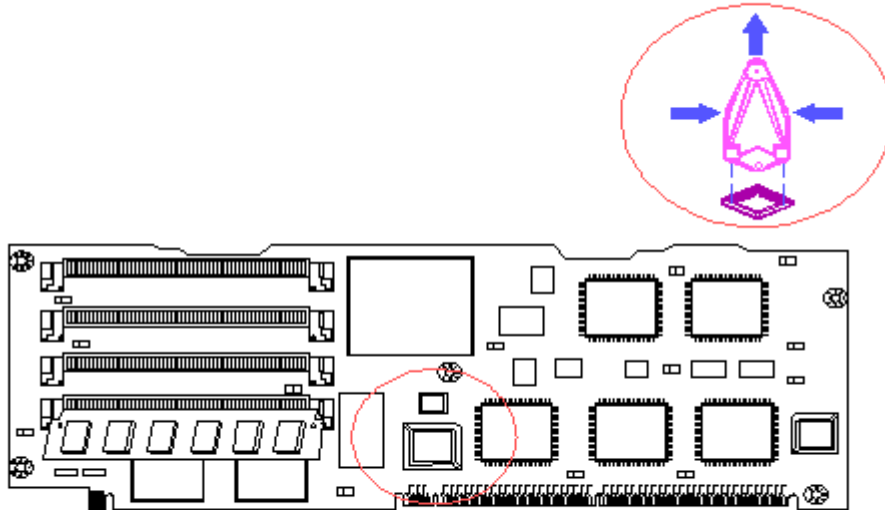


Figure 5-11. Removing the System ROM (Board Assy No. 002139)

6. Using the ROM removal tool, grasp the ROM and gently pull up until it is released from the socket (Figure 5-11).

To replace the system ROM, reverse the steps in the above illustration.

NOTE: When replacing the system ROM, align Pin 1 with the dot on the system ROM socket.

Real Time Clock/Battery

To remove the real time clock/battery, complete the following steps:

1. Remove the rear panel (Section 5.6).
2. Remove the options cover (Section 5.7).
3. Remove the video board (Section 5.8).
4. Remove the processor board (Section 5.8).
5. Locate the real time clock/battery on the processor board (Figure 5-12).

3. Using a Torx T-15 screwdriver, remove three screws securing the power supply to the I/O board (Figure 5-13).

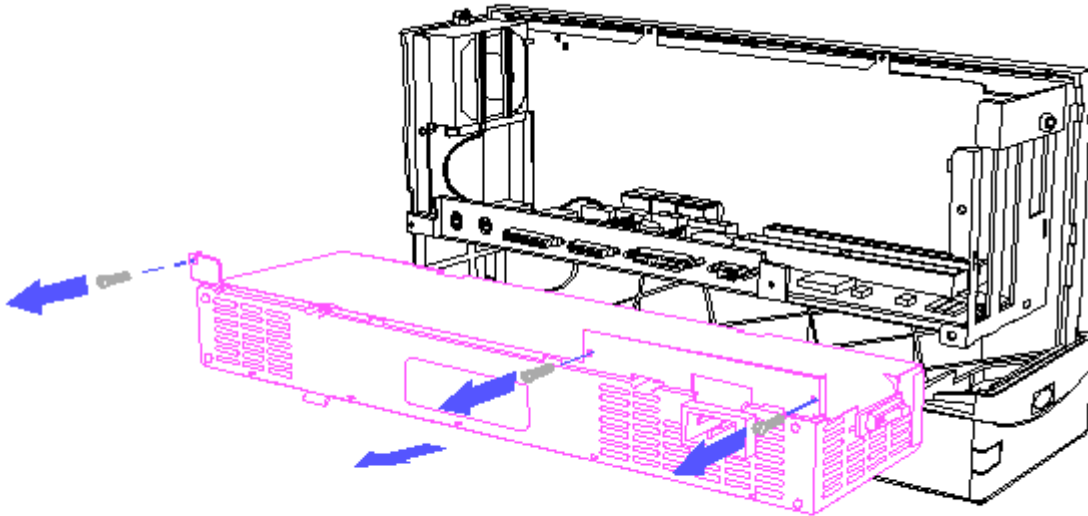


Figure 5-13. Removing the Power Supply

4. Pull out the power supply with the switch bezel attached (Figure 5-13).
5. Remove the switch bezel from the power supply (Figure 5-13).

To replace the power supply, reverse the steps in the above illustration.

Chapter 5.10 Fan Assembly

To remove the fan assembly, complete the following steps:

1. Remove the rear panel (Section 5.6).
2. Remove the options cover (Section 5.7).
3. Carefully disconnect the fan assembly cable (Figure 5-14).

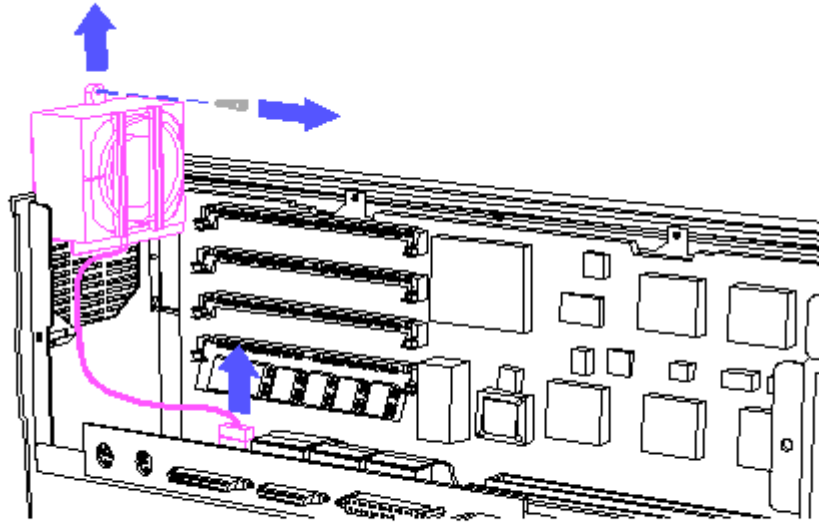


Figure 5-14. Removing the Fan Assembly

4. Using a Torx T-10 screwdriver, remove the screw securing the fan assembly (Figure 5-14).
5. Slide the fan assembly out (Figure 5-14).

To replace the fan assembly, reverse the steps in the above illustration.

Chapter 5.11 I/O Board

To remove the I/O board, complete the following steps:

1. Remove the rear panel (Section 5.6).
2. Remove the options cover (Section 5.7).
3. Remove the video board (Section 5.8).
4. Remove the processor board (Section 5.8).
5. Remove the power supply (Section 5.9).
6. Remove the fan assembly (Section 5.10).
7. Carefully disconnect the diskette drive cable, fixed disk drive cable, and power cable (Figure 5-15).

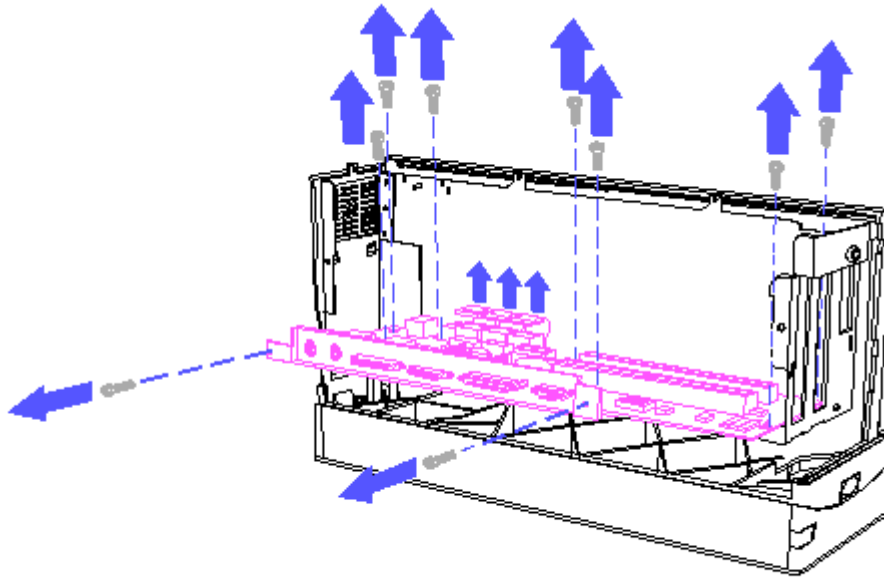


Figure 5-15. Removing the I/O Board

8. Disconnect the fan assembly cable (Figure 5-15).
9. Using a Torx T-10 screwdriver, remove the screw securing the internal keyboard connector to the display pan (Figure 5-15).
10. Using a Torx T-15 screwdriver, remove seven screws securing the I/O board (Figure 5-15).

To replace the I/O board, reverse the steps in the above illustration.

Chapter 5.12 Base Panel

To remove the base panel, complete the following steps:

IMPORTANT: The base panel cannot be removed with the cable lock provision pulled out. Be sure the cable lock provision is completely pushed in before performing the following steps.

1. Push in the cable lock provision (Figure 5-16).

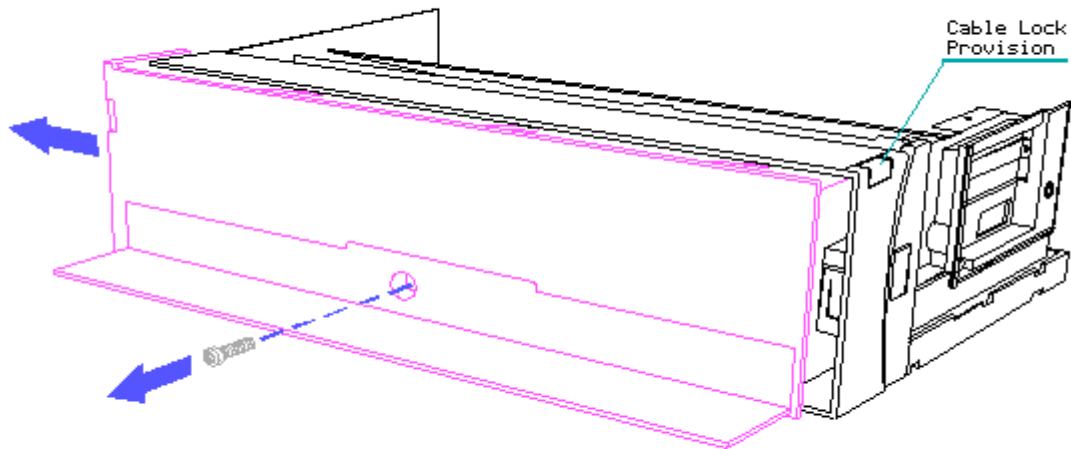


Figure 5-16. Removing the Base Panel

2. Position the computer on the rear panel (Figure 5-16).
3. Using a Torx T-15 screwdriver, remove the screw from the base panel (Figure 5-16).
4. Remove the base panel by sliding it out toward the diskette drive side of the computer (Figure 5-16).

To replace the base panel, reverse the steps in the above illustration.

Chapter 5.13 Mass Storage Devices

Diskette Drive

To remove the diskette drive, complete the following steps:

1. Remove the base panel (Section 5.12).
2. Carefully disconnect the cable from the diskette drive (Figure 5-17).

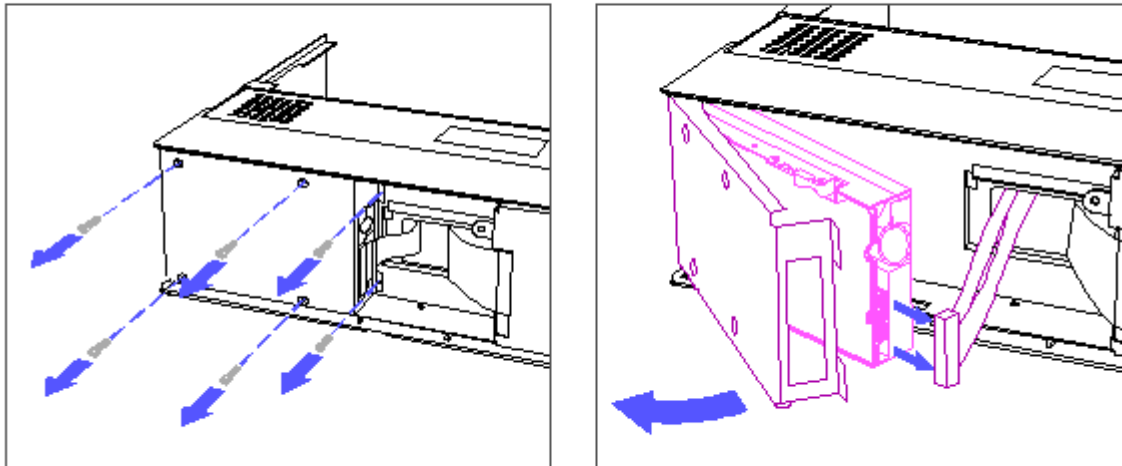


Figure 5-17. Removing the Diskette Drive

3. Using a Torx T-15 screwdriver, remove the screws securing the diskette drive cage; then swing the drive cage out (Figure 5-17).
4. Using a Torx T-15 screwdriver, remove four screws securing the diskette drive to the drive cage (Figure 5-17).

To replace the diskette drive, reverse the steps in the above illustration.

Fixed Disk Drive

To remove the fixed disk drive, complete the following steps:

1. Remove the base panel (Section 5.12).
2. Carefully disconnect the two cables from the fixed disk drive (Figure 5-18).

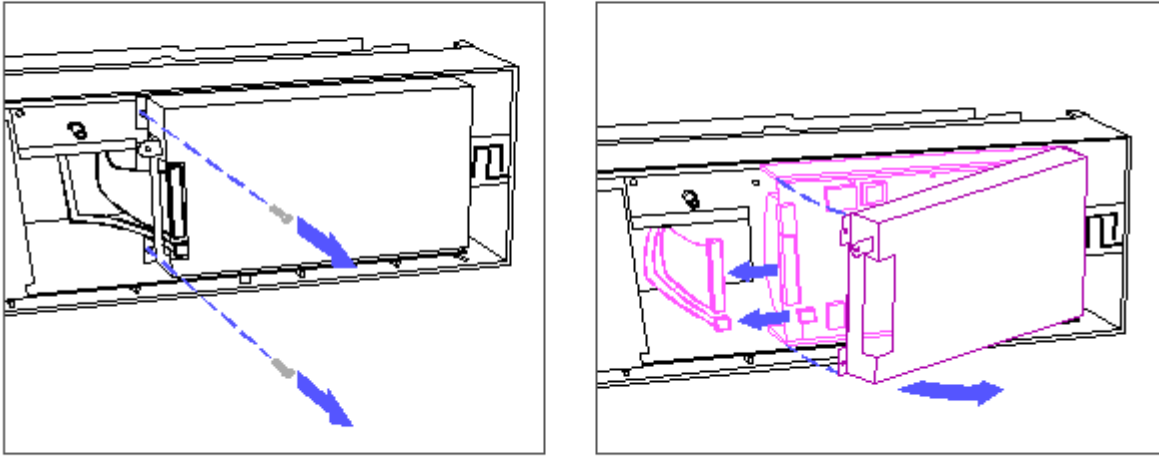


Figure 5-18. Removing the Fixed Disk Drive

3. Using a Torx T-15 screwdriver, remove the screws securing the fixed disk drive cage; then swing the drive cage out (Figure 5-18).
4. Lift the fixed disk drive out of the cage and remove the shock mounts (Figure 5-19).

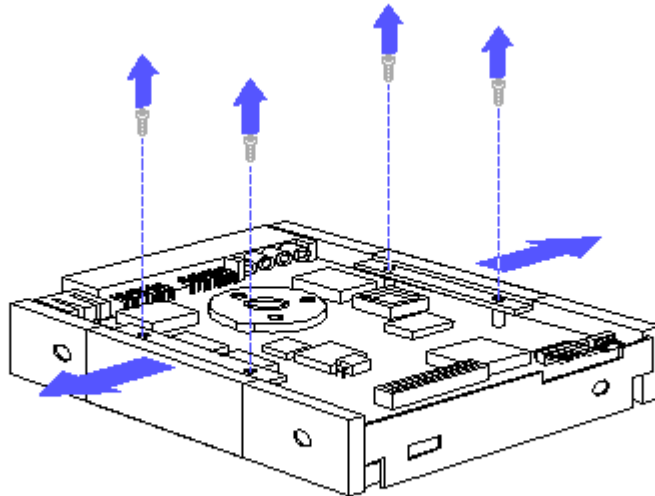


Figure 5-19. Removing the Shock Mounts

To replace the fixed disk drive, reverse the steps in the above illustrations.

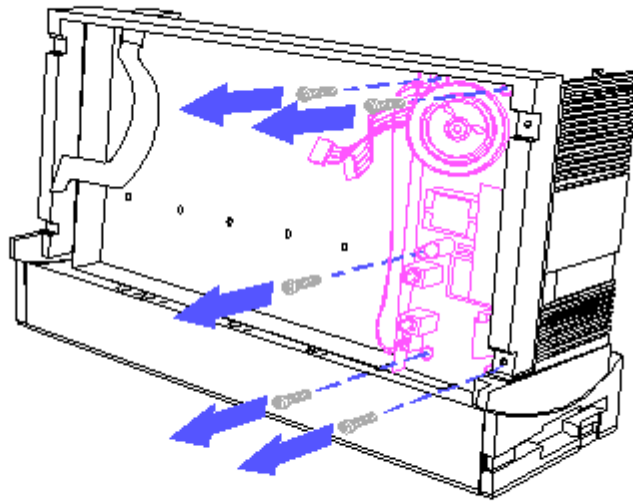


Figure 5-23. Removing the Display Inverter Board

6. Pull the display inverter board insulator aside to gain access to the screws (Figure 5-23).
7. Using a Torx T-15 screwdriver, remove five screws securing the display inverter board (Figure 5-23).

To replace the display inverter board, reverse the steps in the above illustration.

Speaker Assembly

To remove the speaker assembly from the display inverter board, complete the following steps:

1. Remove the keyboard (Section 5.5).
2. Remove the front bezel (Section 5.14).
3. Carefully disconnect the speaker assembly cable from the display inverter board (Figure 5-24).

on the display inverter board (Figure 5-25).

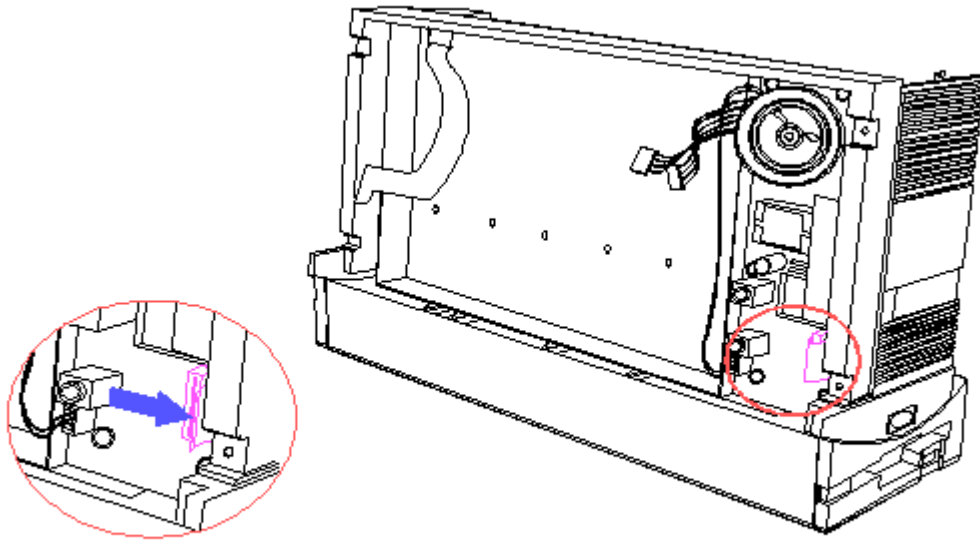


Figure 5-25. Disconnecting the Power Distribution Cable

4. Turn the computer around and remove the rear panel (Section 5.6).
5. Remove the options cover (Section 5.7).
6. Remove the video board (Section 5.8).
7. Remove the processor board (Section 5.8).
8. Remove the power supply (Section 5.9).
9. Remove the fan assembly (Section 5.10).
10. Remove the I/O board (Section 5.11).
11. Remove the base panel (Section 5.12).
12. Carefully disconnect the diskette drive cable, fixed disk drive cable, and power cable (Figure 5-26).

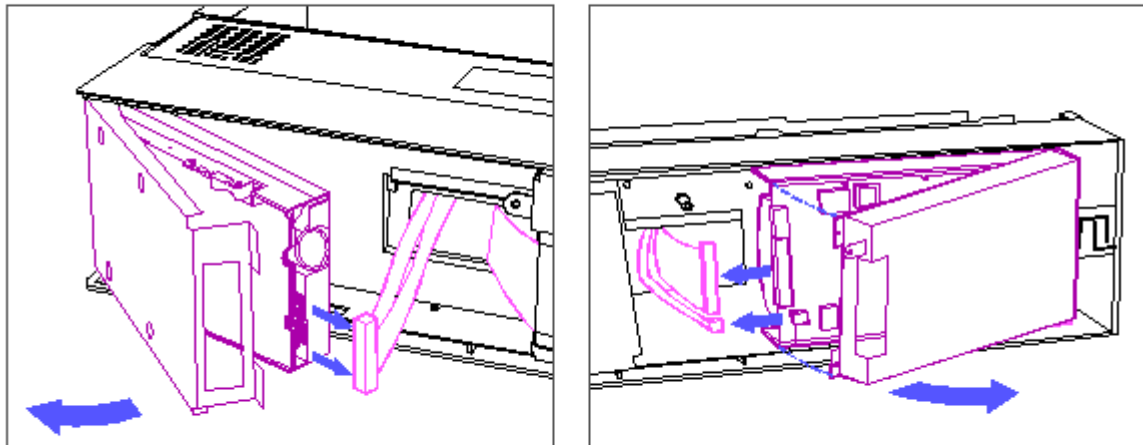


Figure 5-26. Disconnecting the Drive Cables

13. Using a Torx T-15 screwdriver, remove four screws securing the power distribution board (Figure 5-27).

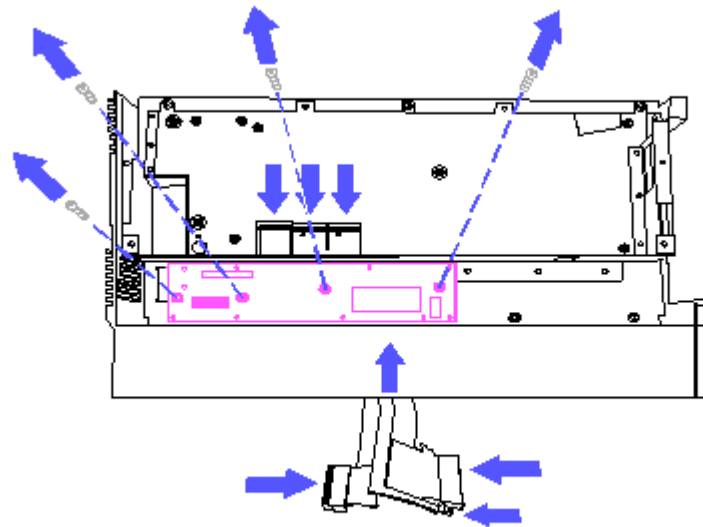


Figure 5-27. Removing the Power Distribution Board

14. Carefully pull the I/O cables, diskette drive cable, fixed disk drive cable, and power cable through their respective slots and remove the power distribution board (Figure 5-27).

To replace the power distribution board, reverse the steps in the above illustrations.

Chapter 5.16 Keylock

To remove the keylock, complete the following steps:

1. Remove the rear panel (Section 5.6).
2. Remove the options cover (Section 5.7).
3. Using a flathead screwdriver, remove the metal clip securing the keylock (Figure 5-28).

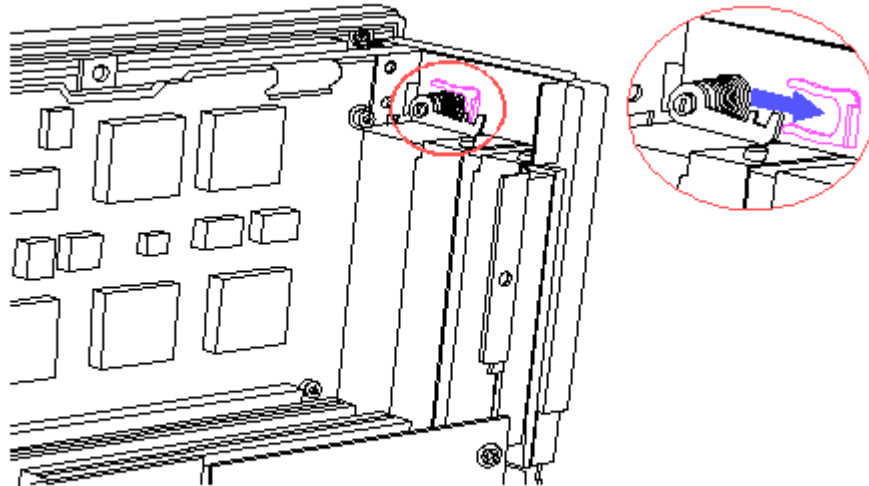


Figure 5-28. Removing the Metal Clip

4. Pull the keylock out of the computer (Figure 5-28).

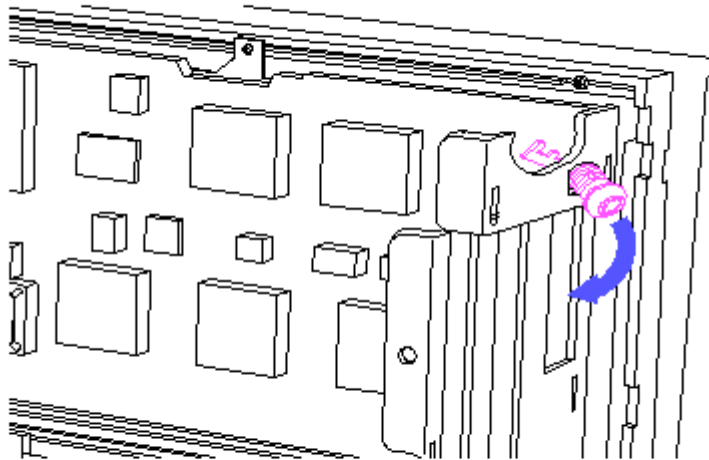


Figure 5-29. Removing the Keylock

To replace the keylock, reverse the steps in the above illustration.

Chapter 5.17 Memory Expansion

Some of the memory expansion alternatives for the COMPAQ PORTABLE 486c Personal Computer are shown in Table 5-3. Memory modules can be added in combinations of 2, 4, and 8 megabytes for a total of 32 megabytes.

NOTE: Memory modules can be installed in any combination and in any available slot. However, slot 1 must contain a memory module.

Table 5-3. Memory Expansion
COMPAQ PORTABLE 486c Personal Computer

Slot 1	Memory Module(s) Added to Slots 2, 3, or 4		Total Memory
4 MB	2 MB		6 MB
4 MB	2 MB	2 MB	8 MB
4 MB	4 MB		8 MB
4 MB	2 MB	2 MB	10 MB
4 MB	2 MB	4 MB	10 MB
4 MB	2 MB	2 MB	12 MB
4 MB	4 MB	4 MB	12 MB
4 MB	8 MB		12 MB
4 MB	2 MB	4 MB	14 MB
4 MB	2 MB	8 MB	14 MB
4 MB	2 MB	2 MB	16 MB
4 MB	4 MB	4 MB	16 MB
4 MB	4 MB	8 MB	16 MB
4 MB	2 MB	4 MB	18 MB
4 MB	4 MB	4 MB	20 MB
4 MB	8 MB	8 MB	20 MB

4 MB
4 MB
4 MB

2 MB
4 MB
8 MB

8 MB
8 MB
8 MB

8 MB
8 MB
8 MB

22 MB
24 MB
28 MB

|
|
8 MB

|
|
8 MB

|
|
8 MB

|
|
8 MB

|
|
32 MB

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Chapter 6. Jumper and Switch Information

This chapter provides the switch settings for the COMPAQ PORTABLE 486c Personal Computer I/O board. The I/O board contains six switches. The default settings shown in the following table are set for the computer as configured by Compaq Computer Corporation. These settings need to be changed only when the system configuration changes.

Table 6-1 lists the switch settings and describes the function of each switch. Figure 6-1 shows the location of the switches on the I/O board.

Table 6-1. I/O Board Switch Settings (Assy No. 002142)

Switch	Position	Status	Function
SW1	ON	Disabled	Controls the integrated video graphics controller. OFF is the default position. ON is used to avoid conflict when using a third party video board.
	OFF	Enabled	
SW2	ON	Enabled	Controls EISA configuration. OFF is the default position and allows the user to change the configuration in CMOS. ON allows the EISA configuration to be viewed but not changed.
	OFF	Disabled	
SW3	ON	Enabled	Controls Read/Write to the Diskette Drive. OFF is the default position and allows Read/Write capability. ON sets the diskette drive for Read only.
	OFF	Disabled	
Switch	Position	Status	Function
SW4	ON	Enabled	Controls whether the diskette can be used to restart. OFF is the default position and uses the EISA configuration selection. ON allows the user to restart from the diskette drive and overrides the EISA configuration selection.
	OFF	Disabled	

SW5	ON OFF	Enabled Disabled	Controls the power on password. OFF is the default position and enables the power on password feature. ON will clear the power on password.
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SW6	ON OFF	Enabled Disabled	Allows the configuration memory to be cleared. OFF is the default position and allows configuration memory to remain unchanged. ON clears the configuration memory.
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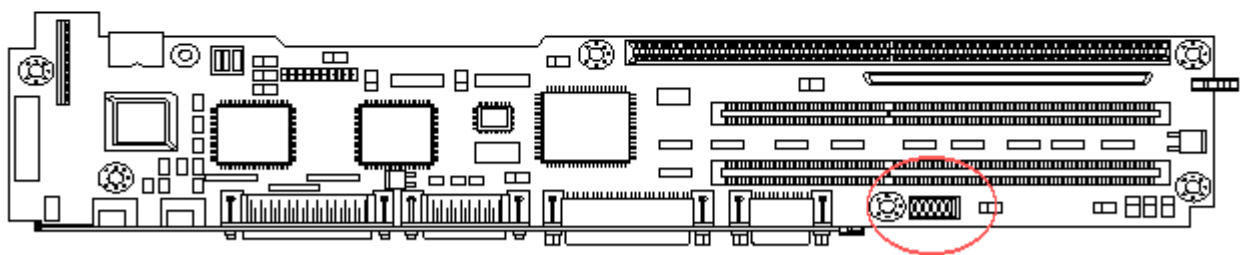
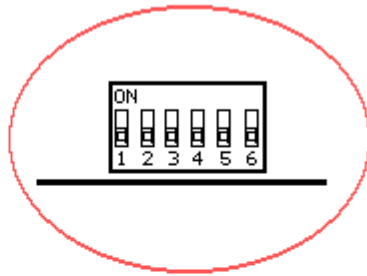


Figure 6-1. I/O Board Switches (Assy No. 002142)