

**COMPUPRO 8/16 COMPUTERS**

**SERVICE MANUAL**

**SBXCES010**

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**CHAPTER 1 GENERAL DATA  
COMPUPRO COMPUTERS SERVICE MANUAL**

## 1.1 HOW TO USE THIS SERVICE MANUAL

This service manual provides information necessary for maintenance of the CompuPro® 816 Computers.

### 1.1.1 MANUAL CONTENT

The manual is divided into eight chapters. Content of chapters is described below.

#### Chapter 1. General Data

This chapter provides information or instructions for manual usage, specifications, tools and supplies lists, and general procedures.

#### Chapter 2. Installation

This chapter provides procedures for installation equipment by a Service Representative.

#### Chapter 3. Repair Data

This chapter provides procedures for removal, replacement, and adjustment of parts. Each procedure refers to related parts list (PL) in Chapter 4.

#### Chapter 4. Parts Identification

This chapter provides exploded view illustrations of parts (and parts configuration) and a matching list of parts descriptions. The parts list refers to the related repair procedures in Chapter 3. Symbols used on parts illustrations are defined in Section 1.1.2.

#### Chapter 5. Print/Display Quality

This chapter is provided only in applicable manuals.

#### Chapter 6. Troubleshooting

This chapter provides CompuPro 816 Computers troubleshooting introduction and explanations, Level 1 Checkout, Level 2 Check Charts, and power distribution BSDs.

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**1.1.2 MANUAL SYMBOLS**

Symbols used in this service manual are defined below.

<b>6</b>	REMOVAL AND REPLACEMENT
<b>7</b>	ADJUSTMENT
<b>8</b>	REMOVAL, REPLACEMENT, AND ADJUSTMENT

Figure 1-2 Repair Procedure Symbols

Repair procedure symbols appear on exploded view illustrations in Chapter 4, located near the applicable item number on the drawing. The number within the symbol matches the number of the repair procedure provided in Chapter 3.

**1.1.3 REVISION MARKS**

Service manual revisions are provided by a change package or a new issue of the manual. On the changed or added pages, a letter (at the bottom of the page) is used to identify level of revision. The following list defines methods used to identify the changes on each page.

Text	Change bar in left margin
Tables	Change bar at left side of the changed data
Changed Illustrations	Number (indicating the level of revision) next to drawing number; change bar at left side of drawing number
New Illustrations	Change bar at left side of drawing number

When additional levels of revision are needed, revision marks for earlier revisions are taken out, and only new revisions are identified. Each revision includes a new title page containing a Revision Control List. The list provides page numbers where revisions have occurred as well as letters identifying the level of revision.

1.2 SPECIFICATIONS

1.2.1 CONFIGURATIONS

Table 1-1 CompuPro Computers					
Hardware	Configurations				
	816/A	816/B	816/C	816/D	System 68K
<b>Required Hardware</b>					
Desktop Enclosure 2	X	X	X	X	X
Floppy Disk Enclosure	X	X	X	X	X
Disk 1 PWA	X	X	X	X	X
CPU 8085/88 PWA	X	X	X		
CPU 8086/87 PWA				X	
CPU 68K PWA					X
System Support 1 PWA	X	X	X	X	X
Interfacer 4 PWA	X			X	X
Interfacer 3		X <sup>Note 2</sup>	X <sup>Note 3</sup>	X <sup>Note 3</sup>	
M/Drive/H PWA				X	X
Memory Size <sup>Note 1</sup>	128K	256K	384K	512K	256K

Note 1: System memory is obtained by using RAM 16, RAM 17, or RAM 21 PWAs

Note 2: Interfacer 3 PWA with 5 serial ports (not fully populated).

Note 3: Interfacer 3 PWA with 8 serial ports (fully populated).

**1.2.2 ELECTRICAL SPECIFICATIONS**

Circuit conductors and ground conductors must be installed in accordance with local electrical requirements. A standard 15A, 2-pole, 3-wire grounded duplex receptacle is required for proper machine operation.

AC power is obtained from a grounded wall outlet. Voltages required at the wall outlet are 103 to 127 VAC line to neutral, 0 to 3 VAC neutral to ground, at 60 Hz.

CHAPTER 2 INSTALLATION  
COMPUPRO COMPUTERS SERVICE MANUAL

### 2.1 PRELIMINARY CHECKS

1. MEASURE AND VERIFY VOLTAGE AT WALL RECEPTACLE (FIGURE 2-1).

#### CAUTION

If any of the voltage measurements is not as specified below, the cause must be corrected. Inform the customer that the equipment must not be connected to the wall receptacle, and that a licensed electrician must correct the wiring. Do not try to make the correction. If the improper condition has not been corrected before the next call, provide a written report to your manager about the improper wiring.

- a. Move meter RANGE switch to 150 VAC scale.
- b. Measure voltage between AC hot (ACH) and neutral (ACN).
- c. Verify that meter reading is between 103 VAC and 127 VAC.
- d. Measure voltage between ACH and ground (GND).
- e. Verify that meter reading is between 103 VAC and 127 VAC.
- f. Measure voltage between GND and ACN.
- g. Verify that meter reading is less than 3 VAC.

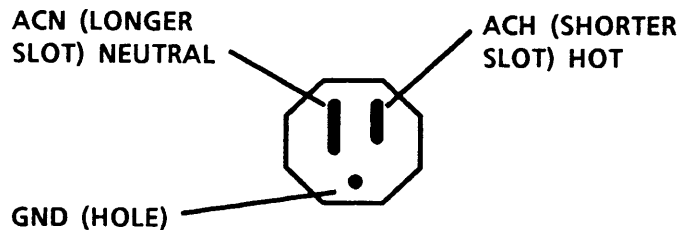


Figure 2-1 Wall Receptacle )



**2.2 COMPUPRO 816 COMPUTERS INSTALLATION**

1. REMOVE THE DESKTOP ENCLOSURE 2 FROM SHIPPING CARTON AND CHECK FOR DAMAGE.
  - a. Open shipping carton carefully to preserve packing materials and store for possible future use.
  - b. Remove any accessories (manuals, cables) packed with unit.
  - c. Remove Desktop Enclosure 2 from carton and place on a desk or table.
  - d. Check unit for damage.
2. REMOVE FLOPPY DISK ENCLOSURE FROM SHIPPING CARTON AND CHECK FOR DAMAGE.
  - a. Open shipping carton carefully to preserve packing materials and store for possible future use.
  - b. Remove any accessories (manuals, cables) packed with unit.
  - c. Remove Floppy Disk Enclosure from carton and place next to the Desktop Enclosure 2.
  - d. Check unit for damage.
3. CONNECT FLOPPY DISK ENCLOSURE TO DESKTOP ENCLOSURE 2.
  - a. Locate the 50 pin flat ribbon cable.
  - b. Connect one end of the cable to the DISK connector on the rear of the Desktop Enclosure 2.
  - c. Connect the other end to the DISK connector on the rear of the Floppy Disk Enclosure.
4. CONNECT SYSTEM CONSOLE TERMINAL TO DESKTOP ENCLOSURE 2.
  - a. Connect the Terminal to TERMINAL 0 connector at rear of Desktop Enclosure 2.
5. IF APPLICABLE, CONNECT THE REMAINING TERMINALS.
6. REMOVE THE FLOPPY DISK ENCLOSURE AND DESKTOP ENCLOSURE TOP COVERS AND CHECK FOR LOOSE CONNECTORS, AND CORRECT CONFIGURATION (FIGURES 2-2 TO 2-16)
7. CONNECT THE AC POWER CORDS.
8. PERFORM LEVEL 1 CHECKOUT TO VERIFY SYSTEM IS WORKING PROPERLY.

## STANDARD SWITCH SETTINGS

CPU 8085/88	off	S1	on	off	S2	on	off	S3	on
		1	x	x	1		x	1	
		2	x	x	2			2	x
		3	x	x	3		x	3	
	x	4		x	4		x	4	
	x	5		x	5		x	5	
	x	6		x	6		x	6	
		7	x	x	7		x	7	
	x	8		x	8		x	8	

DISK 1	off	S1	on	off	S2	on
		1	x	x	1	
x		2			2	x
x		3		x	3	
x		4		x	4	
x		5			5	x
x		6			6	x
x		7			7	x
x		8			8	x

Jumper Settings:  
 J4 — Install a jumper  
 J16 — Install a jumper  
           on B-C  
 J17 — Jumper A-C

INTERFACER 4	off	S1	on	off	S2	on	off	S3	on
	x	1			1	x		1	x
	x	2			2	x		2	x
	x	3		x	3			3	x
	x	4		x	4			4	x
	x	5			5	x	x	5	
	x	6			6	x	x	6	
	x	7			7	x	x	7	
	x	8		x	8		x	8	
					9	x			
					10	x			

## Jumper Settings:

J1 — No shunt	J26 — Jumper A-B and C-D for parallel printer Jumper A-C and B-D for serial printer.
J2 — Bottom installed with Epson printer / No shunt otherwise	JS1, JS2, JS3 — Install shunt, shorting all 8 lines.
J3 — Top installed with Epson printer / No shunt otherwise	JS4 — No connections
J4 — Bottom installed with both Epson and Centronics	JS5 — Connect pins 13-16 to pin 5
J5-J25 — Removed	JS6 — Connect pins 9-12 to pin 6

SYSTEM SUPPORT 1	off	S1	on	off	S2	on	off	S3	on
	x	1			1	x	x	1	
	x	2			2	x	x	2	
	x	3			3	x	x	3	
		4	x		4	x	x	4	
	x	5		x	5			5	x
	x	6		x	6		x	6	
		7	x	x	7			7	x
	x	8		x	8		x	8	

Jumper Settings:

J1 — Serial port connection  
 J2 — Insert an eight pin dip shunt, leaving the lower five pins on the right side out. Leaving the first three wires shunted effectively makes a 3-wire serial connection.

J3 — Plug an auxiliary battery cable into this connector, red wire toward the left.  
 J8 — Install an eight pin shunt  
 J13 — Insert a shorting plug onto prongs 8 and C.  
 Remaining jumpers are left unconnected.  
 U16 — Install the "Go 86" EPROM

RAM 17's	Both Boards		1st 64K		2nd 64K	
	off	S1 on	off	S2 on	off	S2 on
	x	1	x	1	x	1
		2	x	2		2
		3	x	3		3
		4	x	4		4
		5	x	5		5
		6	x	6		6
		7	x	7		7
		8	x	8		8
		9	x	9	x	9
		10	x	10		10

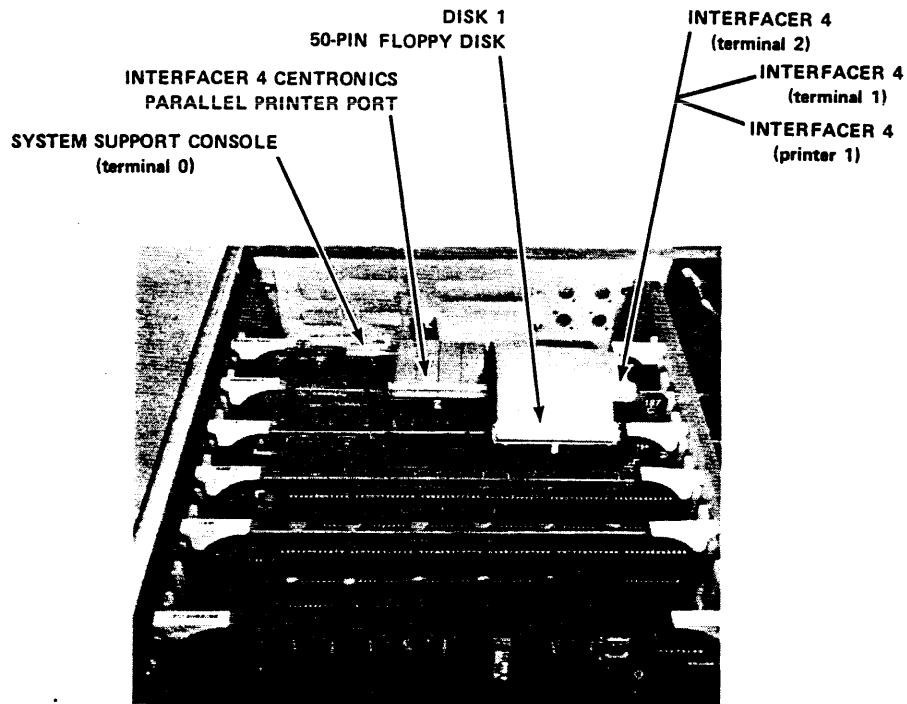
RAM 16's — - or -

1st 64K		2nd 64K	
off	S1 on	off	S1 on
	1 x		1 x
	2 x		2 x
	3 x		3 x
	4 x		4 x
	5 x		5 x
	6 x		6 x
	7 x		7 x
	8 x	x	8

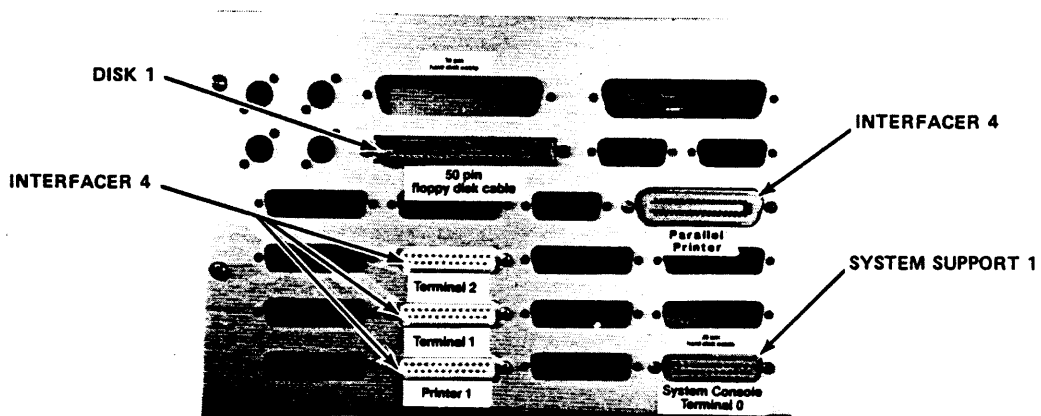
RAM 21 — - or -

off	S1	on
	1	x
	2	x
	3	x
	4	x
	5	x
	6	x
	7	x
	8	x

Figure 2-3 816/A Standard Switch Settings (Continued)



FOR MAXIMUM COOLING LEAVE EMPTY SLOTS BETWEEN BOARDS.



**STANDARD SWITCH SETTINGS**

CPU 8085/88	—	off	S1	on	off	S2	on	off	S3	on
			1	x	x	1		x	1	
			2	x	x	2			2	x
			3	x	x	3		x	3	
		x	4		x	4		x	4	
		x	5		x	5		x	5	
		x	6		x	6		x	6	
			7	x	x	7		x	7	
		x	8		x	8		x	8	

DISK 1	—	off	S1	on	off	S2	on
			1	x	x	1	
		x	2		2	x	
		x	3		x	3	
		x	4		x	4	
		x	5		5	x	
		x	6		6	x	
		x	7		7	x	
		x	8		8	x	

Jumper Settings:  
 J4 — Install a jumper  
 J16 — Install a jumper  
           on B-C  
 J17 — Jumper A-C

INTERFACER 3-5	—	off	S1	on
		x	1	
			2	x
			3	x
			4	x
		x	5	
			6	x
			7	x
			8	x

**Jumper Settings:**

- J1 — Insert a dip shunt, shunting lines 1, 2 and 3 for 3-wire, no handshaking. Consult manual for hardware handshaking.
- J2 — Insert a dip shunt, shunting lines 1, 2 and 3 for 3-wire, no handshaking. Consult manual for hardware handshaking.
- J15 — Connect pins 9-16 to pin 5
- J16 — Connect pins 1-8 to pin 11
- J17 — Jumper two top pins.

Remaining jumpers left unconnected.

<b>SYSTEM SUPPORT 1</b>	—	off	S1	on		off	S2	on		off	S3	on
		x	1				1	x		x	1	
		x	2				2	x		x	2	
		x	3				3	x		x	3	
			4	x			4	x		x	4	
		x	5			x	5				5	x
		x	6			x	6			x	6	
			7	x		x	7				7	x
		x	8			x	8			x	8	

Jumper Settings:

- J1 — Serial port connection
  - J2 — Insert an eight pin dip shunt, leaving the lower five pins on the right side out. Leaving the first three wires shunted effectively makes a 3-wire serial connection.
  - J3 — Plug an auxiliary battery cable into this connector, red wire toward the left.
  - J8 — Install an eight pin shunt
  - J13 — Insert a shorting plug onto prongs 8 and C.
- Remaining jumpers are left unconnected.  
U16 — Install the "Go 86" EPROM

RAM 17's —

ALL BOARDS			1st 64K			2nd 64K			3rd 64K			4th 64K		
off	S1	on	off	S2	on	off	S2	on	off	S2	on	off	S2	on
x	1		x	1		x	1		x	1		x	1	
	2	x		2	x		2	x		2	x		2	x
	3	x		3	x		3	x		3	x		3	x
	4	x		4	x		4	x		4	x		4	x
	5	x		5	x		5	x		5	x		5	x
	6	x		6	x		6	x		6	x		6	x
	7	x		7	x		7	x		7	x		7	x
	8	x		8	x		8	x	x	8		x	8	
	9	x		9	x	x	9			9	x		9	x
	10	x		10	x		10	x		10	x		10	x

RAM 16's —

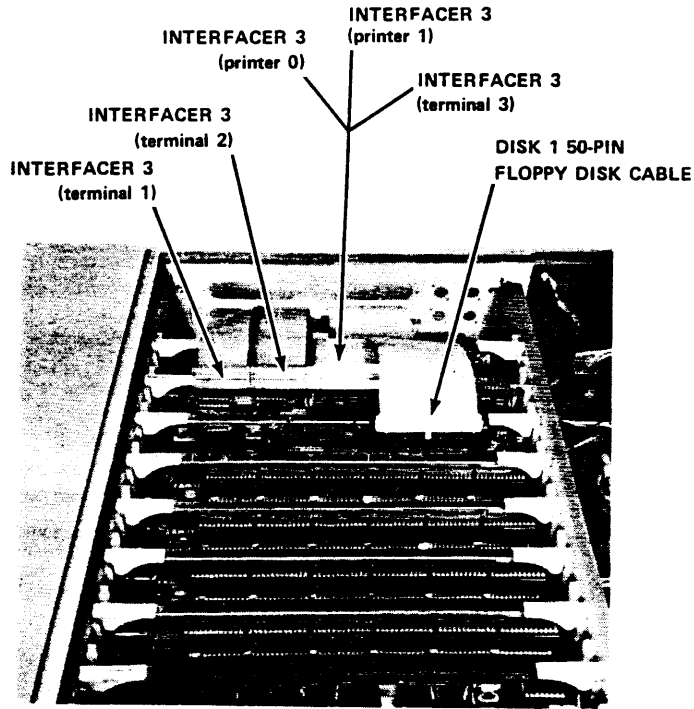
1st 64K			2nd 64K			3rd 64K			4th 64K		
off	S1	on	off	S1	on	off	S1	on	off	S1	on
1	x		1	x		1	x		1	x	
2	x		2	x		2	x		2	x	
3	x		3	x		3	x		3	x	
4	x		4	x		4	x		4	x	
5	x		5	x		5	x		5	x	
6	x		6	x		6	x		6	x	
7	x		7	x	x	7		x	7		x
8	x		x	8		8	x		x	8	

- or -

RAM 21's —

1st 128K			2nd 128K		
off	S1	on	off	S1	on
1	x		1	x	
2	x		2	x	
3	x		3	x	
4	x		4	x	
5	x		5	x	
6	x		6	x	
7	x		7	x	x
8	x		8	x	

NOTE: THE SYSTEM SUPPORT 1 SYSTEM CONSOLE CABLE (terminal 0) IS NOT SHOWN IN PHOTO BECAUSE IT IS UNDERNEATH THE OTHER CABLES.



FOR MAXIMUM COOLING LEAVE EMPTY SLOTS BETWEEN BOARDS.

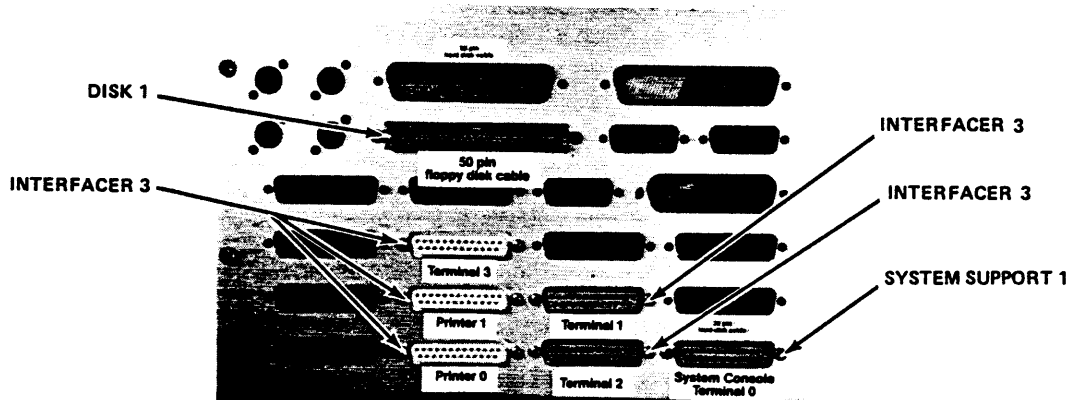


Figure 2-7 816/B Cable Connections

---

CPU 8085/88	—	off	S1	on	off	S2	on	off	S3	on
			1	x	x	1		x	1	
			2	x	x	2			2	x
			3	x	x	3		x	3	
		x	4		x	4		x	4	
		x	5		x	5		x	5	
		x	6		x	6		x	6	
			7	x	x	7		x	7	
		x	8		x	8		x	8	

---

DISK 1	—	off	S1	on	off	S2	on	
			1	x	x	1		
		x	2			2	x	Jumper Settings:
		x	3		x	3		J4 — Install a jumper
		x	4		x	4		J16 — Install a jumper
		x	5			5	x	on B-C
		x	6			6	x	J17 — Jumper A-C
		x	7			7	x	
		x	8			8	x	

---

INTERFACER 3-8	—	off	S1	on	
		x	1		J1 — Insert a dip shunt, shunting lines 1, 2 and 3 for 3-wire no handshaking. Consult manual for hardware handshaking.
			2	x	J2 — Insert a dip shunt, shunting lines 1, 2 and 3 for 3-wire, no handshaking. Consult manual for hardware handshaking.
			3	x	
			4	x	
		x	5		J15 — Connect pins 9-16 to pin 5
			6	x	J16 — Connect pins 1-8 to pin 11
			7	x	J17 — Jumper two top pins.
			8	x	Remaining jumpers left unconnected.

---

SYSTEM SUPPORT 1	—	off	S1	on	off	S2	on	off	S3	on
		x	1			1	x	x	1	
		x	2			2	x	x	2	
		x	3			3	x	x	3	
			4	x		4	x	x	4	
		x	5		x	5			5	x
		x	6		x	6		x	6	
			7	x	x	7			7	x
		x	8		x	8		x	8	

Jumper Settings:

- J1 — Serial port connection
- J2 — Insert an eight pin dip shunt, leaving the lower five pins on the right side out. Leaving the first three wires shunted effectively makes a 3-wire serial connection.
- J3 — Plug an auxiliary battery cable into this connector, red wire toward the left.
- J8 — Install an eight pin shunt
- J13 — Insert a shorting plug into prongs 8 and C.

Remaining jumpers are left unconnected.

U16 — Install the "Go 86" EPROM.

---



RAM 17's

ALL BOARDS			1st 64K			2nd 64K			3rd 64K		
off	S1	on	off	S2	on	off	S2	on	off	S2	on
x	1		x	1		x	1		x	1	
	2	x		2	x		2	x		2	x
	3	x		3	x		3	x		3	x
	4	x		4	x		4	x		4	x
	5	x		5	x		5	x		5	x
	6	x		6	x		6	x		6	x
	7	x		7	x		7	x		7	x
	8	x		8	x		8	x	x	8	
	9	x		9	x	x	9			9	x
	10	x		10	x		10	x		10	x

4th 64K			5th 64K			6th 64K		
off	S2	on	off	S2	on	off	S2	on
x	1		x	1		x	1	
	2	x		2	x		2	x
	3	x		3	x		3	x
	4	x		4	x		4	x
	5	x		5	x		5	x
	6	x		6	x		6	x
	7	x	x	7		x	7	
x	8			8	x		8	x
x	9			9	x	x	9	
	10	x		10	x		10	x

RAM 16's

- or -

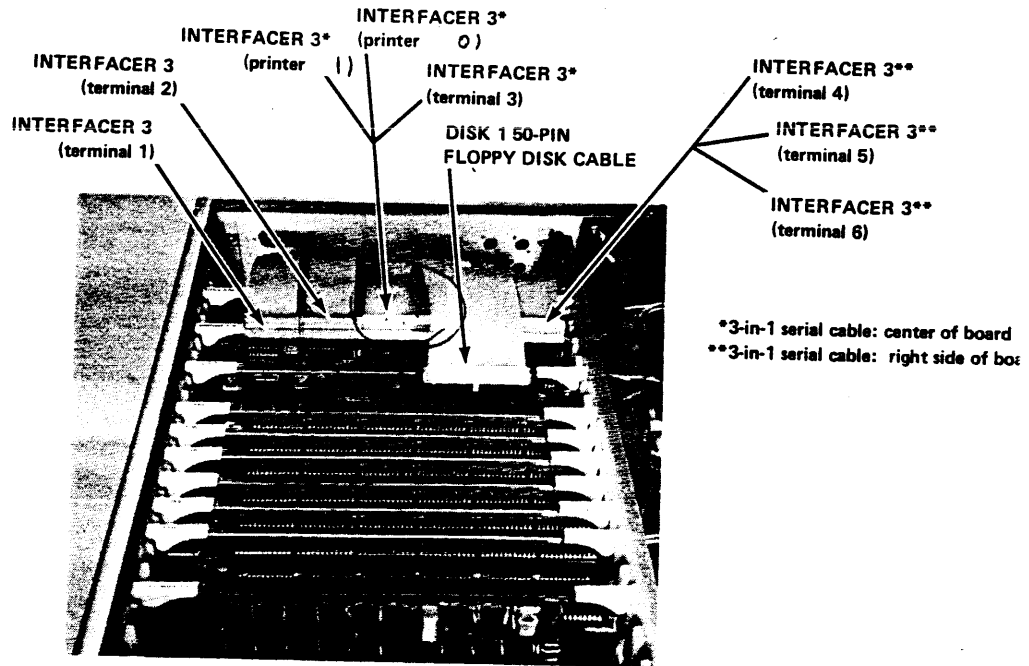
1st 64K			2nd 64K			3rd 64K			4th 64K			5th 64K			6th 64K		
off	S1	on	off	S1	on	off	S1	on	off	S1	on	off	S1	on	off	S1	on
1	x		1	x		1	x		1	x		1	x		1	x	
2	x		2	x		2	x		2	x		2	x		2	x	
3	x		3	x		3	x		3	x		3	x		3	x	
4	x		4	x		4	x		4	x		4	x		4	x	
5	x		5	x		5	x		5	x		5	x		5	x	
6	x		6	x		6	x		6	x		x	6		x	6	
7	x		7	x		x	7		x	7		7	x		7	x	
8	x		x	8		8	x		x	8		8	x		x	8	

- or -

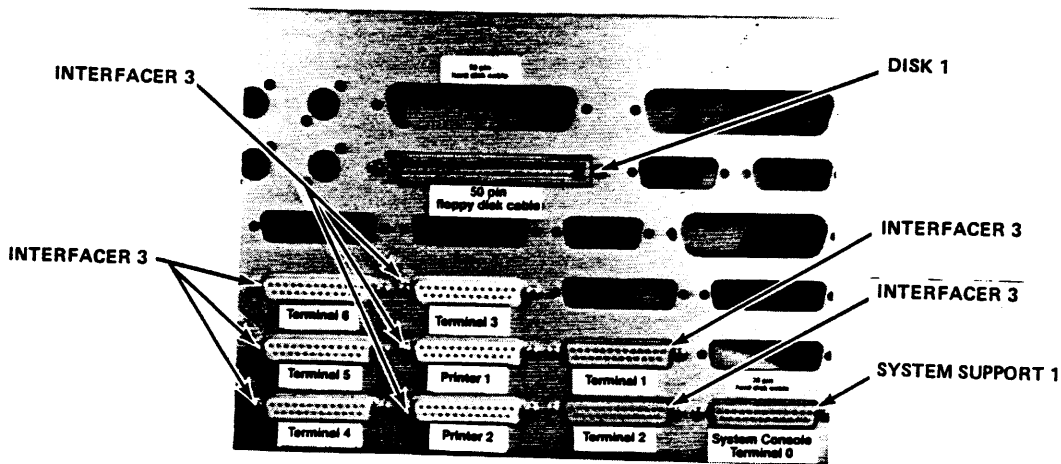
RAM 21's —

1st 128K			2nd 128K			3rd 128K		
off	S1	on	off	S1	on	off	S1	on
	1	x		1	x		1	x
	2	x		2	x		2	x
	3	x		3	x		3	x
	4	x		4	x		4	x
	5	x		5	x		5	x
	6	x		6	x	x	6	
	7	x	x	7			7	
	8	x		8	x		8	x

NOTE: THE SYSTEM SUPPORT 1 SYSTEM CONSOLE CABLE (terminal 0) IS NOT SHOWN IN PHOTO BECAUSE IT IS UNDERNEATH THE OTHER CABLES.



FOR MAXIMUM COOLING LEAVE EMPTY SLOTS BETWEEN BOARDS.



CPU 8086/87 —

off	S1	on	off	S2	on	off	S3	on	off	S4	on	off	S5	on
x	1		x	1		x	1		x	1		x	1	
x	2		x	2		x	2		x	2		x	2	
x	3		x	3			3	x		3	x		x	3
x	4		x	4			4	x		4	x		x	4
x	5		x	5		x	5			5	x		x	5
x	6		x	6		x	6			6	x		x	6
x	7		x	7			7	x		7	x		x	7
x	8		x	8		x	8			8	x		x	8
x	9		x	9						9	x		x	9
x	10		x	10						10	x		x	10

J8 — No shunt installed if using 8087 co-processor, otherwise, install shunt.

DISK 1 —

off	S1	on	off	S2	on
		1	x	1	
	x	2		2	x
	x	3		3	
	x	4		4	
	x	5		5	x
	x	6		6	x
	x	7		7	x
	x	8		8	x

Jumper Settings:  
 J4 — Install a jumper  
 J16 — Install a jumper on B-C  
 J17 — Jumper B-C

INTERFACER 3-8 —

off	S1	on
x	1	
	2	x
	3	x
	4	x
x	5	
	6	x
	7	x
	8	x

Jumper Settings:

J1 — Insert a dip shunt, shunting lines 1, 2 and 3 for 3-wire no handshaking. Consult manual for hardware handshaking.  
 J2 — Insert a dip shunt, shunting lines 1, 2 and 3 for 3-wire, no handshaking. Consult manual for hardware handshaking.  
 J15 — Connect pins 9-16 to pin 5  
 J16 — Connect pins 1-8 to pin 11  
 J17 — Jumper two top pins.  
 Remaining jumpers left unconnected.

INTERFACER 4 —

off	S1	on	off	S2	on	off	S3	on
x	1		x	1		x	1	
x	2			2	x	x	2	
x	3			3	x	x	3	
x	4		x	4		x	4	
x	5			5	x		5	x
x	6			6	x		6	x
x	7			7	x		7	x
x	8		x	8			8	x
x	9			9	x			
x	10			10	x			

Jumper Settings:

J1 — No shunt  
 J2 — Bottom installed with Epson printer/No shunt otherwise.  
 J3 — Top installed with Epson printer/No shunt otherwise.  
 J4 — Bottom installed with both Epson and Centronics  
 J5-J25 — Removed  
 J26 — Jumper A-B and C-D  
 JS1, JS2, JS3 — Install shunt, shorting all 8 lines.  
 JS4 — No connections  
 JS5 — Connect pins 13-16 to pin 5  
 JS6 — Connect pins 9-12 to pin 6

## 2. INSTALLATION

816/D

COMPUPRO  
PRELIMINARY

SYSTEM SUPPORT 1	off	S1	on	off	S2	on	off	S3	on
	x	1		1	x		x	1	
	x	2		2	x		x	2	
	x	3		3	x		x	3	
		4	x	4	x		x	4	
	x	5		x	5			5	x
	x	6		x	6		x	6	
		7	x	x	7			7	x
	x	8		x	8		x	8	

### Jumper Settings:

J1 — Serial port connection

J2 — Insert an eight pin dip shunt, leaving the lower five pins on the right side out. Leaving the first three wires shunted effectively makes a 3-wire serial connection.

J3 — Plug an auxiliary battery cable into this connector, red wire toward the left.

J8 — Install an eight pin shunt

J13 — Insert a shorting plug onto prongs 8 and C.

Remaining jumpers are left unconnected.

U16 — Install the "Go 86" EPROM

### RAM 16's

1st 64K	2nd 64K	3rd 64K	4th 64K	5th 64K	6th 64K	7th 64K	8th 64K
off S1	on	off S1	on	off S1	on	off S1	on
1	x	1	x	1	x	1	x
2	x	2	x	2	x	2	x
3	x	3	x	3	x	3	x
4	x	4	x	4	x	4	x
5	x	5	x	5	x	5	x
6	x	6	x	6	x	6	x
7	x	7	x	7	x	7	x
8	x	8	x	8	x	8	x

### RAM 21's

1st 128K	2nd 128K	3rd 128K	4th 128K
off S1	on	off S1	on
1	x	1	x
2	x	2	x
3	x	3	x
4	x	4	x
5	x	5	x
6	x	6	x
7	x	7	x
8	x	8	x

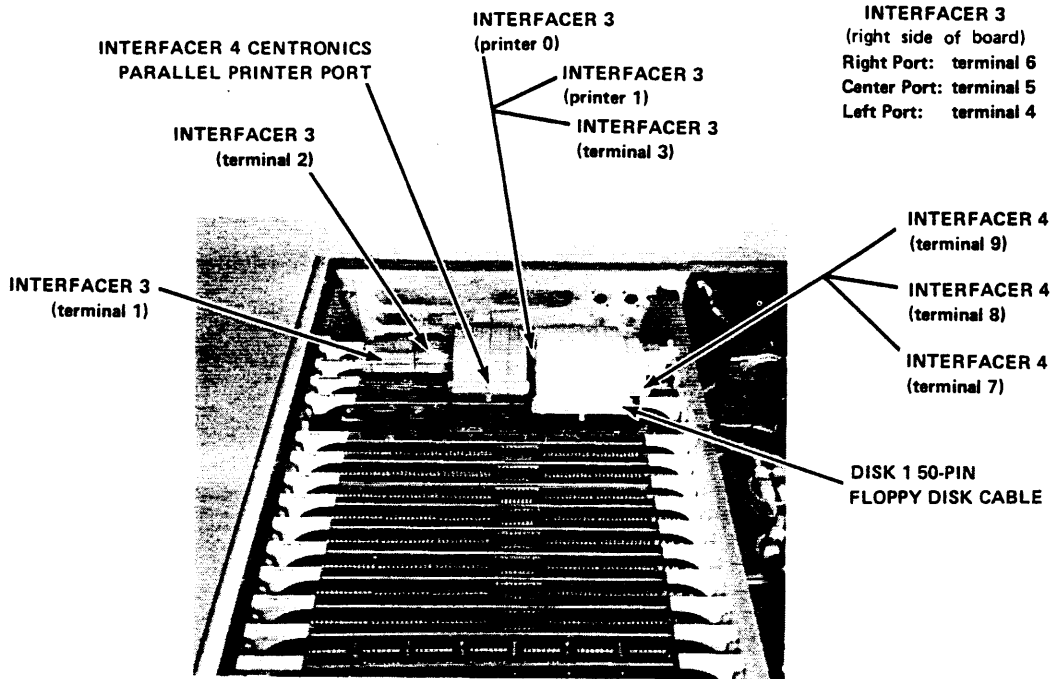
### M-Drive B

1st 512K	2nd 512K	3rd 512K
off S1	on	off S1
x	1	x
x	2	x
	3	x
	4	x
	5	x
x	6	x
x	7	x
	8	x
	9	x
10	x	10

2) In addition to the switch settings and jumper settings already listed for the System Support board, you must also make the following modification:

Pull IC28 out of its socket, bend pin 4 out so that when replacing the IC it does not make contact with the socket or any other pins. Without this modification, MP/M 86 will not work with the CPU 8086.

NOTE: THE SYSTEM SUPPORT 1 SYSTEM CONSOLE CABLE (terminal 0) IS NOT SHOWN IN PHOTO BECAUSE IT IS UNDERNEATH THE OTHER CABLES.



FOR MAXIMUM COOLING LEAVE EMPTY SLOTS BETWEEN BOARDS.

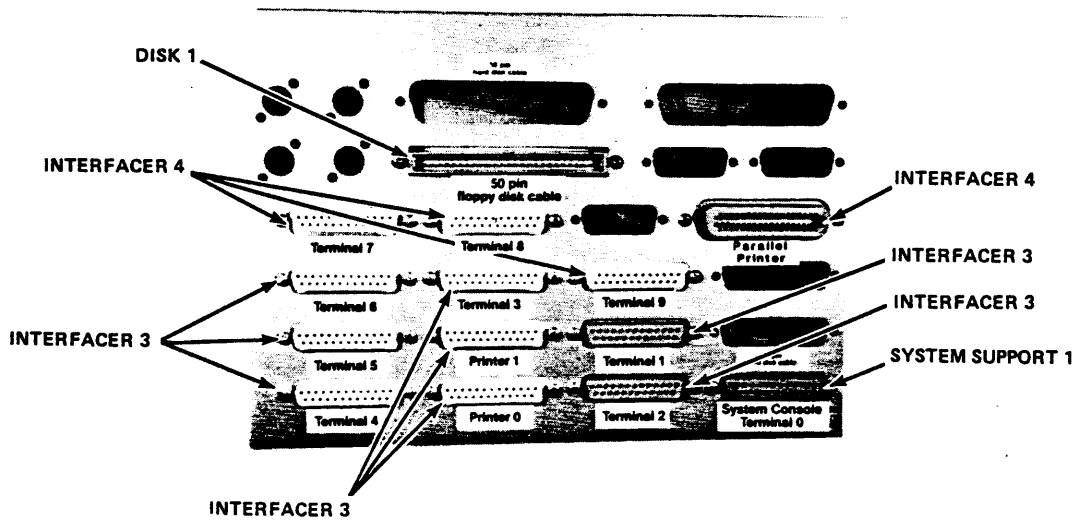


Figure 2-13 816/D Cable Connections

**SYSTEM 68K  
STANDARD SWITCH SETTINGS & JUMPER POSITIONS**

**CPU 68K**

All positions on all switches OFF.

Jumper J1 - B-C connected	Jumper J11 - don't care
Jumper J2 - OFF (for 4 or 8 MHz operation) ON (for 5 or 10 MHz operation)	Jumper J12 - don't care
Jumper J3 - OFF	Jumper J13 - don't care
Jumper J4 - OFF	Jumper J14 - ON
Jumper J5 - INSTALLED	Jumper J15 - OFF
Jumper J6 - INSTALLED	Jumper J16 - B-C connected
Jumper J7 - ON	Jumper J17 - don't care
Jumper J8 - ON	Jumper J18 - don't care
Jumper J9 - A to J10 installed	
Jumper J10 - A to J9 installed	

**DISK 1**

OFF	S1	ON	OFF	S2	ON	
	1	>		1	>	
<	2		<	2		Jumper J16 - B-C connected
<	3		<	3		Jumper J17 - B-C connected
<	4		<	4		
<	5			5	>	Must have ROM labeled
<	6			6	>	"BOOT F"
<	7			7	>	"68/85/88"
<	8			8	>	

**RAM 16 and RAM 21**

BOARD 1			BOARD 2			BOARD 3			BOARD 4		
OFF	S1	ON	OFF	S1	ON	OFF	S1	ON	OFF	S1	ON
	1	>	<	1			1	>	<	1	
	2	>		2	>	<	2		<	2	
	3	>		3	>		3	>		3	>
	4	>		4	>		4	>		4	>
	5	>		5	>		5	>		5	>
	6	>		6	>		6	>		6	>
	7	>		7	>		7	>		7	>
	8	>		8	>		8	>		8	>

**INTERFACER 4**

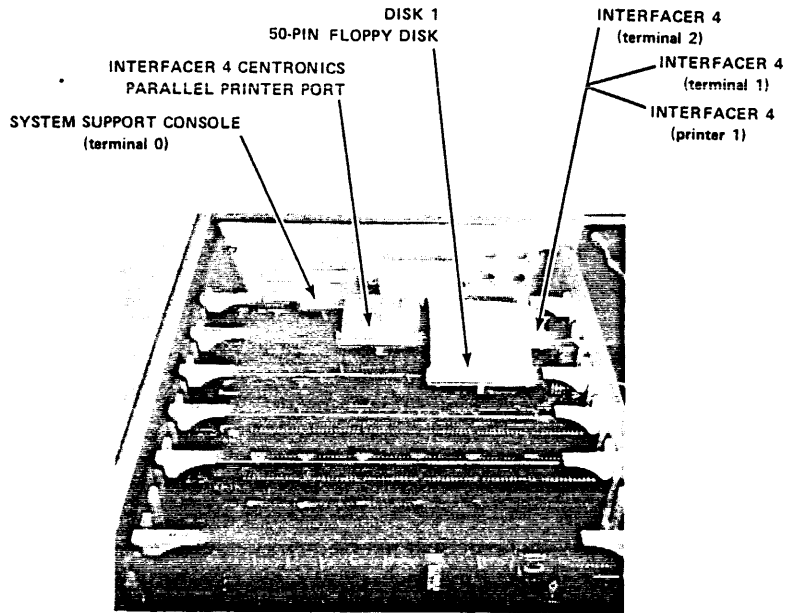
OFF	S1	ON	OFF	S2	ON	OFF	S3	ON
<	1			1	>	<	1	
<	2			2	>	<	2	
<	3		<	3		<	3	
<	4		<	4		<	4	
<	5			5	>		5	>
<	6			6	>		6	>
<	7			7	>		7	>
<	8		<	8			8	>
<	9			9	>			
<	10		<	10				

Jumper Sockets JS1-JS3 should be jumpered straight across

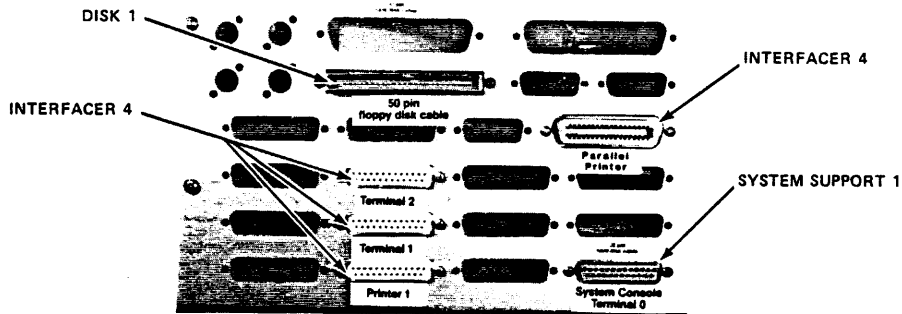
**JUMPER and SWITCH SUMMARY**

The following summary of jumpers and switches explains the function of each option, the location, and the manual page with the detailed explanation for usage.

JUMPERS	FUNCTION	BOARD LOCATION	PAGE
J1	CLOCK SPEED	BETWEEN U4 & U5	2
J2	2 MHZ	BETWEEN U7 & U9	2
J3	2 MHZ	BETWEEN U7 & U9	2
J4	POWER-ON-JUMP	BETWEEN U11 & U12	3
J5	MMU OPTION	IN U21 OUTLINE	4
J6	MMU OPTION	IN U21 OUTLINE	4
J7	MMU OPTION	BELOW U21	4
J8	MMU OPTION	BELOW U21	4
J9	NUMBER OF WAITS	BETWEEN U27 & U28	5
J10	MACHINE CYCLES	BETWEEN U27 & U28	5
J11	MMU MODE SELECT	BETWEEN U30 & U31	5
J12	INTERRUPTS	BETWEEN U30 & U31	6
J13	BUS INT PIN	BETWEEN U30 & U31	6
J14	MWRITE	BELOW U32	4
J15	PHI-DSB	BELOW U33	4
J16	pDBIN	BETWEEN U33 & U34	4
J17	ROM ADDRESS	BETWEEN U36 & U37	3
J18	INTERUPT ACK.	BELOW U39	6
SW1 POS 2-8	ROM ADDRESS	BETWEEN U39 & U40	3
SW1 POS 1	AUTO VECTOR	BETWEEN U39 & U40	6



FOR MAXIMUM COOLING LEAVE EMPTY SLOTS BETWEEN BOARDS.





CHAPTER 3 REPAIR DATA  
COMPUPRO COMPUTERS SERVICE MANUAL

<b>3.1</b>	<b>DESKTOP ENCLOSURE 2 TOP COVER</b> REF PL 4.1
------------	--

#### REMOVAL

1. SWITCH OFF SYSTEM POWER.
2. REMOVE TOP COVER.
  - a. Remove 7 phillip screws from right side of cover.
  - b. Remove 7 phillip screws from the left side of cover.
  - c. Lift cover off frame.

#### REPLACEMENT

1. REPLACE TOP COVER.
  - a. Perform removal procedure in reverse order.

<b>3.2</b>	<b>MOTHERBOARD PWA</b> REF PL 4.1
------------	--------------------------------------

#### REMOVAL

1. SWITCH OFF SYSTEM POWER AND DISCONNECT AC POWER CORD FROM WALL OUTLET.
2. REMOVE TOP COVER (3.1).
3. REMOVE ALL PWAs.
  - a. Disconnect all harnesses from PWAs.
  - b. Remove all PWAs from card cage.
4. REMOVE MOTHERBOARD PWA.
  - a. Disconnect all harnesses from Motherboard PWA.
  - b. Remove the 22 plastics screws securing Motherboard.
  - c. Carefully lift Motherboard PWA from enclosure.

#### REPLACEMENT

1. REPLACE MOTHERBOARD PWA.
  - a. Perform removal procedure in reverse order.

<b>3.3</b>	<b>DESKTOP POWER SUPPLY</b> REF PL 4.1
------------	---

#### REMOVAL

1. SWITCH OFF SYSTEM POWER AND DISCONNECT AC POWER CORD FROM WALL OUTLET.
2. REMOVE TOP COVER (3.1).
3. REMOVE DESKTOP POWER SUPPLY.
  - a. Disconnect In-Line connectors going to power supply.
  - b. Disconnect DC Power harness going to Motherboard PWA.
  - c. Cut cable-ties as necessary to free harnesses.
  - d. Tilt enclosure on its side and remove the 8 phillips screws securing power supply.
  - e. Carefully lift power supply from enclosure.

#### REPLACEMENT

1. REPLACE DESKTOP POWER SUPPLY.
  - a. Perform removal procedure in reverse order.

**3.4 DESKTOP ENCLOSURE PWAs**  
REF PL 4.1

**REMOVAL**

1. REMOVE TOP COVER (3.1).
  - a. If necessary, disconnect harnesses from PWA.
  - b. Using the PWA puller, remove the PWA.

**REPLACEMENT**

**NOTE:** The PWA must be configured before installing it in the appropriate slot. Determine the system configuration (i.e., 816/A, 816/B, 816/C, 816/D, or System 68K), then refer to Chapter 2 for the correct switch an/or jumper settings for the PWA. Also use the failed PWA as a guide for configuring the new PWA..

1. REPLACE THE PWA.
  - a. Using the failed PWA as a reference, and the standard switch settings described in chapter 2, configure the new PWA.
  - b. Perform removal procedure in reverse order.

**3.5 FLOPPY ENCLOSURE TOP COVER**  
REF PL 4.3

**REMOVAL**

1. SWITCH OFF SYSTEM POWER.
2. REMOVE TOP COVER.
  - a. Remove 7 phillip screws from right side of cover.
  - b. Remove 7 phillip screws from the left side of cover.
  - c. Lift cover off frame.

**REPLACEMENT**

1. REPLACE TOP COVER.
  - a. Perform removal procedure in reverse order.

**3.6 FLOPPY DISK DRIVE**  
REF PL 4.3

**REMOVAL**

1. DISCONNECT AC POWER CORD FROM REAR OF FLOPPY DISK ENCLOSURE.
2. REMOVE TOP COVER (3.5).
3. REMOVE FLOPPY DISK DRIVE.
  - a. Disconnect the AC power harness from disk drive.
  - b. Disconnect the DC power harness from disk drive.
  - c. Disconnect the Signal harness from disk drive.
  - d. Tilt enclosure on its side and remove the 4 phillips screws securing disk drive.
  - e. Remove floppy disk drive from enclosure.

**REPLACEMENT (FIGURES 3-1, 3-2)**

---

**CAUTION**

Jumpers on new disk drive must be exactly configured **BEFORE** installation. Note that Drive A (left) and Drive B (right) is not configured the same. Ensure that the correct figure is being used to configure drive.

1. CONFIGURE DISK DRIVE (FIGURE 3-1 OR 3-2).
  - a. Refer to Figure 3-1 for Drive A and Figure 3-2 for Drive B.
  - b. Remove any jumpers not shown in figure.
  - c. Add any jumpers necessary, as shown in figure.
2. REPLACE FLOPPY DISK DRIVE.
  - a. Perform removal procedure in reverse order.

<b>3.7 FLOPPY ENCLOSURE POWER SUPPLY</b> REF PL 4.3
--

**REMOVAL**

1. DISCONNECT AC POWER CORD FROM REAR OF FLOPPY DISK ENCLOSURE.
2. REMOVE TOP COVER (3.5).
3. REMOVE POWER SUPPLY.
  - a. Disconnect terminals going transformer.
  - b. Disconnect AC power harness from disk drives.
  - c. Disconnect DC power harness from disk drives.
  - d. Tilt enclosure and remove 4 phillips screws securing power supply.
  - e. Remove power supply from enclosure.

**REPLACEMENT**

1. REPLACE POWER SUPPLY
  - a. Perform removal procedure in reverse order.

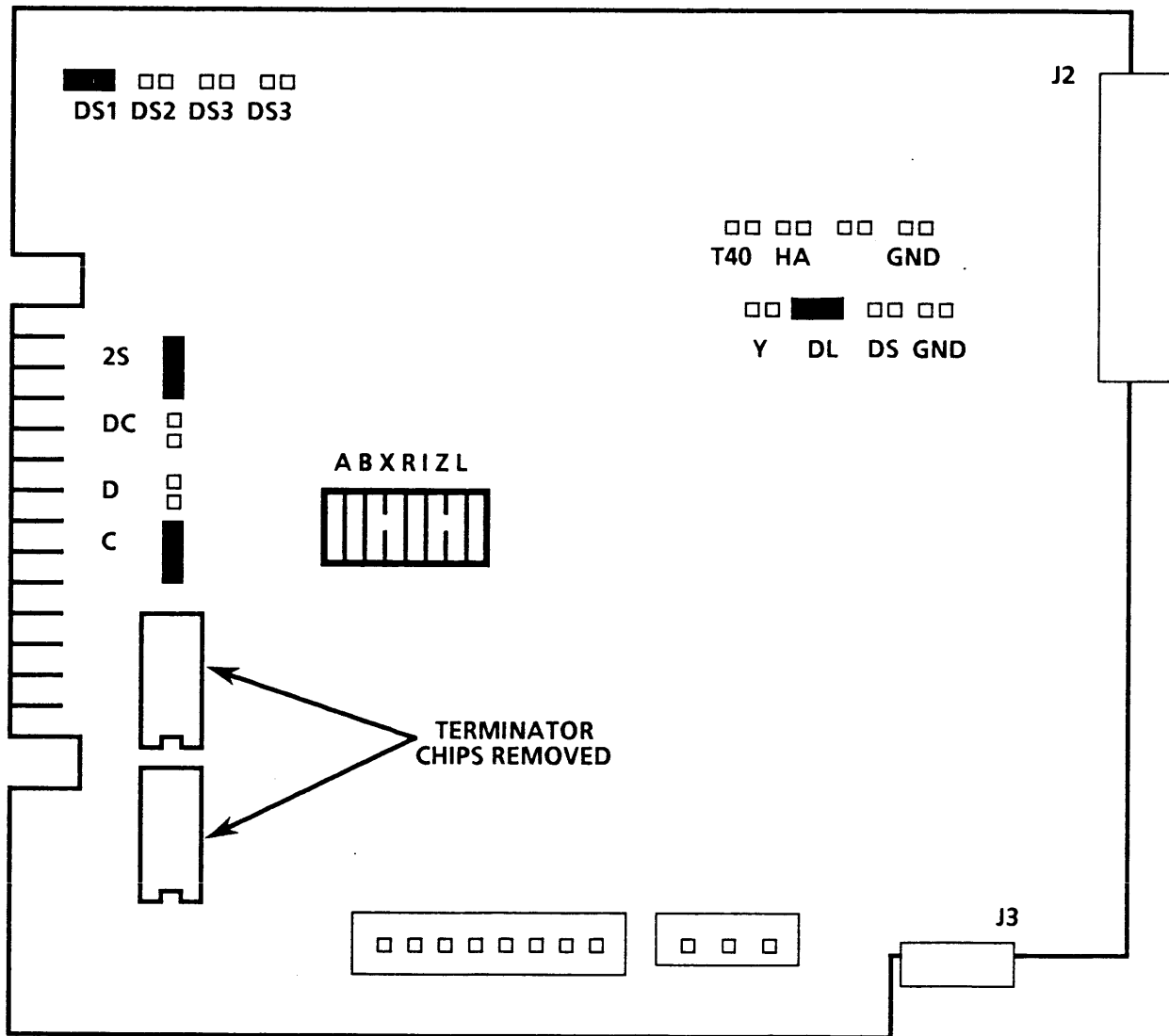


Figure 3-1 Qume Drive Jumpers Locations (Drive A)

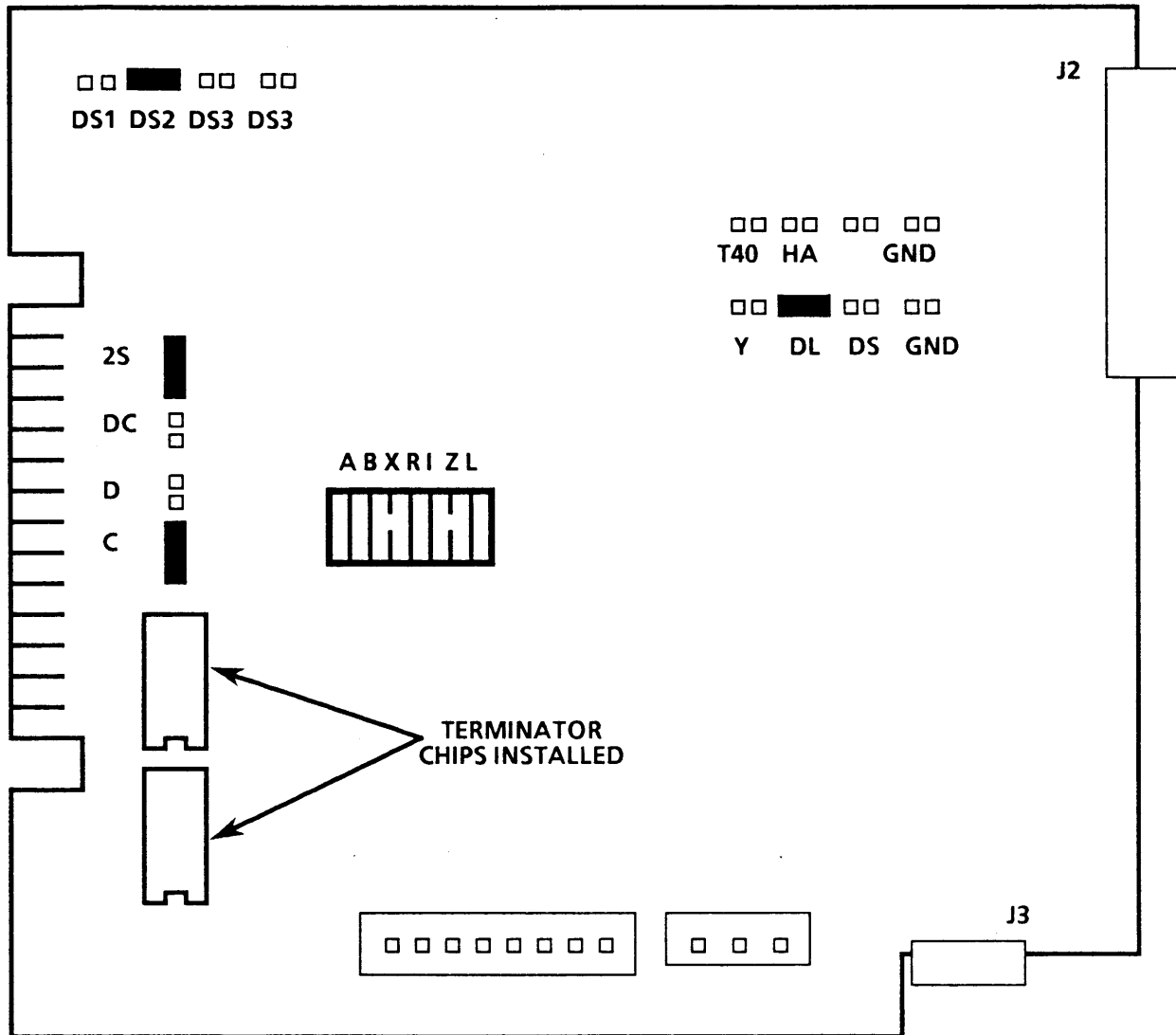


Figure 3-2 Qume Drive Jumpers Locations (Drive B)

CHAPTER 4 PARTS IDENTIFICATION  
COMPUPRO COMPUTERS SERVICE MANUAL

## 4. PARTS IDENTIFICATION

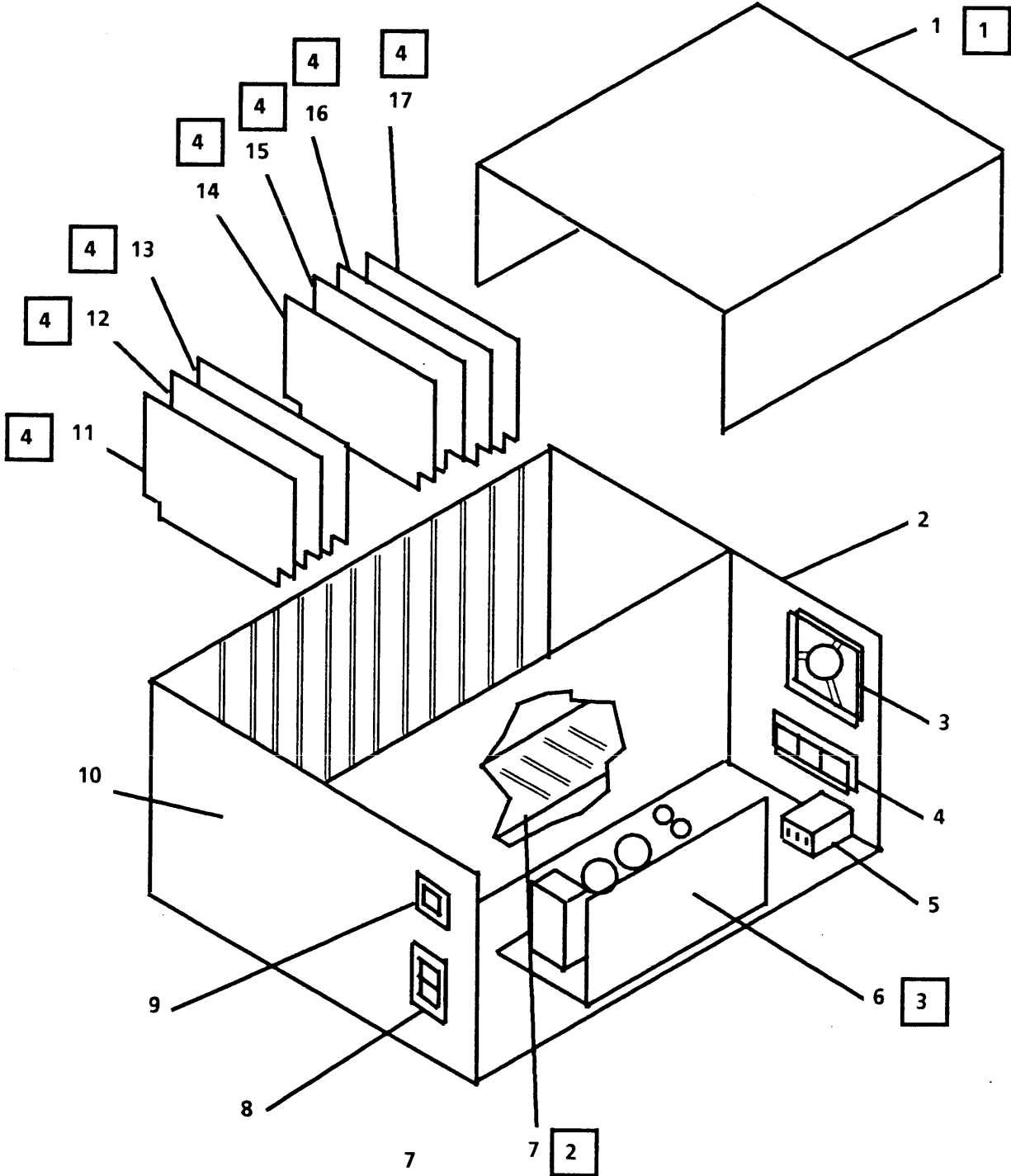
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PRELIMINARY

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### PL 4.1 DESKTOP ENCLOSURE 2

ITEM	PART NO.	DESCRIPTION
1	--	Cover, Top
2	--	Cover, Rear
3	--	Fan
4	--	Outlets, AC Assy
5	--	Filter, Line
6	--	Power Supply
7	--	PWA, Motherboard
8	--	Switch, On/Off
9	--	Switch, Reset
10	--	Cover, Front
11	--	PWA, RAM 16
		PWA, RAM 17
		PWA, RAM 21
12	--	PWA, M/Drive/H
13	--	PWA, CPU 8085/88
		PWA, CPU 8086/87
		PWA CPU 68K
14	--	PWA, Disk 1
15	--	PWA, Interfacer 4
16	--	PWA, Interfacer 3
17	--	PWA, System Support 1
18	--	Fuse, 25A (not shown)
19	--	Fuse, 3A (not shown)





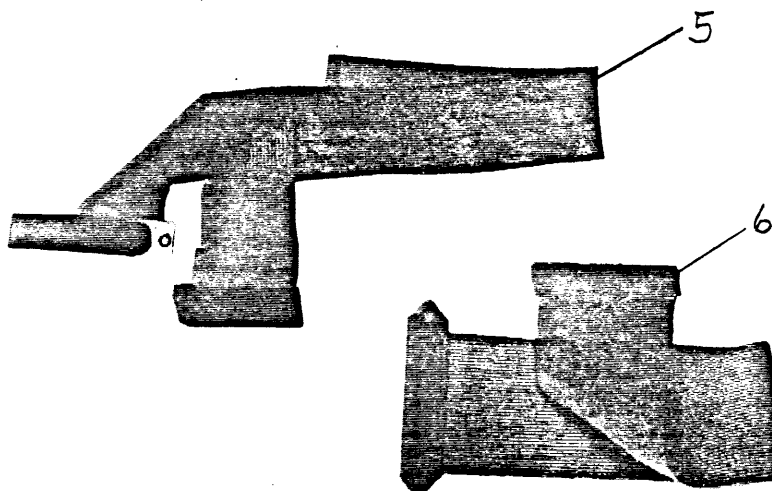
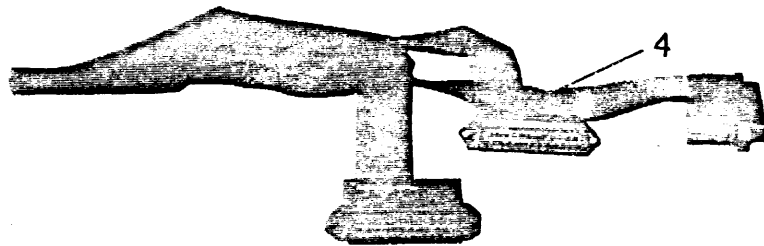
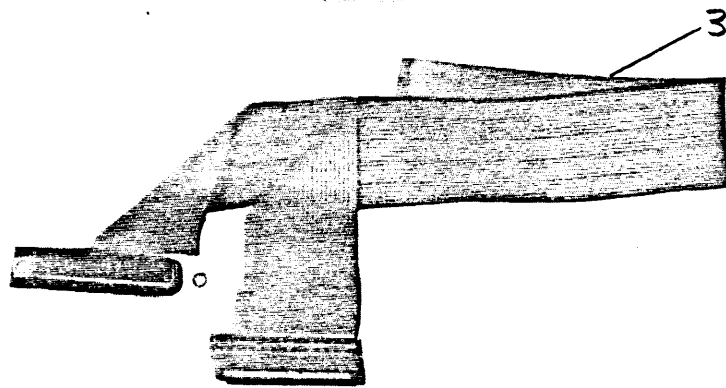
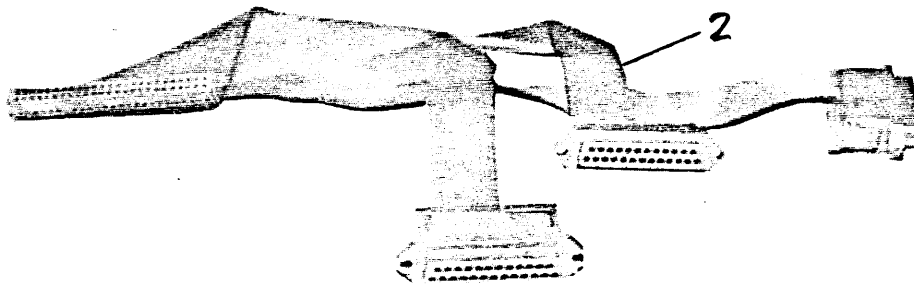
#### 4. PARTS IDENTIFICATION

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##### PL 4.2 DESKTOP ENCLOSURE 2 HARNESSES

ITEM	PART NO.	DESCRIPTION
1	--	Cable, System Support PWA (not shown)
2	--	Cable, Interfacer 3 PWA
3	--	Cable, Interfacer 3 PWA
4	--	Cable, Interfacer 4 PWA
5	--	Cable, Interfacer 4 PWA
6	--	Cable, Interfacer 4 PWA
7	--	Cable, Disk 1 PWA (not shown)
8	--	Harness, DC Power (not shown)



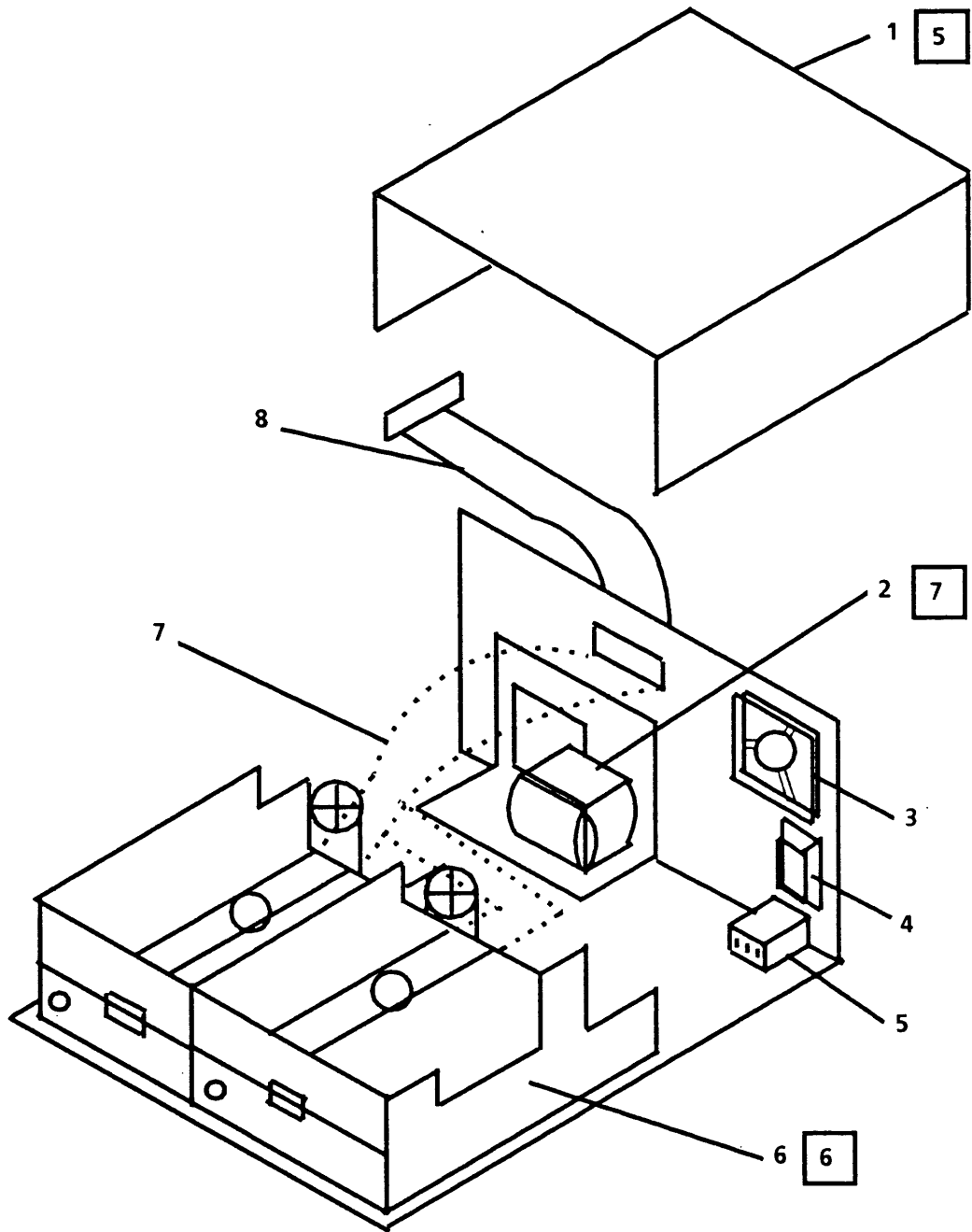
#### 4. PARTS IDENTIFICATION

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##### PL 4.3 FLOPPY DISK ENCLOSURE

ITEM	PART NO.	DESCRIPTION
1	--	Cover, Top
2	--	Power Supply
3	--	Fan
4	--	Switch, On/Off
5	--	Filter, Line
6	--	Disk Drive
7	--	Harness, Internal Signal
8	--	Harness, Desktop to Floppy Enclosure Signal



**CHAPTER 6 TROUBLESHOOTING  
COMPUPRO COMPUTER SERVICE MANUAL**

## 6. TROUBLESHOOTING

### INTRODUCTION TO COMPUPRO 816 COMPUTERS TROUBLESHOOTING

#### 816 Computers Service Strategy

Steps required for isolation of 816 computers faults are provided in sequece below.

1. Perform LEVEL 1 CHECKOUT Procedure. Level 1 Checkout includes preparation for diagnostics and performance of diagnostics.
2. Perform any LEVEL 2 CHECK CHART procedures indicated by Level 1 Checkout.
3. If corrective action does not correct the problem, ask for assistance from the Dallas Service Center Technical Support Hot Line.

Check Charts are designed to include dependency on specific visible indications. If specific indications occur, several areas of the system are eliminated as a cause of failure. As a result, the LEVEL 1 CHECKOUT must be performed in the specified sequence in the procedure.

If an indication is not observed and later a failure occurs, the dependent Check Chart will not be valid. Since Level 1 eliminates areas that cause a failure, the remaining areas can be checked quickly.

Use the appropriate amount of time to troubleshoot a problem. If a correction cannot be made, ask for assistance from the Dallas Service Center Technical Support. Telephone numbers for the Dallas Service Center Technical Support are provided below.

OUTSIDE TEXAS 1-800-527-0483  
IN TEXAS 1-214-442-4731

### LEVEL 1 CHECKOUT EXPLANATION

Figure 6-1 provides a sample of the format of a Level 1 Checkout procedure. An explanation of the three columns is provided below.

1. The PROCEDURE column describes the actions required to perform the step.
2. In the INDICATIONS column, statements marked with letters describe indications of the correct operation. Check and verify the indications in the sequence provided. If the sequence is not observed, the Level 2 Access will not be valid for the correct isolation of faults.

PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
<b>POWER</b> (1)	(2)	(3)
2. Ensure System power is on, and look for following conditions.	a. Desktop Enclosure fan operate. b. Flopy Disk Enclosure fan operate. c. Cursor appears on Terminal.	6.1 6.2 6.3

Figure 6-1 Sample Level 1 Checkout

3. The LEVEL 2 ACCESS column identifies the number of the appropriate Level 2 Check Chart procedure for corrective action for conditions described below:
  - a. One of the indications does not occur.
  - b. An incorrect indication occurs.

Level 1 Checkout provides appropriate references to diagnostic procedures or other appropriate service manuals.

**LEVEL 2 CHECK CHART EXPLANATION**

Figure 6-2 provides a sample of the format of a Level 2 Check Chart. Content of the various sections is described below.

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
<b>6.1 DESKTOP FANS INOPERATIVE</b> (1)				
(2)	1. Voltage at in-line connectors going to transformer is 103 to 127 VAC.	TB-1 to TB2	Replace fans	Step 2
(3)		(4)	(5)	(6)

Figure 6-2 Sample Level 2 Check Chart

1. Within section 1 is the number and name of the Level 2 Check Chart.
2. The STEP column provides the number sequence of steps in the check chart. Since some steps may not be required, the check charts provide reference to the required steps for isolation of a fault.



## 6. TROUBLESHOOTING

### LEVEL 2 CHECK CHART EXPLANATION

---

PROCESSOR  
600P84227

3. The PROCEDURE column describes any required preparations. AC or DC voltage tolerances are specified within the procedure. All AC voltages are identified with VAC, and all DC voltages are identified with V. Negative DC voltages include the negative symbol (-); the positive symbol (+) is not used. **Always switch off system power if it is necessary to connect or disconnect plugs or remove or install PWAs.** If a required preparation can cause an electrical shock, the procedure will specify instructions to switch off power.
4. The TEST POINT column identifies how and where to check the procedure statement. If a voltage reading is required, the first point is for the RED (+) lead, and the second point is for the BLACK (-) lead. If no second point is provided, the BLACK lead must be connected to frame ground. Chapter 7 provides component or plug/jack location diagrams to assist in locating the test points.
5. If the voltage or visible indication was **CORRECT (or occurred as specified)**, the CORRECT INDICATION column provides instructions to continue troubleshooting, to replace a component, or to perform an adjustment.
6. If the voltage or visible indication was **INCORRECT (or did not occur as specified)**, the INCORRECT INDICATION column provides instructions to continue troubleshooting, to replace a component, or to perform an adjustment.

STEP	PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
<b>LEVEL CHECKOUT</b>			
<b>PREPARATION</b>			
	<ol style="list-style-type: none"> <li>1. Check for an obvious problem (loose connections, broken parts), and repair according to Chapter 3.</li> <li>2. Remove floppy disk from drive(s).</li> <li>3. Switch off power to Desktop Enclosure 2, Floppy Disk Enclosure, and Terminal.</li> </ol>		
<b>POWER</b>			
	<ol style="list-style-type: none"> <li>4. Wait 10 Seconds, then switch on power to Desktop Enclosure 2, Floppy Disk Enclosure, and Terminal. Check for conditions in the indication column.</li> </ol>	<ol style="list-style-type: none"> <li>a. Desktop Enclosure 2 fan operate.</li> <li>b. Floppy Disk Enclosure fan operate.</li> <li>c. Within 1 minute, proper indication (i.e., cursor) appears on screen.</li> </ol>	<p>6.1 6.2 6.3</p>

## 6. TROUBLESHOOTING

COMPUPRO  
PRELIMINARY

STEP	PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
5.	Check for <u>ALL</u> voltages at P1 on Motherboard PWA (Figure 6-3).	a. 8V to 10V at pins 3 to 7 b. 16V to 18V at pins 1 to 7 c. -16V to -18V at pins 2 to 7	6.4 6.4 6.4

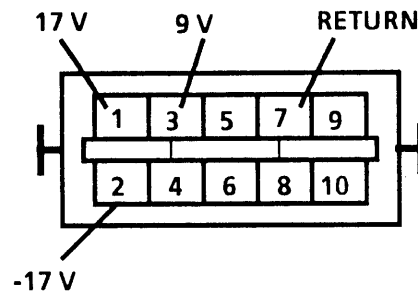


Figure 6-3 Voltage Connector (Front View)

STEP	PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
<b>LOAD/DIAGNOSTICS SEQUENCE</b>			
6.	Insert Diagnostics disk in Drive A, then close disk drive door.	a. Within 30 seconds Sign-on message and <b>A&gt; Prompt</b> appears on screen, similar Figure 6-4.	6.5
7.	Remove the Diagnostic disk from Drive A. Install the CP/M-86 disk in Drive A. Press the Reset switch. After the <b>A&gt;</b> prompt appears on the screen, remove the CP/M-86 disk and install the Diagnostic disk. Press the Reset switch. After the <b>A&gt;</b> prompt appears on the screen, type <b>swap5</b> then press return.	a. <i>HERE BEGINS THE 85/88 SWAP TEST</i> <i>THIS 85/88 SWAPS OK</i> appears on the screen.	6.6

```

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CompuPro and (c) G & G Engineering
64K CP/M 2.2 LDA

A>
    
```

Figure 6-4 Screen Message

## 6. TROUBLESHOOTING

COMPUPRO  
PRELIMINARY

STEP	PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
8.	Insert a Blank diskette in Drive B, then close disk drive door. Type <b>format</b> then press <b>return</b> .	a. <i>CompuPro Disk Sub-sytem FORMAT Version X.YZ Specify drive (A: - D:):</i>	Continue
9.	Type <b>B</b> .	a. <i>Disk is formatted as XXX byte sectors Select Disk format mode (0, 1, 2,3):</i>	Continue
10.	Type <b>3</b> .	a. <i>Comfirm ready for format on disk drive B (y)</i>	Continue
11.	Type <b>Y</b> .	a. Within 3 minutes, screen indicates no errors. (bottom row contains V's only)	6.7
12.	Format the Blank disk using Drive A.	a. Within 3 minutes, screen indicates no errors. (bottom row contains V's only)	6.7
13.	Insert a CP/M-86 System disk in Drive A, then close the disk drive door. Press the Reset switch.	a. The amount Memory displayed on screen is the same amount of memory installed in the system.	6.8

STEP	PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
------	-----------	-------------	-------------------

**NOTE:** In order to run MTEST86.COM (memory test), system must have at least 128K bytes of memory, CP/M-86 system disk, and one of the Memory PWAs must be reconfigured. Time for MTEST86 to complete is approximately 3 minutes for each 64K bytes of memory.

- |   |   |            |
|---|---|------------|
| <p>14. Perform the following:</p> <ul style="list-style-type: none"> <li>● Remove disk from drives.</li> <li>● Switch off system power.</li> <li>● Reconfigure Memory PWA (Figure 6-5 to 6-8).</li> <li>● Switch on system power.</li> <li>● Install CP/M-86 disk in Drive A.</li> <li>● Install Diagnostic Disk in Drive B.</li> <li>● Type <b>b:mtest86</b> then press return.</li> </ul> | <p>a. Within the specified amount of time, <i>Done With Pass 1 CTRL + C To Stop Test</i> appears on the screen.</p> | <p>6.9</p> |
|---|---|------------|

6. TROUBLESHOOTING

COMPUPRO  
PRELIMINARY

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style="text-align: center;"><b>RAM 21 PWA</b></p> <p><b>NOTE: MTEST86 will not run on 816/A using a RAM 21 PWA. If a memory problem is suspected, replace RAM 21 PWA.</b></p>	
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15. IF a problem is suspected with a Printer or Terminal port, perform Check Chart 6.10.

## 6. TROUBLESHOOTING

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STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
<b>6.1 DESKTOP FAN INOPERATIVE</b>					
1.	Disconnect AC power cord from AC wall outlet. Voltage at wall outlet is 103 to 127 VAC.	ACH to ACN	Step 2		Notify Customer of power needs.
2.	Disconnect AC Power Cord from rear of Desktop Enclosure 2. Connect AC Power Cord to wall outlet. Voltage at end of AC Power Cord is 103 to 127 VAC.	AC Power Cord	Step 3		Replace AC Power Cord
3.	Disconnect In-Line connectors going to Transformer. Connect AC Power Cord to rear of Desktop Enclosure 2. Switch on system power. Voltage at female end of plug is 103 to 127 VAC.	Black wire to White wire	Replace Fan	Step 4	
4.	Switch off System power. Disconnect AC Power cord from rear of Desktop Enclosure 2. With On/Off Switch in the ON position, Resistance is less than 5 ohms.	On/Off Switch terminals	Check wiring going to fan and switch. If good, replace Line Filter.		Replace On/Off Switch

STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
<b>6.2 FLOPPY DISK FAN INOPERATIVE</b>					
1.	Floppy Disk Drive motors are turning.	Visual	Replace Fan	Step 2	
2.	Disconnect AC Power Cord from rear of Floppy Disk Enclosure. Voltage is 103 to 127 VAC.	AC Power Cord	Step 3	Check AC outlet. If good, replace AC Power Cord.	
3.	Switch off System power. Disconnect AC Power cord from rear of Desktop Enclosure 2. With On/Off Switch in the ON position, Resistance is less than 5 ohms.	On/Off Switch terminals	Replace Line Filter	Replace On/Off Switch	
<b>6.3 INDICATION ON TERMINAL INCORRECT</b>					
1.	Operator Brightness Control is adjusted correctly.	Visual	Step 2	Adjust Brightness Control	
2.	Terminal AC Power Cord is connected to rear of Desktop Enclosure 2.	Visual	Step 3	Notify Customer of Terminal Problem	

## 6. TROUBLESHOOTING

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STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
3.	Disconnect AC Power Cord from rear of Desktop Enclosure 2. Voltage at AC outlet on Desktop Enclosure 2 is 103 to 127 VAC.	ACH to ACN (outlet on Desktop Enclosure 2)	Notify Customer of Terminal problem		Check wiring going to AC outlet on rear of Desktop Enclosure 2. If good, replace AC outlets
<b>6.4 LOSS OF DC VOLTAGES</b>					
1.	ALL three Power Supply fuses are good.	Visual	Step 2		Replace fuse. If fuse blows again, use BSD's to isolate problem.
2.	Disconnect P1 from Motherboard PWA. Suspect voltage is within tolerance.	P1	Step 4		Step 3
3.	Disconnect In-Line connectors going to Transformer. Connect AC Power Cord to rear of Desktop Enclosure 2. Switch on system power. Voltage at female end of plug is 103 to 127 VAC.	Black wire to White wire	Replace Power Supply		Check wiring going to the transformer

STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
4.	Connect P1 to Motherboard. Remove <u>ALL</u> PWAs from card cage. Suspect voltage is within tolerance.	P1	Step 5	Replace PWA	Motherboard
5.	Install one PWA. Suspect voltage is within tolerance.	P1	Step 6	Replace installed	PWA last
6.	All PWAs are installed.	Visual	Return to Checkout	Level 1	Repeat Step 5

## 6. TROUBLESHOOTING

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STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
<b>6.5 LOAD PROBLEM</b>					
1.	Perform the following: a. Remove Diagnostics Disk from Drive A. b. Switch off system power. c. Move DS1 jumper on Drive A to DS2. d. Move DS2 jumper on Drive B to DS1. e. Switch on system power. f. Install Diagnostics Disk in Drive B and closed the door. g. Within 30 seconds Sign-On message with A prompt appears on the screen.	Visual		If cleaning diskette is available clean Read/Write Heads. If problem still exists, replace Drive A.	Step 2
2.	Perform the following: a. Voltage is 4.75V to 5.25V. b. Voltage is 22V to 26V.	DC Power Connector at Drive A Pins 5 to 6 Pins 1 to 2	Step 5		Step 3
3.	Disconnect DC Power Harness from both drives. Suspect voltage is within tolerance.	DC Power Connector at Drive A	Step 4		Replace Power Supply

STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
4.	Connect DC Power Harness to Drive A. Suspect voltage is within tolerance.	DC Power Connector at Drive A	Replace Drive B		Replace Drive A
5.	Remove <u>ALL</u> PWAs except, CPU, Disk 1, System Support 1, and the Memory PWA that contains the first 64K or 128K (Refer to Chapter 2). System loads sucessfully.	Visual	Replace PWAs that were removed one at a time, until PWA that is causing loading problem is identified		Replace in order: CPU PWA Disk 1 PWA System Support 1 PWA RAM 16/17/21 PWA
<b>6.6 SWAP5 TEST FAILURE</b>					
1.	System is a 816/A, 816/B, or 816/C configuration with CPU 8085/88 PWA.	Visual	Replace CPU 8085/88 PWA		Swap5 Test will only run on a CPU 8085/88 PWA. Return to Level 1 Checkout



## 6. TROUBLESHOOTING

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STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
<b>6.7 ERROR DETECTED WITH FORMAT</b>					
1.	Errors were detected in Drive B.	Visual	Step 2		If head cleaning diskette is available, clean read/write heads. If problem still exists, replace Drive A.
2.	Format the blank disk using Drive A. Errors are detected.	Visual	Verify that diskette is good. If good replace Disk 1 PWA		If head cleaning diskette is available, clean read/write heads. If problem still exists, replace Drive A.
<b>6.8 INCORRECT AMOUNT OF MEMORY DISPLAYED</b>					
1.	System is a 816/A configuration. (system with 128K bytes of memory)	Visual	Verify switch setting. If correct, replace second 64K PWA, if using RAM 16 or RAM 17 PWAs; otherwise replace RAM 21 PWA		Replace PWA indicated by Table 6-1

STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
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Table 6-1 256K to 512K Bytes Systems		
Amount of Memory Displayed	Type of Memory PWA	
	RAM 16 PWA or RAM 17 PWA	RAM 21 PWA
64K to 112K	Replace PWA configured for second 64K	Replace PWA configured for first 128K
128K to 176K	Replace PWA configured for third 64K	Replace PWA configured for second 128K
192K to 240K	Replace PWA configured for fourth 64K	Replace PWA configured for second 128K
256K to 304K	Replace PWA configured for fifth 64K	Replace PWA configured for third 128K
320K to 368K	Replace PWA configured for sixth 64K	Replace PWA configured for third 128K
384K to 432K	Replace PWA configured for seventh 64K	Replace PWA configured for fourth 128K
448K to 496K	Replace PWA configured for eighth 64K	Replace PWA configured for fourth 128K

## 6. TROUBLESHOOTING

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STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
<b>6.9 MTEST86 FAILURE</b>					
1.	Test failed on Page 2.	Visual	Replace PWA configured for third 64K	Step 2	
2.	Test failed on Page 3.	Visual	Replace PWA configured for fourth 64K	Step 3	
3.	Test failed on Page 4.	Visual	Step 4	Step 5	
4.	System is using RAM 21 PWAs.	Visual	Replace PWA configured for third 128K	Replace PWA configured for fifth 64K	
5.	Test failed on Page 5.	Visual	Step 6	Step 7	
6.	System is using RAM 21 PWAs..	Visual	Replace PWA configured for third 128K	Replace PWA configured for sixth 64K	

STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
7.	Test failed on Page 6.	Visual	Step 8	Step 9	
8.	System is using RAM 21 PWAs.	Visual	Replace PWA configured for fourth 128K	Replace PWA configured for seventh 64K	
9.	Test failed on Page 7.	Visual	Step 10	Step 11	
10.	System is using RAM 21 PWAs.	Visual	Replace PWA configured for fourth 128K	Replace PWA configured for eight 64K	
11.	Test failed on Page .	Visual	Step 12	Maximum amount of memory is 512K bytes. Return to Level 1 Checkout	
12.	System is using RAM 21 PWAs.	Visual	Replace PWA configured for fifth 128K	Replace PWA configured for ninth 64K	

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STEP	PROCEDURE	TEST POINT	CORRECT	INDICATION	INCORRECT
<b>6.10 PRINTER OR TERMINAL PROBLEM</b>					
1.	Problem exists with a printer.	Visual	Step 2		Replace Interfacer 3 or Interfacer 4 PWA
2.	Printer is connected to a parallel port	Visual	Replace Interfacer 4 PWA. If problem still exists, have customer to verify printer.		Replace Interfacer 3 PWA. If problem still exists, have customer verify printer

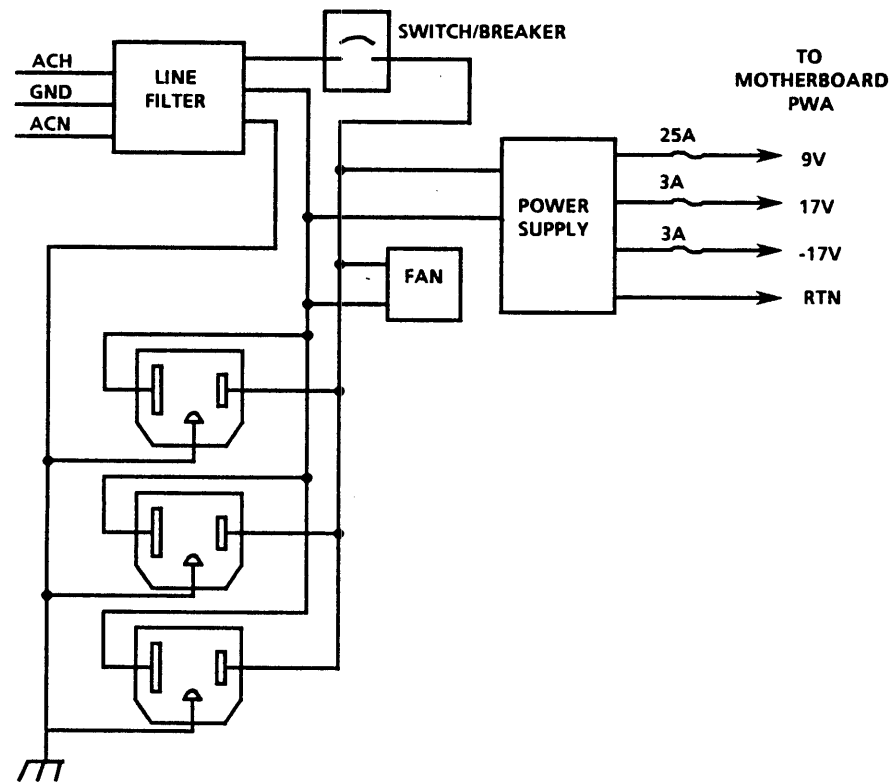


Figure 6-9 Desktop Enclosure 2 Power Distribution

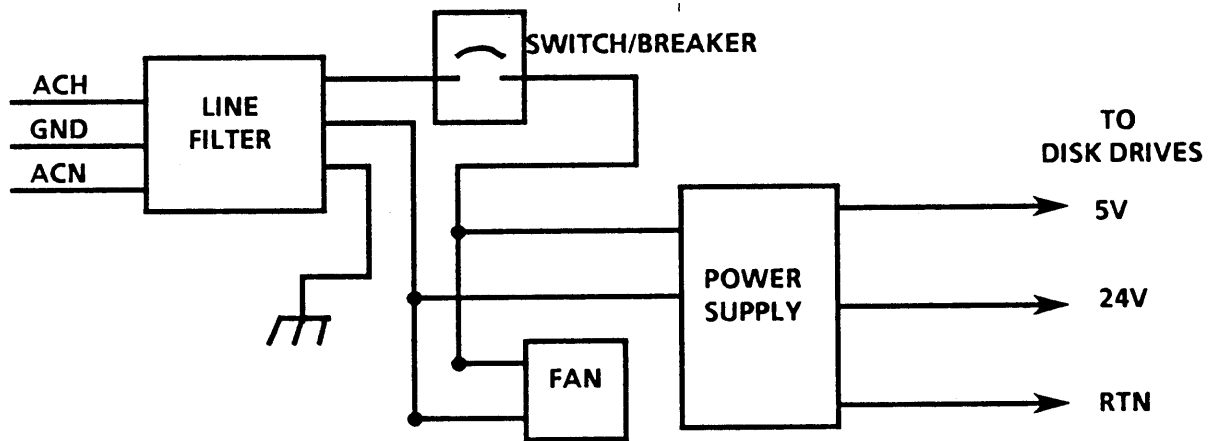


Figure 6-10 Floppy Disk Enclosure Power Distribution

