COMPAQ DESKPRO 386
Personal Computer
MAINTENANCE AND
SERVICE GUIDE

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MAINTENANCE AND SERVICE GUIDE
COMPAQ DESKPRO 386 Personal Computer

Compaq Computer Corporation

WARNING

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with noncertified peripherals is likely to result in interference to radio and TV reception.

WARNING

This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the manufacturer's instructions, if may cause interference with radio and television reception. This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. If this occurs, the user will be required to take whatever measures may be necessary to eliminate the interference. In attempting to do so, the user should:

☐ Reorient the receiving antenna.

☐ Relocate the computer with respect to the receiver with which it interferes..

☐ Plug the computer into a different AC receptacle so that the computer and the receiver with which it interferes are on different branch circuits.

If necessary, consult an Authorized COMPAQ Computer Dealer or an experienced radio/television technician for additional suggestions.

NOTICE

Compaq Computer Corporation requires that all peripheral devices be connected to this computer via shielded cables with metal RFI/EMI connector hoods.

WIRE TYPE:	Multipaired overall-shielded; Belden #98XX; Alpha #54XX; or equivalent.
CONNECTOR HOOD:	RFI/EMI metal shield; AMP #74517X-X; or equivalent.

It is important that the chassis ground of any peripheral device be connected to the computer chassis. An Alpha #1221 flat-braided strap is sufficient. This strap is not necessary if the shielded cable connects the two chassis.

PREFACE

The *COMPAQ DESKPRO 386 PERSONAL COMPUTER MAINTENANCE AND SERVICE GUIDE* is a troubleshooting, maintenance, and repair guide that can be used as a reference when servicing the COMPAQ DESKPRO 386 Personal Computer.

All troubleshooting and repair procedures are detailed to allow subassembly/module-level repair only.

CAUTION

Because of the complexity of the individual boards and subassemblies, Compaq Computer Corporation strongly recommends that you do not attempt to make field repairs at the component level.

SUMMARY OF TEXT

The *COMPAQ DESKPRO 386 MAINTENANCE AND SERVICE GUIDE* contains the following eight chapters:

Chapter 1	**OPERATING AND PERFORMANCE SPECIFICATIONS** provides operating and performance specifications for the COMPAQ DESKPRO 386 Personal Computer.
Chapter 2	**POWER-ON SELF-TEST (POST)/PROBLEM ISOLATION** describes the internal system diagnostics programs that run automatically when you turn on the system. A flowchart is provided for identifying and correcting problems that can occur during the Power-On Self-Test procedure.
Chapter 3	**SETUP PROGRAM** describes the purpose and function of the SETUP program, including explanations about when you must run the SETUP program and when the system prompts you to run the SETUP program.
Chapter 4	**ADVANCED DIAGNOSTICS PROGRAM** describes the use and function of the COMPAQ ADVANCED DIAGNOSTICS program and provides a detailed description of the various diagnostics routines.
Chapter 5	**ERROR MESSAGES AND CODES** lists and describes the Power-On Self-Test (POST) and the ADVANCED DIAGNOSTICS program error messages and codes. This chapter also identifies the action required to resolve each problem described by the corresponding error message or code.

Chapter 6	**ILLUSTRATED PARTS CATALOG** contains illustrated part breakdowns, order numbers, and part names for the COMPAQ DESKPRO 386 Personal Computer.
Chapter 7	**REMOVAL AND REPLACEMENT PROCEDURES** describes how to remove and replace subassemblies for the COMPAQ DESKPRO 386 Personal Computer.
Chapter 8	**JUMPER SETTINGS AND SWITCH SETTINGS** provides detailed information for setting jumpers and switches on the COMPAQ DESKPRO 386 Personal Computer.

REQUIRED TOOLS AND SUPPLIES

To service the COMPAQ DESKPRO 386 Personal Computer, you need:

☐ Torx T-10 screwdriver

☐ Torx T-15 screwdriver

☐ Small Phillips screwdriver

☐ COMPAQ Personal Computer ADVANCED DIAGNOSTICS Diskette Version 5.XX (part no. 108137)

☐ Formatted scratch diskette(s)

☐ 25-pin printer loopback plug (part no. 100755-001)

☐ 9-pin serial loopback plug (part no. 102999-001)

☐ 80387 coprocessor removal tool (part no. 108492-001)

Optional tools are:

☐ Memory chip insertion tool

☐ Memory chip removal tool

ADDITIONAL INFORMATION

The following documentation and related software are available to support the COMPAQ DESKPRO 386 Personal Computer.

Associated Documentation:

☐ *COMPAQ DESKPRO 386 PERSONAL COMPUTER OPERATIONS GUIDE*

☐ *COMPAQ DESKPRO 386 TECHNICAL REFERENCE GUIDE VOLUMES I and II*

☐ *MS-DOS®/BASIC VERSION 3.1 REFERENCE GUIDE*

☐ *MS-DOS®/BASIC VERSION 3.2 REFERENCE GUIDE*

☐ *MS-DOS®/BASIC VERSION 3.3 REFERENCE GUIDE*

☐ Service Advisories

☐ Service Bulletins

☐ *HOW TO DO BUSINESS WITH COMPAQ SERVICE*

☐ *COMPAQ ENHANCED COLOR GRAPHICS BOARD OPERATIONS AND INSTALLATION GUIDE*

☐ *COMPAQ ENHANCED COLOR GRAPHICS BOARD TECHNICAL REFERENCE GUIDE*

☐ *COMPAQ VIDEO GRAPHICS CONTROLLER BOARD TECHNICAL REFERENCE GUIDE*

☐ *COMPAQ SERVICE QUICK REFERENCE GUIDE*

☐ *SY-TOS TAPE OPERATING SYSTEM USER'S GUIDE*

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OPERATING AND PERFORMANCE SPECIFICATIONS

Chapter 1
OPERATING AND PERFORMANCE SPECIFICATIONS

1.1 INTRODUCTION

This chapter provides operating and performance specifications for the following components of and options for the COMPAQ DESKPRO 386 Personal Computer:

- ☐ System Unit
- ☐ COMPAQ Enhanced Keyboard
- ☐ COMPAQ 84-Key Keyboard
- ☐ COMPAQ Dual-Mode Monitor
- ☐ COMPAQ Color Monitor
- ☐ COMPAQ Video Graphics Color Monitor
- ☐ COMPAQ Video Graphics Monochrome Monitor
- ☐ 360-Kbyte Diskette Drive
- ☐ 1.2-Megabyte Diskette Drive
- ☐ 3½-Inch 1.44-Megabyte Diskette Drive
- ☐ 40-Megabyte Fixed Disk Drive
- ☐ 70-Megabyte Fixed Disk Drive
- ☐ 130-Megabyte Fixed Disk Drive
- ☐ 40-Megabyte Fixed Disk Drive Backup (Tape)
- ☐ 135-Megabyte Fixed Disk Drive Backup (Tape)
- ☐ 300-/600-Megabyte Fixed Disk Drive Expansion Unit
- ☐ 300-Megabyte Fixed Disk Drive for the Expansion Unit

1.2 COMPAQ DESKPRO 386 PERSONAL COMPUTER SYSTEM UNIT

Dimensions:

Height:	6.35 in. (16.2 cm)
Depth:	16.50 in. (41.9 cm)
Width:	19.80 in. (50.3 cm)

Weight:

Model 40:	42.0 lb (19.1 kg)
Model 70:	44.1 lb (20.0 kg)
Model 130:	44.1 lb (20.0 kg)

Environmental Requirements:

Temperature:	
Operating:	Not less than 50°F or more than 104°F (10°C to 40°C)
Nonoperating:	Not less than 50°F or more than 140°F (10°C to 60°C)
Shipping (adequately packed):	Not less than –22°F or more than 140°F (–30°C to 60°C)

Humidity:

Operating:	Not less than 20% or more than 80% (noncondensing)
Nonoperating:	Not less than 5% or more than 90% (noncondensing)

Power Requirements:

Nominal Line Voltage:	
North American:	120 VAC, 60 Hz
International:	230 VAC, 50 Hz
Range Line Voltage:	
North American:	102 to 132 VAC
International:	204 to 264 VAC
Line Frequency:	
North American:	47 to 63 Hz
International:	47 to 63 Hz
Wattage:	192 watts (steady state)
Current:	
North American:	5 A (fuse rating)
International:	4 A (fuse rating)

Acoustic Noise Level: 50 Decibels 54 Decibels 60 Decibels

W/O Fixed Disk:
Fixed Disk:
Fixed Disk and Fixed Disk Backup:

Shock: (in G 's for 11 ms half-sine)

Operating:	5.0 G
Nonoperating:	20.0 G

Vibration: (in G's, 0 to peak, sinusoidal, 5 to 500 Hz, 1/2 octave per minute).

Operating:	0.25 G
Nonoperating:	0.50 G

1.3 COMPAQ ENHANCED KEYBOARD

Dimensions:	
Height:	8.30 in. (21.1 cm)
Depth:	1.50 in. (3.8 cm)
Width:	19.25 in. (48.9 cm)
Weight:	3.8 lb (1.7 kg)
Power:	
Volts:	5 VDC
Current:	250 mA maximum
Number of Keys:	101
	(102 keys for international units)
Cable:	
Length:	42 in. (106.68 cm) retracted
	75 in. (190 cm) extended
Interface:	5-pin circular DIN-type connector located on the system side
	(shell provides chassis ground)
	6-pin SDL-type connector located on the keyboard side
	(shell provides chassis ground)

1.4 84-KEY KEYBOARD

Dimensions:	
Height:	1.40 in. (3.8 cm)
Depth:	7.06 in. (17.8 cm)
Width:	18.25 in. (46.3 cm)
Weight:	3.5 lb (1.6 kg)
Power:	
Volts:	5 VDC
Current:	200 mA maximum/
	80 mA nominal
Number of Keys:	84
Cable:	
Length:	22.75 in. (57.8 cm) retracted
	6 ft (1.8 m) extended
Interface:	5-pin circular DIN-type connector
	(shell provides chassis ground)

1.5 COMPAQ DUAL-MODE MONITOR

Dimensions:

Height:	10.25 in. (26.0 cm)
Depth:	13.75 in. (34.9 cm)
Width:	14.75 in. (37.5 cm)

Weight: 18.2 lb (8.3 kg)

Display:
- ☐ Integral implosion protection
- ☐ 12-inch (30.48 cm) screen (diagonal)
- ☐ Radiation compliance with DDHS 21 CFR Subchapter J
- ☐ 90-degree deflection
- ☐ Medium-persistence green or amber phosphor
- ☐ Dual-mode; monochrome
- ☐ 80/40 characters by 25 lines
- ☐ Etched screen surface to reduce glare

Signal Cable:

Length:	29 in. (73.7 cm)
Interface:	Shielded 9-pin subminiature male D-type connector

Power Cable:

Type:	2-conductor with braided shield
Length:	29 in. (73.7 cm)
Gauge:	20 AWG
Interface:	Shielded 3-pin circular male DIN-type connector

Power:

Volts:	12 VDC nominal
Current:	2 A maximum, 1.5 A nominal

Environmental Requirements:

Temperature:	
Operating:	50°F to 104°F (10°C to 40°C)
Nonoperating:	50°F to 140°F (10°C to 60°C)
Humidity:	5% to 90% (noncondensing)
Altitude:	
Operating:	Mean sea level to 10,000 ft (3000 m)
Nonoperating:	Mean sea level to 30,000 ft (9000 m)

1.6 COMPAQ COLOR MONITOR

Dimensions:	
Height:	11.8 in. (30.0 cm)
Depth:	15.0 in. (38.1 cm)
Width:	13.9 in. (35.3 cm)

Weight:	27.5 lb (12.5 kg)

Display:
- ☐ 13-inch (33.02) diagonal screen
- ☐ 640 or 320 pixels × 350 scan lines
  (16 colors from a palette of 64 colors)
- ☐ 640 or 320 pixels × 200 scan lines
  (16 colors from a palette of 64 colors)
- ☐ Dot pitch 0.41 mm

Signal Cable:	
Length:	58.5 in. (150 ± 2.5 cm)
Interface:	Shielded 9-pin subminiature male D-type connector

Power Cable:	
Type:	2-conductor with ground
Length:	40 in. (1 m)
Interface:	
North American only:	NEMA 5-15P (parallel blade plug)

Power Requirements:	
Volts:	
North American:	120 VAC, 60 Hz
International:	220 to 240 VAC, 50 to 60 Hz
Wattage:	100 watts

Environmental Requirements:	
Temperature:	
Operating:	50˚F to 104˚F (10˚C to 40˚C)
Nonoperating:	14˚F to 131˚F (10˚C to 60˚C)
Humidity:	5% to 90% (noncondensing)
Altitude:	Sea level to 7,000 ft (2,100 m)*

*Reduced operating temperature above 7,000 ft.

1.7 COMPAQ VIDEO GRAPHICS COLOR MONITOR

Dimensions:

Height:	14.1 in. (35.7 cm)
Depth:	14.6 in. (37.0 cm)
Width:	13.8 in. (35.0 cm)

Weight: 42.0 lb (19.1 kg)

Display:

- ☐ 640 pixel × 480 line VGA-compatible graphics resolution
- ☐ 640 pixel × 350 line EGA-compatible graphics resolution
- ☐ 320 pixel × 200 line CGA-compatible graphics resolution
- ☐ 720 pixel × 400 line text resolution
- ☐ Up to 256 colors out of a 262,144 color palette
- ☐ Dot pitch 0.31 mm
- ☐ 70 Hz vertical scan rate (60 Hz for 640 x 480 mode)
- ☐ 14-in. (35.56 cm) diagonal screen
- ☐ Antiglare screen
- ☐ Tilt/swivel (integral)
  - – Tilt 5° down, 15° up
  - – Swivel ± 90°

Signal Cable:

Length:	72 in. (1.8 m)
Interface:	Analog 15-pin video connector

Power Cable:

Length, attached:	
North American:	72 in.
International:	NA
Length, detachable:	
North American:	NA
International:	1.8 m
Cable connector:	
North American:	NEMA 5-15P (parallel blade plug)
International:	Specific for each country

Continued...

Power Requirements:
Volts:	
North American:	115 VAC, 60 Hz
International:	220 to 240 VAC, 50 Hz
Amperes:	
North American:	2A
International:	1A
Wattage:	125 watts

Environmental Requirements:
Temperature:	
Operating:	50˚F to 104˚F (10˚C to 40˚C)
Nonoperating:	32˚F to 140˚F (0˚C to 60˚C)
Humidity:	
Operating:	10% to 90% (noncondensing)
Nonoperating:	10% to 95% (noncondensing)
Altitude:	
Operating:	Sea level to 12,000 ft (3658 m)*
Nonoperating:	Sea level to 40,000 ft (12,192 m)

*Reduced operating temperature above 7,000 ft.

1.8 COMPAQ VIDEO GRAPHICS MONOCHROME MONITOR

Dimensions:
Height:	10.2 in. (26.0 cm)
Depth:	12.6 in. (32.1 cm)
Width:	11.7 in. (29.8 cm)

Weight: 13.0 lb (5.9 kg)

Display:
- □ 640 pixel × 480 line VGA-compatible graphics resolution
- □ 640 pixel × 350 line EGA-compatible graphics resolution
- □ 320 pixel × 200 line CGA-compatible graphics resolution
- □ 720 pixel × 400 line text resolution
- □ Up to 64 shades of gray
- □ 70 Hz vertical scan rate (60 Hz 640 × 480 mode)
- □ 12-in. (30.48 cm) diagonal screen
- □ Antiglare screen
- □ Tilt/swivel stand (included)
  - – Tilt 5˚ down, 15˚ up
  - – Swivel ± 90˚

Signal Cable:
Length:	72 in. (1.8 m)
Interface:	Analog 15-pin video connector

Power Cable:
  Length, attached:
    North American: 72 in.
    International: 30.48 cm.
  Length, detachable:
    North American: NA
    International: 1.8 m
  Cable connector:
    North American: NEMA 5-15P (parallel blade plug)
    International: Shrouded IEC 320/CEE 22 configuration
  Appliance coupler/cable:
    North American: NA
    International: IEC 320/CEE 22

Power Requirements:
  Volts:
    North American: 120 VAC, 60 Hz
    International: 220 to 240 VAC, 50 Hz
  Amperes:
    North American: 0.8 A
    International: 0.4 A
  Wattage: 96 watts

Environmental Requirements:
  Temperature:
    Operating: 50˚F to 104˚F (10˚C to 40˚C)
    Nonoperating: 32˚F to 140˚F (0˚C to 60˚C)
  Humidity:
    Operating: 10% to 90% (noncondensing)
    Nonoperating: 10% to 95% (noncondensing)
  Altitude:
    Operating: Sea level to 12,000 ft (3658 m)*
    Nonoperating: Sea level to 40,000 ft (12,192 m)

*Reduced operating temperature above 7,000 ft.

1.9 360-KBYTE 5¼-INCH DISKETTE DRIVE

Dimensions:	
Height:	1.62 in. (4.1 cm)
Depth:	8.25 in. (21.0 cm)
Width:	5.75 in. (14.6 cm)
	(allow 0.375 in. (0.94 cm) for installing rails)
Weight:	3.2 lb (1.4 kg)
Data Transfer Rate:	250 Kbits per second
Media:	5¼-inch dual-density, double-sided diskette
Tracks per inch:	48
Tracks per side:	40
Average Access Time:	80 ms
Rotational Speed:	300 RPM ± 1.5%
Motor Start Time:	500 ms
Sectors per Track:	9
Bytes per Sector:	512

1.10 1.2-MEGABYTE 5¼-INCH DISKETTE DRIVE

Dimensions:	
Height:	1.62 in. (4.1 cm)
Depth:	8.25 in. (21.0 cm)
Width:	5.75 in. (14.6 cm)
	(allow 0.375 in. (0.94 cm) for installing rails)
Weight:	3.2 lb (1.4 kg)
Data Transfer Rate:	300/500 Kbits per second
Media:	5¼-inch 1.2-megabyte dual-density, double-sided diskette
Tracks per inch:	96 (1.2-megabyte drive mode)
Number of tracks:	80 (1.2-megabyte drive mode)
Tracks per inch:	48 (360-Kbyte drive mode)
Number of tracks:	40 (360-Kbyte drive mode)
Average Access Time:	79 ms
Rotational Speed:	360 RPM
Motor Start Time:	500 ms
Sectors per Track:	15 (1.2-megabyte drive mode)
	9 (360-Kbyte drive mode)
Bytes per Sector:	512

1.11 1.44-MEGABYTE 3½-INCH DISKETTE DRIVE

Dimensions:	
Height:	1.62 in. (4.1 cm)
Depth:	8.25 in. (21 cm)
Width:	6.12 in. (15.5 cm)
Weight:	1.75 lb (0.79 kg)
Data Transfer Rate:	250/500
Media:	3½-inch 1.44-megabyte double-sided diskette
	Dual-density (720-Kbyte mode)
	High-density (1.44-megabyte mode)
Tracks per inch:	135
Number of tracks:	160
Average Access Time:	80 ms
Rotational Speed:	300 RPM
Motor Start Time:	400 ms
Sectors per Track:	9 (720-Kbyte mode)
	18 (1.44-megabyte mode)
Bytes per Sector:	512

1.12 40-MEGABYTE FIXED DISK DRIVE

Dimensions:	
Height:	1.6 in. (4.1 cm)
Depth:	8.8 in. (22.4 cm)
Width:	5.8 in. (14.6 cm)
	(allow 0.375 in. (0.94 cm) for installing rails)
Weight:	4.2 lb (1.9 kg)
Drive Type:	
(used in SETUP program)	17
Number of Data Heads:	5
Number of Cylinders:	980
Average Access Time:	Less than 30 ms
Data Transfer Rate:	5 megabits per second

1.13 70-MEGABYTE FIXED DISK DRIVE

Dimensions:	
Height:	3.38 in. (8.6 cm)
Depth:	8.00 in. (20.3 cm)
Width:	5.87 in. (14.9 cm)
	(allow 0.375 in. (0.94 cm) for installing rails)
Weight:	7.5 lb (3.4 kg)
Drive Type:	
(used in SETUP program)	12
Number of Data Heads:	9
Number of Cylinders:	925
Average Access Time:	Less than 30 ms
Data Transfer Rate:	5 megabits per second

1.14 130-MEGABYTE FIXED DISK DRIVE

Dimensions:	
Height:	3.38 in. (8.6 cm)
Depth:	8.00 in. (20.3 cm)
Width:	5.87 in. (14.9 cm)
	(allow 0.375 in. (0.95 cm) for installing rails)
Weight:	7.5 lb (3.4 kg)
Drive Type:	
(used in SETUP program)	25[1] or 35
Number of Data Heads:	8
Number of Cylinders:	966
Average Access Time:	Less than 25 ms
Data Transfer Rate:	10 megabits per second
Sectors per track:	17 (Type 25)/34 (Type 35)
Interleave:	1:1[2] or 3:1[3]

[1] MS-DOS 3.1 or earlier supports drive type 25 only. Use drive type 25 if the application software
  supports only 17 sectors per track.
[2] When used with ESDI Fixed Disk Drive Controller Board assy. no. WD1007AWAH.
[3] When used with ESDI Fixed Disk Drive Controller Board assy. no. WD1005WAH.

1.15 40-MEGABYTE FIXED DISK DRIVE BACKUP

Dimensions:	
Height:	1.62 in. (4.1 cm)
Depth:	8.00 in. (20.3 cm)
Width:	5.75 in. (14.6 cm)
	(allow 0.375 in. (0.95 cm) for installing rails)
Weight:	1.7 lb (0.77 kg)
Media:	DC 2000 streaming cartridge
	(manufactured by the 3M Corporation) or equivalent
	DC 1000 read-only streaming cartridge
	(manufactured by the 3M Corporation) or equivalent
Tape Speed:	
Read/write:	50 in. per second
Rewind/fast forward:	70 in. per second
Tape End-to-End Positioning Time:	
Read/write:	49 seconds
Forward/reverse:	35 seconds
Track Density:	83 TPI
Number of Tracks:	20
Blocks/Track:	124
Data Sectors/Block:	16
Bytes/Sector:	1024

1.16 135-MEGABYTE FIXED DISK DRIVE BACKUP (TAPE)

Dimensions:	1.62 in. (4.1 cm)
Height:	8.50 in. (21.6 cm)
Depth:	5.75 in. (14.6 cm)
Width:	(allow 0.375 in (0.95 cm) for installing rails)
Weight:	2.4 lb (1.1 kg)
Media:	DC 600XTD streaming cartridge
	(manufactured by the 3M Corporation) or equivalent
Tape Speed:	
Read/write:	72 in. per second
Rewind/fast forward:	90 in. per second
Tape End-to-End Positioning Time:	
Read/write:	100 seconds
Forward/reverse:	80 seconds
Track Density:	76 TPI
Number of Tracks:	18
Bytes/Blocks:	512
ECC Percentage:	6.67

1.17 300-/600-MEGABYTE FIXED DISK DRIVE EXPANSION UNIT

Dimensions:

Height:	6.4 in. (16.1 cm)
Depth:	16.5 in. (41.9 cm)
Width:	14.5 in. (35.9 cm)

Weight:

One Drive, 300-Megabyte unit:	27.5 lb (12.4 kg)
Two Drives, 300-Megabyte units, mirrored:	35.5 lb (15.9 kg)

Environmental Requirements:

Temperature

Operating:	Not less than 50°F or more than 104°F (10°C to 40°C)
Nonoperating:	Not less than 50°F or more than 104°F (10°C to 40°C)
Shipping (adequately packed):	Not less than - 22°F or more than 140°F (- 30°C to 60°C)

Humidity:

Operating:	Not less than 20% or more than 80% (noncondensing)
Nonoperating:	Not less than 5% or more than 90% (noncondensing)

Controller: 1:1 interleave Buffered ESDI External Fixed Disk Drive Controller Board installs in one 8-/16-bit expansion slot in the system unit.

Interface Board: Internal ESDI interface board supports one or two 300-Megabyte Fixed Disk Drives.

LED Indicator: Green

Power Requirements:	**U.S.**	**International**
Nominal Line Voltage:	120 VAC, 60 Hz	230 VAC, 50 Hz
Range, Line Voltage:	102 to 132 VAC	204 to 264 VAC
Range, Line Frequency:	47 to 63 Hz	47 to 63 Hz
Power:		
Steady State:	192 watts	
Peak Power:	220 watts	

Current: (fuse rating)   5A (U.S.)   4A (International)

Power Cable:

Length:	60 in (1.52 m)
Type:	44-Lead twisted pair
Interface:	44-Pin Subminiature D-Shell

Signal Cable:

Length:	60 in (1.52 m)
Type:	44-Lead twisted pair
Connectors:	44-Pin Subminiature D-Shell

1.18 300-MEGABYTE FIXED DISK DRIVE FOR THE EXPANSION UNIT

Dimensions:	
Height:	3.25 in. (8.3 cm)
Depth:	8.00 in. (20.3 cm)
Width:	5.75 in. (14.6 cm)
	(allow 0.375 in (0.95 cm) for installing rails)
Weight:	8.0 lb (3.6 kg)
Drive Type:	
(used in SETUP program)	38
Number of Data Heads:	16
Number of Cylinders:	612
Average Access Time:	Less than 20 ms
Data Transfer Rate:	10 megabits per second
Sectors per Track:	63
Interleave:	1:1
Power:	
Volts:	+12 VDC (steady)
Current:	1.49 Amperes
Wattage:	7.51 watts
Volts:	+ 5 VDC (steady)
Current:	0.778 Amperes
Wattage:	3.92 watts

CONTENTS

Chapter 2
POWER-ON SELF-TEST (POST)/PROBLEM ISOLATION

Chapter 2
POWER-ON SELF-TEST (POST)/PROBLEM ISOLATION

2.1 INTRODUCTION

This chapter provides a list of the subassemblies that are tested by the Power-On Self-Test (POST), a list of steps that you should perform prior to going through the problem isolation procedures, and a problem isolation flowchart for quick reference.

2.2 POWER-ON SELF-TEST (POST)

A series of diagnostics tests automatically runs on every COMPAQ personal computer system when you turn on the system. These tests are called Power-On Self-Tests (POST).

POST checks the following subassemblies to see if the computer system is functioning properly:

☐ Power supply

☐ System board

☐ Memory

☐ Keyboard

☐ Controller boards

Turning on the computer automatically activates POST. If POST finds an error in the system, error codes (in the form of beeps) are heard or error codes (numbers) are visible on the monitor. See *Chapter 5*, ERROR MESSAGES AND CODES, for definitions of the error codes.

2.3 PRELIMINARY STEPS TO PROBLEM ISOLATION

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

1. Turn off power to the system unit.

2. Disconnect any peripheral devices other than the keyboard and monitor. 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. Insert the ADVANCED DIAGNOSTICS diskette into Drive A.

5. Turn on the system unit.

See *Chapter 4*, **ADVANCED DIAGNOSTICS PROGRAM**, for descriptions of the diagnostics tests.

2.4 PROBLEM ISOLATION FLOWCHART

The problem isolation flowchart provides a quick reference for identifying and correcting possible error conditions that may occur during POST. It gives troubleshooting procedures for identifying malfunctions and replacing major subassemblies in the computer and directs you to *Chapter 4*, **ADVANCED DIAGNOSTICS PROGRAM**, and to *Chapter 5*, **ERROR MESSAGES AND CODES**, for in-depth troubleshooting information.

```
┌──────────────┐        ┌──────────────┐                              ┌──────────┐
│  Complete    │        │ Turn AC power│         Did the      Yes    │   To B   │
│ Preliminary  │ ─────► │  switch ON.  │ ─────► ◄ cursor appear ────► │  Page    │
│   Steps.     │        │              │         on the              │   2-5    │
└──────────────┘        └──────────────┘         monitor? ►          └──────────┘
                                                     │
                                                     │ No
                                                     ▼
                                                ┌─────────┐
                                                │  To A   │
                                                │  Page   │
                                                │   2-4   │
                                                └─────────┘
```

A → Is the brightness knob turned up?

Is the brightness knob turned up? — Yes → Did the cursor appear on the monitor?

Is the brightness knob turned up? — No → Adjust brightness knob and restart.

Did the cursor appear on the monitor? — Yes → To B Page 2-5

Did the cursor appear on the monitor? — No → To C Page 2-6

B →

Did an error code appear on the monitor? — Yes → See *Chapter 5* **ERROR MESSAGES AND CODES.**

No ↓

Did you hear 1 or 2 short beeps? — Yes → POST has completed successfully. → Proceed with diagnostics. See *Chapter 4* **ADVANCED DIAGNOSTICS PROGRAM.**

No ↓

To D Page 2-7

```
   ┌───┐              ╱╲                      ┌─────┐
   │ C │─────────────╱  ╲     Yes            │ To E│
   │   │            ╱Is the╲───────────────→ │ Page│
   └───┘           ╱ system ╲                │ 2-8 │
                   ╲ LED lit? ╱              └─────┘
                    ╲        ╱
                     ╲      ╱
                      ╲╱
                       │ No
                       ↓
                      ╱╲                    ┌─────────────┐      ┌──────────────┐
                     ╱  ╲     Yes           │ Replace the │      │ If replacing │
                    ╱Is the╲───────────────→│ power supply│─────→│ the power    │
                    ╲AC power╱              │ assembly and│      │ supply, did  │
                    ╲fuse good?╱            │ restart.    │      │ not the system│
                     ╲      ╱               └─────────────┘      │ LED light?   │
                      ╲╱                           ↑             │ Proceed to F │
                       │ No                        │ No          │ Page 2-8.    │
                       ↓                           │             └──────────────┘
               ┌─────────────┐                    ╱╲
               │ POST has    │                   ╱  ╲     ┌─────┐
               │ completed   │─────────────────→╱Did the╲→│ To E│
               │ successfully.│                 ╲system  ╱ │ Page│
               └─────────────┘                  ╲LED light?╱│ 2-8 │
                                                 ╲      ╱  └─────┘
                                                  ╲╱
```

D → **Did you hear other audible error codes (beeps)?**

Yes → See *Chapter 5* **ERROR MESSAGES AND CODES**

No ↓

Check the speaker assembly connection. → **Is the speaker assembly connected?**

Yes → Replace the speaker and restart. → If beeps are still not heard, proceed to Page 2-8.

No ↓

Make proper connection and restart.

E

E
1. Verify that all signal cables are
   connected.
2. Replace the following devices in order.
3. Restart after each replacement and
   check for the appearance of the cursor
   and/or first screen of
   the ADVANCED DIAGNOSTICS program.
   □ Fuse
   □ Video Display
     Controller Board
   □ Video Display
     Monitor Unit
   □ System Board

F

F
1. Verify that all signal cables are
   connected.
2. Replace the following devices
   in order.
   □ Controller or Expansion Boards
   □ Storage or Video Devices
   □ System Board

CONTENTS

Chapter 3
SETUP PROGRAM

Chapter 3
SETUP PROGRAM

The COMPAQ personal computer uses a memory device that stores the current date, time, and system configuration. The SETUP program, included on both the ADVANCED DIAGNOSTICS and USER DIAGNOSTICS diskettes, enters this information into the memory device.

3.1 WHEN TO RUN SETUP

You need to run SETUP:

☐ When the COMPAQ personal computer is used for the first time.

☐ When the system configuration is changed.

☐ When certain options are added to the system including:

Coprocessor
Diskette drive
Fixed disk drive
Memory
Internal Modem

☐ If the system board or battery is disconnected or replaced.

☐ If a system configuration error is detected during POST. In this situation, the system prompts you to run SETUP so that you can enter the correct information before continuing.

3.2 HOW TO RUN SETUP

To run SETUP, follow these instructions:

1. Insert either ADVANCED DIAGNOSTICS or USER DIAGNOSTICS diskette into drive A.

2. Turn the diskette drive latch to engage the drive.

3. Turn on the computer and monitor. If the computer is already on, reset the system.

   The system runs POST, counting and displaying the amount of memory and checking the various system components.

4. Follow the instructions on the screen as the program sets the system configuration.

   NOTE: The F1 function key can be used anytime during SETUP to access HELP.

5. When SETUP is complete, select EXIT and reset the system.

CONTENTS

Chapter 4
ADVANCED DIAGNOSTICS PROGRAM

4.4 TEST SELECTION MENU *Continued*

Continued...

4.4 TEST SELECTION MENU *Continued*

Continued...

4.4 TEST SELECTION MENU *Continued*

Chapter 4
ADVANCED DIAGNOSTICS PROGRAM

This chapter describes the ADVANCED DIAGNOSTICS program for the COMPAQ personal computer being tested. The screens and information displayed are specific to the system being tested. Diagnostics verify the proper operation of the computer.

NOTE: When running the program, be sure to record any messages that are displayed during a test. This information helps in determining defective parts or assemblies. Refer to *Chapter 5*, **ERROR MESSAGES AND CODES**, for error descriptions and the procedures recommended for correcting the error condition.

4.1 PRELIMINARY STEPS

Before running the ADVANCED DIAGNOSTICS program, complete the following steps:

1. Turn off the computer.

2. Disconnect any peripheral devices other than the keyboard and monitor. Do not disconnect the printer if you want to test it or use it to log error messages.

3. Install loopback and terminating plugs for complete testing.

4. Insert the ADVANCED DIAGNOSTICS diskette into drive A.

5. Turn the diskette drive latch to engage the drive.

6. Turn on the computer and monitor.

    Once POST completes successfully, the screen displays a list of the devices installed.

    NOTE: The F1 function key can be used anytime during SETUP to access HELP.

7. Verify that the POST program has correctly detected the devices installed.

    ☐ If listed correctly, enter Y (yes) and proceed to the main menu of ADVANCED DIAGNOSTICS.

    ☐ If listed incorrectly, enter N (no) and follow the instructions on the screen.

4.2 MAIN MENU

The main menu allows you to select one of the following:

☐ Run the diagnostic tests

☐ Format a diskette (for diagnostic use only)

☐ Run the SETUP program

☐ Clear configuration and run the SETUP program

☐ Display ROM versions

These selections are described in the following paragraphs.

Run the Diagnostic Tests

This selection presents the menu-selectable tests and methods of testing.

Format a Diskette

The ADVANCED DIAGNOSTICS program requires that a diskette be formatted for each diskette drive being tested. This utility is not the same as the operating system FORMAT command. A diskette formatted for diagnostics can be used for diagnostics only, unless it is reformatted using the operating system.

NOTE: To fully test a diskette drive, use the highest capacity media intended for each drive.

Run the SETUP Program

This selection runs the SETUP program to enter all system information into the system configuration memory. For more information on the SETUP program, refer to *Chapter 3*, **SETUP PROGRAM**.

Clear Configuration and Run the SETUP Program

This selection clears the system configuration memory before invoking the SETUP program. It may be used to return all configuration options to the default setting. This is particularly useful if the computer has an incorrect setting in the configuration memory.

Display ROM Versions

This selection displays information about the pro-cessor type and the current version level of ROM on the system board, video display controller, and keyboard controller.

4.3 ADVANCED DIAGNOSTICS PROGRAM

System Test Menu

When running the diagnostic tests, the program allows you to:

☐ Run the tests once in an interactive mode

☐ Run the tests multiple times in a looping mode

☐ Select the Test Logging Utilities Menu

Test Logging Utilities Menu

This selection allows you to:

☐ Log detected errors to a printer. When this feature is turned ON, all error messages are written to the printer.

☐ Display the test log. When selected, it lists the devices tested, the number of test passes completed, and any errors encountered.

☐ Print the test log. When the test log is printed, it lists the devices installed and how many test passes have been completed on the various devices. Additionally, any errors encountered during testing are printed.

4.4 TEST SELECTION MENU

The Test Selection Menu selections vary according to the configuration of the computer being tested. You can elect to run one test, a combination of tests, or all of the tests. When you run multiple tests, the program proceeds automatically from one test to the next until testing is completed successfully. When running the program in the unattended mode, tests that require operator intervention are not performed. For complete system checkout, each test should be run at least once in the attended mode. The diagnostic tests are:

- ☐ Processor
- ☐ Memory
- ☐ Keyboard
- ☐ Parallel Interface
- ☐ Video
- ☐ Diskette Drive
- ☐ Monochrome Video Board
- ☐ Asynchronous Communications Interface
- ☐ Modem Communications
- ☐ Fixed Disk Drive
- ☐ Fixed Disk Drive Backup (Tape)
- ☐ Enhanced Color Graphics or Video Graphics
- ☐ Auxiliary Input Interface

NOTE: If error codes appear as you run the tests, refer to *Chapter 5*, **ERROR MESSAGES AND CODES**, for a list of error codes, code descriptions, and the procedures recommended for correcting the error condition.

The following paragraphs describe these tests.

Processor

The Processor test verifies the main processor, coprocessor (if installed), configuration (CMOS) memory (if applicable), processor support logic, and speaker.

Memory

The Memory test verifies memory data patterns, memory addressing, and parity detection for all system memory.

Keyboard

The Keyboard test verifies the keyboard inter-face, the individual keys, the LED indicators, the repeat action key mode, and the security lock (if applicable).

Parallel Interface

The Parallel Interface test verifies interface data and control lines, internal loopback control circuitry, external loopback (if a loopback plug is attached), and a shifted pattern of standard printable characters (if a printer is connected).

NOTE: Before selecting this test, be sure you know which device is set to LPT1 or LPT2. This is necessary to determine the applicability of any messages or error codes that may appear. For more complete testing of the parallel interface, attach a loopback plug.

Video

Depending on the devices installed in the computer being tested, you can run selected tests or all of the tests listed in Table 4-1. It details the possible tests for various system video configurations and indicates the screens that appear during the tests (assuming only one video controller is installed).

NOTE: The screens that appear in this section are provided for reference only and may vary depending on the type of video controller or monitor being used.

Table 4-1. Matrix of Possible Video Tests

Video Test	Video Controller/Display					
	CGA	**EGA W/DMM**	**EGA W/COLOR**	**VGA W/COLOR**	**VGA W/MONO**	**MDA**
Video Controller	X	X	X	X	X	X
Display Characteristics	X	X	X	X	X	
Character Set	X	X	X	X	X	
80 x 25 Display	X	X	X	X	X	
40 x 25 Display	X	X	X	X	X	
320 x 200 Standard Graphics	X	X	X	X	X	
640 x 200 Standard Graphics	X	X	X	X		
Lightpen	X	X	X			
Display Memory Pages	X	X	X	X	X	X
Gray Scale/Color	X	X	X	X		
Noise	X	X	X	X	X	X
Enhanced Display Characteristics		X	X			
640 x 200 Color Graphics		X	X	X		
640 x 350 Color Graphics		X	X	X		
Monochrome Text		X			X	X
640 x 350 Monochrome Graphics		X			X	
640 x 480 Graphics				X		
256 Color Mode				X		
Monitor Alignment		X	X	X		

CGA - Color graphics adapter
DMM - Dual-mode monitor
EGA - Enhanced graphics adapter
MDA - Monochrome display adapter
VGA - Video graphics array

The following paragraphs describe the tests for the various video configurations.

Video Controller

The Video Controller selection verifies the integrity of the video display controller, the video graphics controller, or the enhanced color graphics board.

Display Characteristics

The Display Characteristics selection verifies the ability of the video display controller and monitor to display certain attributes: various intensities, blinking, and reverse video.

Character Set

The Character Set selection verifies that the system can display all of the available character patterns.

80 x 25 Display

The 80 x 25 Display selection verifies that the system can operate in both the high-resolution and low-resolution modes.

The screen for the 80 x 25 high-resolution text mode (9 x 14 character matrix) using inverted video appears similar to Screen 1.
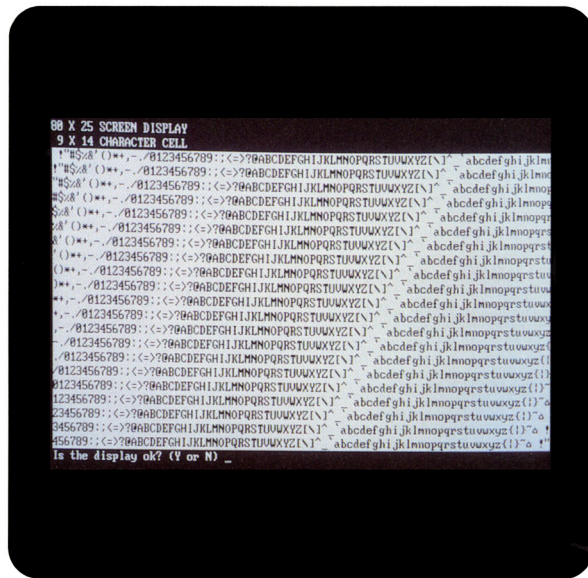
Screen 1.

The screen for the 80 x 25 low-resolution charac-ter display mode (8 x 8 character matrix) appears similar to Screen 2.

Screen 2.

40 x 25 Display

The 40 x 25 Display selection verifies that the system can operate in the 40 x 25 low-resolution character display mode 8 x 8 character matrix). A display similar to Screen 3 appears on the monitor.

Screen 3.

320 x 200 Standard Graphics

The 320 x 200 Standard Graphics selection verifies that the system can operate in the 320 x 200 color graphics mode with color sets 0 and 1. A display similar to Screen 4 appears for the color sets.

Screen 4.

640 x 200 Standard Graphics

The 640 x 200 Standard Graphics selection verifies that the system can operate in the 640 x 200 monochrome graphics mode. A display similar to Screen 5 appears.
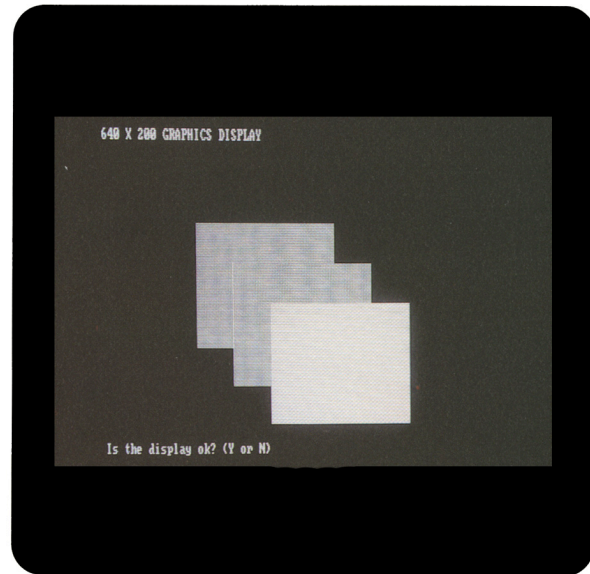
Screen 5.

Lightpen

The Lightpen selection verifies that the lightpen is operating properly with the color monitor.

Display Memory Pages

The Display Memory Pages selection verifies that the system can address all eight pages (0 through 7) of the memory on the video display controller. A display similar to Screen 6 appears for the eighth page.

Screen 6.

Gray Scale/Color

The Gray Scale/Color selection verifies that the system can display as many as 16 shades of the gray scale and all 8 possible colors (at 2 intensities for each). A display similar to Screen 7 appears on the monitor.

Noise

The Noise selection checks the amount of electronic noise generated from the video controller; it also tests the ability of the controller to communicate with the system board.
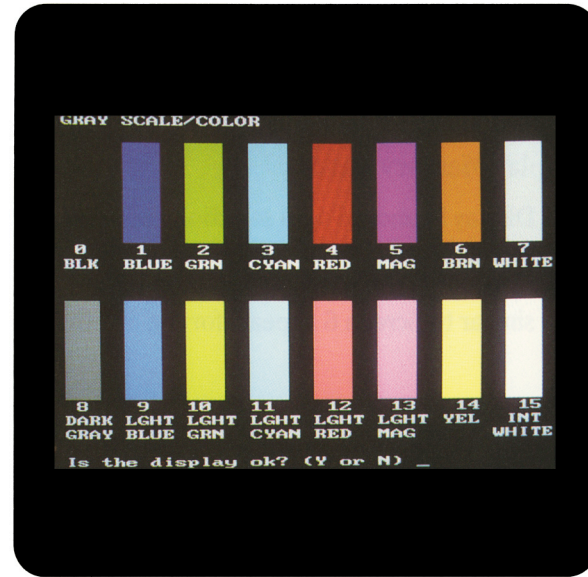
Screen 7.

Enhanced Display Characteristics

The Enhanced Display Characteristics selection verifies the ability of the video display controller and monitor to display certain attributes: normal and high intensities; blinking; inverted video; and shades of red, blue, green, and gray. A display similar to Screen 8 appears on the monitor.

Screen 8.

640 x 200 Color Graphics

The 640 x 200 Color Graphics selection verifies that the system can operate in the 640 x 200 color graphics mode, displaying 16 different colors. A display similar to Screen 9 appears on the monitor.
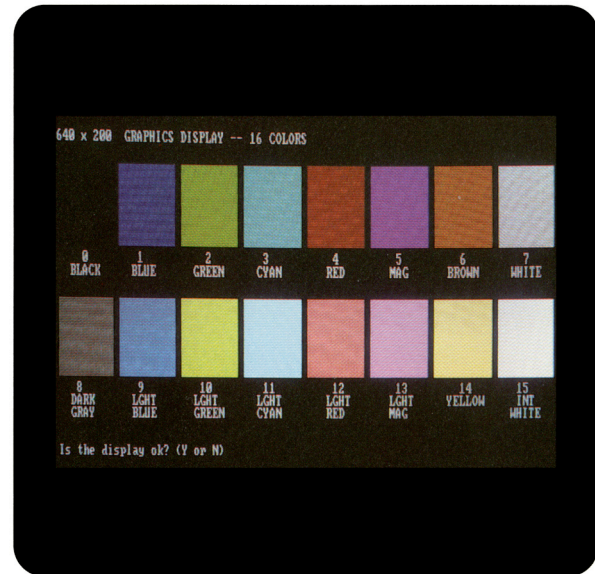
Screen 9.

640 x 350 Color Graphics

The 640 x 350 Color Graphics selection verifies that the system can operate in the 640 x 350 color graphics mode by displaying the first 16 of 64 possible colors, then all 64 possible colors.

Displays of the first 16 colors appear similar to Screen 10.

Screen 10.

Displays of all 64 possible colors appear similar to Screen 11.

Screen 11.

Monochrome Text

The Monochrome Text selection verifies that the system can operate in the monochrome text mode. A display similar to Screen 12 appears on the monitor with the word "monochrome" blinking.
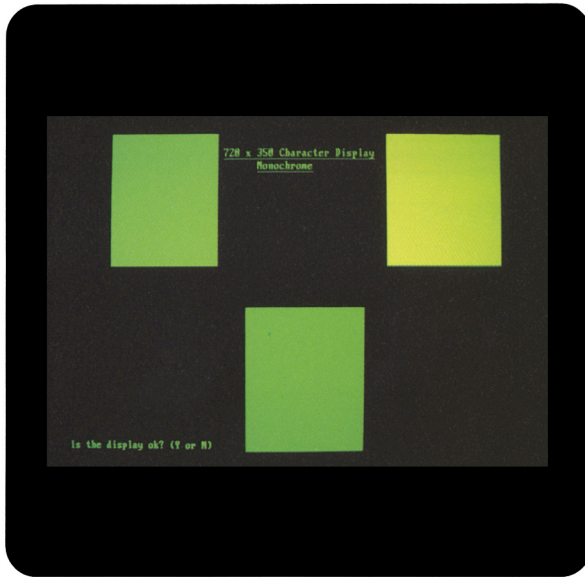
Screen 12.

640 x 350 Monochrome Graphics

The 640 x 350 Monochrome Graphics selection verifies that the system can operate in the 640 x 350 monochrome graphics mode. A display similar to Screen 13 appears on the monitor with the word "monochrome" blinking.
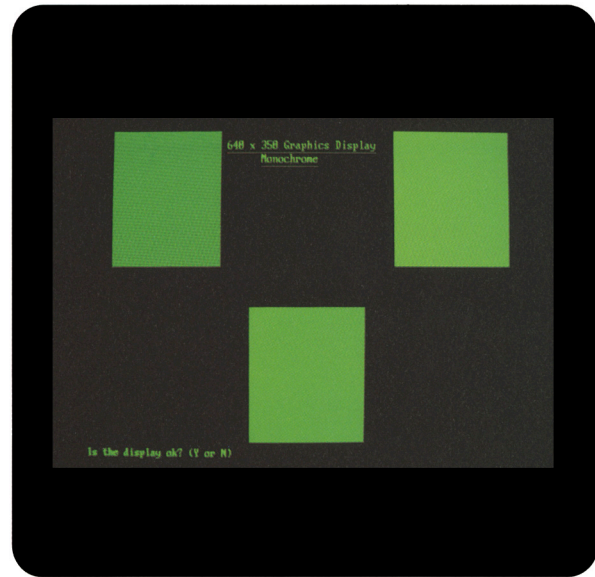
Screen 13.

640 x 480 Graphics

The 640 x 480 Graphics selection verifies that the system can operate in the 640 x 480 graphics mode. A display similar to Screen 14 appears on the monitor.
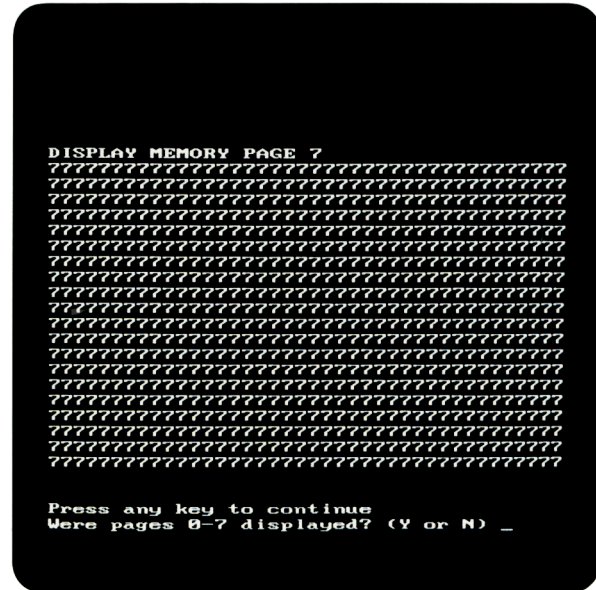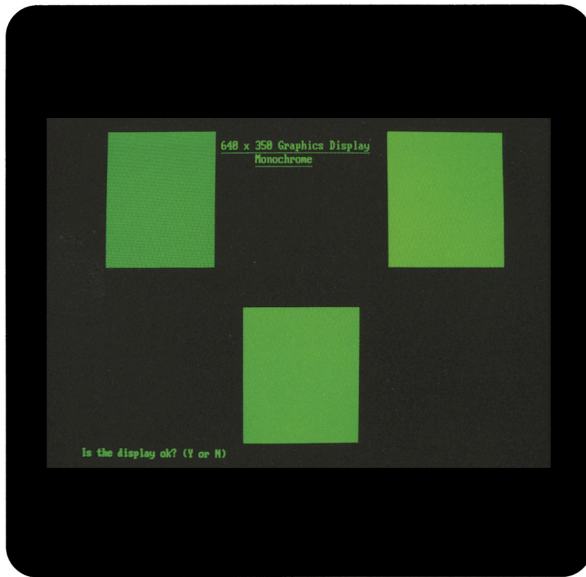

Screen 14.

256 Color Mode

The 256 Color Mode selection verifies the different shading of nine colors. A display similar to Screen 15 appears on the monitor.

Screen 15.

Monitor Alignment

The Monitor Alignment selection allows you to check the alignment and intensity of the video display unit.

Diskette Drive

The Diskette Drive test verifies that the diskette drive, diskette drive controller, and associated cables are operating properly.

The following selections are available:

☐ Write/Read/Compare

☐ Random Seek

☐ Verify Diskette

☐ Diskette Speed

☐ Diskette Change Line

☐ Format a Diskette (for diagnostic use only)

NOTE: During certain tests, you may be asked to insert a blank diskette that has been formatted for diagnostics. To fully test a diskette drive, use the highest capacity media intended for the drive. The diskette must not be write protected.

The following paragraphs describe these selections.

Write/Read/Compare

The Write/Read/Compare selection verifies that the diskette drive subsystem writes, reads, and compares data patterns, that the diskette drive controller properly resets, and that the diskette drive controller buffers are valid.

Random Seek

The Random Seek selection verifies that the diskette drive and the diskette drive controller randomly seek tracks across the diskette.

Verify Diskette

The Verify Diskette selection verifies the diskette drive by reading the contents of the entire diskette.

Diskette Speed

The Diskette Speed selection verifies that the diskette drive motor is spinning within the proper speed range.

Diskette Change Line

The Diskette Change Line selection verifies that the diskette drive change-line circuitry is functioning properly. You may be instructed to remove and reinsert the blank diskette that has been formatted for diagnostics.

Format a Diskette (for diagnostic use only)

The ADVANCED DIAGNOSTICS program requires that a diskette be formatted for each diskette drive being tested. This utility is not the same as the operating system FORMAT command. A diskette formatted for diagnostics can be used for diagnostics only, unless it is reformatted using the operating system.

NOTE: To fully test a diskette drive, use the highest capacity media intended for the drive.

Monochrome Video Board

For a description of this test, see "Video Tests" described previously.

Asynchronous Communications Interface

The Asynchronous Communications Interface test verifies interface data and control lines, baud rate, internal loopback control circuitry, external loopback circuitry (if a loopback plug is attached), as well as clock and calendar functions (if applicable).

NOTE: This selection tests all asynchronous communications interfaces. Before selecting this test, be sure you know which device is set to COM1 and which is set to COM2. This is necessary to determine the applicability of any messages or error codes that may appear. For more complete testing of an asynchronous communications interface, attach a loopback plug.

Modem

The Modem test runs a series of other tests that verify the modem and interface cables.

The following selections are available:

☐ Modem Internal Loopback

☐ Auto Originate Mode

☐ Auto Answer Mode

☐ Modem External Termination

☐ Modem Direct Connect

The following paragraphs describe these selections.

Modem Internal Loopback

The Modem Internal Loopback selection verifies the TIP/RING (two wire) loopback circuitry as well as the data transfer and bit error rate circuitry.

Auto Originate Mode

The Auto Originate Mode selection verifies that the modem subassembly can dial a remote modem, establish the transmission line carrier, check the transmission line quality, perform data transfer, check bit error rate, and disconnect the transmission carrier.

Auto Answer Mode

The Auto Answer Mode selection verifies that the modem subassembly can receive an incoming dial-up call, establish the transmission line carrier, check the transmission line quality, perform data transfer, check bit error rate, and disconnect the transmission carrier.

Modem External Termination

The Modem External Termination selection verifies that the TIP/RING (two wire) lines are externally available.

NOTE: Before running this test, attach a modem terminating plug.

Modem Direct Connect

The Modem Direct Connect selection verifies the TIP/RING (two wire) loopback circuitry as well as the data transfer and bit error rate circuitry (as does the Modem Internal Loopback selection, above). It also verifies that the modem can communicate with another modem. This test is performed when two modems in different computers are directly connected through one telephone cable. The selection does not verify dialing, originating, or answering.

Fixed Disk Drive

The Fixed Disk Drive test runs a series of tests that verify the fixed disk drive, the fixed disk drive controller, and cables. Depending on the computer configuration, a Fixed Disk Drive Menu may appear. The selections allow you to run any one or all of the tests on any physical drive.

The following selections are available:

☐   Write/Read/Compare on Test Cylinder

☐   Seek

☐   Head Select

☐   Error Detection and Correction

☐   Run All the Above Tests

☐   Read Verify

☐   Format Menu

The following paragraphs describe these selections.

Write/Read/Compare on Test Cylinder

The Write/Read/Compare on Test Cylinder selection writes information from memory to the fixed disk drive on the test cylinder, reads it back, then compares it to what is in memory.

Seek

The Seek selection performs a sequential seek over the fixed disk drive then performs a random seek to verify the ability of the head actuator to find randomly selected cylinders in a predetermined amount of time.

Head Select

The Head Select selection verifies that each head of the fixed disk drive can be accessed and is functional.

Error Detection and Correction

The Error Detection and Correction selection verifies that the error detection circuitry in the fixed disk drive can properly calculate the error correction code.

Run All the Above Tests

The Run All the Above Tests selection allows all of the previously described Fixed Disk Drive Test selections to run sequentially.

Read Verify

The Read Verify selection verifies that the system can read each track of the fixed disk drive. The program reads the entire disk and reports the number of unusable tracks, if any.

Format Menu

The Format Menu selection provides two format program options and two formatting features for special applications only. The Format Menu allows you to run the following tests selectively on each physical drive present.

> ### CAUTION
>
> **The fixed disk drive format selection destroys all data on the fixed disk drive. Before Formatting, back up all data stored on the fixed disk drive.**

The Format Menu selections available are:

- ☐ Conditional Format
- ☐ Unconditional Format
- ☐ Surface Analysis
- ☐ Change Interleave
- ☐ Display Current Interleave

IMPORTANT

Because several of these selections destroy all information on the fixed disk drive, you may need to reinitialize the fixed disk drive.

For more information on initializing the fixed disk drive, refer to operating system documentation.

The following paragraphs describe the Format Menu selections.

Conditional Format

The Conditional Format selection reads the disk to find tracks formatted as unusable, reformats the entire disk, and then restores the original unusable track information. It then performs a complete surface analysis to find other unusable tracks.

NOTE: The computer must be turned on for at least 20 minutes before formatting the fixed disk drive.

Also, it is very important that this test be allowed to run to completion once started. If the test does not run to completion, bad-track information may be lost.

When the Conditional Format completes without error, repeat the Fixed Disk Drive test to verify that the fixed disk drive and the fixed disk drive controller (if applicable) are functioning properly.

Unconditional Format

The Unconditional Format selection formats all tracks as good, except for those entered by the user. This test accepts a list of usable tracks from the user, reformats the entire disk, and then reformats as unusable the tracks entered by the user. Additionally, you may elect to run a Surface Analysis automatically after the Unconditional Format.

NOTE: An Unconditional Format should be performed only if you are sure that tracks marked bad on the fixed disk drive are not actually bad. Good tracks may be marked bad as a result of using a defective fixed disk drive controller or controller cable.

You must perform a Surface Analysis after an Unconditional Format to identify any additional bad tracks that may exist on the fixed disk drive.

Run the Fixed Disk Drive test to verify that the fixed disk drive and the fixed disk drive controller (if applicable) are functioning properly.

Surface Analysis

The Surface Analysis selection performs multiple write/read/compares on each track of the disk in search of more unusable tracks. It formats tracks to be unusable when errors are found.

Change Interleave

The Change Interleave selection permits you to change the interleave factor of the fixed disk drive. You must run either the Conditional or Unconditional Format to enable the new interleave factor.

CAUTION

Changing the interleave factor can drastically reduce the performance of the system. The interleave factor is preset to achieve maximum efficiency from the computer.

Do not choose this selection unless you are required to do so, either by a software program or by an operating system other than MS-DOS. Changing the interleave factor requires that the drive be reformatted to function properly.

Display Current Interleave

The Display Current Interleave selection tests the fixed disk drive and reports the current interleave setting.

Fixed Disk Drive Backup (Tape)

The Fixed Disk Drive Backup (Tape) test verifies the tape backup, the fixed disk drive controller, the tape host adapter, and associated cables. Depending on the computer configuration, the Fixed Disk Drive Backup Menu may appear. This menu allows you to run the following tests selectively:

☐   Format Fixed Disk Drive Backup Cartridge (for diagnostic use only)

☐   Fixed Disk Drive Backup Device

☐   Fixed Disk Drive Backup Media

During each of these tests, the screen displays each track and block as it is checked. The following paragraphs describe these selections.

Format Fixed Disk Drive Backup Cartridge (for diagnostic use only)

This selection formats a fixed disk drive backup tape cartridge for use during diagnostic testing. This selection tests the format and servo write circuitry.

CAUTION

This test will destroy stored data. When prompted, be sure to insert a blank tape cartridge to avoid losing data.

The test goes through two stages of formatting: physical formatting and logical formatting. Each stage requires an extended period of time.

CAUTION

Do *not* interrupt the physical formatting process in any way. An interruption can destroy the servo information on the tape cartridge requiring erasure before reformatting.

Fixed Disk Drive Backup

The Fixed Disk Drive Backup selection verifies that the system can identify the following on selected tracks of the tape cartridge: drive type; cartridge in place; write protect, beginning of tape (BOT), and end of tape (EOT) sensors; drive motion and seek circuitry; drive indexing circuitry; and drive write and read circuitry.

Fixed Disk Drive Backup Media

The Fixed Disk Drive Backup Media selection verifies that the system can rewind the tape cartridge to the beginning of the tape (BOT) and the end of the tape (EOT) as well as write, read, and compare data to all blocks and tracks of the cartridge.

Enhanced Color Graphics

For a description of this test, see "Video Tests" described previously.

Video Graphics Controller

For a description of this test, see "Video Tests" described previously.

CONTENTS

Chapter 5
ERROR MESSAGES AND CODES

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Table 5-1. Power-On Self-Test Error Messages *Continued*

Message	Beeps	Probable Cause	Recommended Action
402–Monochrome Adapter Failure	1L[1], 2S[2]	Monochrome display controller board	Replace the monochrome display controller board.
501–Display Adapter Failure	1L[1], 2S[2]	Video display controller board	Replace the video board.
601–Diskette Controller Error	None	Multipurpose fixed disk drive controller board	Replace the multipurpose fixed disk drive controller board.
605–Diskette Drive Type Error		Mismatch in drive type	Run Setup.
702–Coprocessor Detection Error	None	Coprocessor or switch setting problem	1. Check the switch settings. 2. Replace the coprocessor.
1780–Disk 0 Failure	None	Fixed disk drive/format error	Run ADVANCED DIAGNOSTICS.
1781–Disk 1 Failure	None	Fixed disk drive/format error	Run ADVANCED DIAGNOSTICS.
1782–Disk Controller Failure	None	Fixed disk drive controller error	Run ADVANCED DIAGNOSTICS.
1790–Disk 0 Error	None	Fixed disk drive recalibration or wrong drive type	Run SETUP and ADVANCED DIAGNOSTICS.
1791–Disk 1 Error	None	Fixed disk drive recalibration or wrong drive type	Run SETUP and ADVANCED DIAGNOSTICS.
Parity Check 2 XX000Y ZZ	None	Parity RAM failure	Run ADVANCED DIAGNOSTICS.
Audible	1S[2]	Power-on successful	None.
Audible	2S[2]	Power-on successful	None.
(RESUME = "**F1**" KEY)	None	As indicated	Press **F1** key to continue.

[1]L = Long
[2]S = Short

5.3 ADVANCED DIAGNOSTICS ERROR CODES

ADVANCED DIAGNOSTICS error codes occur if the system recognizes a problem while running the COMPAQ ADVANCED DIAGNOSTICS Program. These error codes help identify possible defective subassemblies.

Table 5-2 lists 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 ADVANCED DIAGNOSTICS Program to verify whether the error condition has been corrected. If the error code reappears, perform the next step, then run the ADVANCED DIAGNOSTICS Program. Follow this procedure until the ADVANCED DIAGNOSTICS Program no longer detects an error condition.

The error codes are in the form of AYY-XX or AAYY-XX. A or AA is the number that represents the faulty subassembly. YY denotes the test or action that failed. XX denotes a specific problem. For example, error code 610-01 shows that the diskette drive change line test exceeded the maximum soft error limit.

For assistance in the removal and replacement of a particular subassembly, see *Chapter 7*, **REMOVAL AND REPLACEMENT PROCEDURES.**

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Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
105-07	Port 61 bit 3 not at one.	Replace the system board and retest for error codes 103-xx through 113-xx.
105-08	Port 61 bit 1 not at one.	
105-09	Port 61 bit 0 not at one.	
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.	
106-01	Keyboard controller self-test failed.	
107-01	CMOS RAM test failed.	
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.	
110-01	Programmable timer load data test failed.	
110-02	Programmable timer dynamic test failed.	
110-03	Programmable timer #2 load data test failed.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
111-01	Refresh detect test failed.	Replace the system board and retest for error codes 103-xx through 113-xx.
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.	
112-09	Speed test unable to enter high mode.	
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.	
113-01	Protected mode test failed.	
114-01	Speaker test failed.	1. Verify the speaker connection. 2. Replace the speaker and retest. 3. Replace the system board and retest.
199-00	Installed devices test failed.	1. Check system configuration. 2. Verify cable connection. 3. Check switch settings. 4. Run SETUP. 5. Replace the system board and retest.

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
Memory Test		
201-01	Memory machine ID test failed.	The following steps apply to error codes 201-xx through 202-xx:
202-01	Memory system ROM checksum failed.	1. Replace the video display controller board and retest.
202-02	Failed RAM/ROM map test.	2. Replace the system ROM and retest. 3. Replace the system memory board and retest.
202-03	Failed RAM/ROM protect test.	4. Replace the system board and retest.
203-01	Memory write/read test failed.	"Replace the memory board(s) and retest for error codes 203-xx through 205-xx.
203-02	Error during saving program memory in write/read test.	
203-03	Error during restore of program memory in write/read test.	
204-01	Memory address test failed.	
204-02	Error during saving program memory in address test.	
204-03	Error during restore of program memory in address test.	
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.	
*See Section 5.4 for Memory Error Code Information.		

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
Memory Test		
210-xx	Incrementing pattern test.	Replace the memory board and retest for 210 and 211 error codes.
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, but RAM was correct.	
210-10	Mapping LIM block, LIM page not present.	
211-xx	Random pattern test.	
211-01	Test failed.	
211-02	Error while saving test block.	
211-03	Error while restoring test block.	
211-04	Insufficient memory to perform test.	
211-05	Inverted pattern compare, but RAM was correct.	
Keyboard Test		
301-01	Keyboard short test, 8042 self test failed.	The following steps apply to error codes 301-xx through 304-xx:
301-02	Keyboard short test, interface test failed.	1. Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard.
301-03	Keyboard short test, echo test failed.	2. Replace the keyboard and retest.
301-04	Keyboard short test.	3. Replace the system board and retest.
302-01	Keyboard long test failed.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
303-01	Keyboard LED test, 8042 self test failed.	The following steps apply to error codes 301-xx through 304-xx:
303-02	Keyboard LED test, reset test failed.	1. Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard.
303-03	Keyboard LED test, reset test failed.	2. Replace the keyboard and retest.
303-04	Keyboard LED test, LED command test failed.	3. Replace the system board and retest.
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.	
303-08	Keyboard LED test, command byte restore test failed.	
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.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
Security Lock Test		
315-01	Security lock inoperative.	The following steps apply to error codes 315-xx:
315-02	Security lock stuck in locked position.	1. Verify the security lock cable connection. 2. Replace the security lock and retest.
Parallel Printer Test		
401-01	Printer failed or not connected.	The following steps apply to error codes 401-xx through 498-xx:
402-01	Printer data register failed.	
402-02	Printer control register failed.	1. If a printer is connected, be sure it is turned ON and in the ONLINE mode.
402-03	Printer data and control register failed.	2. Check the switch settings and jumper positions on the multipurpose fixed disk controller board (see *Chapter 8*).
402-04	Printer loopback failed.	
402-05	Printer loopback and data failed.	3. Replace the printer and/or the printer cable and retest.
402-06	Printer loopback and control register failed.	4. Replace the multipurpose fixed disk drive controller board.
402-07	Printer loopback, data and control register failed.	5. Replace the system board and retest.
402-08	Printer interrupt test failed.	
402-09	Printer interrupt and data register failed.	
402-10	Printer interrupt and control register failed.	
402-11	Printer interrupt, data and control register failed.	
402-12	Printer interrupt, and loopback failed.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
402-13	Printer interrupt, loopback and data register failed.	The following steps apply to error codes 401-xx through 498-xx:
402-14	Printer interrupt, loopback and control register failed.	1. If a printer is connected, be sure it is turned ON and in the ONLINE mode.
402-15	Printer interrupt, loopback data and control register failed.	2. Check the switch settings and jumper positions on the multipurpose fixed disk controller board (see *Chapter 8*).
402-16	Printer unexpected interrupt received.	3. Replace the printer and/or the printer cable and retest.
403-01	Printer pattern test failed.	4. Replace the multipurpose fixed disk drive controller board.
498-00	Printer failed or not connected.	5. Replace the system board and retest.

Video Display Unit Test

Error Code	Description	Recommended Action
501-01	Video controller test failed.	The following steps apply to error codes 501-xx through 516-xx:
502-01	Video memory test failed.	
503-01	Video attribute test failed.	1. Replace the monitor and retest.
504-01	Video character set test failed.	2. Replace the video display controller board and retest.
505-01	Video 80 × 25 mode 9 × 14 character cell test failed.	3. Replace the system board and retest.
506-01	Video 80 × 25 mode 8 × 8 character cell test failed.	
507-01	Video 40 × 25 mode test failed.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
508-01	Video 320 × 200 mode color set 0 test failed.	The following steps apply to error codes 501-xx through 516-xx:
509-01	Video 320 × 200 mode color set 1 test failed.	1. Replace the monitor and retest. 2. Replace the video display controller board and retest. 3. Replace the system board and retest.
510-01	Video 640 × 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.	
517-01	Lightpen text mode test failed–no response.	The following steps apply for error codes 517-xx:
517-02	Lightpen text mode test failed–invalid response.	1. Replace the lightpen and retest. 2. Replace the video display controller board and retest. 3. Replace the system board and retest.
517-03	Lightpen medium resolution mode test failed–no response.	
517-04	Lightpen medium resolution mode test failed–invalid response.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
Diskette Drive Test		
600-xx	Diskette ID drive types test failed.	The following steps apply to error codes 600-xx through 610-xx:
601-xx	Diskette format failed.	
602-xx	Diskette read test failed.	1. Replace the diskette and retest.
603-xx	Diskette write, read, compare test failed.	2. Check the switch settings and jumper positions on the multipurpose fixed, disk drive controller board and retest (see *Chapter 8*).
604-xx	Diskette random seek test failed.	3. Check and/or replace the diskette drive power and signal cables and retest.
605-xx	Diskette ID media failed.	
606-xx	Diskette speed test failed.	4. Replace the multipurpose fixed disk drive controller board and retest.
607-xx	Diskette wrap test failed.	5. Replace the diskette drive and retest.
608-xx	Diskette write protect test failed.	6. Replace the system board and retest.
608-xx	Diskette write protect test failed.	
609-xx	Diskette reset controller test failed.	
610-xx	Diskette change line test failed.	
694-00	Pin 34 is not cut on 360-Kbyte diskette drive.	Refer to Service Bulletin 25.
697-00	Diskette type error.	The following steps apply to error codes 697-xx through 699-xx:
698-00	Diskette drive speed not within limits.	
699-00	Diskette drive/media ID error–rerun SETUP.	1. Replace the diskette and retest.
-xx		2. Check the switch settings and jumper positions on the multipurpose fixed disk drive controller board and retest (see *Chapter 8*).
01	Exceeded maximum soft error limit.	3. Check and/or replace the diskette power and signal cables and retest.
02	Exceeded maximum hard error limit.	4. Replace the multipurpose fixed disk drive controller board and retest.
03	Previously exceeded maximum soft error limit.	5. Replace the diskette drive and retest.
		6. Replace the system board and retest.

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
-xx		The following steps apply to error codes 697-xx through 699-xx:
04	Previously exceeded maximum hard error limit.	1. Replace the diskette and retest.
05	Failed to reset controller.	2. Check the switch settings and jumper positions on the multipurpose fixed disk drive controller board and retest (see *Chapter 8*).
06	Fatal error while reading.	
07	Fatal error while writing.	3. Check and/or replace the diskette power and signal cables and retest.
08	Failed compare of write/read buffers.	4. Replace the multipurpose fixed disk drive controller board and retest.
09	Failed to format a track.	
10	Failed sector wrap test.	5. Replace the diskette drive and retest.
20	Failed to get drive type.	6. Replace the system board and retest.
21	Failed to get change line status.	
22	Failed to clear change line status.	
23	Failed to set drive type in ID media.	
24	Failed to read diskette media.	
25	Failed to verify diskette media.	
26	Failed to read media in speed test.	
27	Failed speed limits.	
28	Failed write protect test.	

Monochrome Video Board Test

802-01	Video memory test failed.	The following steps apply to error codes 802-xx through 824-xx:
824-01	Monochrome video text mode test failed.	1. Replace monitor and retest.
		2. Replace monochrome board.
		3. Replace system board and retest.

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
Serial Test		
1101-01	Serial Port Test, UART DLAB bit failure.	The following steps apply to error codes 1101-xx through 1109-xx.
1101-02	Serial Port Test, line input or UART fault.	1. Check the switch settings and jumper positions on the multipurpose fixed disk controller board (see *Chapter 8*).
1101-03	Serial Port Test, address line fault.	
1101-04	Serial Port Test, data line fault.	2. Replace the multipurpose fixed disk drive controller board and retest.
1101-05	Serial Port Test, UART control signal failure.	3. Replace the system board and retest.
1101-06	Serial Port Test, UART THRE 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, COM-1 set to invalid interrupt.	
1101-11	Serial Port Test, COM-2 set to invalid interrupt.	
1101-12	Serial Port Test, DRIVER/RECEIVER control signal failure.	
1101-13	Serial Port Test, UART control signal interrupt failure.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
1101-14	Serial Port Test, DRIVER/RECEIVER data failure.	The following steps apply to error codes 1101-xx through 1109-xx.
1109-01	Clock register initialization failure.	1. Check the switch settings and jumper positions on the multipurpose fixed disk controller board (see *Chapter 8*).
1109-02	Clock register rollover failure.	
1109-03	Clock reset failure.	2. Replace the multipurpose fixed disk drive controller board and retest.
1109-04	Input line or clock failure.	3. Replace the system board and retest.
1109-05	Address line fault.	
1109-06	Data line fault.	
Modem Communications Test		
1201-xx	Modem Internal Loopback Test	The following steps apply to error codes 1201-xx through 1210-xx:
01	UART DLAB bit failure.	1. Refer to the modem documentation for correct setup procedures.
02	Line input or UART failure.	
03	Address line fault.	2. Check the modem line.
04	Data line fault.	3. Replace the modem and retest.
05	UART control signal failure.	
06	UART THRE bit failure.	
07	UART DATA READY bit failure.	
08	UART TX/RX buffer failure.	
09	INTERRUPT circuit failure	
10	COM1 set to invalid interrupt.	
11	COM2 set to invalid interrupt.	
12	DRIVE/RECEIVER control signal failure.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

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

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
1203-xx	Modem External Termination Test.	The following steps apply to error codes 1201-xx through 1210-xx:
01	Modem external TIP/RING failure.	1. Refer to the modem documentation for correct setup procedures.
02	Modem external DATA TIP/RING failure.	2. Check the modem, line.
03	Modem line termination failure.	3. Replace the modem and retest.
1204-xx	Modem Auto Originate Test.	
1205-xx	Modem Auto Answer Test.	
01	Modem timed out waiting for SYNC.	
02	Modem timed out waiting for response.	
03	Modem exceeded data block retry limit.	
04	RCV exceeded carrier lost limit.	
05	XMIT exceeded carrier lost limit.	
06	Timed-out waiting for dial tone.	
07	Dial number string too long.	
08	Modem timed out waiting for remote response.	
09	Modem exceeded maximum redial limit.	
10	Line quality prevented remote connection.	
11	Modem timed out waiting for remote connection.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
1206-xx	Dial Multifrequency Tone Test.	The following steps apply to error codes 1201-xx through 1210-xx:
17	Tone detection failure.	1. Refer to the modem documentation for correct setup procedures.
1210-xx	Modem Direct Connect Test.	2. Check the modem, line.
01	Modem timed out waiting for SYNC.	3. Replace the modem and retest.
02	Modem timed out waiting for response.	
03	Modem exceeded data block retry limit.	
04	RCV exceeded carrier lost limit.	
05	XMIT exceeded carrier lost limit.	
06	Time-out waiting for dial tone.	
07	Dial number string too long.	
08	Modem timed out waiting for remote response.	
09	Modem exceeded maximum redial limit.	
10	Line quality prevented remote connection.	
11	Modem timed out waiting for remote connection.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
Fixed Disk Drive Test		
1700-xx	Fixed disk ID drive types test failed.	The following steps apply to error codes 1700-xx through 1799-xx:
1701-xx	Fixed disk format test failed.	
1702-xx	Fixed disk read test failed.	1. Run SETUP.
1703-xx	Fixed disk write read compare test failed.	2. Check the switch settings and jumper positions on the controller board and retest (see *Chapter 8*).
1704-xx	Fixed disk random seek test failed.	3. Replace the fixed disk drive signal and power cables and retest.
1705-xx	Fixed disk controller test failed.	4. Replace the controller board and retest.
1706-xx	Fixed disk drive ready test failed.	5. Replace the fixed disk drive and retest.
1707-xx	Fixed disk drive recalibrate test failed.	6. Replace the system board and retest.
1708-xx	Fixed disk format bad track test failed.	
1709-xx	Fixed disk reset controller test failed.	
1710-xx	Fixed disk park head test failed.	
1714-xx	Fixed disk file write test failed.	
1715-xx	Fixed disk head select test failed.	
1716-xx	Fixed disk conditional format test failed.	
1717-xx	Fixed disk ECC* test failed.	

* Error Correction Code

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
1799-xx	Invalid fixed disk drive type failed.	The following steps apply to error codes 1700-xx through 1799-xx:
-xx		1. Run SETUP.
01	Exceeded maximum soft error limit.	2. Check the switch settings and jumper positions on the controller board and retest (see *Chapter 8*).
02	Exceeded maximum hard error limit.	3. Replace the fixed disk drive signal and power cables and retest.
03	Previously exceeded maximum soft error limit.	4. Replace the controller board and retest.
04	Previously exceeded maximum hard error limit.	5. Replace the fixed disk drive and retest.
05	Failed to reset controller.	6. Replace the system board and retest.
06	Fatal error while reading.	
07	Fatal error while writing.	
08	Failed compare of write/read/compare.	
09	Failed to format a track.	
10	Failed sector wrap test.	
19	Controller failed to deallocate bad sector.	
40	Failed cylinder 0.	
41	Drive not ready.	
42	Recalibrate tailed.	
43	Failed to format bad track.	
44	Failed fixed disk controller diagnostics.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
-xx		The following steps apply to error codes 1700-xx through 1799-xx:
45	Failed to get drive parameters from ROM.	1. Run SETUP.
46	Invalid drive parameters found in ROM.	2. Check the switch settings and jumper positions on the controller board and retest (see *Chapter 8*).
47	Failed to park heads.	3. Replace the fixed disk drive signal and power cables and retest.
48	Failed to move disk table to RAM.	4. Replace the controller board and retest.
49	Failed to read media in file write test.	5. Replace the fixed disk drive and retest.
50	Failed file I/O write test.	6. Replace the system board and retest.
51	Failed file I/O read test.	
52	Failed file I/O compare test.	
53	Failed drive/head register test.	
54	Failed digital input register test.	
55	Failed cylinder 1.	
56	Fixed disk drive controller RAM diagnostics failed.	
57	Fixed disk drive controller to drive test failed.	
58	Failed to write sector buffer.	
59	Failed to read sector buffer.	
60	Failed to compare sector buffer.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code -xx	Description	Recommended Action
		The following steps apply to error codes 1700-xx through 1799-xx:
61	Failed uncorrectable ECC* error.	1. Run SETUP.
62	Failed correctable ECC* error.	2. Check the switch settings and jumper positions on the controller board and retest (see *Chapter 8*).
63	Failed soft error rate.	3. Replace the fixed disk drive signal and power cables and retest.
65	Exceeded maximum bad sector per track.	4. Replace the controller board and retest.
66	Failed initial drive parameter.	5. Replace the fixed disk drive and retest.
67	Failed to write long.	6. Replace the system board and retest.
68	Failed to read long.	
69	Failed to read drive size from controller.	
70	Failed translate mode.	
71	Failed nontranslated mode.	
72	Bad track limit exceeded.	
73	Previously exceeded bad track limit.	

*Error Correction Code

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
Fixed Disk Drive Backup (Tape) Test		
1900-xx	Tape ID failed.	The following steps apply to error codes 1900-xx through 1907-xx:
1901-xx	Tape servo write failed	
1902-xx	Tape format failed.	1. Replace the tape cartridge and retest.
1903-xx	Tape drive sensor test failed.	2. Check and/or replace the signal cable and retest.
1904-xx	Tape BOT/EOT test failed.	3. Replace the multipurpose fixed disk drive controller board (40-megabyte tape backup) and retest.
1905-xx	Tape read test failed.	4. Replace the tape controller board (135-megabyte tape backup) and retest.
1906-xx	Tape write/read/compare test failed.	5. Replace the tape backup and retest.
1907-xx	Tape write-protected test.	6. Replace the system board and retest.
-xx		
01	Drive not installed.	
02	Cartridge not installed.	
03	Tape motion error.	
04	Drive busy error.	
05	Track seek error.	
06	Tape write protected error.	
07	Tape already servo written.	
08	Unable to servo write.	
09	Unable to format.	
10	Format mode error.	
11	Drive recalibration error.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
-xx		The following steps apply to error codes 1900-xx through 1907-xx:
12	Tape not servo written.	1. Replace the tape cartridge and retest.
13	Tape not formatted.	2. Check and/or replace the signal cable and retest.
14	Drive timeout error.	3. Replace the multipurpose fixed disk drive controller board (40-megabyte tape backup) and retest.
15	Sensor error flag.	4. Replace the tape controller board (135-megabyte tape backup) and retest.
16	Block locate (block ID) error.	5. Replace the tape backup and retest.
17	Soft error limit exceeded.	6. Replace the system board and retest.
18	Hard error limit exceeded.	
19	Write (probably ID) error.	
20	NEC fatal error.	
21	Got servo pulses second time but not first.	
22	Never got to EOT after servo check.	
23	Change-line unset.	
24	Write-protect error.	
25	Unable to erase cartridge.	
26	Cannot identify drive.	
27	Drive not compatible with controller.	
28	Format gap error.	
30	Exception bit not set.	
31	Unexpected drive status.	
32	Device fault.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
-xx		The following steps apply to error codes 1900-xx through 1907-xx:
33	Illegal command.	1. Replace the tape cartridge and retest.
34	No data detected.	2. Check and/or replace the signal cable and retest.
35	Power-on reset occurred.	3. Replace the multipurpose fixed disk drive controller board (40-megabyte tape backup) and retest.
36	Failed to set to flexformat mode.	4. Replace the tape controller board (135-megabyte tape backup) and retest.
37	Failed to reset flexformat mode.	5. Replace the tape backup and retest.
38	Data mismatched on directory track.	6. Replace the system board and retest.
39	Data mismatched on track 0.	
40	Failed self test.	
91	Power lost during test.	
Video Color Graphics (VCG) and Enhanced Color Graphics (ECG) Test		
2402-01	Video memory test failed.	The following steps apply to error codes 2402-xx through 2416-xx:
2403-01	Video attribute test failed.	1. Verify the switch settings.
2404-01	Video character set test failed.	2. Replace the video board and retest.
2405-01	Video 80 × 25 mode 9 × 14 character cell test failed.	3. Replace the system board and retest.
2406-01	Video 80 × 25 mode 8 × 8 character cell test failed.	
2407-01	Video 40 × 25 mode test failed.	
2408-01	Video 320 × 200 mode color set 0 test failed.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
2409-01	Video 320 × 200 mode color set 1 test failed.	The following steps apply to error codes 2402-xx through 2416-xx:
2410-01	Video 640 × 200 mode test failed.	1. Verify the switch settings.
2411-01	Video screen memory page test failed.	2. Replace the video board and retest. 3. Replace the system board and retest.
2412-01	Video gray scale test failed.	
2414-01	Video white screen test failed.	
2416-01	Video noise pattern test failed.	
2417-01	Lightpen text mode test failed–no response.	The following steps apply to error codes 2417-xx:
2417-02	Lightpen text mode test failed–invalid response.	1. Check the switch settings on the video board (see *Chapter 8*). 2. Replace the lightpen and retest.
2417-03	Lightpen medium resolution mode test failed–no response.	3. Replace the video board and retest. 4. Replace the system board and retest.
2417-04	Lightpen medium resolution mode test failed–invalid response.	

Continued...

Table 5-2. Advanced Diagnostics Error Codes *Continued*

Error Code	Description	Recommended Action
2418-01	EGC/VCG memory test failed.	The following steps apply to error codes 2418-xx through 2432-xx:
2418-02	EGC/VCG shadow RAM test failed.	
2419-01	EGC/VCG ROM checksum test failed.	1. Verify the switch settings.
2420-01	EGC/VCG attribute test failed.	2. Replace the video board and retest.
2421-01	EGC/VCG 640 × 200 graphics mode test failed.	3. Replace the system board and retest.
2422-01	EGC/VCG 640 × 350 16 color set test failed.	
2423-01	EGC/VCG 640 × 350 64 color set test failed.	
2424-01	EGC/VCG monochrome text mode test failed.	
2425-01	EGC/VCG monochrome; graphics mode test failed.	
2431 -01	VCG or ECG 640 × 480 graphics mode test failed.	
2432-01	VCG or ECG 640 × 200 graphics mode test failed.	

5.4 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 (203 error codes). The TEST programs attempt to isolate the memory fault to a specific location, then generate a memory error code that identifies the defective system memory board or system memory module to be replaced.

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 boards installed and the type of memory device used.

The first one megabyte of RAM in the system is mapped into various areas of the system memory map. The common configuration is that the first 640 Kbytes are the base memory. The next 256 Kbytes are used by the COMPAQ Expanded Memory Management (CEMM) Program. The last 128 Kbytes are reserved for system use. The base memory size is configured on the system memory board to 256 Kbytes, 512 Kbytes, or 640 Kbytes. When the base memory size is reduced, the RAM normally assigned to the base memory is mapped into the extended memory space.

Memory error codes in the following tables are in the format:

Xx000Y ZZ 201

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

Failed byte. Values are 0, 1, 2, 3.

Always zero.

Ignore.

Failed address. Values are 0 through F. They indicate soldered memory or socketed memory and whether the board is the 32-bit system memory board, the 1- to 2-megabyte 32-bit memory board, or the 4- to 8-megabyte 32-bit memory board.

0 or F*	= soldered on the 32-bit system memory board
1	= socketed on the 32-bit system memory board
2*	= soldered on the 1- to 2-megabyte 32-bit memory board
3	= socketed on the 1- to 2-megabyte 32-bit memory board
2 thru 5*	= soldered on the 4- to 8-megabyte 32-bit memory board
6 thru 9	= socketed on the 4- to 8-megabyte 32-bit memory board

* If error indicates a soldered chip), replace the board.
After identifying X, use Figures 5-1, 5-2, and 5-3 to identify the location of the bad data bit.

Figure 5-1. Memory Error Locations on the 32-Bit System Memory Board.

Format: Xx000Y ZZ 201

- Data Bit
- Byte
- 2 = Soldered
- 3 = Socketed
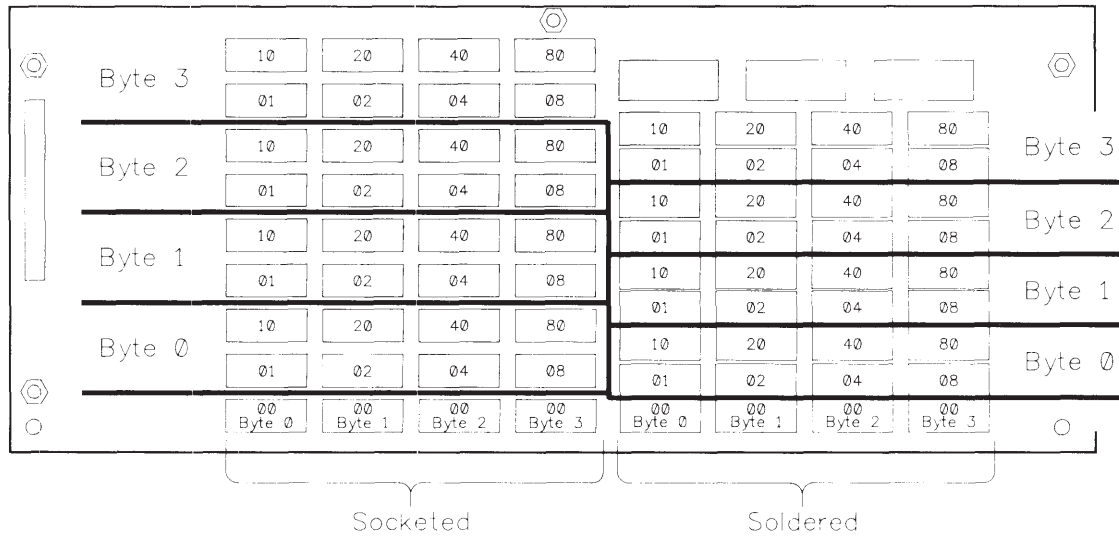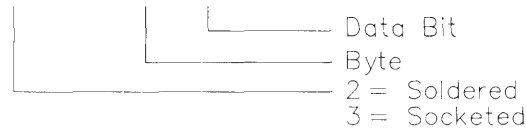
Figure 5-2.   Memory Error Locations on the 1- to 2-Megabyte 32-Bit Memory Board.
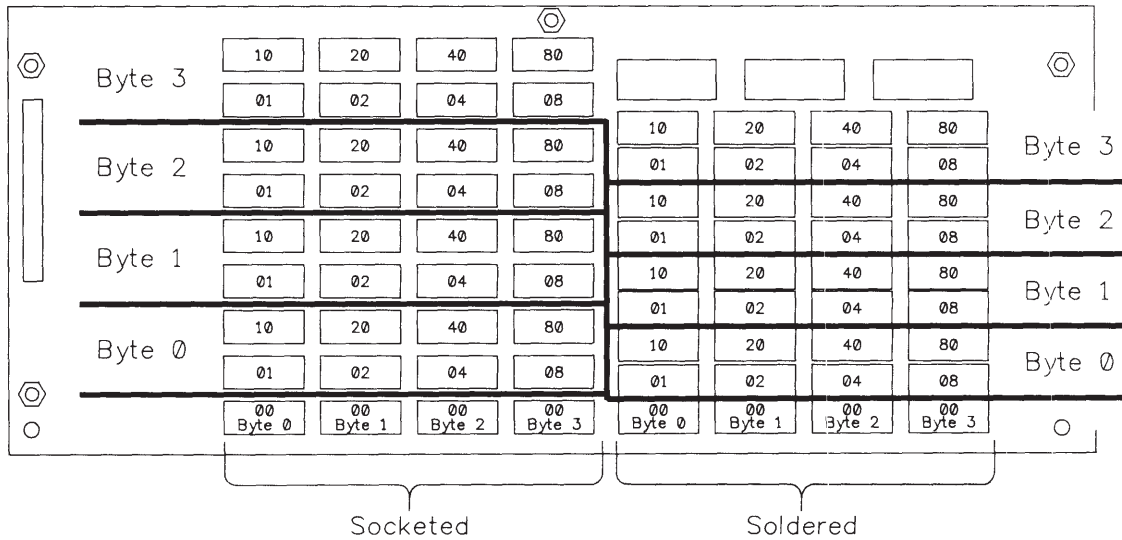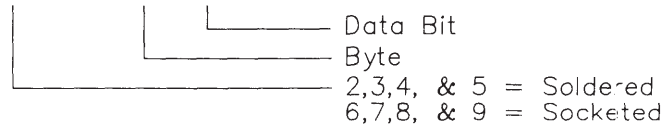
Figure 5-3. Memory Error Locations on the 4- to 8-Megabyte 32-Bit Memory Board.

5.5 EXTDISK MESSAGES

The following list of messages may be issued while installing the EXTDISK utility. The probable cause of each error message and the recommended action to take are also described.

NOTE: For more information on installation and use of the 300-/600-Megabyte Fixed Disk Drive Expansion Unit, see *Chapter 9,* **MASS STORAGE CONFIGURATIONS.**

Table 5-5. EXTDISK Messages

Message	Probable Cause	Recommended Action
Error Accessing Disk x, Secondary Controller	The EXTDISK.SYS device driver cannot access a fixed disk drive on the secondary controller board.	1. Reseat boards. 2. Check cables and switch settings. 3. Replace external fixed disk drive controller board.
EXTDISK Already Processed in CONFIG.SYS	You may have more than one EXTDISK device drive defined in your CONFIG.SYS file.	Remove the subsequent EXTDISK device driver from your CONFIG.SYS file.
EXTDISK Installed	The EXTDISK.SYS device driver was successfully loaded into memory.	None.

EXTDISK Not Installed	No drives were found on the secondary controller board.	1. Be sure that:
		  a. The hardware is connected correctly.
		  b. EXTDISK is required (the expansion unit is running on the secondary controller).
		  c. SETUP was run.
		  d. The fixed disk drive is formatted and partitioned correctly.
		2. Install the external fixed disk drive controller in the system unit and run SETUP or remove the EXTDISK.SYS device driver from the CONFIG.SYS file.

Incorrect DOS Version	EXTDISK runs only under MS-DOS 3.3x.	Install the correct version of MS-DOS.
Secondary Controller Board Error	An error occurred on the secondary controller board.	Remove and replace the secondary controller board.
Timeout on Disk x, Secondary Controller	The EXTDISK.SYS device cannot detect a fixed disk drive on the secondary controller board.	Check that cable connections are secure.

CONTENTS

Chapter 6
ILLUSTRATED PARTS CATALOG

Chapter 6
ILLUSTRATED PARTS CATALOG

6.1 INTRODUCTION

This chapter provides a reference for spare parts for the COMPAQ DESKPRO 386 Personal Computer.

Each section contains a parts list which consists of:

☐   Description - The name of the particular part or parts kit

☐   Part Number - The number to use when ordering parts from Compaq Computer Corporation

When multiple parts have the same part number, the parts are only available as part of a kit. The number shown represents the part number of that kit.

6.2 SPARE PARTS LIST, U.S.

Table 6-1. Spare Parts List, U.S.

Description	Part Number
System Board	
1. Power Supply	108065-001
2. Fuse Kit	102930-001
3. AC Power Cord	101155-001
4. Speaker/Board Guide Assembly	101062-001
5. System Unit Chassis	108267-001
6. Reinforcement Brace	101352-001
7. System Unit Bezel Assembly	108204-001
8. Drive Housing Assembly	108266-001
9. System Unit Cover	108205-001
10. Security Lock Assembly with Keys	105036-001
11. Security Lock Switch with Cable	106860-001
12. Security Lock Switch	102767-001
13. RF Shield	108264-001
Boards	
14. System Board, Version 1	108060-001
15. System Board with 80387 Coprocessor Socket, Version 2	108407-001
16. Video Display Controller Board	101340-001
17. COMPAQ Enhanced Color Graphics Board, Version 1	106373-001
18. COMPAQ Enhanced Color Graphics Board, Version 2	109196-001

Continued...

Table 6-1. Spare Parts List, U.S. *Continued*

Description	Part Number
19. Video Display Controller Board	101340-001
20. COMPAQ Video Color Graphics Board	109253-001

21. ESDI Fixed Disk Drive Controller Boards (130-Megabyte)
     1:1 Interleave
     3:1 Interleave
	
	113245-001
	108140-001

22. ESDI External 300/600-Megabyte Fixed Disk Drive Controller Board	115839-001
23. Fixed Disk Drive Controller Board (70-Megabyte)	102778-001
24. Asynchronous Communications/Parallel Printer Board	106886-001
25. 2400-Baud Internal Modem	113699-001
26. Tape Controller Board (135-Megabyte)	113259-001
27. 80287-8 Numeric Coprocessor	106558-001
28. 80387-16 Numeric Coprocessor	108408-001
29. System ROM-Qty 2	108283-001
30. Enhanced Color Graphics ROM	106686-001
Memory Boards	
31. 32-Bit System Memory Board	108059-001
32. 1 - to 2-Megabyte 32-Bit Memory Expansion Board	108082-001
33. 4- to 8-Megabyte 32-Bit Memory Expansion Board	108083-001
34. .5- to 2-Megabyte 16-Bit Memory Expansion Board	108138-001
35. 1-Megabit × 1 Static RAM Memory Chip	108144-001
36. 256K × 1 Static Column RAM Memory	108143-001
Mass Storage Devices	
37. 1.44-Megabyte 3½-Inch Diskette Drive	113263-001
38. 1.2-Megabyte 5¼-Inch Diskette Drive	102775-001

Continued...

Table 6-1. Spare Parts List, U.S. *Continued*

Description	Part Number
39. 360-Kbyte 5¼-Inch Diskette Drive	102928-001
40. 130-Megabyte Fixed Disk Drive	108080-001
41. 70-Megabyte Fixed Disk Drive	102932-001
42. 40-Megabyte Fixed Disk Drive	108058-001
43. 135-Megabyte Fixed Disk Drive Backup (Tape)	113218-001
44. 40-Megabyte Fixed Disk Drive Backup (Tape)	108081-001
45. DC 600XTD Tape Cartridge	113234-001
46. DC 2000 Tape Cartridge	108142-001
47. Mass Storage Power Cable	101137-001
48. Diskette Drive Signal Cable	101380-002
49. 130-Megabyte Fixed Disk Drive Cables (ESDI) (Set)	108249-001
50. 130-Megabyte Fixed Disk Drive Cable, 34-Position	100625-005
51. 130-Megabyte Fixed Disk Drive Cable, 20-Position	100625-006
52. Fixed Disk Drive Cables (Set)	100641-002
53. Fixed Disk Drive Cable, 34-Position	100625-003
54. Fixed Disk Drive Cable, 20-Position	100625-004
55. 40-Megabyte Fixed Disk Drive Cable (Single)	108086-001
56. 40-Megabyte Fixed Disk Drive Cable (Dual)	108087-001
57. 130/300-Megabyte Fixed Disk Drive Cable (ESDI) (20 position)	108249-001
58. 135-Megabyte Fixed Disk Drive Backup (Tape) Cable	113198-001
59. Tape Utility Upgrade Kit	106613-001
60. Cable Kit (Contains the Mass Storage Power Cable (101137-001), Diskette Drive Signal Cable (101380-001), and 40-Megabyte Fixed Disk Drive Cable, Single (108086-001))	108146-001

Continued...

Table 6-1. Spare Parts List, U.S. *Continued*

Description	Part Number
Keyboards	
61. Keyboard, COMPAQ Enhanced	108067-001
62. Enhanced Keyboard Cable	106607-001
63. 84-Key Keyboard	102776-001
64. Keyboard Connector	108247-001
65. Keyboard Feet (Rubber)	*
65. Enhanced Keyboard Template	106776-001
Monitors	
67. Monitor Assembly - Dual-Mode Green	101439-001
68. Monitor Assembly - Dual-Mode Amber	101439-002
69. Monitor Assembly - Video Graphics Color	109255-001
70. Monitor Assembly - Video Graphics Monochrome	109254-001
71. Monitor Feet	*
Documentation and Diskettes	
72. *MS-DOS VERSION 3.3 REFERENCE GUIDE*	106979-001
73. *MS-DOS VERSION 3.2 REFERENCE GUIDE*	106650-001
74. *MS-DOS VERSION 3.1 REFERENCE GUIDE*	105350-001
75. *BASIC VERSION 3.3 REFERENCE GUIDE*	106983-001
76. *BASIC VERSION 3.2 REFERENCE GUIDE*	106653-001
77. *BASIC VERSION 3.1 REFERENCE GUIDE*	105345-001
78. *COMPAQ DESKPRO 386 OPERATIONS GUIDE*	108291-003

* Contained in the Miscellaneous Hardware Kit (102709-001)

Continued...

Table 6-1. Spare Parts List, U.S. *Continued*

Description	Part Number
79. ***COMPAQ DESKPRO 386 MAINTENANCE AND SERVICE GUIDE*** (with ADVANCED DIAGNOSTICS)	108139-001
80. ***COMPAQ DESKPRO 366 MAINTENANCE AND SERVICE GUIDE*** (with Test Cable)	105264-001
81. ***COMPAQ DESKPRO 386 TECHNICAL REFERENCE GUIDE***	108400-001
82. ***SUPPLEMENTAL SOFTWARE GUIDE***	108416-002
83. ***COMPAQ SERVICE QUICK REFERENCE GUIDE'*** (Set of 5)	106854-001
84. ***COMPAQ SERVICE QUICK REFERENCE GUIDE*** with covers (Set of 5)	106786-001
85. ***SY-TOS TAPE OPERATING SYSTEM USERS GUIDE*** and Diskette	109141-001
86. ADVANCED DIAGNOSTICS Software	108137-002
87. USER PROGRAMS Kit (3 diskettes)	108289-001
88. MS-DOS/Basic Version 3.1 Diskettes	105415-001
89. MS-DOS/Basic Version 3.2 Diskettes	106586-001
90. MS-DOS/Basic Version 3.3 Diskettes	109162-001
91. MS-DOS/Basic Version 3.3 Support Diskette	108270-002
92. Out-of-Warranty Form	105461-001
93. Extended Service Agreement Form	100574-001
Tools	
94. Universal Coprocessor Removal Tool	108420-001
95. Socket/Torx Tool Kit	101089-001
96. Torx T-10 Screwdriver	105155-001
97. Torx T-15 Screwdriver	105156-001

Continued...

Table 6-1. Spare Parts List, U.S. *Continued*

Description	Part Number
Miscellaneous Spare Parts	
98. Logo Set	108141-001
99. Exchange Tag Form	105460-001
100. Upper Blank Drive Panel	101135-001
101. Lower Blank Drive Panel	101135-002
102. Keyboard Feet (rubber)	*
103. Brightness Knob	100105-001
104. Lithium Battery	102929-001
105. Cable Shield	106554-001
106. Blank I/O Access Plate	101144-001
107. Desk Saver	101297-001
108. Diagnostics Test Cables and Plug	100767-001

* Contained in the Miscellaneous Hardware Kit (102709-001)

Table 6-1. Spare Parts List, U.S. *Continued*

Description	Part Number
109. Miscellaneous Hardware Kit	102709-001
PCB Retainer (Qty 4)	
PCB Standoff (Qty 3)	
Brightness Knob (Qty 5)	
Push Button Mount Fastener (Qty 5)	
Ty-wrap (Qty 100)	
PCB Card Guide (Qty 5)	
Keyboard Feet, Rubber (Qty 10)	
Monitor Feet, Cork (Qty 5)	
Fuse, AC line, 2 Ampere (Qty 10)	
Fuse, AC line, 3 Ampere (Qty 10)	
Fuse, AC line, 4 Ampere (Qty 10)	
Nut, Hex Self-Locking (Qty 5)	
Screw, 8-32 x 3/8 (Qty 50)	
Screw, 6-32 x 3/8 (Qty 50)	
Screw, 6-32 x 1/2 (Qty 50)	
Screw, 4-40 x 1/4 (Qty 10)	
Screw, 6-32 x 5/8 (Qty 50)	
Screw, 6-32 x 7/8 (Qty 2)	
Insulator (Qty 6)	
Security Lock Switch (Qty 2)	
Bracket, Speaker Card Guide (Qty 1)	
LED Cable Assembly (Qty 1)	

6.3 SPARE PARTS LIST, INTERNATIONAL

Table 6-2. Spare Parts List, International*

Description	Part Number
1. Power Supply	108524-001
2. Fixed Disk Drive (40-Megabyte Gray)	120332-001
3. Fixed Disk Drive (70-Megabyte Gray)	120369-001
4. Fixed Disk Drive (130-Megabyte ESDI Gray)	120333-001
5. COMPAQ Enhanced Keyboard Assembly	
U.S. ENGLISH	107673-001
U.K. ENGLISH	107674-001
GERMAN	107675-001
FRENCH	107676-001
ITALIAN	107677-001
SPANISH	120339-001
DANISH	107679-001
NORWEGIAN	107680-001
SWEDISH/FINNISH	107681-001
SWISS	107682-001
6. 1.2-Megabyte 5¼-Inch Diskette Drive (Gray)	120331-001
7. 360-Kbyte 5¼-Inch Diskette Drive (Gray)	120329-001
8. 1.44-Megabyte 3½-Inch Diskette Drive (Gray)	113264-001
9. 40-Megabyte Fixed Disk Drive Backup (Tape)	120330-001

* All drive bezels and monitor plastics are international gray.

Table 6-2. Spare Parts List, International* *Continued*

Description	Part Number
10. 135-Megabyte Fixed Disk Drive Backup (Tape)	113227-001
11. Monitor Assembly, Dual-Mode, Green	105329-001
12. Monitor Assembly, Dual-Mode, Amber	105329-002
13. Video Graphics Color Monitor, Northern Hemisphere	109337-001
14. Video Graphics Color Monitor, Southern Hemisphere	109336-001
15. Video Graphics Monochrome Monitor	109335-001
16. Upper Blank Drive Panel	101135-003
17. Lower Blank Drive Panel	101135-004

* All drive bezels and monitor plastics are international gray.

6.4 PARTS LIST

Table 6-3. System Unit

Description	Part Number
1. Security Lock Assembly with Keys	105036-001
2. System Unit Bezel	108204-001
3. System Unit Cover	108205-001
4. AC Power Cord	101155-001
5. Lithium Battery	102929-001

Continued...
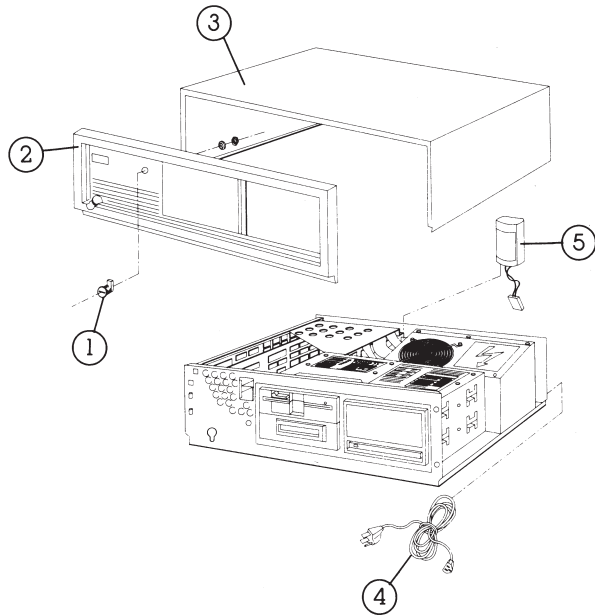
Figure 6-1.   System Unit (Exterior and Battery).

Table 6-3. System Unit *Continued*

Description	Part Number
6. Speaker/Board Guide Assembly Enclosure	101062-001
7. Speaker Assembly	101062-001
8. Security Lock Contact Switch	102767-001
9. Drive Housing Assembly	108266-001
10. Fuse Kit (40 ea.)	102930-001
11. Power Supply Assembly	108065-001
12. System Unit Chassis	108267-001
13. Reinforcement Brace	101352-001
14. RF Shield	108264-001
15. Keyboard Connector	108247-001
16. System Board, Version 1	108060-001
17. System Board with 80387 Socket	108407-001
18. 1- to 2-Megabyte 32-Bit Memory Expansion Board	108082-001
19. 4- to 8-Megabyte 32-Bit Memory Expansion Board	108083-001
20. .5- to 2-Megabyte 16-Bit Memory Expansion Board	108138-001
21. 32-Bit System Memory Board	108059-001
22. 1-Megabit × 1 Static Column RAM Chip	108144-001
23. 256K × 1 Static Column RAM Chip	108143-001

Continued...

Figure 6-2.   System Unit (Interior with Memory Options).

Table 6-3. System Unit *Continued*

Description	Part Number
24. Multipurpose Fixed Disk Drive Controller Board	104174-001
25. Fixed Disk Drive Controller Board (70-Megabyte)	102778-001
26. Fixed Disk Drive Cables (70-Megabyte)	100641-002
27. ESDI Fixed Disk Drive Controller Board (3:1) (130-Megabyte)	108140-001
28. ESDI External 300/600-Megabyte Fixed Disk Drive Controller Board	115839-001
29. 130/300-Megabyte Fixed Disk Drive Controller Cables (ESDI) (SET)	108249-001
30. Diskette Drive Controller Cable	101380-002
31. Mass Storage Device Power Cable	101137-001
32. 135-Megabyte Fixed Disk Drive Backup Cable	113198-001
33. Asynchronous Communications/Parallel Printer Board	106886-001
34. 2400-Baud Internal Modem	112693-001
35. COMPAQ Video Display Controller Board	101340-001
36. COMPAQ Video Graphics Controller Board	109253-001
37. Tape Controller Board (135-Megabyte)	113259-001
38. Blank I/O Access Plate	101144-001
39. 135-Megabyte Fixed Disk Drive Backup (Tape)	113218-001
40. 40-Megabyte Fixed Disk Drive Backup (Tape)	108081-001
41. Fixed Disk Drive Backup (Tape) Cartridge (DC2000)	108142-001
42. 135-Megabyte Tape Backup Cartridge (DC 600XTD)	113234-001
43. Drive Blank Panel Subassembly (Upper)	101135-001
44. Drive Blank Panel Subassembly (Lower)	101135-002
45. 360-Kbyte 5¼-Inch Diskette Drive	102928-001
46. 1.2-Megabyte 5¼-Inch Diskette Drive	102775-001
47. 1.44-Megabyte 3½-Inch Diskette Drive	113263-001
48. 40-Megabyte Fixed Disk Drive	108058-001
49. 70-Megabyte Fixed Disk Drive	102932-001
50. 130-Megabyte Fixed Disk Drive (Full Height)	108080-001
51. 40-Megabyte Fixed Disk Drive Cable (Single)	108086-001
52. 40-Megabyte Fixed Disk Drive Cable (Dual)	108087-001
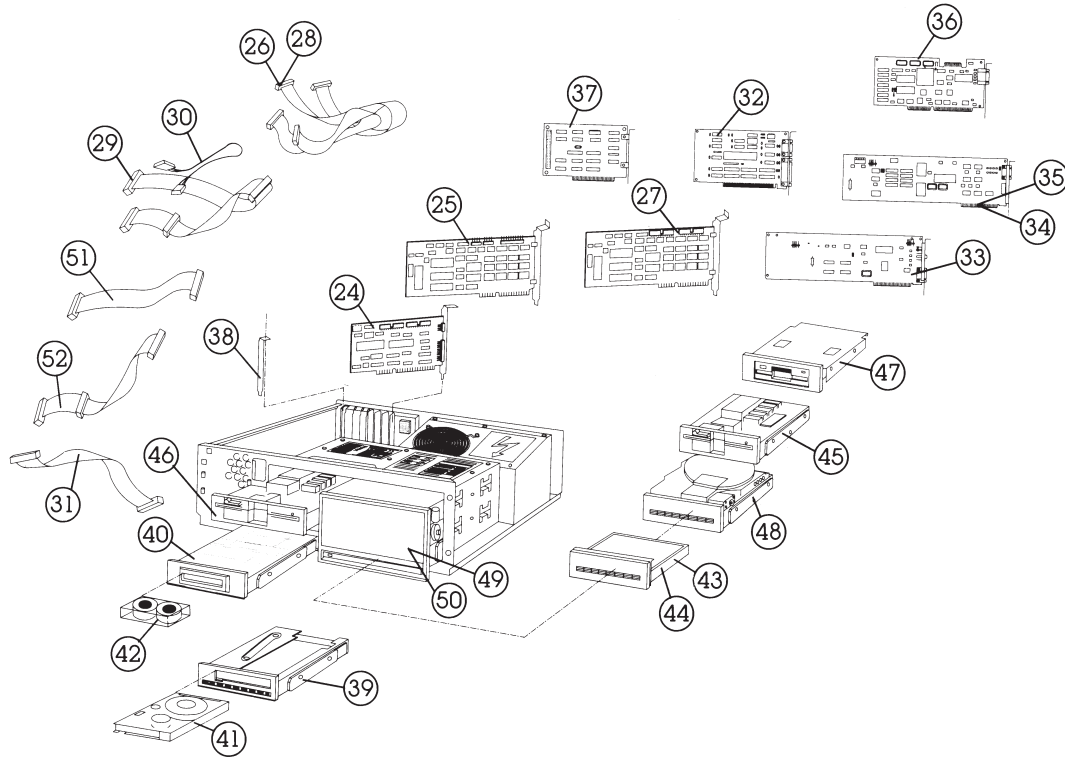
Figure 6-3. System Unit (Interior with Controller Boards and Mass Storage Options).

Table 6-4. COMPAQ Enhanced Keyboard

Description	Part Number
1. Keyboard Assembly (with cable)	108067-001
2. Keyboard Cable	108095-001
3. Keyboard Feet (rubber)	*
*Contained in Miscellaneous Hardware Kit (part no. 102709-001)	

Figure 6-4.   COMPAQ Enhanced Keyboard.

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Table 6-4. COMPAQ Video Graphics Color Monitor

Description	Part Number
Monitor Assembly	109255-001

Figure 6-7.   COMPAQ Video Graphics Color Monitor.

Table 6-4. COMPAQ Video Graphics Monochrome Monitor

Description	Part Number
Monitor Assembly	109254-001
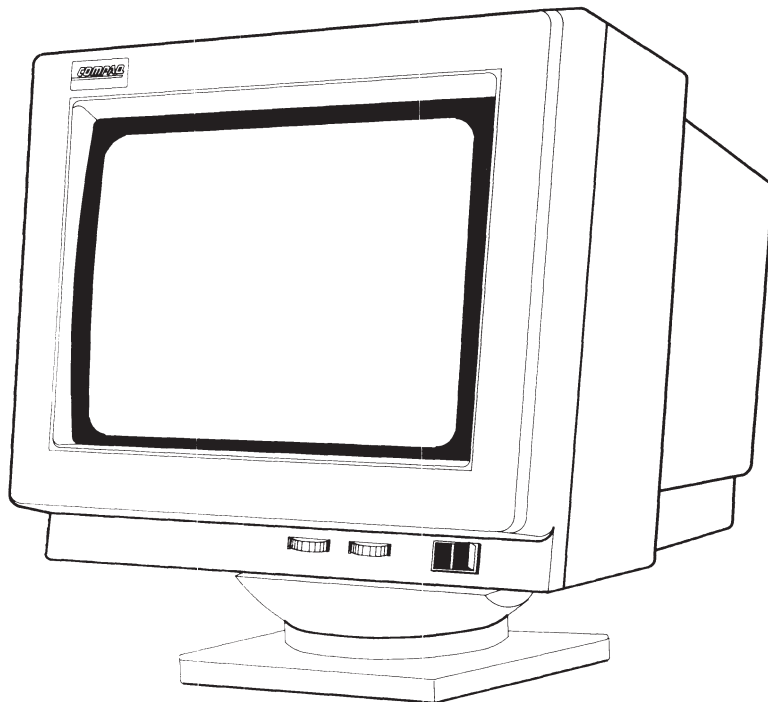
Figure 6-8.   COMPAQ Video Graphics Monochrome Monitor.

6.5 300-/600-MEGABYTE FIXED DISK DRIVE EXPANSION UNIT PARTS LIST

The Parts Kit contains the recommended parts available to an Authorized COMPAQ Computer Dealer for the EXPANSION UNIT.

NOTE: Cables from Cable Kit 115812-001 and cables for other mass storage devices are not interchangeable. Use only 115812-001 signal cables in the 300-/600-Megabyte Fixed Disk Drive Expansion Unit.
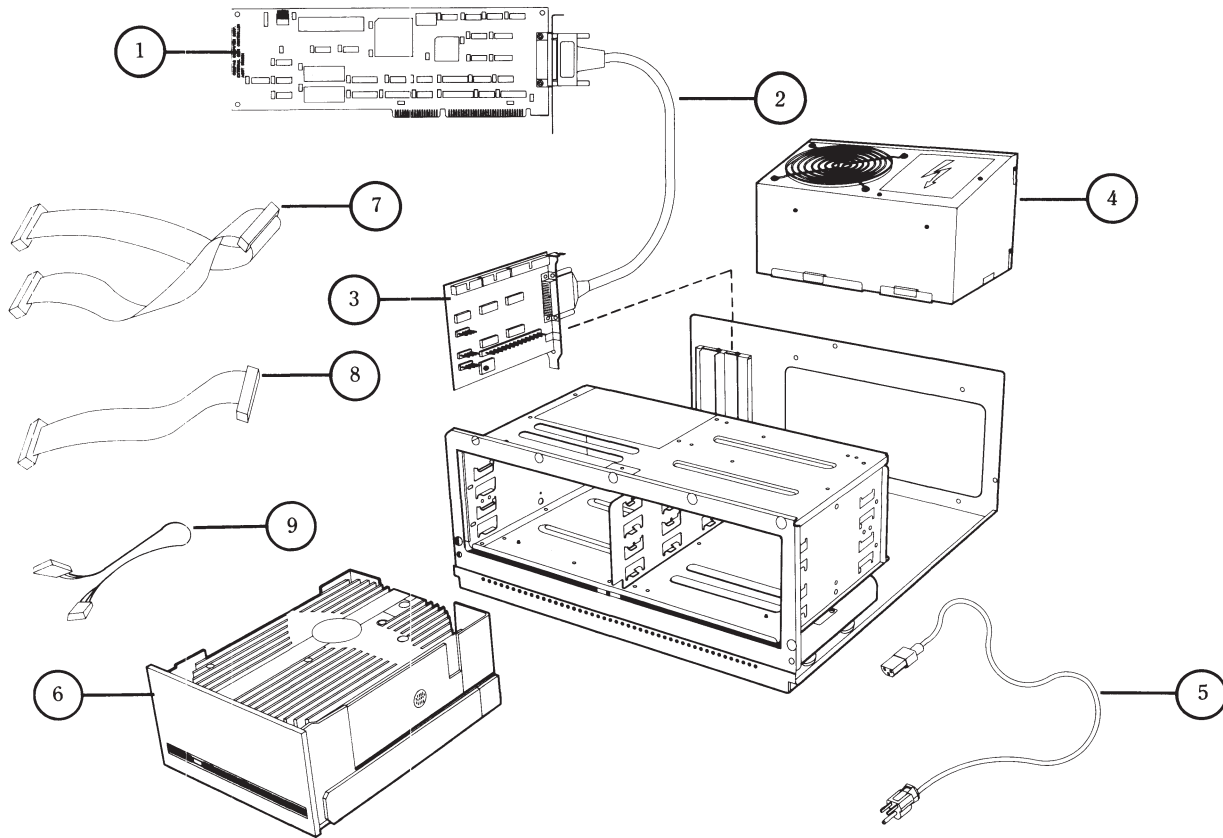
Figure 6-9.   300-/600-Megabyte Fixed Disk Drive Expansion Unit.

Table 6-9. Parts for Expansion Unit

Description	Part Number
1. External Fixed Disk Drive Controller	115839-001
2. I/O Cable	115810-001
3. External Interlace Adapter	115838-001
4. Power Supply	108065-001
5. Power Cord	101155-001
6. 300-MB Fixed Disk Drive	113219-001
7. Signal Cable (34-position)	*
8. Signal Cable (20-position)	*
9. Universal Drive Power Cable	101137-001
10. Expansion Unit Cover and Bezel	
U.S.	115804-001
International	115804-002
11. Kit, LOGO	115836-001

* Contained in the External Fixed Disk Drive Cable kit (115812-001)

CONTENTS

Chapter 7
REMOVAL AND REPLACEMENT PROCEDURES

Continued...

Chapter 7
REMOVAL AND REPLACEMENT PROCEDURES

7.1 INTRODUCTION

This chapter contains module-level removal and replacement procedures for the COMPAQ DESKPRO 386 Personal Computer.

The procedures in this section describe the following:

☐ Monitor

☐ Keyboard

☐ Power fuse

☐ Preparing the system unit for the internal removal and replacement procedures

☐ System unit cover and internal configuration

☐ Power supply

☐ Battery

☐ Security lock

☐ Expansion board(s)

☐ 80287 coprocessor

☐ Memory expansion board(s)

☐ Memory chip(s)

☐ Speaker assembly and security lock switch

☐ Mass storage device(s)

☐ System board

☐ 80387 coprocessor

☐ Lost key

☐ 300-/600-Megabyte Fixed Disk Drive Expansion Unit

7.2 MONITOR

The following procedures apply to the COMPAQ Dual-Mode, COMPAQ Color, COMPAQ Video Graphics Monochrome, or COMPAQ Video Graphics Color Monitor.

1.   Turn OFF the computer.

CAUTION

The system unit power should be OFF prior to disconnecting the monitor cables.

2.   If the monitor has an ON/OFF switch on the front or right side, place the ON/OFF switch in the OFF position.

3.   Study Figures 7-1, 7-2, 7-3, and 7-4 to locate the monitor power and signal cables.
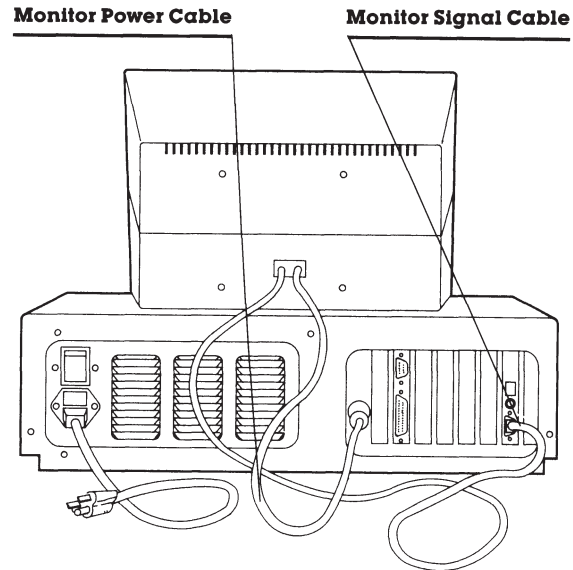
Figure 7-1.   COMPAQ Dual-Mode Monitor (Installed).

Monitor Power Cable   **Monitor Signal Cable**   **Monitor Power Cable**   **Monitor Signal Cable**
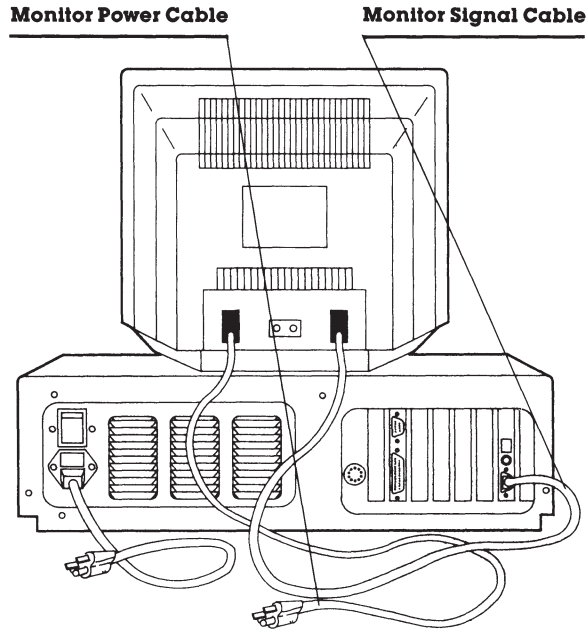
Figure 7-2.   COMPAQ Color Monitor (Installed).
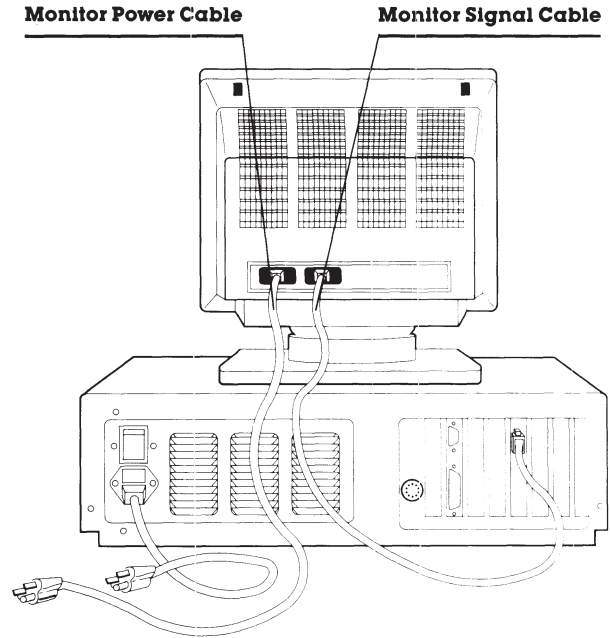
Figure 7-3.   COMPAQ Video Graphics Color Monitor (Installed).

Monitor Power Cable   **Monitor Signal Cable**
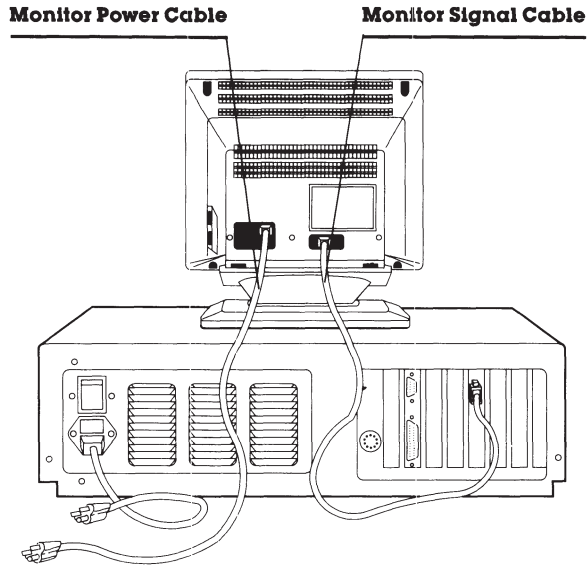
4. Remove the monitor cables from the system unit.

5. Set the monitor aside.

To replace the monitor, reverse Steps 1 through 5 of the preceding removal procedures.

Figure 7-4.   COMPAQ Video Graphics Monochrome Monitor (Installed).

7.3 KEYBOARD

To remove the keyboard, follow these steps:

1. Turn OFF the computer.

CAUTION

The system unit power should be OFF prior to disconnecting the keyboard cable.

---

2. Gently pull the keyboard connector from the receptacle on the front of the system unit (Figure 7-5).

3. Set the keyboard aside.

To replace the keyboard, reverse Steps 1 and 2 of the preceding removal procedures.
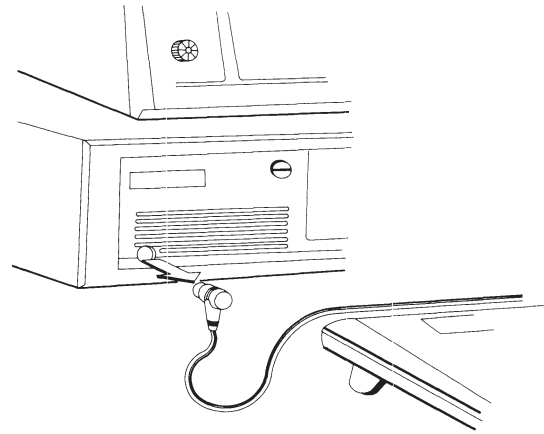
Figure 7-5. Removing the Keyboard.

7.4 POWER FUSE

New power fuses are available in the fuse kit (part no. 102930-001). The power fuse is inside a fuse holder and casing on the back of the system unit.

To remove the power fuse, follow these steps:

1. Turn OFF the computer.

2. Insert a flat-bladed screwdriver along the bottom edge of the fuse holder and lift it outward with enough pressure to release it from the casing (Figure 7-6).
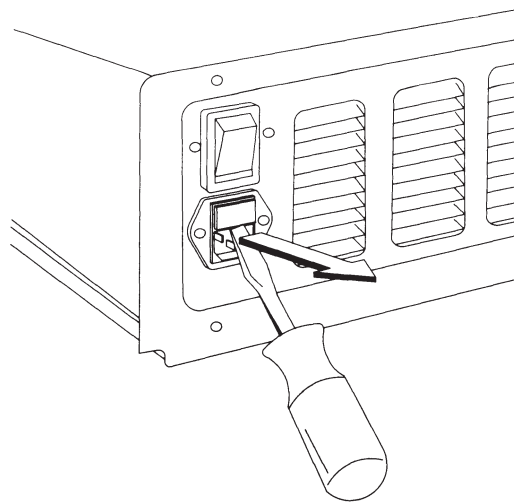
Figure 7-6.   Removing the Fuse Holder.

To replace the power fuse, follow these steps:

> ### CAUTION
>
> **Be sure that the fuse clips fit tightly to ensure a good electrical connection.**

1. Put the fuse in the fuse holder.

2. Position the fuse holder in the casing, and press until you feel the fuse holder snap into place (Figure 7-7).
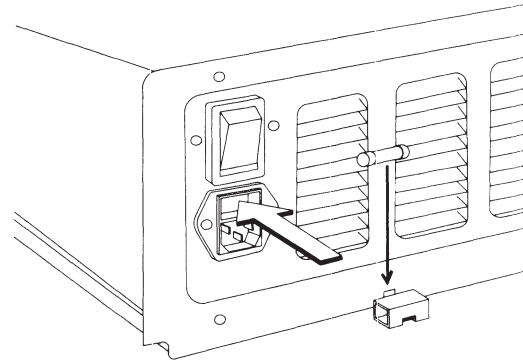
Figure 7-7. Replacing the Power Fuse.

7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

To prepare the system unit for the internal removal and replacement procedures, follow these steps:

1. Complete the removal procedures in the following sections:

   a. 7.2 MONITOR

   b. 7.3 KEYBOARD

2. Disconnect any peripheral devices (printers, modems, etc.) from the computer.

3. Disconnect the AC power cord from the AC outlet and from the system unit.

4. Place the system unit on a flat surface with the front facing you.

To reassemble the computer, reverse steps 1 through 3 of the preceding removal procedures.

7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

To remove the system unit cover, follow these steps:

1. Complete the removal procedures in the following sections:

    a. 7.2 MONITOR

    b. 7.3 KEYBOARD

    c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

WARNING

Before removing the cover, be sure that the ON/OFF switch is in the OFF position and the AC power cord is disconnected.

2. Remove the three screws on the back of the system unit (Figure 7-8).
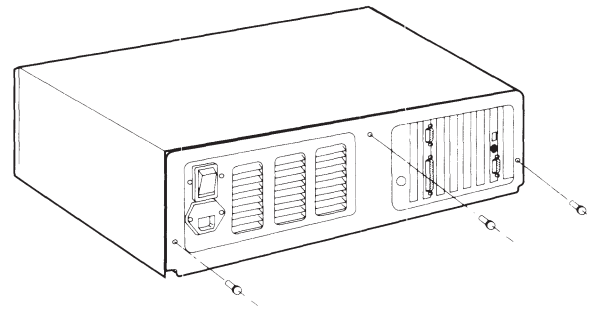
Figure 7-8.   Location of the Three Screws on the Back of the System Unit.

3. Unlock the security lock to free the system unit cover.

4. Positioning yourself at the front of the system unit, slide the system unit cover toward you until you feel it stop.

5. Lift the cover straight up and off of the system unit (Figure 7-9).

> ### CAUTION
>
> **Many of the components on the system board and expansion boards are sensitive to static electricity. Before touching any of the components, be sure that you are discharged of static electricity by briefly touching a metal object, such as the frame of the computer.**

6. Familiarize yourself with the arrangement of the components in the computer (see Figure 7-10).

To replace the system unit cover, reverse Steps 1 through 5 of the preceding removal procedures.

Figure 7-9.   Removing the System Unit Cover.

Fixed Disk Drive Controller Board

Video Graphics Board

Battery

Power Supply Assembly

System Memory Board

Speaker/Board Guide Assembly

Mass Storage Devices
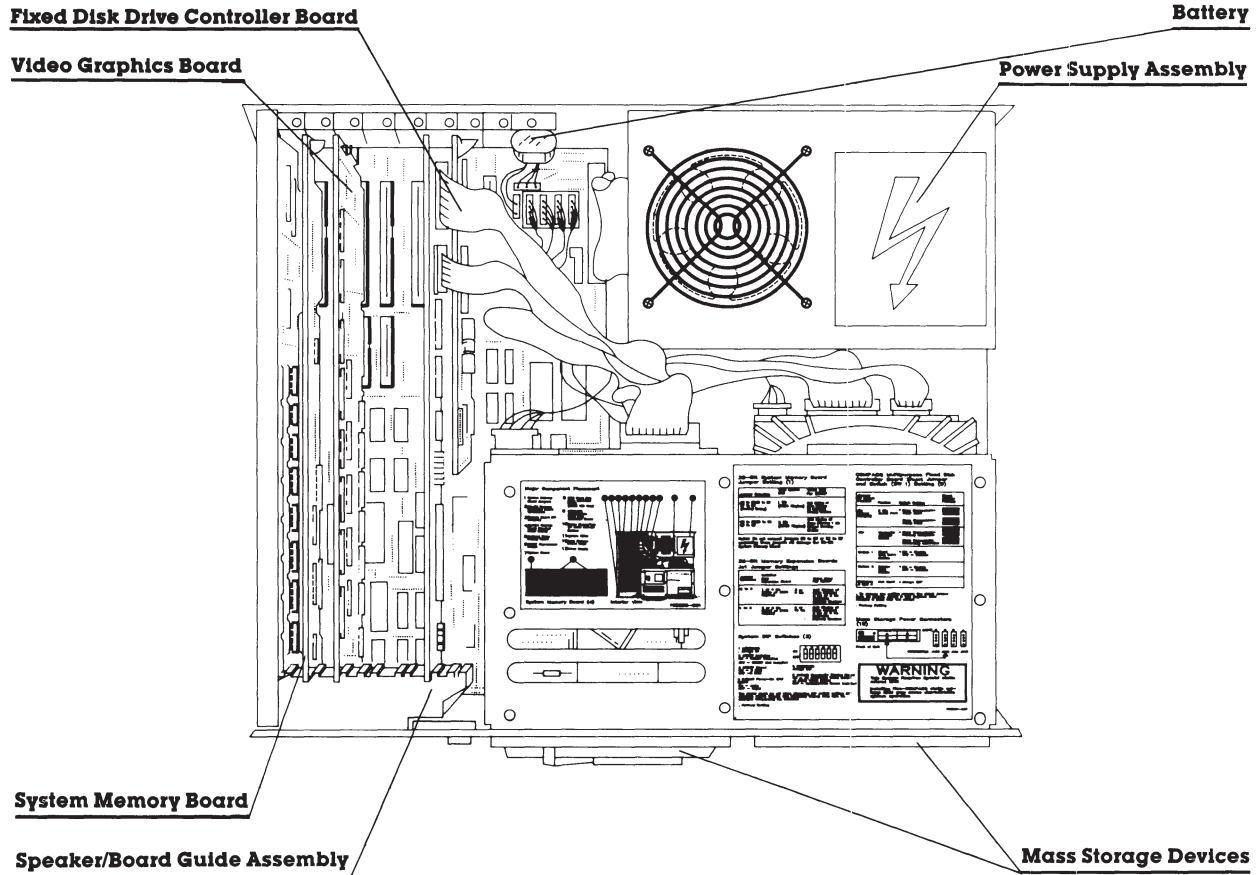
Figure 7-10. Overhead View of the COMPAQ DESKPRO 386 Personal Computer with the System Unit Cover Removed.

7.7 POWER SUPPLY

The power supply is attached to the system board by a power supply cable and connector.

To remove the power supply, follow these steps:

1. Complete the removal procedures in the following sections:

    a. 7.2 MONITOR

    b. 7.3 KEYBOARD

    c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

    d. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

2. Locate the power supply assembly (Figure 7-11).

Power Supply Assembly
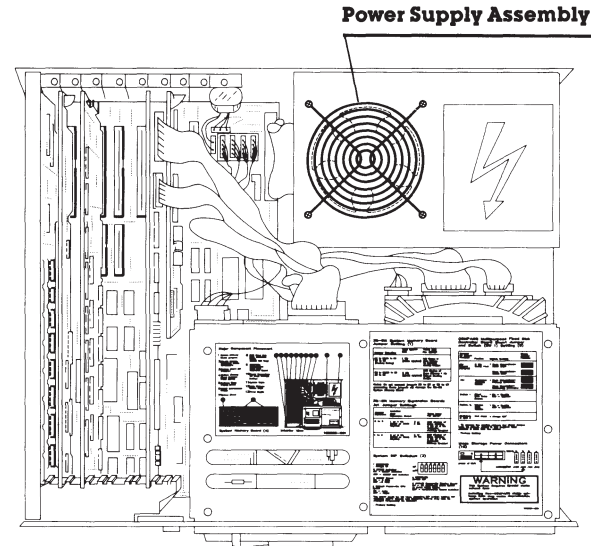
Figure 7-11. Location of the Power Supply Assembly.

3. Remove the four screws that secure the power supply assembly to the chassis (Figure 7-12).
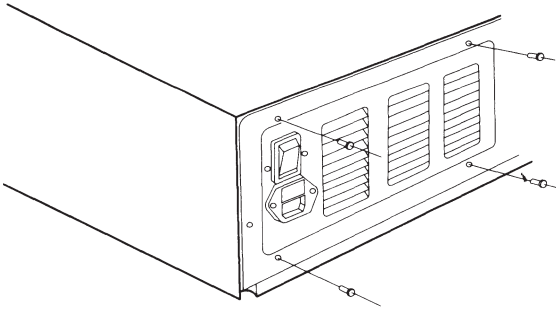
Figure 7-12. Removing the Power Supply Screws.

4. Slide the power supply assembly toward the drive housing assembly until the power supply assembly is released from the tabs holding it to the bottom of the chassis (Figure 7-13).
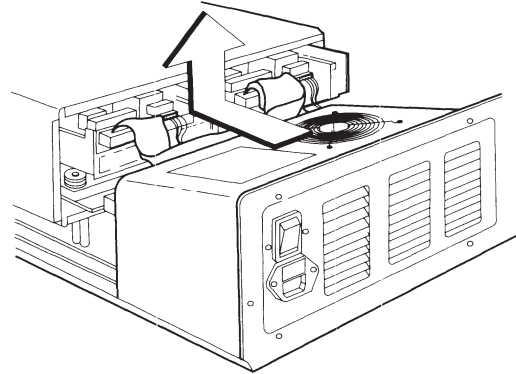
Figure 7-13. Removing the Power Supply Assembly.

5. Shift the power supply slightly away from the system board to locate the power supply connector on the system board (Figure 7-14).

Power Supply Connector
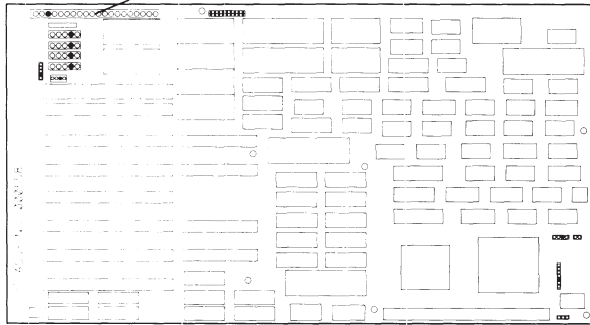
Figure 7-14. Location of the Power Supply Connector on the System Board.

6. Disconnect the power supply connector from the system board, and lift the power supply assembly out of the chassis.

To replace the power supply, reverse Steps 1 through 6 of the preceding removal procedures

7.8 BATTERY

The battery is secured to the system unit chassis with a VELCRO strip and is connected to the system board by a small cable and connector. Disconnecting the battery removes the time, date, and system configuration information from the system memory. Any time you remove the battery, you must rerun the SETUP program.

WARNING

This procedure is to be performed by Authorized COMPAQ Computer Dealers only.

To remove the battery, follow these steps:

1. Complete the removal procedures in the following sections:

   a. 7.2 MONITOR

   b. 7.3 KEYBOARD

   c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   d. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

2. Locate the battery (Figure 7-15).

Battery
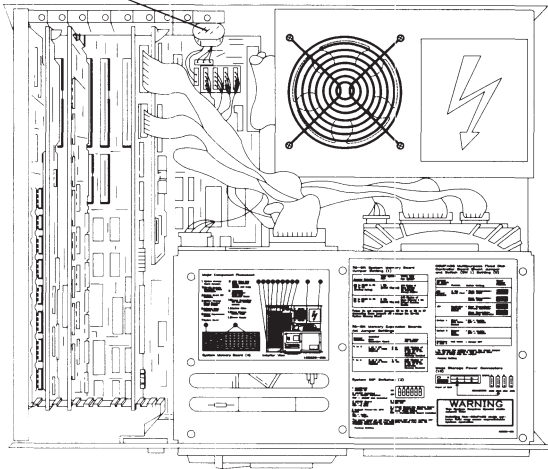
Figure 7-15. Location of the Battery.

3. Locate and remove the battery connector from the system board (Figure 7-16).

Battery Connector (J118)
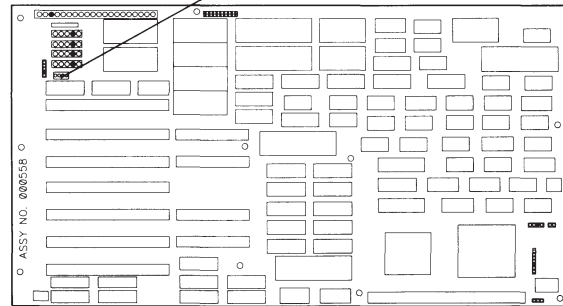
Figure 7-16. Location of the Battery Connector.

4. Remove the battery from the system unit (Figure 7-17).

5. To dispose of the battery properly, see Service Bulletin 46.

To replace the battery, follow these steps:

1. Reverse Steps 1 through 4 of the preceding removal procedures.

2. Run the SETUP program.
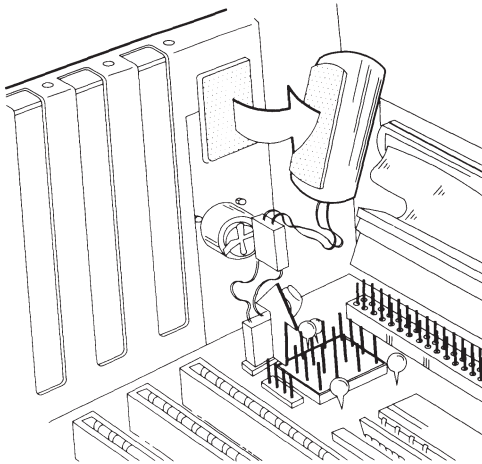
Figure 7-17. Removing the Battery.

7.9 SECURITY LOCK

The security lock secures the security lock assembly to the system unit cover. You do not have to remove the security lock assembly in these procedures.

To remove the security lock, follow these steps:

1. Complete the removal procedures in the following sections:

    a.   7.2 MONITOR

    b.   7.3 KEYBOARD

    c.   7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

    d.   7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

2. Remove the security lock key.

3. Remove the screw and clip that secure the security lock assembly to the system unit cover (Figure 7-18).
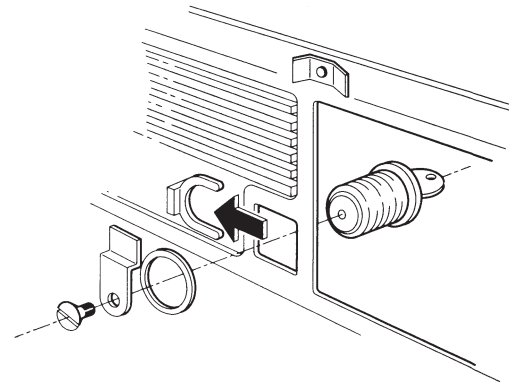
Figure 7-18. Removing the Security Lock (Interior View).

To replace the security lock, reverse Steps 1 through 3 of the preceding removal procedures.

7.10 EXPANSION BOARD(S)

The following procedures apply to each board.

To remove an expansion board, follow these steps:

1. Complete the removal procedures in the following sections:

    a.   7.2 MONITOR

    b.   7.3 KEYBOARD

    c.   7.5 PREPARING THE SYSTEM UNIT
         FOR THE INTERNAL REMOVAL
         AND REPLACEMENT PROCEDURES

    d.   7.6 SYSTEM UNIT COVER AND
         INTERNAL CONFIGURATION

2. Locate and remove the reinforcement bracket by removing the rear screw first and then the front screw (Figure 7-19). This sequence prevents the reinforcement bracket from rotating.
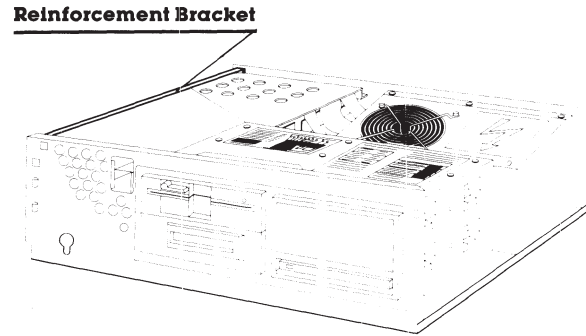
Figure 7-19. Location of the Reinforcement Bracket.

3. Remove the RF shield (Figure 7-20).
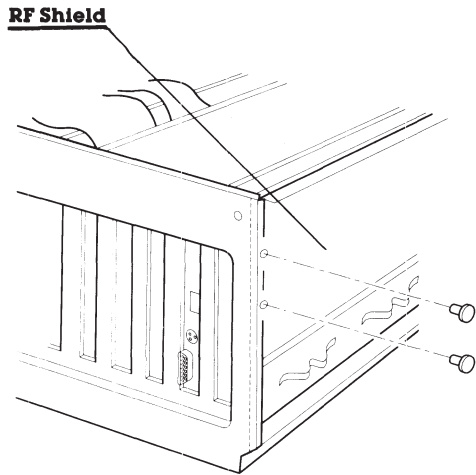
RF Shield

Figure 7-20. Location of the RF Shield.

4. Remove the cable cover (Figure 7-21).
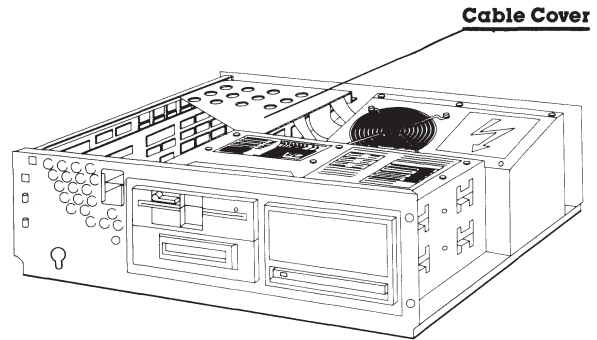
Cable Cover

Figure 7-21. Location of the Cable Cover.

5. Remove the retaining screw that secures the expansion board to the chassis.

6. Disconnect any signal cables attached to the expansion board (Figures 7-22, 7-23, 7-24).

Figure 7-23. Removing the Multipurpose Fixed Disk Drive Controller Board Signal Cables.

Figure 7-22. Removing the ESDI Fixed Disk Drive Controller Board Signal Cables.
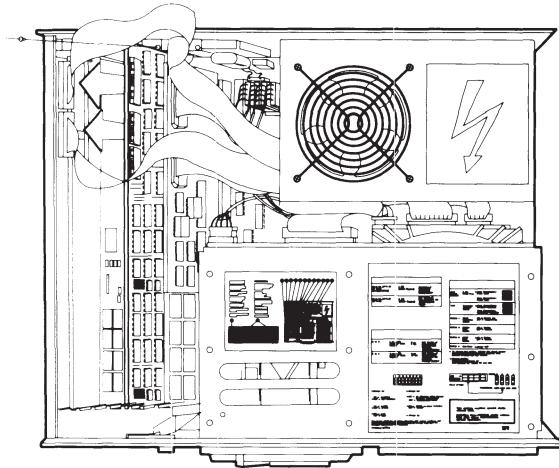
Figure 7-24. Removing the Fixed Disk Drive Controller Board Signal Cables.

7. Lift the board out of the connector(s) on the system board (Figure 7-25).
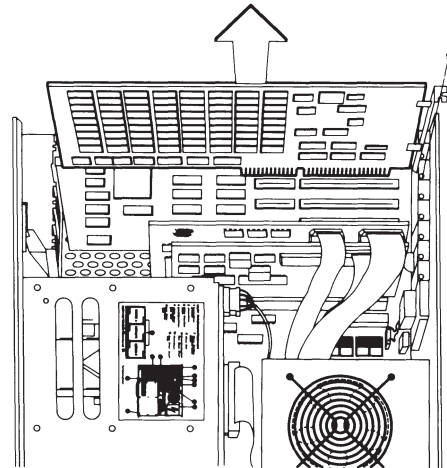
Figure 7-25. Removing an Expansion Board.

To replace an expansion board, reverse Steps 1 through 7 of the preceding removal procedures.

7.11 80287 COPROCESSOR

The 80287 coprocessor is installed on the system board under slots 1, 2, and 3.

To remove the 80287 coprocessor, follow these steps:

1. Complete the removal procedures in the following sections:

    a. 7.2 MONITOR

    b. 7.3 KEYBOARD

    c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

    d. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

    e. 7.10 EXPANSION BOARD(S). Remove expansion boards in slots 1, 2, and 3.

2. Locate the 80287 coprocessor on the system board, and lift the coprocessor off with your fingers (Figure 7-26).

80287 Coprocessor Socket
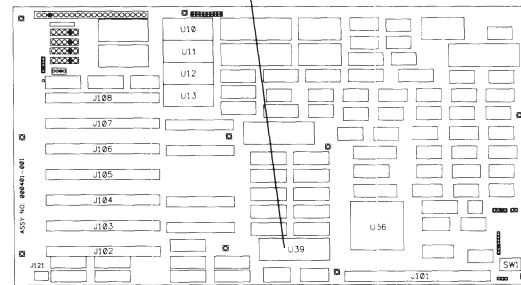
Figure 7-26. Location of the 80287 Coprocessor Socket on the System Board.

To replace the 80287 coprocessor, follow these steps:

1. Align the pins on the 80287 coprocessor with the 80287 coprocessor socket.

2. Press the coprocessor into the socket.

3. Complete the replacement procedures in the following sections:

   a. 7.10 EXPANSION BOARD(S). Remove expansion boards in slots 1, 2, and 3.

   b. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

   c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   d. 7.3 KEYBOARD

   e. 7.2 MONITOR

7.12 MEMORY EXPANSION BOARD(S)

The 1- to 2-megabyte or the 4- to 8-megabyte memory expansion board is secured to the 32-bit system memory board by two connectors and five Phillips head mounting screws.

To remove a memory expansion board, follow these steps:

1. Complete the removal procedures in the following sections:

   a. 7.2 MONITOR

   b. 7.3 KEYBOARD

   c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   d. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

   e. 7.10 EXPANSION BOARD(S). Remove only the 32-bit system memory board.

2. Remove the five mounting screws holding the memory expansion board to the 32-bit system memory board.

3. Gently pull the memory expansion board away from the 32-bit system memory board, and set the memory expansion board aside (Figure 7-27).

To replace a memory expansion board, reverse Steps 1 through 3 of the preceding removal procedures.
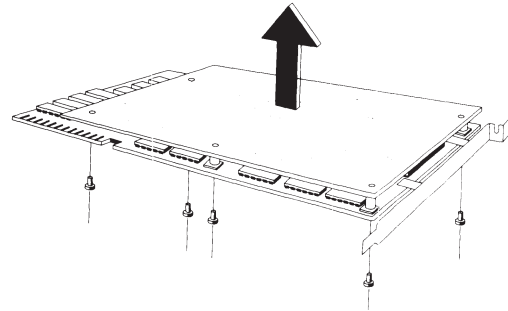
Figure 7-27. Removing the 32-Bit Memory Expansion Board from the 32-Bit System Memory Board.

7.13 MEMORY CHIP(S)

Memory chips can be installed on the 32-bit system memory board, 1- to 2-megabyte 32-bit memory expansion board, 4- to 8-megabyte 32-bit memory expansion board, and .5- to 2-megabyte 16-bit memory expansion board. Use a memory chip removal tool and a memory chip insertion tool for these procedures.

To remove a memory chip, follow these steps:

1. Complete the removal procedures in the following sections:

1. Complete the removal procedures in the following sections:

   a. 7.2 MONITOR

   b. 7.3 KEYBOARD

   c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   d. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

   e. 7.10 EXPANSION BOARD(S). Remove only the 32-bit system memory board.

   f. 7.12 MEMORY EXPANSION BOARD(S). If applicable.

CAUTION

The memory chips are sensitive to static electricity and are shipped on conductive foam to protect them from accidental electrostatic discharge. Do not remove them from the conductive shipping foam until you are ready to install them.

Figure 7-28. Removing the Memory Chip.

2. Using a memory chip removal tool, remove the memory chip (Figure 7-28).

To replace a memory chip, follow these steps:

CAUTION

The pins on the chips bend easily. Carefully line up the pins in the socket before pressing the chips into place.

1. Using a memory chip insertion tool, insert the replacement memory chip so that the notch, or Pin 1 locator dot, on the chip is oriented toward the eight I/O connectors on the board (Figure 7-29).
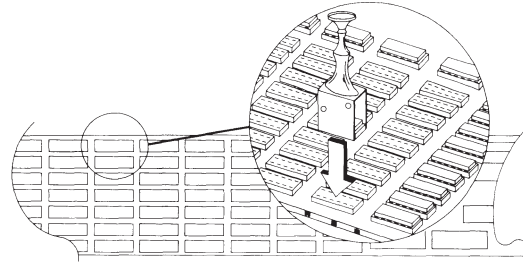
Figure 7-29. Inserting the Memory Chip.

2. Be sure that all the pins are in the socket and that none are bent.

3. Press the chip into place.

4. Complete the replacement procedures in the following sections:

   a. 7.12 MEMORY EXPANSION BOARD(S). If applicable.

   b. 7.10 EXPANSION BOARD(S).

   c. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

   d. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   e. 7.3 KEYBOARD

   f. 7.2 MONITOR

7.14 SPEAKER ASSEMBLY AND SECURITY LOCK SWITCH

The security lock switch and the speaker assembly are inside the speaker/board guide assembly, which is accessible for removal only by removing all the expansion boards in the system unit.

To remove the speaker assembly or security lock switch, follow these steps:

1. Complete the removal procedures in the following sections:

   a. 7.2 MONITOR

   b. 7.3 KEYBOARD

   c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   d. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

   e. 7.10 EXPANSION BOARD(S). Remove only the expansion boards that block the speaker/board guide assembly.

2. Locate the speaker/board guide assembly (Figure 7-30).

Speaker/Board Guide Assembly
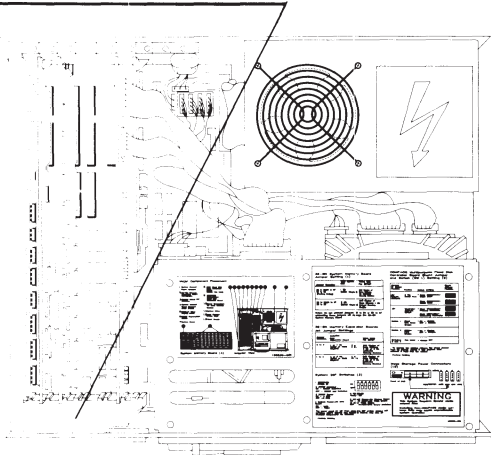
Figure 7-30. Location of the Speaker/Board Guide Assembly.

3. Remove the speaker/board guide assembly by pushing the plastic catch on the front of the chassis and swinging the assembly away from the chassis (Figure 7-31).
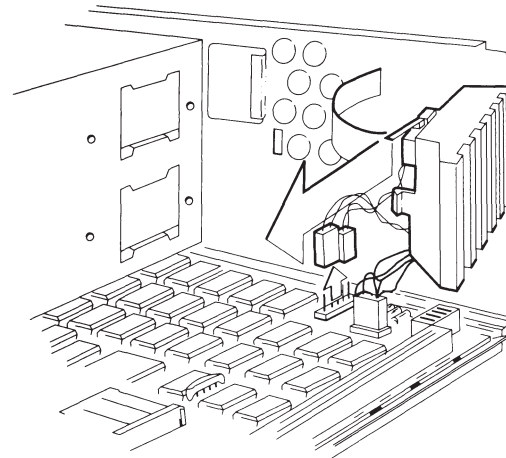
Figure 7-31. Removing the Speaker/Board Guide Assembly.

4. Locate and disconnect the speaker connector (J115) and security lock switch connector (J119) from the system board (see Figure 7-32).

Speaker Connector (J115)   **Security Lock Switch Connector (J119)**
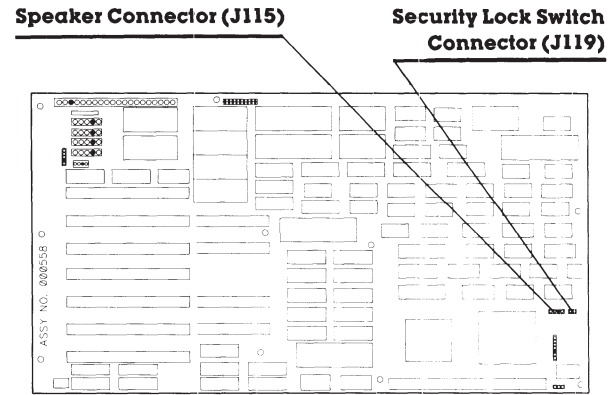
Figure 7-32. Location of the Speaker Connector and Security Lock Switch Connector.

5. Carefully remove the speaker assembly from the speaker/board guide assembly (Figure 7-33).
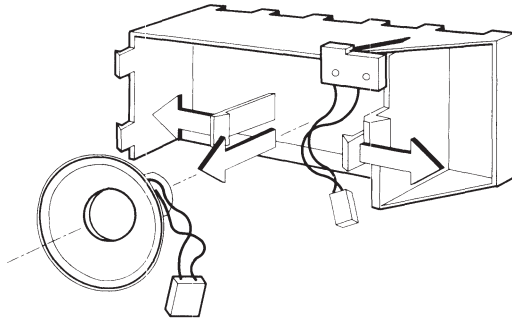
Figure 7-33. Removing the Speaker Assembly.

6. Carefully remove the security lock switch from the speaker/board guide assembly (Figure 7-34).
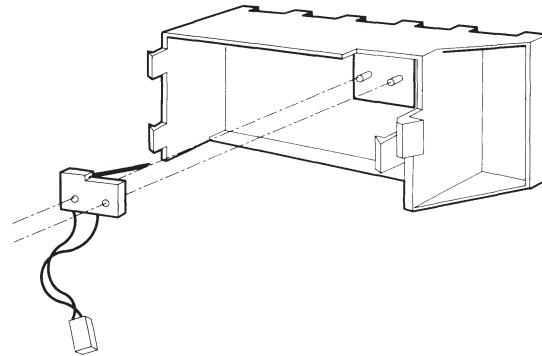
Figure 7-34. Removing the Security Lock Switch Assembly.

To replace the speaker assembly, reverse Steps 1 through 5 of the preceding removal procedures. To replace the security lock switch, reverse Steps 1 through 6 of the preceding removal procedures.

7.15 MASS STORAGE DEVICE(S)

Mass storage devices can be installed in positions A, B, C, and D (Figure 7-35) in several configurations. Procedures for removing and replacing mass storage devices vary with the drive position.

Table 7-1 shows the possible configurations.
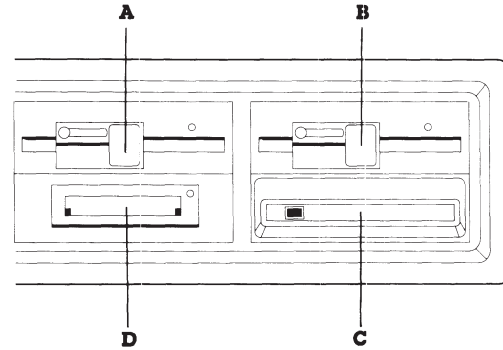
Figure 7-35. Location Designators for COMPAQ DESKPRO 386 Mass Storage Devices.

Table 7-1. Configurations of Mass Storage Devices

Mass Storage Device	Drive Positions				
	A	**B**	**B/C**	**C**	**D**
360-Kbyte 5¼-Inch Diskette Drive	X	X			X
1.2-Megabyte 5¼-Inch Diskette Drive	X	X			X
1.44-Megabyte 3½-Inch Diskette Drive	X	X			X
Any fixed disk drive backup					X
Any full-height fixed disk drive			X		
Any half-height fixed disk drive				X	X

Removal and Replacement Procedures for Drive Positions A or D

To remove a mass storage device from drive positions A or D, follow these steps:

1. Complete the removal procedures in the following sections:

   a. 7.2   MONITOR

   b. 7.3   KEYBOARD

   c. 7.5   PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   d. 7.6   SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

   e. 7.10 EXPANSIONS BOARD(S)

   f. 7.14 SPEAKER ASSEMBLY AND SECURITY LOCK SWITCH. Remove only the speaker/board guide assembly.

2. Locate and disconnect the signal cable and the power cable from the back of the mass storage device (Figure 7-36).
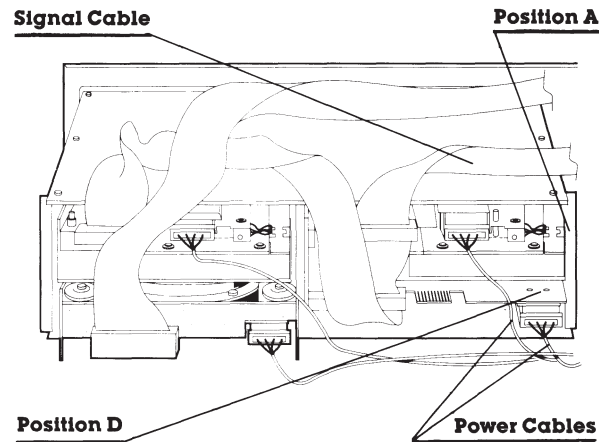
Figure 7-36. Location of the Cables for Mass Storage Devices in Positions A and D.

3. Remove the mounting screws on the left side of the appropriate drive housing assembly (Figure 7-37).

Figure 7-38. Removing a Mass Storage Device from Position A.

Figure 7-37. Location of the Screws for Positions A and D.

4. Slide the mass storage device out of the drive housing assembly (Figures 7-38 and 7-39).
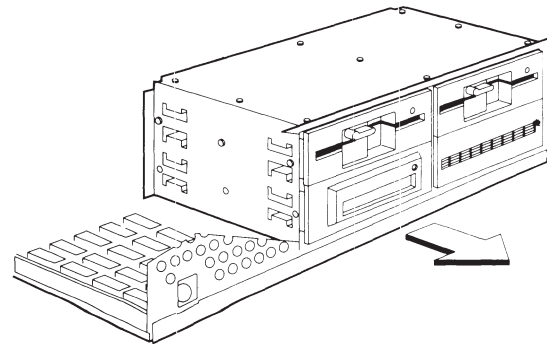
Figure 7-39. Removing a Mass Storage Device from Position D.

To replace a mass storage device in drive positions A or D, reverse Steps 1 through 4 of the preceding removal procedures. When you reconnect the power cable, follow the guidelines for power cable connections in Table 7-2.

Table 7-2. Power Cable Connections for Drive Positions A and D

Drive Position	Mass Storage Device	System Board Connector
A	Any mass storage device	J112
D	Any diskette drive	J111
	Any fixed disk drive	J110
	Any fixed disk drive backup	J111

Removal and Replacement Procedures for Drive Positions B or C

To remove a mass storage device from drive positions B or C, follow these steps:

1. Complete the removal procedures in the following sections:

   a. 7.2 MONITOR

   b. 7.3 KEYBOARD

   c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   d. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

2. Locate and disconnect the signal cable and the power cable from the back of the mass storage device in drive position B or C (Figure 7-40).

3. Remove the retaining screws on the side of the drive housing assembly.

4. Slide the mass storage device out of the drive position (Figure 7-41).

Position B   **Signal Cables**

Position C   **Power Cables**
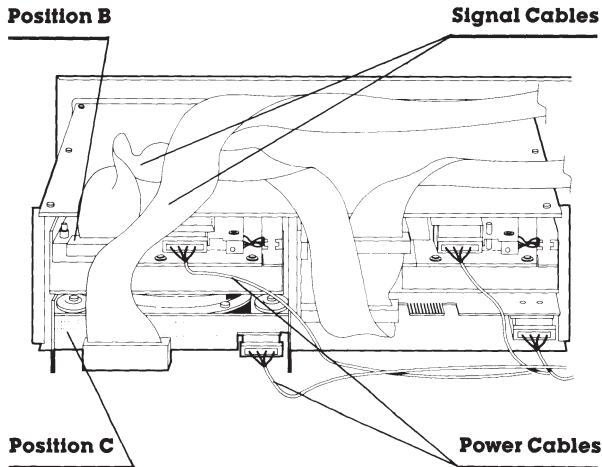
Figure 7-40. Disconnecting Cables from Mass Storage Device B or C.

To replace a half-height storage device in drive position B or C, reverse steps 1 through 4, following the power cable connection guidelines in Table 7-3.

Table 7-3. Power Cable Connections for Drive Positions B and C

Drive Position	System Board Connector
B	J111
C	J109
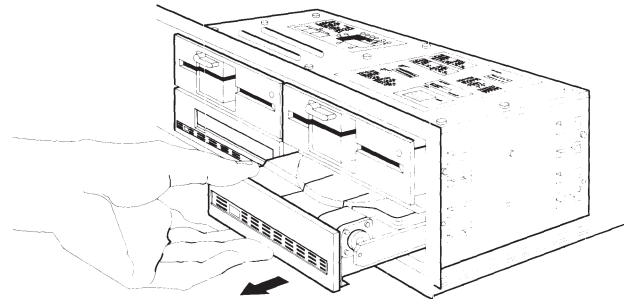
Figure 7-41. Removing a Mass Storage Device from Position B and C.

To replace a full-height mass storage device in drive positions B or C, follow these steps:

> ### IMPORTANT
>
> **When the drive is ordered as a spare part, it comes formatted for use with one of two ESDI Fixed Disk Drive Controller boards.**
>
> ☐ **ESDI Fixed Disk Drive Controller Board Assy. No. WD1007AWAH, which is a 1:1 interleave and drive type 35.**
>
> ☐ **ESDI Fixed Disk Drive Controller Board Assy. No. WD1005WAH, which is a 3:1 interleave and drive type 25.**

Examine the label on the fixed disk drive to determine the controller board for which it was formatted. If the installed controller board is not the board for which the fixed disk drive was formatted, you must reformat the fixed disk drive. Use the UNCONDITIONAL FORMAT in ADVANCED DIAGNOSTICS Version 5.04 or later. Failure to reformat can result in the fixed disk drive not operating with the installed controller. After performing an UNCONDITIONAL FORMAT, perform SURFACE ANALYSIS to detect and mark any surface defects.

NOTE: Software supports drive types in the following manner:

☐ MS-DOS 3.2 or later supports drive type 25 or 35. Depending on the application, there may be some performance improvement by using drive type 35.

☐ MS-DOS 3.1 or earlier supports drive type 25 only.

☐ Other application software supporting only 17 sectors per track supports only drive type 35.

1. Slide the mass storage device into the drive housing.

2. Secure the mass storage device to the drive housing with the screws.

3. Connect the power cable to connector J109 on the system board.

4. Reassemble the system unit.

7.16 SYSTEM BOARD

Removing the system board requires disconnecting the battery. Any time the battery is disconnected, you must run the SETUP program to ensure the correct time, date, and system configuration.

To remove the system board, follow these steps:

1. Complete the removal procedures in the following sections:

    a. 7.2   MONITOR

    b. 7.3   KEYBOARD

    c. 7.5   PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

    d. 7.6   SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

    e. 7.10 EXPANSIONS BOARD(S)

    f. 7.14 SPEAKER ASSEMBLY AND SECURITY LOCK SWITCH. Remove only the speaker/board guide assembly.

2. Locate and disconnect the universal power
    cables, battery connector, monitor power
    connector, and power supply connector
    from the system board (Figures 7-42 and
    7-43).
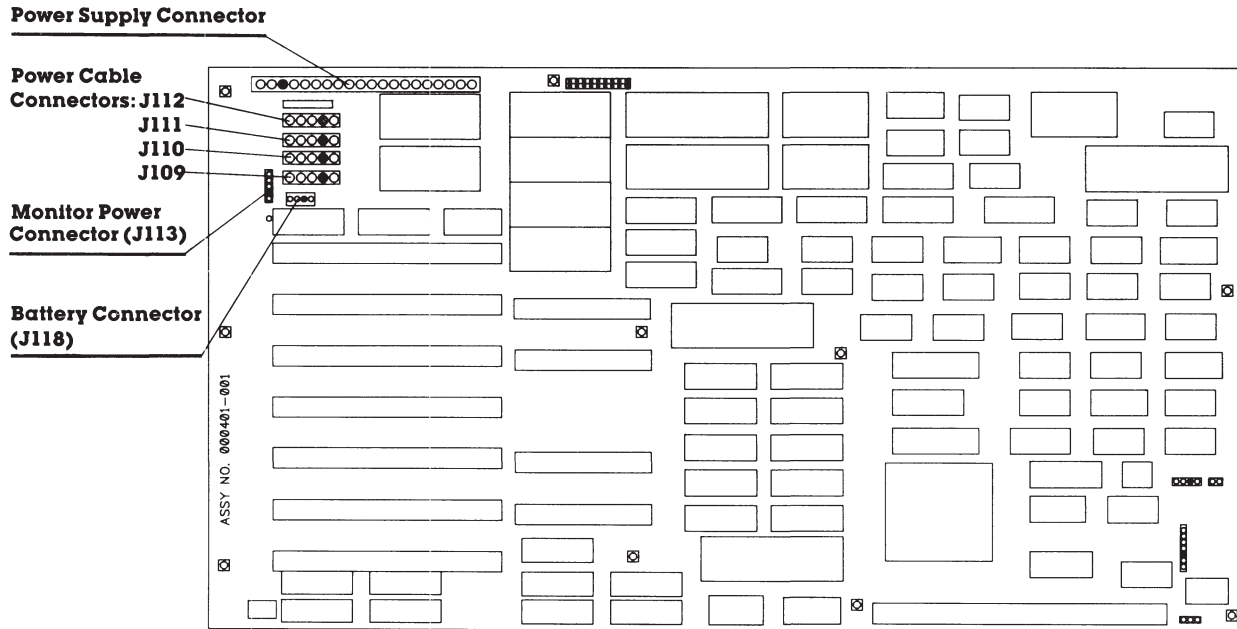
Figure 7-42. Location of the Power Cable Connectors, Battery Connector, Monitor Power Connector, and Power Supply Connector on the COMPAQ DESKPRO 386 System Board Version 1 (assy. no. 000401).
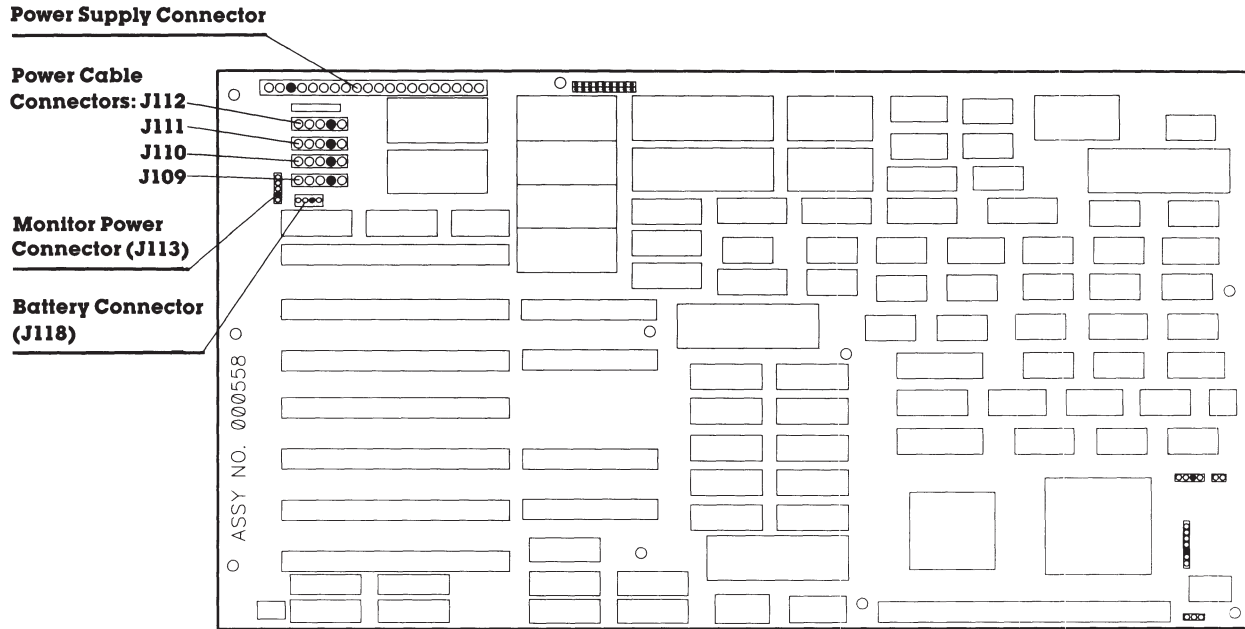
Figure 7-43. Location of the Power Cable Connectors, Battery Connector, Monitor Power Connector, and Power Supply Connector on the COMPAQ DESKPRO 386 System Board Version 2 (assy. no. 000558).

3. Locate and disconnect the security lock
    switch connector, keyboard connector, and
    speaker connector (Figures 7-44 and 7-45).
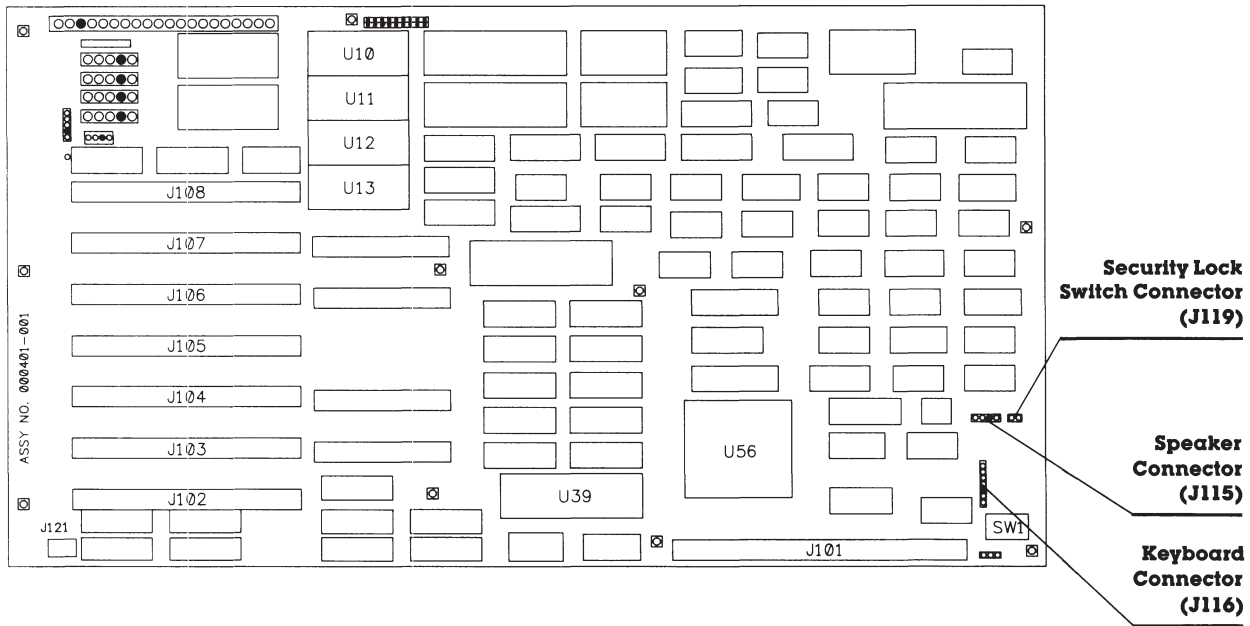
Figure 7-44. Location of the Security Lock Switch Connector, Keyboard Connector, and Speaker Connector
on the COMPAQ DESKPRO 386 System Board Version 1 (assy. no. 000401).

Security Lock Switch Connector (J119)

Speaker Connector (J115)

Keyboard Power Connector (J116)
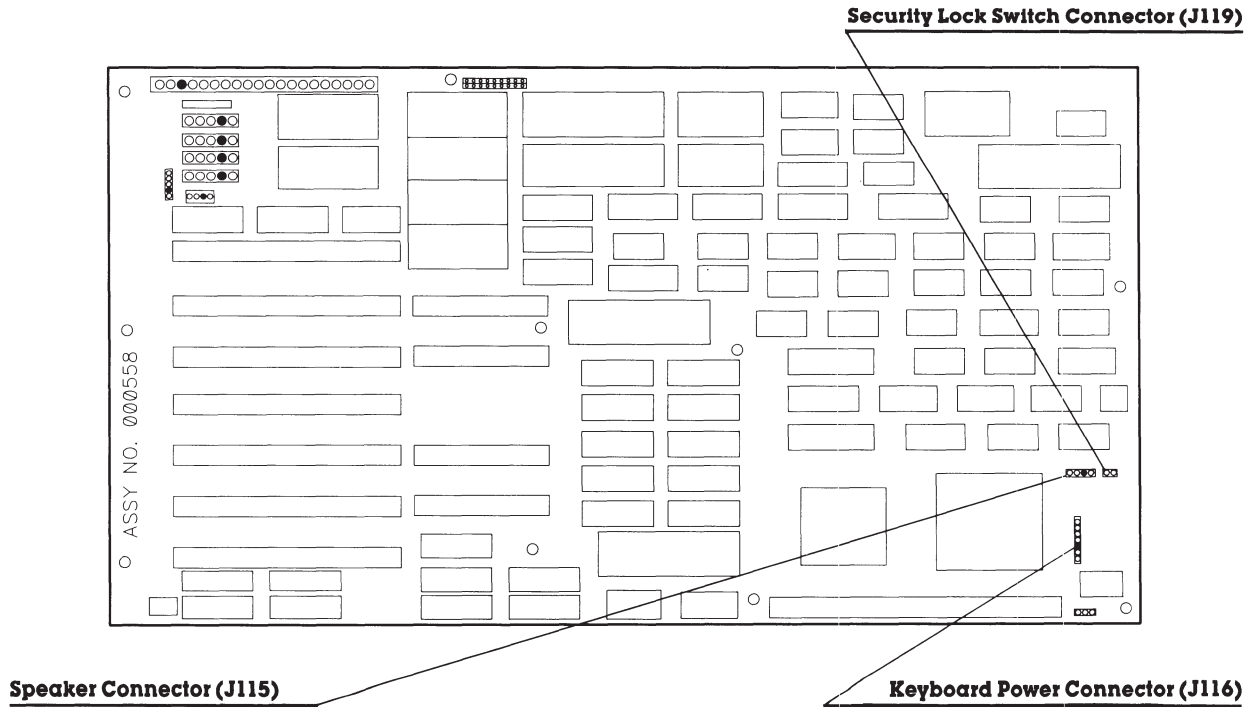
Figure 7-45. Location of the Security Lock Switch Connector, Keyboard Connector, and Speaker Connector on the COMPAQ DESKPRO 386 System Board Version 2 (assy. no. 000558).

4. Remove the ten mounting screws that secure the system board to the chassis.

5. Carefully remove the system board from the chassis (Figure 7-46).
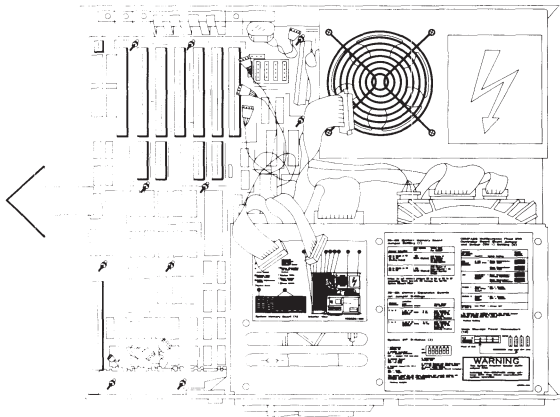
Figure 7-46. Removing the System Board.

To replace the system board, follow these steps:

1. Reverse Steps 1 through 5. Be sure to tighten the mounting screws because they provide proper grounding for the system.

   NOTE: When you reconnect the power cables, refer to the configuration label on the drive housing assembly for the location of the connectors.

2. Run the SETUP program.

7.17 INTEL 387 COPROCESSOR

Removing and replacing the Intel 387™ Coprocessor requires that you remove the system board. The pressure exerted during the removal and replacement procedures may damage the system board if it is in the system unit during these procedures. Use the Universal Coprocessor removal tool to remove the coprocessor itself. Any other tool could bend or damage the pins. Because you must disconnect the battery during these procedures, you must run the SETUP program after you reassemble the computer.

To remove the 387 Coprocessor, follow these steps:

1. Complete the removal procedures in the following sections:

    a. 7.2 MONITOR

    b. 7.3 KEYBOARD

    c. 7.5 PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

    d. 7.6 SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

    e. 7.10 EXPANSIONS BOARD(S)

    f. 7.14 SPEAKER ASSEMBLY AND SECURITY LOCK SWITCH. Remove only the speaker/board guide assembly.

    g. 7.16 SYSTEM BOARD

2. Insert the prongs of the coprocessor removal tool under one side of the coprocessor.

CAUTION

Do not press down on the handle of the co-processor removal tool.

3. Using an upward motion, lift the side of the coprocessor slightly (Figure 7-47).

4. Reposition the coprocessor removal tool on the opposite side of the coprocessor, and lift this side slightly. Continue repositioning the coprocessor removal tool and lifting the sides of the coprocessor until it is released.
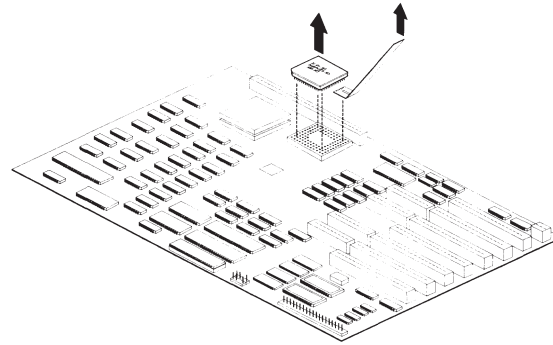
Figure 7-47. Removing the 387 Coprocessor.

To replace the 387 Coprocessor, follow these steps:

> ### CAUTION
>
> The most important step when installing the 387 coprocessor in a COMPAQ DESKPRO 386 Personal Computer is orientation of the coprocessor. See Figure 7-38 for the correct orientation. Pay particular attention to the relative positions of the beveled corners that indicate the location of Pin 1 on the 387 coprocessor.

1. Locate pin 1 of the coprocessor socket on the system board. The coprocessor socket is indicated by a notched corner.

2. Locate pin 1 on the coprocessor (indicated by a notched corner), and align the coprocessor so that pin 1 on the coprocessor matches pin 1 on the coprocessor socket (Figure 7-48).
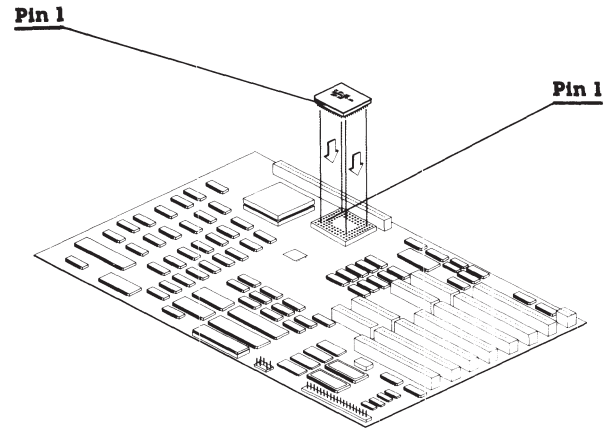
Figure 7-48. Aligning the 387 Coprocessor.

CAUTION

More pressure is needed to press the coprocessor into the socket than is required for installing memory chips. BE SURE the pressure exerted is firm enough to seat the coprocessor and is applied evenly over the surface of the coprocessor.

3. Press the coprocessor into the coprocessor socket.

   NOTE: If you think the coprocessor is not seated properly, use the coprocessor removal tool to remove the coprocessor, and try again to install it.

4. Verify DIP switch settings.

5. Complete the replacement procedures in the following sections:

   a. 7.16 SYSTEM BOARD. Be sure to tighten the mounting screws because they provide proper grounding for the system.

   NOTE: When you reconnect the power cables, refer to the configuration label on the drive housing assembly for the location of the connectors.

   b. 7.14 SPEAKER ASSEMBLY AND SECURITY LOCK SWITCH.

   c. 7.10 EXPANSION BOARD(S).

   d. 7.6   SYSTEM UNIT COVER AND INTERNAL CONFIGURATION

   e. 7.5   PREPARING THE SYSTEM UNIT FOR THE INTERNAL REMOVAL AND REPLACEMENT PROCEDURES

   f. 7.3   KEYBOARD

   g. 7.2   MONITOR

6. Run the SETUP program.

7.18 LOST KEY

If the key for a COMPAQ DESKPRO 386 Personal Computer is lost, you have the following options:

☐ If the system is locked, obtain from the user the security lock ID number and vendor name, which are recorded on a tag provided with each key. Order a new key from the lock vendor.

☐ If the user does not have the lock ID number and if the system is unlocked, replace the security lock assembly by ordering a replacement security lock (part no. 105036-001).

☐ If the security lock ID number is unknown and the system is locked, contact a locksmith to replace the key.

7.19 300-/600-MEGABYTE FIXED DISK DRIVE EXPANSION UNIT

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

1. Turn OFF the computer.

2. Turn OFF the expansion unit.

3. Disconnect all power to the computer and expansion unit.

4. Disconnect the signal cable from the expansion unit to the computer.

5. Place the expansion unit on a flat surface with the front facing you.

6. Remove the three cover retaining screws from the rear of the expansion unit (Figure 7-49).

Figure 7-49. Expansion Unit Cover Retaining Screws.

7. Slide the cover forward until it stops. Then lift it up and away from the expansion unit.

Fixed Disk Drive Unit

To remove a fixed disk drive from an expansion unit, perform the following steps.

1. Complete the steps at the beginning of this section.

2. Disconnect the 20- and 34-pin signal cables from the external interface adapter board in the fixed disk drive expansion unit (Figure 7-50).
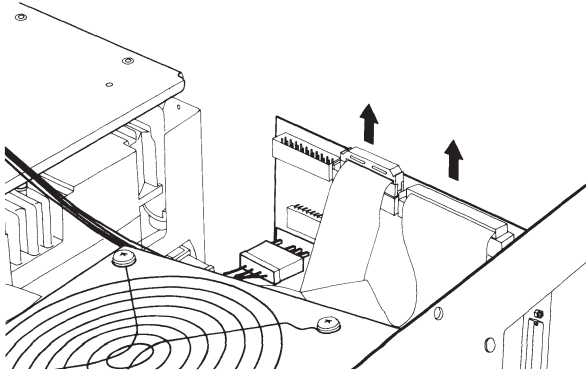
Figure 7-50. Removing Signal Cables from an External Interface Adapter Board.

3. Disconnect the universal drive power cable from the external interface adapter board in the fixed disk drive expansion unit (Figure 7-51).
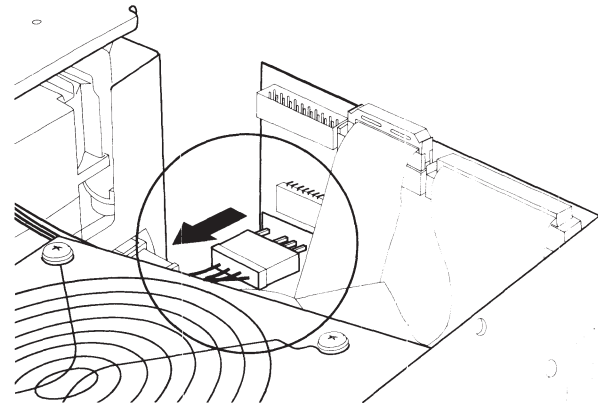
Figure 7-51. Removing Power Cables from an External Interface Adapter Board.

4. Remove the three retaining screws securing the fixed disk drive to the expansion unit (Figure 7-52).
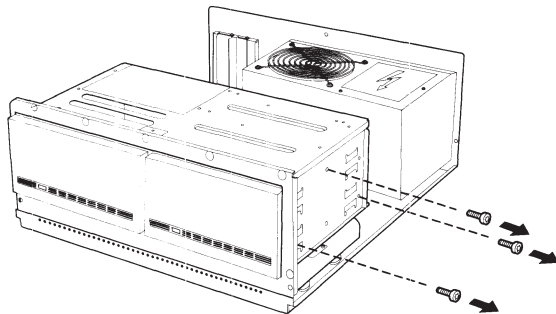
Figure 7-52. Fixed Disk Drive Retaining Screws.

5. Carefully slide the drive out of the expansion unit housing.

    NOTE: A terminating resistor must be installed on the 300-megabyte fixed disk drive if the following is true:

    ☐ The drive is in a 300-megabyte expansion unit.

    ☐ The drive is the secondary drive in a 600-megabyte expansion unit.

To remove the terminating resistor, complete the following steps:

1. Locate the terminating resistor on the fixed disk drive.

   NOTE: Terminating resistors are located in different positions depending on the manufacturer.

2. Remove the terminating resistor on the fixed disk drive using needle-nosed pliers (Figure 7-53).
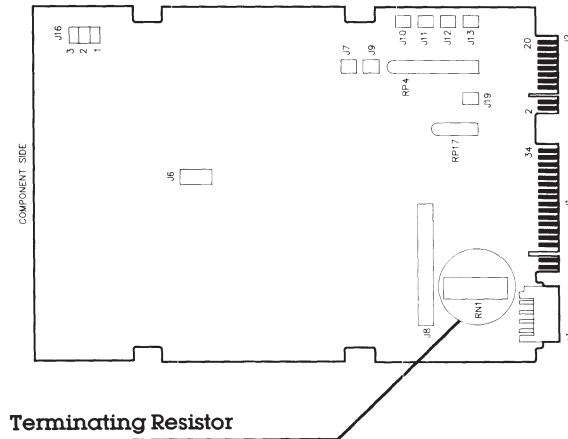
Terminating Resistor

Figure 7-53. Locating and Removing the Terminating Resistor.

To install the fixed disk drive in the expansion unit, reverse steps 1 through 5.

Power Supply

To remove the power supply from the expansion unit complete the following steps.

1. Complete the steps at the beginning of this section.

2. Remove the four screws securing the power supply assembly to the expansion unit chassis (Figure 7-54).
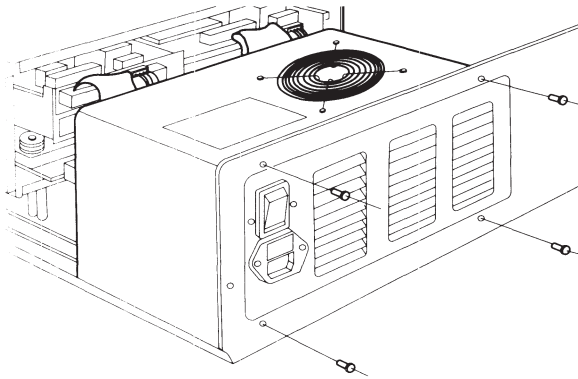
Figure 7-54. Power Supply Screws.

3. Slide the power supply ½-inch to 1-inch toward the drive housing (Figure 7-55). Be sure to clear the tabs on the bottom of the chassis. These tabs hold the power supply assembly in place.
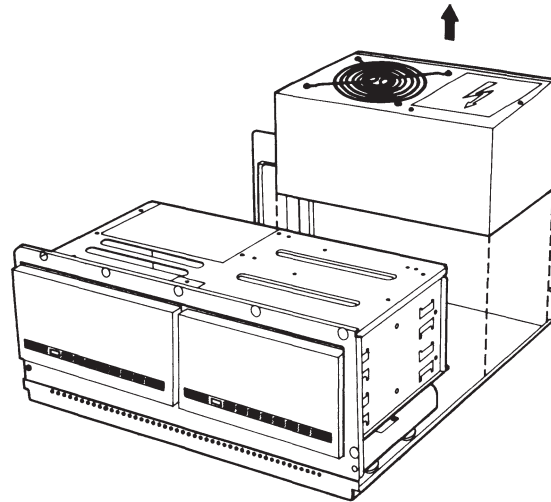
Figure 7-55. Removing the Power Supply Assembly.

4. Shift the power supply away from the external interface adapter board to access the connector on the board.

5. Disconnect the power supply connector from the external interface adapter board and lift the power supply assembly out of the chassis.

To replace the power supply assembly, reverse steps 1 through 5.

External Interface Adapter Board

To remove the external interface adapter board from the expansion unit complete the following steps:

1. Complete the steps at the beginning of this section.

2. Disconnect the 20- and 34-pin signal cables from the external interface adapter board (Figure 7-56).
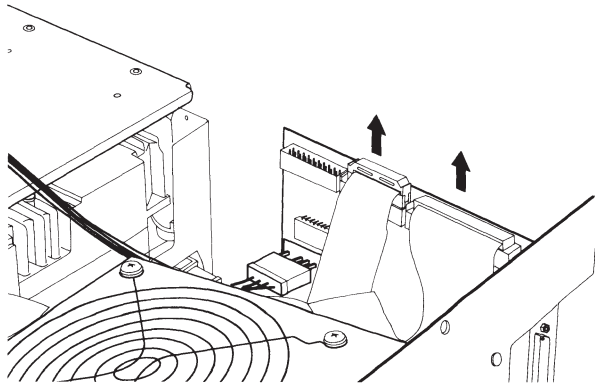
Figure 7-56. Removing the 20- and 34-Pin Signal Cables.

3. Disconnect the universal drive power and power supply cables from the external interface adapter board (Figure 7-57).
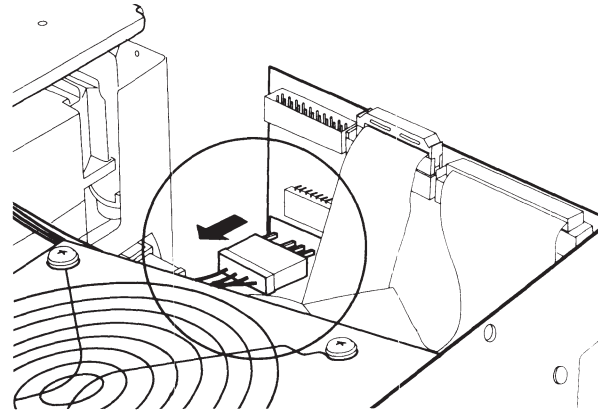
Figure 7-57. Removing Power Cables.

4. Remove the external interface adapter board.

    NOTE: Inspect new external interface adapter board for shipping damage prior to installation.

To replace the external interface adapter board, reverse steps 1 through 4.

NOTE: For internal or external switch settings for the 300-/600-Megabyte Fixed Disk Drive Expansion Unit, see *Chapter 8*, **JUMPER POSITIONS AND SWITCH SETTINGS.**

For internal or external cable connections and configurations for the 300-/600-Megabyte Fixed Disk Drive Expansion Unit, see *Chapter 9*, **MASS STORAGE CONFIGURATIONS.**

CONTENTS

Chapter 8
JUMPER SETTINGS AND SWITCH SETTINGS

Chapter 8
JUMPER SETTINGS AND SWITCH SETTINGS

8.1 INTRODUCTION

This chapter shows the switch and jumper locations on the following:

- ☐ System board
- ☐ 32-bit system memory board
- ☐ .5- to 2-megabyte 16-bit memory expansion board
- ☐ 1-to 2-megabyte or 4-to 8-megabyte 32-bit memory expansion board
- ☐ ESDI Fixed Disk Drive Controller Board

- ☐ Multipurpose fixed disk controller board
- ☐ Fixed disk controller board
- ☐ Tape adapter board
- ☐ COMPAQ Enhanced Color Graphics Board
- ☐ Video display controller board
- ☐ COMPAQ Video Graphics Controller Board
- ☐ Asynchronous communications/parallel printer board
- ☐ ESDI External Fixed Disk Controller Board

8.2. SYSTEM BOARDS
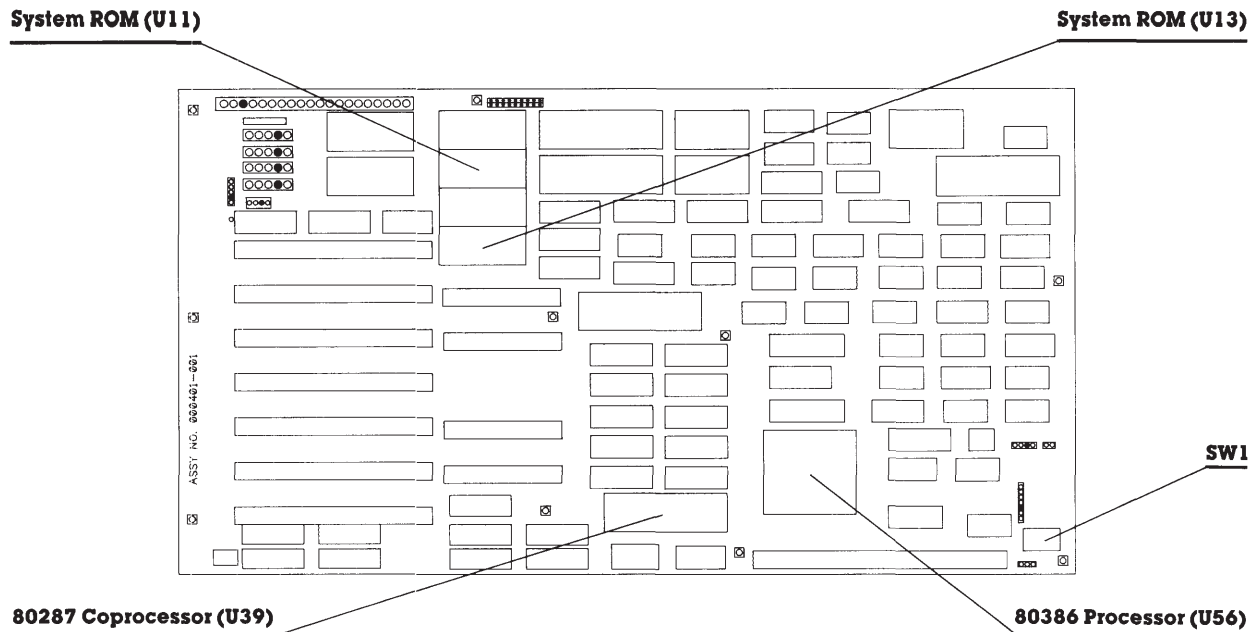
Figure 8-1.   COMPAQ DESKPRO 386 Personal Computer System Board Version 1 (assy. no. 000401).

Table 8-1. System Board (assy. no. 000401) Switch Settings

Switch Position Number	Switch Positions	Function
1	ON	Reserved
2	ON OFF	Coprocessor installed Coprocessor not installed (default)
3	ON OFF	Coprocessor speed 4 MHz Coprocessor speed 8 MHz (default)
4	ON OFF	CPU boot speed 16 MHz except when accessing diskette drive; then 8 MHz (default) CPU boot speed 16 MHz always
5	OFF	Reserved
6	ON OFF	COMPAQ VDU, COMPAQ ECG, compatible EGA, RGBI, or VGC (default) Third-party monochrome

Table 8-2. Locations for the Processor, Coprocessor, and System ROM on the System Board (assy. no. 000401)

Location	Description
U11 EVEN	System ROM
U13 ODD	System ROM
U39	Coprocessor (80287-3, -6, or -8)
U56	Processor (80386-16)

System ROM (U13)

System ROM (U15)

J108

J107

J106

J105

J104

J103

J102

J121

ASSY NO. 00558

U42

U60

U76

SW1

SW1

J101
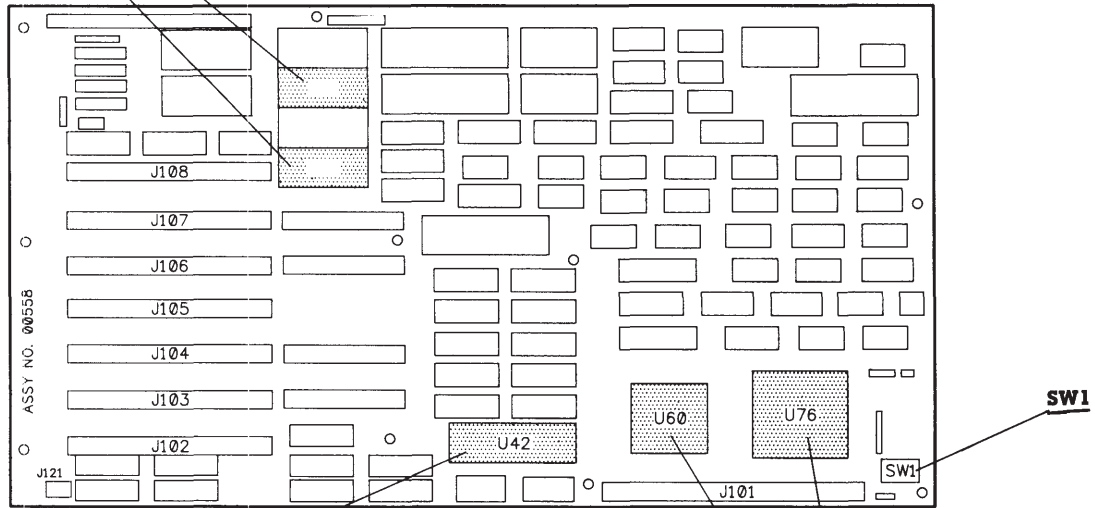
80287 Coprocessor (U42)

80386 Processor (U76)

80387 Coprocessor (U60)

Figure 8-2.   COMPAQ DESKPRO 386 System Board Version 2 (assy. no. 000558).

Table 8-3. System Board (assy. no. 000558) Switch Settings

Switch Position Number	Switch Positions	Function
1	ON	Reserved
2	ON OFF	Coprocessor installed Coprocessor not installed (default)
3	ON OFF	80287-3 or -6 coprocessor speed 4 MHz 80286-8 coprocessor speed 8 MHz (default)
4	ON OFF	CPU boot speed 16 MHz except when accessing diskette drive; then 8 MHz (default) CPU boot speed 16 MHz always
5	OFF	Reserved
6	ON OFF	COMPAQ VDU, COMPAQ ECG, compatible EGA, RGBI, or VGC (default) Third-party monochrome
7	ON OFF	80287-3, -6, or -8 coprocessor or no coprocessor installed (default) 80387-16 coprocessor
8	ON	Reserved

Table 8-4. Locations for the Processor, Coprocessor, and System ROM on the System Board (assy. no. 000558)

Location	Description
U13 EVEN	System ROM
U15 ODD	System ROM
U42	Coprocessor (80287-3, -6, or -8)
U60	Coprocessor (80387-16)
U76	Processor (80386-16)

8.3 32-BIT SYSTEM MEMORY BOARD

E123 (Jumpers E1 through E9)
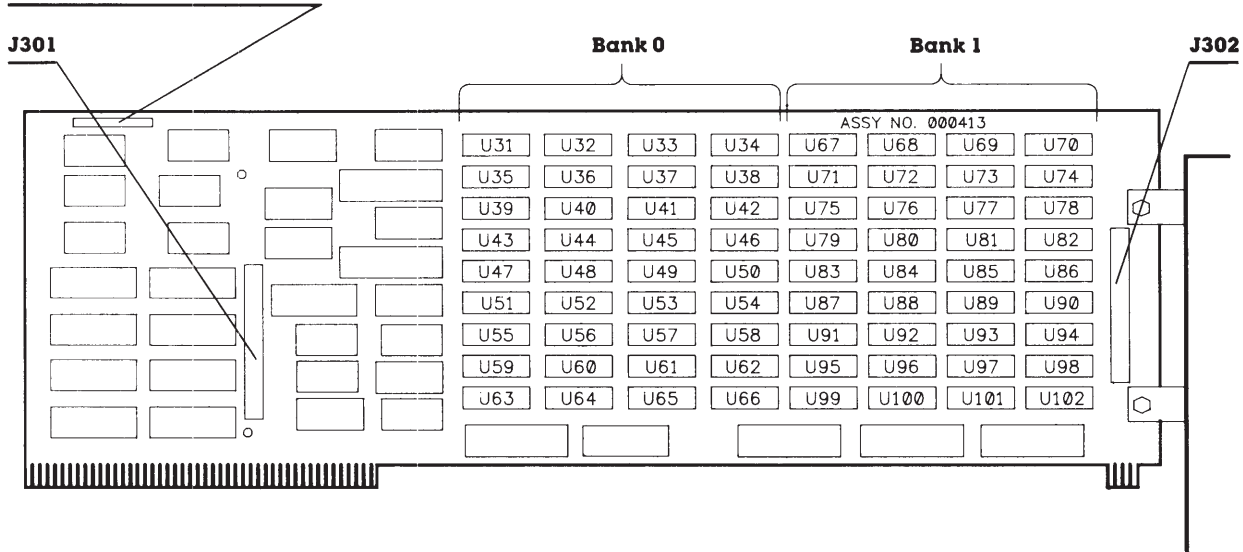
Figure 8-3.   32-Bit System Memory Board (assy. no. 000413).

Table 8-5. Jumper Settings for the 32-Bit System Memory Board (assy. no. 000413)

Jumper Selection	Function	Memory Selected
E1 to E2, E4 to E5 E7 to E8	256 Kbytes of base memory selected No extended memory	1-megabyte
E2 to E3, E4 to E5 E7 to E8	512 Kbytes of base memory selected No extended memory selected	1-megabyte
E2 to E3, E5 to E6 E7 to E8	640 Kbytes of base memory selected No extended memory selected (default)	1-megabyte
E1 to E2, E4 to E5 E8 to E9	256 Kbytes of base memory selected 1024 Kbytes of extended memory selected	2-megabyte or above
E2 to E3, E4 to E5 E8 to E9	512 Kbytes of base memory selected 1024 Kbytes extended memory selected.	2-megabyte or above
E2 to E3, E5 to E6, E8 to E9	640 Kbytes of base memory selected 1024 Kbytes of extended memory selected	2-megabyte or above

CAUTION

Do *not* connect jumpers E3 to E4 or E6 to E7; connecting these jumpers damages the 32-bit System Memory Board.

8.4 .5- TO 2-MEGABYTE 16-BIT MEMORY EXPANSION BOARD
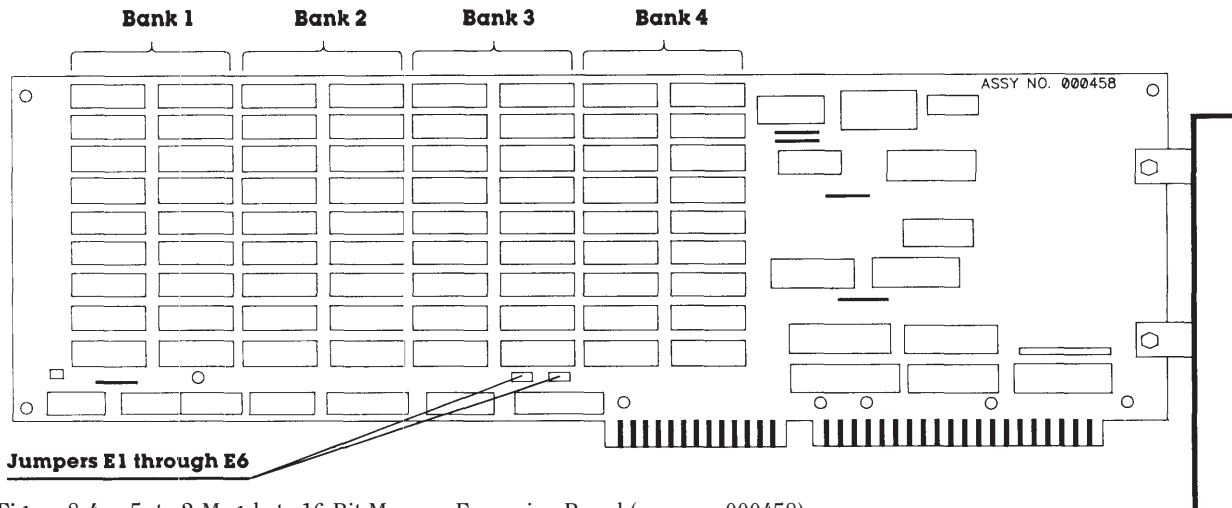
Figure 8-4.   .5- to 2-Megabyte 16-Bit Memory Expansion Board (assy. no. 000458).

Table 8-6. Jumper Settings for the .5- to 2-Megabyte 16-Bit Memory Expansion Board

Jumper Selection	Function
E1 to E2, E4 to E5	Base address of 4 megabytes selected (default)
E1 to E2, E5 to E6	Base address of 6 megabytes selected
E2 to E3, E4 to E5	Base address of 10 megabytes selected
E2 to E3, E5 to E6	Base address of 12 megabytes selected

Table 8-7. Memory Configuration for Jumper Settings E1-E2 and E5-E6 for the .5- to 2-Megabyte 16-Bit Memory Expansion Board

Banks Installed	Resulting Expansion Memory
Bank 1	512 Kbytes
Banks 1 and 2	1 megabyte
Banks 1, 2, and 3	1.5 megabytes
Banks 1, 2, 3, and 4	2 megabytes

8.5 1- TO 2-MEGABYTE AND 4- TO 8-MEGABYTE 32-BIT MEMORY EXPANSION BOARDS
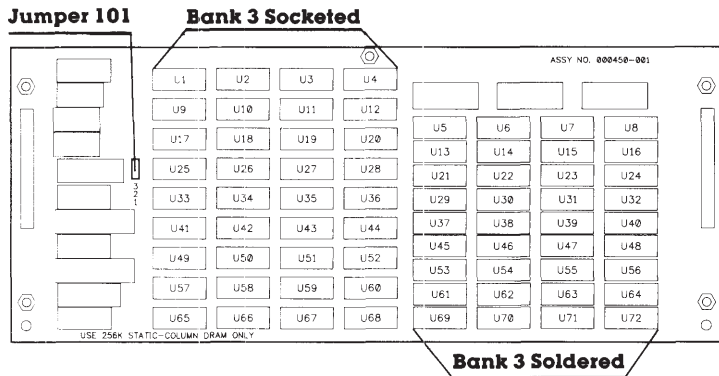
Figure 8-5a. 1- to 2-Megabyte 32-Bit Memory Expansion Board (assy. no. 000450).
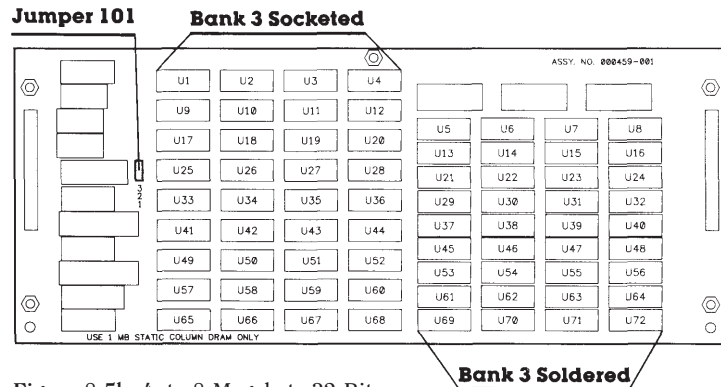
Figure 8-5b. 4- to 8-Megabyte 32-Bit Memory Expansion Board (assy. no. 000459).

Bank 3 Enabled

When pin 1 to pin 2 is jumpered, Bank 3 (socketed memory) is accessed normally by the system. If memory is not installed in Bank 1 and the jumper is set in this position, parity errors occur.
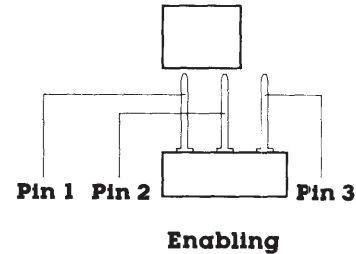
Bank 3 Disabled

When pin 2 to 3 is jumpered, Bank 3 (socketed memory) is disabled. This position should be used when memory is not installed in Bank 1.
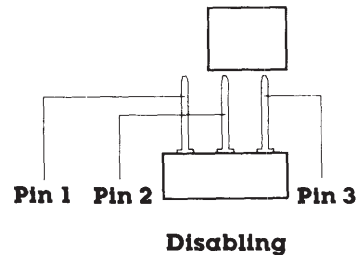
Figure 8-6. Jumper 101 Setting on the 1- to 2-Megabyte (assy. no. 000450) or 4- to 8-Megabyte (assy. no. 000459) 32-Bit Memory Expansion Board.

Table 8-8. Jumper Settings for the 1- to 2-Megabyte or 4- to 8-Megabyte 32-Bit Memory Expansion Boards

J101 Setting	1- to 2-Megabyte 32-Bit Memory Expansion Board	4- to 8-Megabyte 32-Bit Memory Expansion Board
1 to 2	Enables second 1 MB of memory	Enables second 4 MB of memory
2 to 3 (default)	Disables second 1 MB of memory	Disables second 4 MB of memory

8.6 ESDI FIXED DISK DRIVE CONTROLLER BOARD
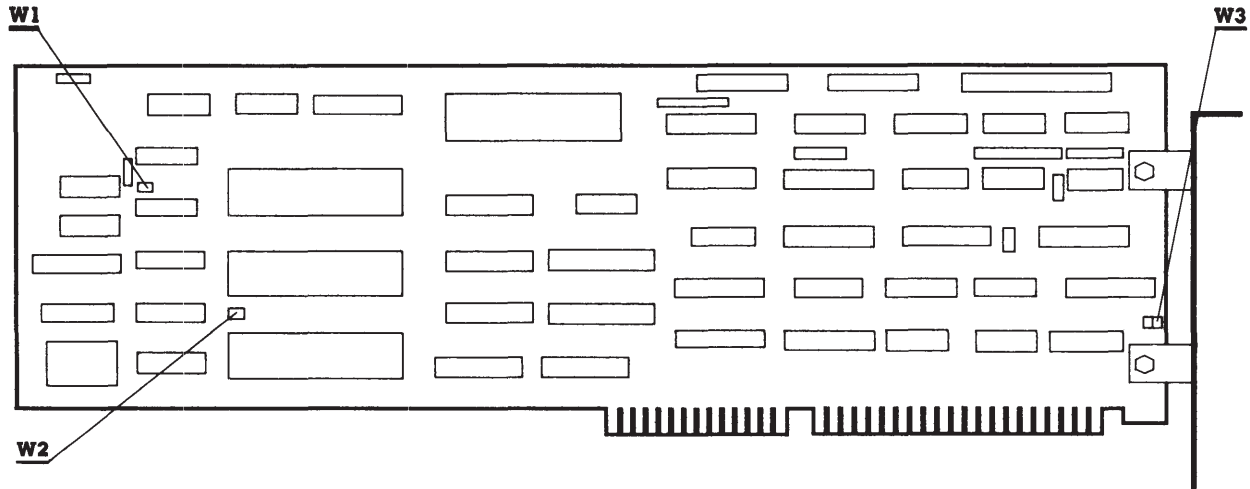
Figure 8-7.   ESDI Fixed Disk Drive Controller Board (assy. no. WD1005WAH).

Table 8-9. Jumper Settings for the ESDI Fixed Disk Drive Controller Board (assy. no. WD1005WAH).

Jumper	Jumper Position	Function
W1	Not installed	Reserved
W2	Not installed	Reserved
W3	2 to 3	Reserved

8.7 MULTIPURPOSE FIXED DISK DRIVE CONTROLLER BOARDS
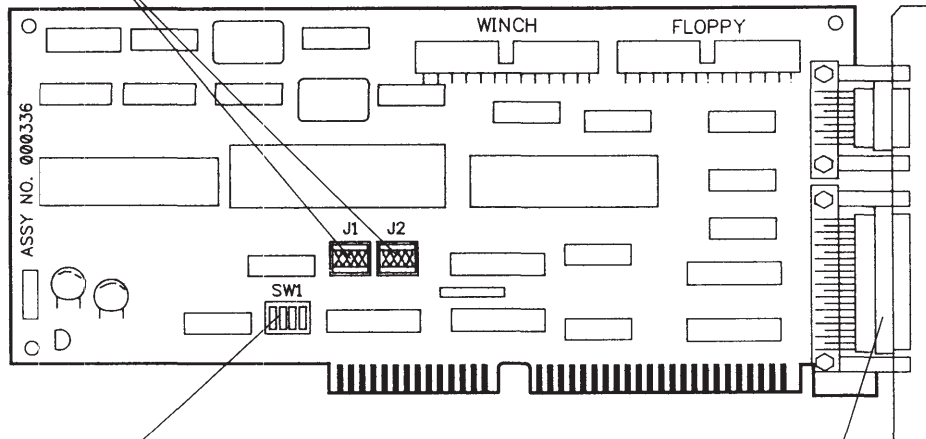
Figure 8-8.   Multipurpose Fixed Disk Drive Controller Board (assy. no. 000336-001 or -021).

Table 8-10. Shunt Jumper and Switch Settings for the Multipurpose Fixed Disk Drive Controller Board (assy. no. 000336-001 and -021)

Jumper or Switch Position	Function	Switch Setting
J1[1] (Shunt Jumper)	Asynchronous communication	Open connectors on left—serial interface COM1 IRQ4 (default) Open connectors on right—serial interface COM2 IRQ3
J2[1]	Controller address	Open connectors on left—primary diskette controller address (default) Open connectors on right— secondary diskette controller address
Switch 1-1	Fixed disk drive	ON = Enable OFF = Disable
Switch 1-2	Parallel printer port	ON = Enable (default) OFF = Disable
Switch 1-3[2]	Serial port	ON = Enable (default) OFF = Disable
Switch 1-4	Reserved	OFF

[1]To change the setting, remove the shunt jumper from its socket, rotate it 180 degrees, then reinstall it in the socket.
[2]Reserved on 000336-001 Rev. P or earlier.

SW500
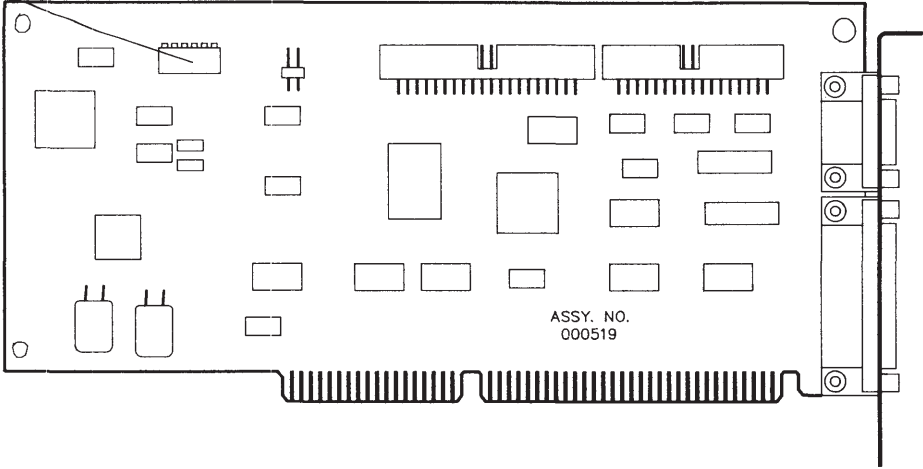
Figure 8-9. Multipurpose Fixed Disk Drive Controller Board (assy. no. 000519 and 000815).

Table 8-11. Switch Settings for the Multipurpose Fixed Disk Drive Controller Board (assy. no. 000519 and 000815)

Switch	Setting/Function
SW500-1	OFF = Primary diskette controller address (default) ON = Secondary diskette controller address
SW500-2	OFF = Disable high-speed transfer rates (for systems without 1.2 Megabyte 5¼-Inch Diskette Drive or 40-Megabyte Fixed Disk Drive Backup) (default) ON = Enable high-speed transfer rates (for systems with 1.2 Megabyte 5¼-Inch Diskette Drive or 40-Megabyte Fixed Disk Drive Backup)
SW500-3	OFF = Enable fixed disk drive ON = Disable fixed disk drive
SW500-4	OFF = Serial interface COM1 IRQ4 (default) ON = Serial interface COM2 IRQ3
SW500-5	OFF = Enable serial port (default) ON = Disable serial port
SW500-6	OFF = Enable parallel port (default) ON = Disable parallel port

8.8. FIXED DISK DRIVE CONTROLLER BOARD
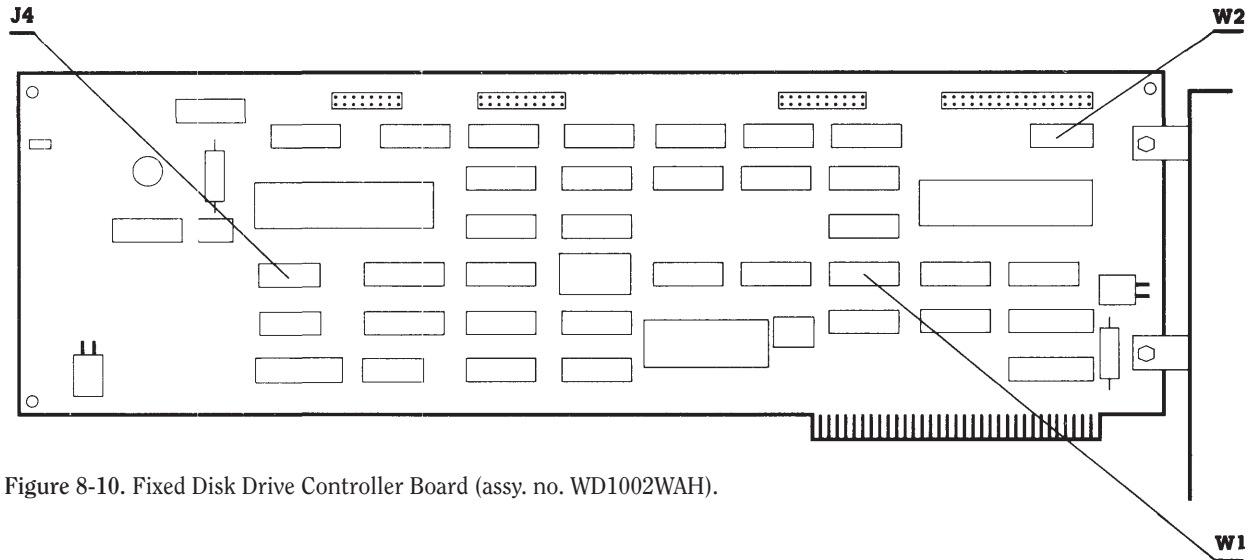
Figure 8-10. Fixed Disk Drive Controller Board (assy. no. WD1002WAH).

Table 8-12. Jumper Settings for the Fixed Disk Drive Controller Board (assy. no. WD1002WAH)

Jumper	Jumper Position	Function
W1	1-2	Reserved; primary controller
W2	NL	Reserved; LED operation
J4	No connection	Reserved

8.9 HOST ADAPTER BOARD
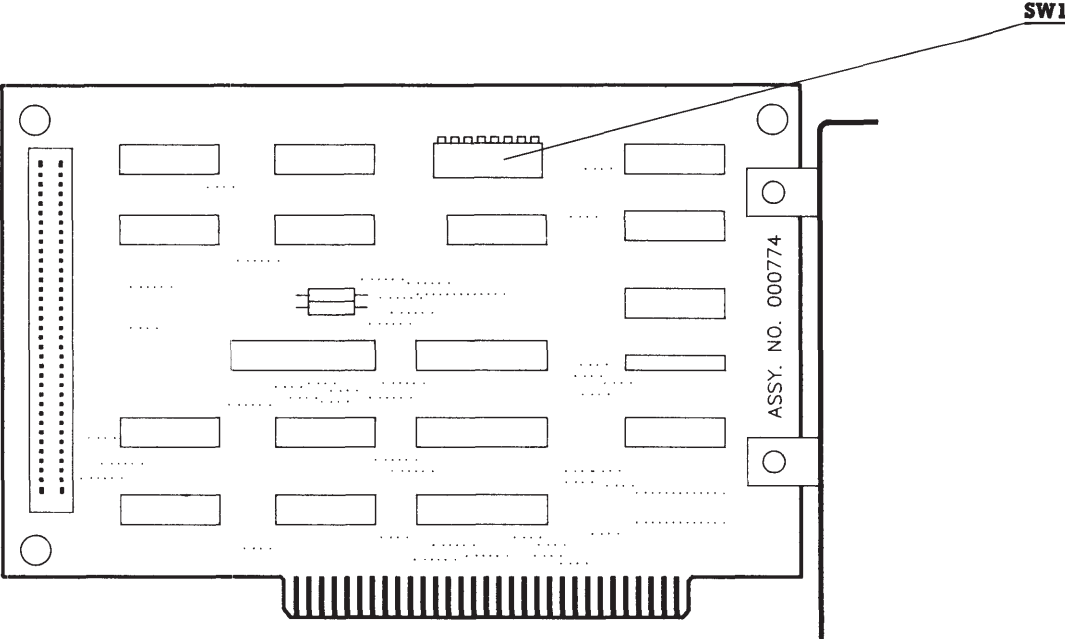
Figure 8-11. Host Adapter Board (assy. no. 000774).

Table 8-13. Switch Settings for the Host Adapter Board

1	2	3	4	5	6	7	8	Function
ON	OFF							Interrupt select IRQ5 (default)
OFF	ON							Interrupt select IRQ3
		ON	OFF	ON	OFF			DMA channel 3 (default)
		OFF	ON	OFF	ON			DMA channel 1
						ON	OFF	Base address 300 hex (default)
						OFF	ON	Base address 200 hex

8.10 COMPAQ ENHANCED COLOR GRAPHICS BOARD
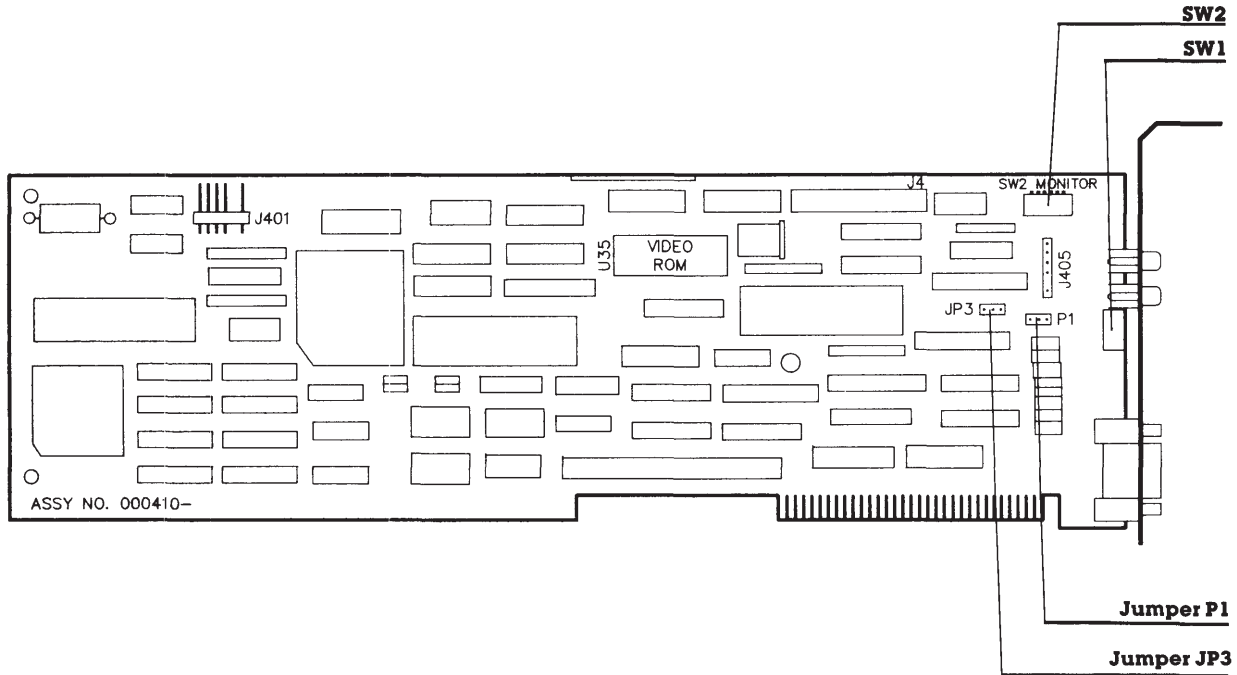
Figure 8-12. COMPAQ Enhanced Color Graphics Boards (assy. no. 000410 and 000471).

The COMPAQ Enhanced Color Graphics Board has two banks of configuration switches (SW1 and SW2) as well as two jumpers (P1 and JP3) that must be positioned to allow the board to work properly with your computer system (Figure 8-18). The monitor you use with the COMPAQ Enhanced Color Graphics Board determines the correct setting for one of the jumpers and one bank of configuration switches.

Another configuration switch bank setting determines whether the COMPAQ Enhanced Color Graphics Board is the only or primary video display controller board, or the secondary video display controller board in your computer. This configuration switch bank also determines the power-on mode and character format of the COMPAQ Enhanced Color Graphics Board when the computer is turned on or rebooted.

The following sections provide jumper and configuration switch locations and instructions on how to set them.

CAUTION

Use care when setting the configuration switches on the COMPAQ Enhanced Color Graphics Board. Many of the components on the board are sensitive to static electricity. Be sure that you are discharged of static electricity by briefly touching a metal object, such as the frame of the computer.

Also, the correct setting of the configuration switches is vital to the operation of the COMPAQ Enhanced Color Graphics Board. Be sure that you set them correctly for your computer system before installing the board.

Configuration Switch Bank SW1

The setting for configuration switch bank SW1 is determined by whether the COMPAQ Enhanced Color Graphics Board is to be used as:

☐   The only video display controller board or the primary video display controller board (the controller board that is active at power-on or reboot). Refer to Table 8-14.

☐   The secondary video display controller board in the computer. Refer to Table 8-15.

To change settings, use the end of a pen to toggle the switch to the correct position.

Table 8-14. SW1 Settings for the COMPAQ Enhanced Color Graphics Board as the Only or Primary Video Display Controller Board

Monitor Type	Power-On Mode	Switches 1	2	3	4
COMPAQ Color, compatible Enhanced Color, or COMPAQ Dual-Mode Monitor	80 × 25 (640 × 350)	OFF	ON	ON	OFF
COMPAQ Color, compatible Enhanced Color, or COMPAQ Dual-Mode Monitor	80 × 25 (640 × 200)	ON	ON	ON	OFF
RGBI Color or COMPAQ Dual-Mode Monitor	80 × 25 (640 × 200)	OFF	OFF	OFF	ON
RGBI Color or COMPAQ Dual-Mode Monitor	40 × 25 (320 × 200)	ON	OFF	OFF	ON
COMPAQ Dual Mode Monitor	80 × 25 (720 × 350)	OFF	OFF	ON	OFF

Table 8-14. SW1 Settings for the COMPAQ Enhanced Color Graphics Board as the Secondary Video Display Controller Board

Monitor Type	Power-On Mode	Switches 1	2	3	4
COMPAQ Color, compatible Enhanced Color, or COMPAQ Dual-Mode Monitor	80 × 25 (640 × 350)	OFF	OFF	ON	ON
COMPAQ Color, compatible Enhanced Color, or COMPAQ Dual-Mode Monitor	80 × 25 (640 × 200)	ON	OFF	ON	ON
RGBI Color or COMPAQ Dual-Mode Monitor	80 × 25 (640 × 200)	OFF	ON	ON	ON
RGBI Color or COMPAQ Dual-Mode Monitor	40 × 25 (320 × 200)	ON	ON	ON	ON
COMPAQ Dual Mode Monitor	80 × 25 (720 × 350)	OFF	ON	OFF	ON

Configuration Switch Bank SW2

The setting for configuration switch bank SW2 is determined by the monitor type that you use with the COMPAQ Enhanced Color Graphics Board.

Table 8-16 SW2 Settings for the COMPAQ Enhanced Color Graphics Board

Monitor Type	Configuration Switches					
	1	2	3	4	5	6
COMPAQ Color, compatible Enhanced Color	OFF	OFF				
RGBI Color	ON	OFF				
COMPAQ Dual-Mode	OFF	ON				
External RGBI enabled			ON			
Internal RGBI enabled (Portables)			OFF			
Reserved				ON	OFF	ON

Configuration Switch Bank SW3

If the SW3 switches are present, they are reserved and should be set to the OFF position.

Jumper P1 Settings for the COMPAQ Enhanced Color Graphics Board

The setting for Jumper P1 is determined by the monitor used with the COMPAQ Enhanced Color Graphics Board (Figures 8-13 and 8-14).

To reset the jumper, remove the jumper from its current pins and press it into place on the correct pins.

Jumper JP3 Setting for the COMPAQ Enhanced Color Graphics Board

Pin 1-2 is the standard factory setting. Do not change this setting.
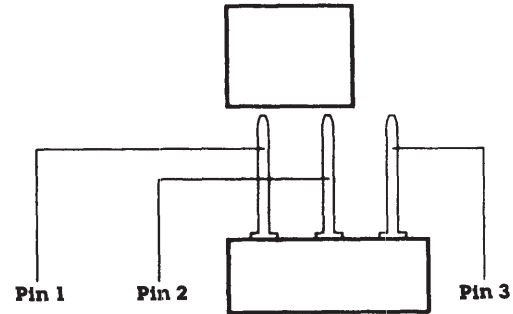
Figure 8-13. Setting for a COMPAQ Color or Compatible Enhanced Color Monitor.
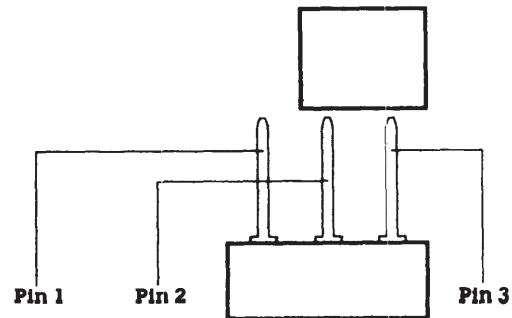
Figure 8-14. Setting for an RGBI Color Monitor or a COMPAQ Dual-Mode Monitor.

8.11 VIDEO DISPLAY CONTROLLER BOARDS

The COMPAQ video display controller boards (assy. no. 000031, 000160, 000345, and 000525) support only those video monitors that require positive and vertical horizontal synchronization pulses. Jumpers J3 and J5 must both be changed at the same time or the video display controller board will not function correctly.

Table 8-17. Jumper Settings for the Video Display Controller Board (assy. no. 000031, 000160 and 000345)

J3	J5	Configuration
2-3	2-3	Enable high-scan video on external outputs (Portable-default)
1-2	1-2	Disable high-scan video on external outputs
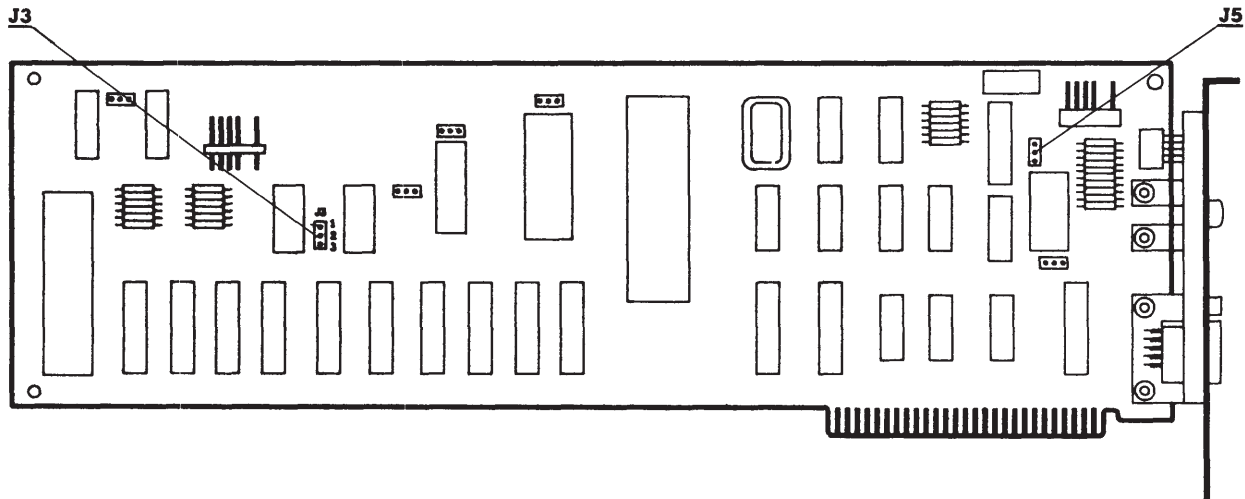
Figure 8-15. Jumper Locations for the Video Display Controller Board (assy. no. 000031).
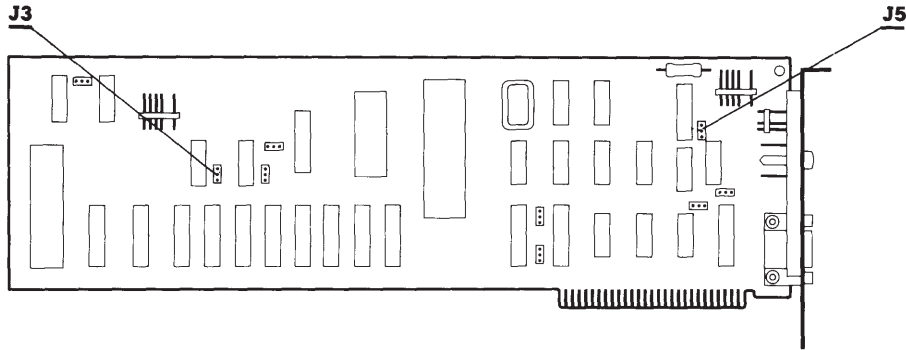
Figure 8-16. Jumper Locations for the Video Display Controller Board (assy. no. 000160).
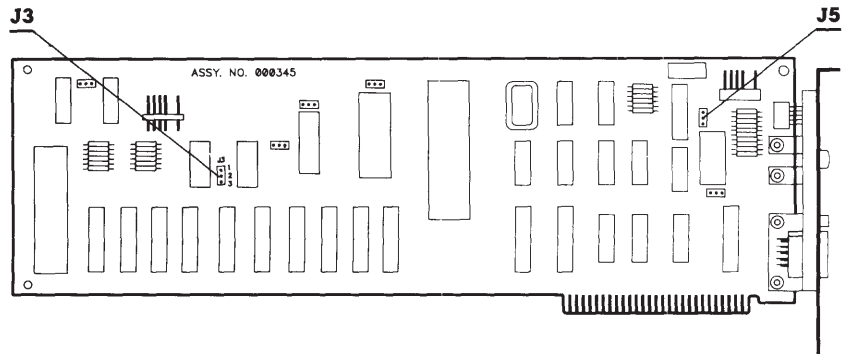
Figure 8-17. Jumper Locations for the Video Display Controller Board (assy. no. 000345).

J3/5
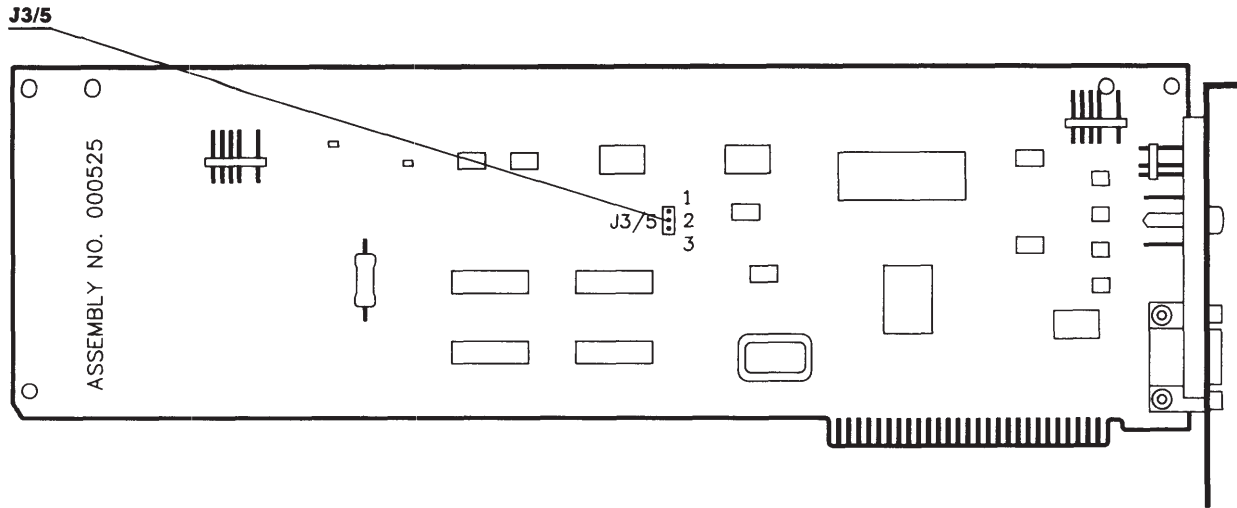
Figure 8-18. Jumper Settings for the Video Display Controller Board (assy. no. 000525).

Table 8-18. Jumper Settings for the Video Display Controller Board (assy. no. 000525).

J3/5	Configuration
2-3	Enable RGBI and composite video (high-scan) (Desktops-default)
1-2	Disable RGBI and composite video (high-scan) (Portables-default)

8.12 COMPAQ VIDEO GRAPHICS CONTROLLER BOARD

J1
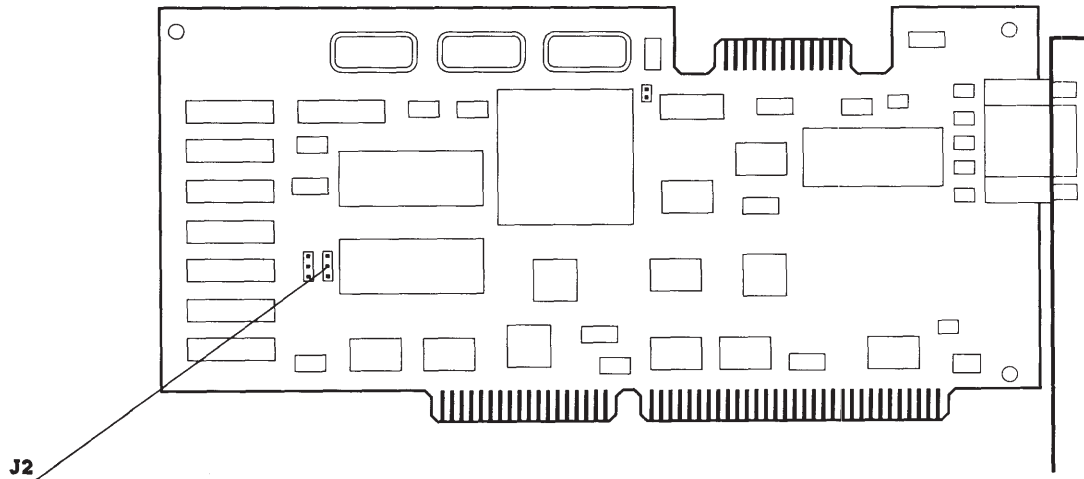
Figure 8-19. Jumper Locations on the COMPAQ Video Graphics Controller Board (assy. no. 109360).

Table 8-19. Jumper Settings for the COMPAQ Video Graphics Controller Board

Jumper	Setting	Function
J1	1-2	Reserved–16-bit (video RAM)
J2	2-3	Reserved–8-bit (video ROM)

8.13 ASYNCHRONOUS COMMUNICATIONS/PARALLEL PRINTER BOARD

Table 8-20. Asynchronous Communications/Parallel Printer Board (assy. no. 000570) Switch Settings

Switch	Function	Setting	
1	Reserved	Always OFF	
2	Asynchronous interface	2 = ON	ENABLED
		2 = OFF	DISABLED
3, 4	Parallel Port Select/Disable		
	LPT1 SELECTED	3 = ON	4 = ON
	LPT2 SELECTED	3 = OFF	4 = ON
	LPT3 SELECTED	3 = ON	4 = OFF
	LPT DISABLED	3 = OFF	4 = OFF
5, 6	Asynchronous interface		
	COM1 SELECTED	5 = ON	6 = ON
	COM2 SELECTED	5 = OFF	6 = ON
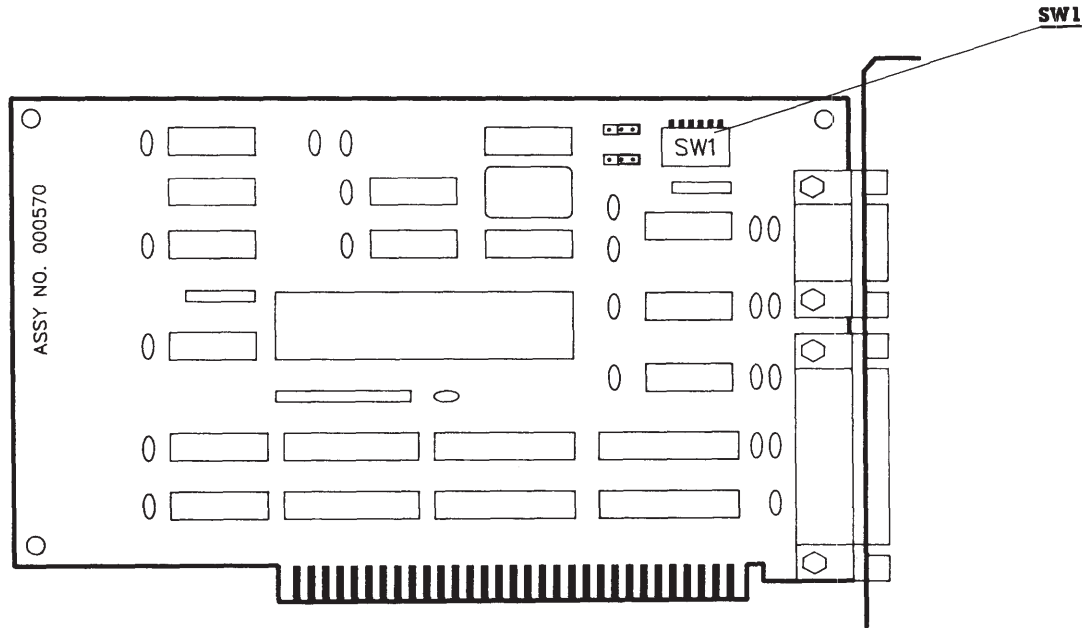
Figure 8-20. Asynchronous Communications/Parallel Printer Board (assy. no. 000570).

Table 8-21. Asynchronous Communications/Parallel Printer Board (assy. no. 000990) Switch Settings

Switch	Function	Setting	
1	Reserved	Always OFF	
2	Reserved	Always OFF	
3, 4	Parallel Port Select/Disable		
	LPT1 SELECTED	3 = ON	4 = ON
	LPT2 SELECTED	3 = OFF	4 = ON
	LPT3 SELECTED	3 = ON	4 = OFF
	LPT DISABLED	3 = OFF	4 = OFF
5, 6	Asynchronous interface		
	COM1 SELECTED	5 = ON	6 = ON
	COM2 SELECTED	5 = OFF	6 = ON
	DISABLE	5 = OFF	6 = OFF

SW1

SW1
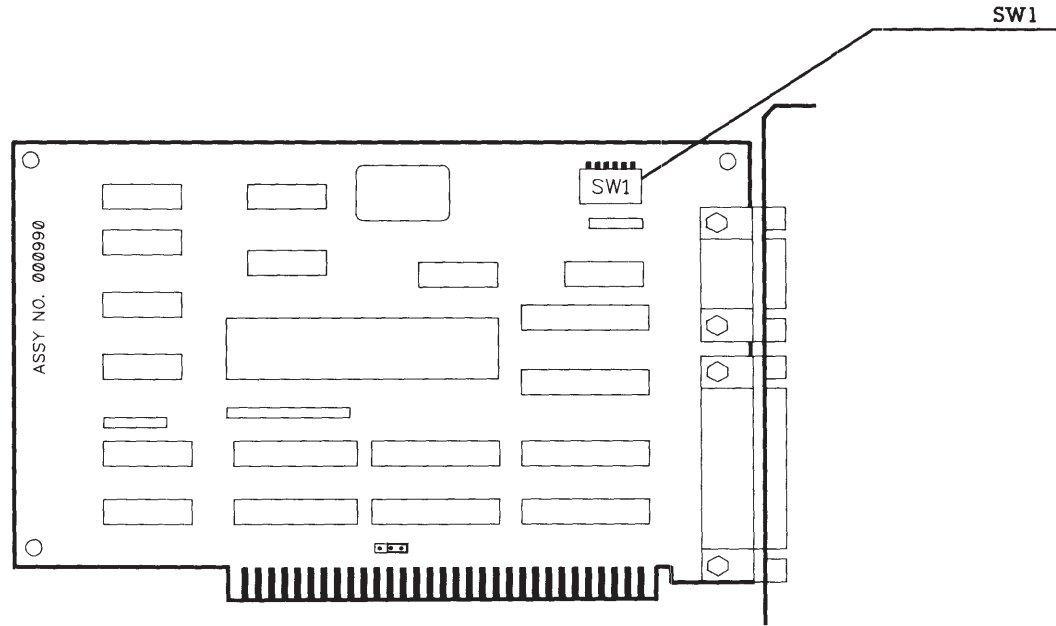
ASSY NO. 000990

Figure 8-21. Asynchronous Communications/Parallel Printer Board (assy. no. 000990).

8.14 300-/600-MEGABYTE FIXED DISK DRIVE EXPANSION UNIT

The 300-/600-Megabyte Fixed Disk Drive Expansion Unit can be used with 386-based COMPAQ desktop systems with ROM revision G or later.

NOTE: A terminating resistor must be installed on a 300-Megabyte Fixed Disk Drive. Refer to *Chapter 7,* **REMOVAL AND REPLACEMENT PROCEDURES,** for detailed steps. If two drives are present in the expansion unit, only one drive should have a terminating resistor.

Whenever more than one drive controller is in a system, one controller must be set as primary; the other controller must be set as secondary.

Table 8-22 lists the SW500 settings when installing the expansion unit with the ESDI External Fixed Disk Drive Controller Board (Figure 8-22). See *Chapter 7,* **REMOVAL AND REPLACEMENT PROCEDURES,** for detailed steps. See *Chapter 9,* **MASS STORAGE CONFIGURATIONS,** for cabling and configurations.

Table 8-22. ESDI External Fixed Disk Drive Controller Board Switch Settings

SW500 Settings			
1	2	3	Function
OFF			Primary fixed disk drive address select
ON			Secondary fixed disk drive address select
	OFF	OFF	Interrupt select IRQ15
	ON	OFF	Interrupt select IRQ14
	OFF	ON	Interrupt select IRQ12
	ON	ON	Interrupt select IRQ11 Default
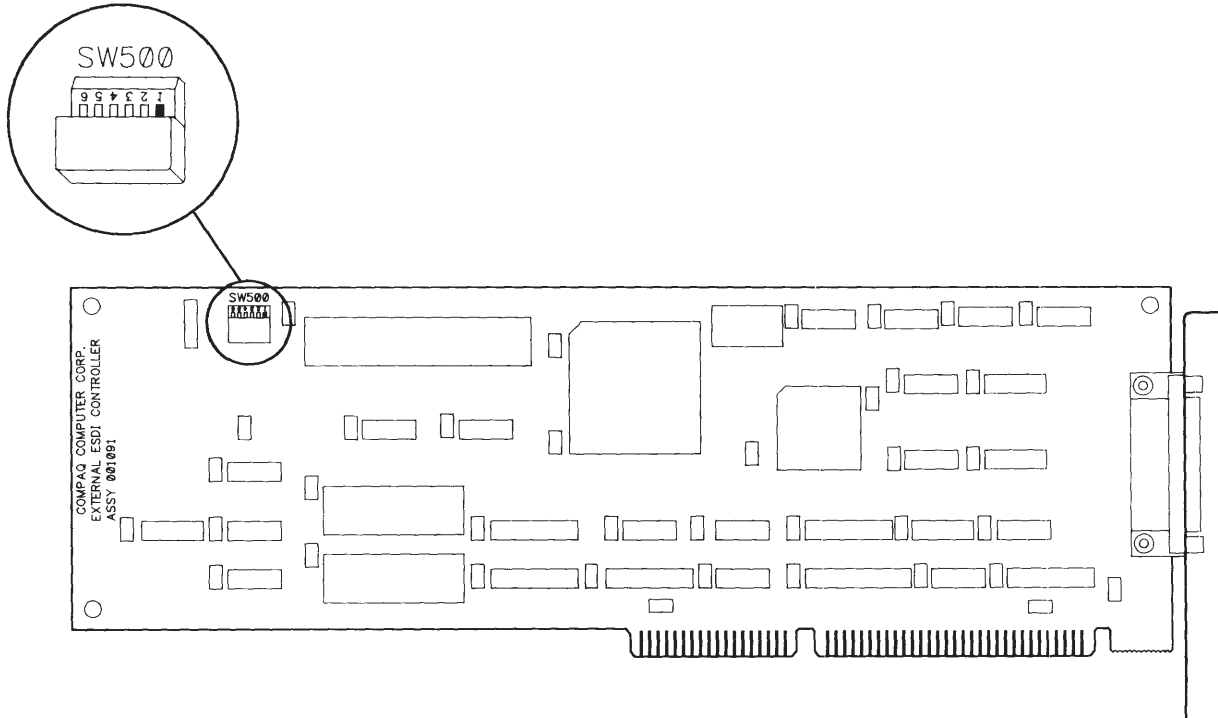
Figure 8-22. ESDI External Fixed Disk Drive Controller Board.

CONTENTS

Chapter 9
MASS STORAGE CONFIGURATION

9.1 THEORY OF OPERATION

The 300-/600-Megabyte Fixed Disk Drive Expansion Unit can be used with a COMPAQ DESKPRO 386-based Personal Computer with system ROM revision G or later. The expansion unit can be used as a normal external fixed disk drive for maximum storage or in a mirroring or duplexing mode. The three options are described below:

☐ Maximum storage. This gives you the maximum storage space available in the drives.

Example: With dual 300-Megabyte fixed disk drives installed in the expansion unit, you would have a total storage capability of 600 megabytes of information. Two expansion units configured this way would give you a maximum of 1.2 gigabytes of storage.

☐ Mirroring. In mirroring, two identical fixed disk drives are connected to a single controller. Special software causes both drives to read and write the same information.

Example: In this case, the same two 300 megabyte drives would only have a total storage capability of 300 megabytes, since the two drives would contain exactly the same information. However, this in turn would keep the system operational and the stored data intact if the hardware for one fixed disk drive failed.

☐ Duplexing. The main difference between mirroring and duplexing is that the two drives in the mirrored unit operate off one controller and the two fixed disk drives in the duplexed unit operate off two controllers. An advantage of using dual controllers for duplexing is that the data retrieval speed is increased and the second controller provides additional protection if the system fails.

Example: In a system where two drives are duplexed, one drive may be reading data while the other drive is seeking the next block of data. The information on both fixed disk drives is the same.

NOTE: For information on component removal and replacement, see *Chapter 7*, **REMOVAL AND REPLACEMENT PROCEDURES.** For information on switch settings, see *Chapter 8*, **JUMPER SETTINGS AND SWITCH SETTINGS.**

9.2 SYSTEM CONFIGURATION

NOTE: Internal cables are not interchangeable between the system unit and the expansion unit.

Maximum Storage

Use the device driver, EXTDISK.SYS, and an operating system such as MS-DOS 3.31 or later to access the capabilities of the 300-/600-Megabyte fixed disk drive expansion unit.

For MS-DOS (with the device driver) to support any two internal fixed disk drives, with one expansion unit, two rules must be followed.

☐ A maximum of two controllers may be plugged into the system bus.

☐ Each controller may support only two fixed disk drives.

    Example: With the use of two expansion units, a total of 1.2 gigabytes of fixed disk storage is available, divided into four 300-Megabyte volumes. This configuration with switch settings is shown in Figure 9-1.

NOTE: For maximum storage the system is connected in the same way as duplexing or mirroring. The only difference between maximum storage and mirroring or duplexing is that the NOVELL software need not be run when the system is configured for maximum storage.
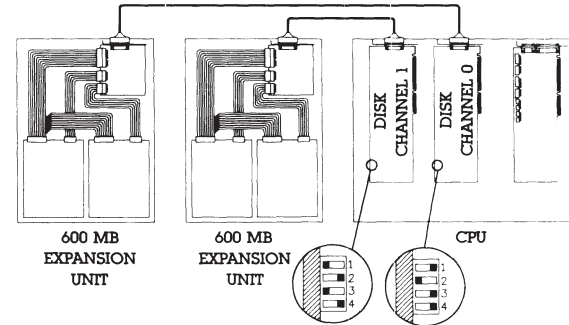
Figure 9-1. System Configured for 1.2 Gigabytes.

Mirroring

IMPORTANT

Novell Netware software must be used when setting up the system for proper operation of the mirroring function.

Two possible mirroring configurations are currently supported by COMPAQ Computer Corporation. The first uses two 40-Megabyte internal half-height fixed disk drives as shown in Figure 9-2.
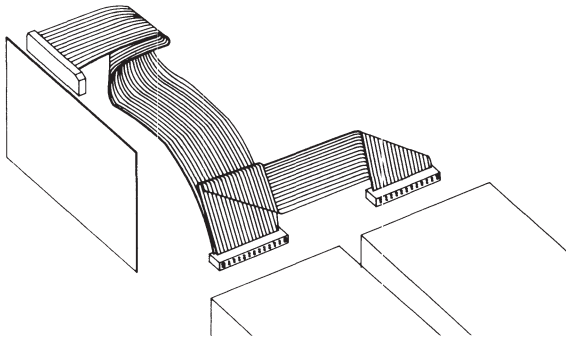
Figure 9-2. Two Mirrored 40-Megabyte Internal Half-Height Fixed Disk Drives.

Mirroring is also supported using one 300-/600-Megabyte expansion unit, equipped with two 300-Megabyte fixed disk drive units, A single external fixed disk drive controller, plugged into the system bus and connected with a cable to an external interface adapter mounted in the expansion unit, complete this implementation (Figure 9-3). In both Figures 9-2 and 9-3, data written to one fixed disk drive is exactly duplicated in the other.
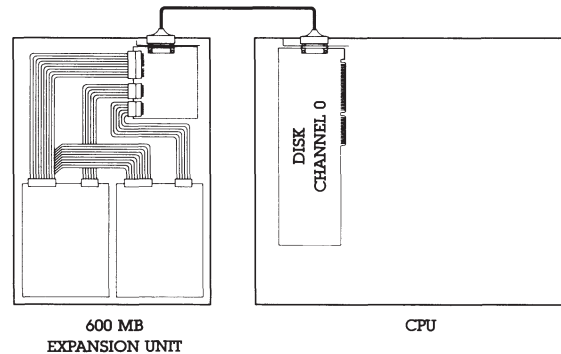
Figure 9-3. Two Mirrored 300-Megabyte fixed disk drives externally mounted in expansion unit.

Duplexing

> ### IMPORTANT
>
> Novell Netware software must be used when setting up the system for the duplexing function to work.

COMPAQ Computer Corporation also supports one duplexing configuration. Duplexing is supported with two separate controllers plugged separately into the System Bus, and requires the use of two 300-/600-Megabyte expansion units, each equipped with two 300-Megabyte fixed disk drives. The two fixed disks in each unit connect to a single adapter board, and to an external fixed disk drive controller via a single cable. This configuration would have two expansion units, four 300-Megabyte fixed disk drives, and two external fixed disk drive controllers plugged into the system bus. In this particular setup, each fixed disk drive would duplex (and duplicate) a drive in the other unit as shown in Figure 9-4.
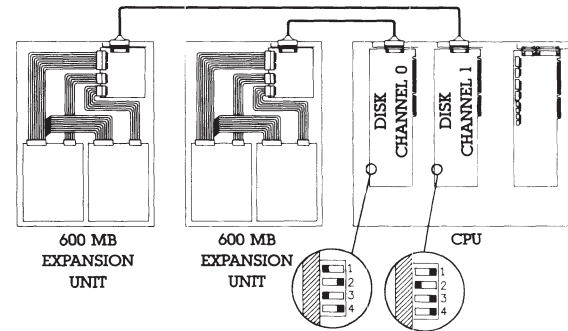
Figure 9-4.   Duplexed Twin Expansion Units With Four 300-Megabyte Fixed Disk Drives.

9.3 SETTING UP THE EXTERNAL FIXED DISK DRIVE EXPANSION UNIT

NOTE: The EXTDISK.SYS device driver needs to be installed in the CONFIG.SYS file only if you are running the expansion unit at the secondary address. If the EXTDISK.SYS device driver is used, then DOS Version 3.31 or later must also be used.

After you run SETUP, insert the EXTDISK into drive A and copy the EXTDISK.SYS file to the directory that contains the MS-DOS files.

You must then modify the CONFIG.SYS file to install the device driver. After modifying the CONFIG.SYS file, restart the computer to load the EXTDISK.SYS device driver in memory.

FDISK Utility

You must install the FDISK utility (FDISK.SYS) device driver in the CONFIG.SYS file before you can use FDISK with the expansion unit. For detailed information about FDISK, refer to your MS-DOS user documentation.

IMPORTANT

Each time you use the FDISK utility with the expansion unit, you must insert the EXTDISK diskette in drive A and restart the computer. Then use the version of FDISK contained on that diskette.

Use the FDISK utility to partition each fixed disk drive that is to be used with the expansion unit. Each fixed disk drive can have up to four partitions.

If the expansion unit is configured at the primary address, that fixed disk drive must contain a primary DOS partition. This primary partition is created with the menu-driven FDISK utility. This fixed disk drive may also contain an extended partition, which can contain logical drives. The total number of logical drives on the system may not exceed 24.

Format Command

After you use FDISK to partition the fixed disk drive, use the FORMAT command on the EXTDISK diskette to format each logical drive on the fixed disk drive. For detailed information on using FORMAT command, refer to the MS-DOS user documentation.

Novell Netware Configuration

To install Mirroring or Duplexing you must use Novell System Fault Tolerant (SFT) NetWare operation (SFT I and SFT II). SFT Local Area Network (LAN) operation helps ensure data integrity by duplicating data files on a second fixed disk drive and by performing read-after-write verification. Three disk configurations that achieve fault tolerant operation are SFT I, SFT II (disk mirroring), and SFT II (disk duplexing).

☐ SFT I (read-after-write verification with "Hot Fix") confirms each write and automatically corrects erroneous writes by relocating data to another portion of the disk.

☐ SFT II (fixed disk mirroring) helps ensure uninterrupted system operation without data loss if a fixed disk drive fails. Disk mirroring requires a single fixed disk drive controller and two identical fixed disk drives. The Novell ATDISK driver supports SFT II (disk mirroring) for a single fixed disk drive controller system. The COMPAQ CPQDSK driver supports SFT II (disk mirroring) for a single or dual disk controller system.

☐ SFT II (disk duplexing) goes beyond disk mirroring in both fault tolerance and performance. It helps ensure continuous system operation if either a fixed disk drive or a controller fails. It improves performance by simultaneously servicing two disk write or read requests and by selecting the fixed disk drive that is best able to service a given read request. Duplexed drives typically perform read operations twice as quickly as mirrored drives. Disk duplexing requires two fixed disk drive controllers and two identical fixed disk drives.

IMPORTANT

Do not use CPQDSK or NVCPQDSK for non-dedicated servers.

The EXTDISK diskette contains two versions of the Value Added Disk Driver (VADD) for Novell NetWare: CPQDSK and NVCPQDSK. Both versions operate in dedicated servers running Novell NetWare (V2.1x). The two versions are identical except the CPQDSK performs a read-after-write verification and NVCPQDSK does not.

☐ NVCPQDSK executes disk write operations over two times faster than CPQDSK because it does not perform read-after-write verification.

NOTE: The probability of unrecoverable disk write errors with mirrored or duplexed drives is very low, since erroneous data on one fixed disk drive can usually be recovered from the second. Disk configurations that do not use mirroring or duplexing depend on the inherent reliability of the fixed disk drive and tape backup units as the only protection against disk errors.

☐ NVCPQDSK is for use with mirrored or duplexed disk configurations that require maximum performance.

   NOTE: Execution of the NetWare UNMIRROR command terminates write duplication on mirrored or duplexed drives. The UNMIRROR command has no effect on which disk drive is in use. NetWare must be reinstalled in order to change from one fixed disk drive to another.

To prepare the 1:1 Interleave Buffered ESDI External Fixed Disk Drive Controller Board, complete the following steps:

1. Select the primary or alternate disk controller address and the IRQ level using the appropriate switches. Select IRQ11, IRQ12, or IRQ15 for the external fixed disk controller operating as a secondary channel.

   NOTE: If you are using the external fixed disk drive controller and have the internal fixed disk drive controller disabled, select IRQ14. If you are using two fixed disk drive controllers, one must be defined as IRQ14 and the other can be IRQ11, IRQ12, or IRQ15. (Most other COMPAQ fixed disk drive controllers use the primary address and IRQ14).

2. Verify that the interrupt level chosen does not conflict with interrupts for other installed devices.

3. Install the external fixed disk drive controller. Refer to *Chapter 7,* **REMOVAL AND REPLACEMENT PROCEDURES.**

4. Follow the instructions in *Chapter 3,* **SETUP PROGRAM,** for running the SETUP program to initialize the CMOS memory to reflect the number of fixed disk drives currently installed.

5. Insert the EXTDISK diskette into drive A and restart the computer.

6. Copy the files with .DSK extensions from the root directory of the EXTDISK diskette to the working copy of the NetWare AUXGEN diskette.

☐ If you are running the Novell NETGEN program from a fixed disk drive or network, you may want to create a subdirectory for the files with .OBJ extensions found in the root directory or the EXTDISK diskette. If so, create a directory named "DSK_DRV_.203" and copy the files with .OBJ extensions into the directory.

☐ If you are running the Novell NETGEN program from diskettes, the program prompts you to "Insert the disk DSK_DRV_.203 in any drive." At this point, insert the EXTDISK diskette into the diskette drive.

☐ If you are installing NetWare V2.1, you must apply a patch to several files. (No patches are required for V2.11.) After copying the following files to a separate workspace, apply the COMP21 patch:

COMPSURF.OBJ	(from UTILOBJ-1 diskette)
DISKED.OBJ	(from UTILOBJ-1 diskette)
INSTOVL.OBJ	(from UTILOBJ-2 diskette)

The following files should appear in the root directory of the EXTDISK diskette:

COMP21.BAT	Batch file to run patch
COMP21.DOC	Documentation for patch
SFTPATCH.EXE	Main patch program

7. If you applied the patch, place the patched files on the working copies of the appropriate NetWare diskettes. Use the NETGEN program to generate and link the NetWare operating system and utilities.

8. Run COMPSURF to perform a surface analysis on the server fixed disk drives. The following are appropriate responses to COMPSURF prompts:

Format the disk?	N
Retain the bad block list?	N
Enter bad blocks?	N
Number of sequential passes	At least 1 (one) pass
Random I/O operations	Take the default number

9. Use the "NetWare Installation" option from the NETGEN Main Menu to install NetWare.

NOTE: When installing NetWare on high capacity fixed disk drives, the NETGEN program may halt and display the following message:

ABEND: Not enough memory for disk FAT tables.

The NETGEN memory requirements does not leave enough memory to store the File Allocation Table for large SYS: volumes. The solution is to avoid the "NetWare Installation" choice on the NETGEN Main Menu and install the software manually.

From the A > prompt, enter the following
commands:

Command	Where x is:	When Using:
INSTOVL 1x	SUPPORT	5¼-Inch Diskettes
	NETGEN	3½-Inch Diskettes
NINSTALL -ox-pr	1	Advanced Netware
	2	SFT NetWare
	3	SFT NetWare with TTS
INSTOVL 2x	SUPPORT	5¼-Inch Diskettes
	NETGEN	3½ -Inch Diskettes
BOLDFACE = Screen Commands		

Appendix A
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