HEWLETT PACKARD

SERVICE MANUAL

HP 7475A
GRAPHICS PLOTTER

SERIAL NUMBERS

This manual applies directly to plotters with serial numbers prefixed 2541V.

For additional important information about serial numbers, see PLOTTERS COVERED BY MANUAL in Section I.

16399 W. BERNARDO DRIVE, SAN DIEGO, CALIFORNIA 92127-1899

MANUAL PART NO. 07475-90000 **Printed: AUGUST 1987**

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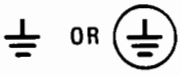
ILLUSTRATIONS

General Definitions of Safety Symbols Used On Equipment

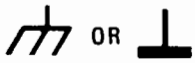
International caution symbol (refer to manual): the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.

Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must be so marked).



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with field wiring terminals to indicate the terminal which must be connected to ground before operating equipment.

Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of a fault. A terminal marked with this symbol must be connected to ground in the manner described in the installation (operating) manual, and before operating the equipment.



Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.

Alternating current

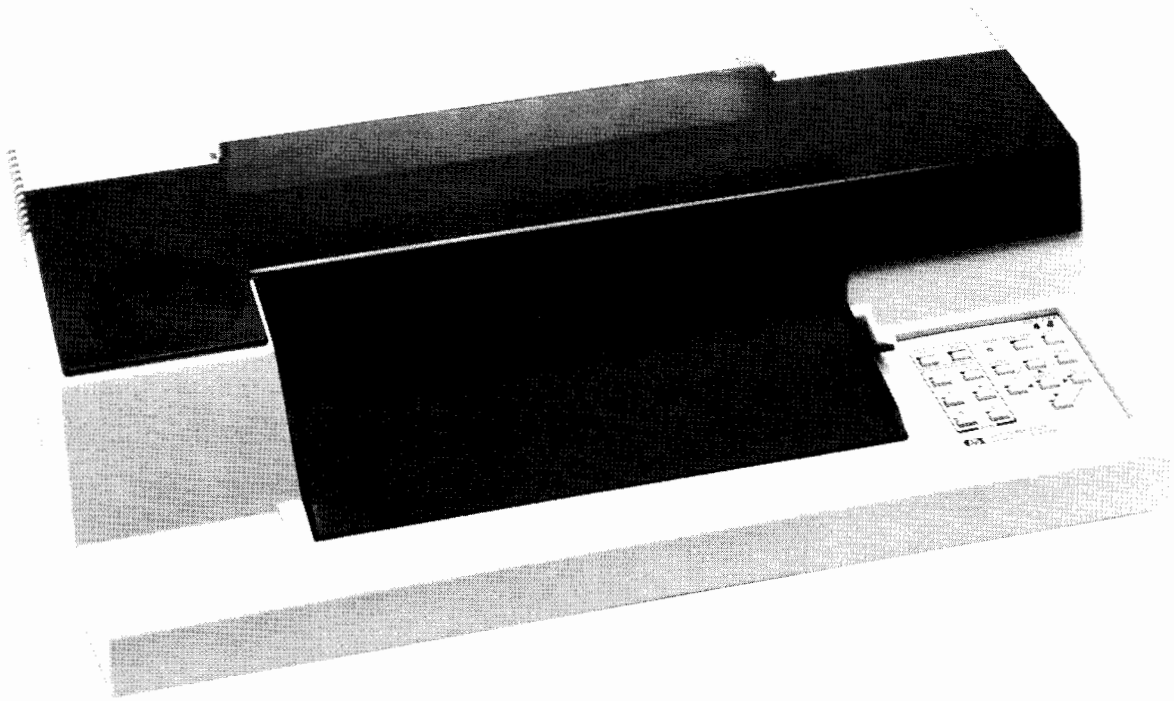
Direct current

Alternating or direct current

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury.

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

1-A-26-1



7475-A-1-1

Figure 1-1. Model 7475A

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This service manual contains information necessary to test and service the Hewlett-Packard Model 7475A Plotter. This manual is divided into six sections as follows:

I	GENERAL INFORMATION
II	OPERATING AND PERFORMANCE TESTS
III	ADJUSTMENTS
IV	REPLACEABLE PARTS
V	PRODUCT HISTORY
VI	SERVICE

1-3. Information for interfacing, operating, and programming the Model 7475A is contained in the following publications:

Title	HP Part Number
Interfacing and Programming Manual	07475-90001
Operation and Interconnection Manual	07475-90002
Programmer's Reference Card	07475-90004

1-4. This General Information section includes a description of the plotter, its specifications, options available, accessories supplied, and general installation instructions.

1-5. SPECIFICATIONS

1-6. Table 1-1 lists the specifications for the Model 7475A. These specifications include the performance standards against which the plotter is tested.

1-7. Also included in Table 1-1 are supplemental characteristics. Supplemental characteristics are not specifications but are typical characteristics included as additional information for the user.

1-8. SAFETY CONSIDERATIONS

1-9. Safety information relevant to the service procedure being described is provided in the appropriate sections of this manual. The Model 7475A and this manual should be reviewed for safety markings and instructions before service work is begun.

Table 1-1. Specifications

PERFORMANCE SPECIFICATIONS

Repeatability
With the same pen: 0.1 mm (0.004 in.)
With a different pen: 0.2 mm (0.008 in.)

SUPPLEMENTAL CHARACTERISTICS

Maximum plotting area
B/A3: 402.2 mm (15.8 in.)
× 274.8 mm (10.8 in.) metric

414.2 mm (16.3 in.)
× 258.0 mm (10.2 in.) English

A/A4: 274.8 mm (10.8 in.)
× 192.2 mm (7.6 in.) metric

258.0 mm (10.2 in.)
× 198.2 mm (7.8 in.) English

Pen velocity
Pen down: maximum, 38.1 cm/s (15 in./s) programmable, 1 to 38 cm/s in 1 cm/s increments.

Pen up: 50.8 cm/s (20 in./s)

Addressable step size
0.025 mm (0.00098 in.)

Acceleration
Approximately 2g

Power requirements
Source: 100, 120, 220, or 240 Vac −10%, +5%
Frequency: 48 to 66 Hz
Consumption: 35 W maximum

Size
Length: 57 cm (22.5 in.)
Width: 37 cm (14.5 in.)
Height: 13 cm (5 in.)

Weight
7.2 kg (15.8 lb)

1-10. PLOTTERS COVERED BY MANUAL

1-11. The plotter serial number is located on the rear panel. Hewlett-Packard uses a two-part serial number consisting of a four-digit prefix and a five-digit suffix separated by a letter (0000A00000). The prefix is the same for all identical plotters and changes only when a modification is made that affects parts compatibility. The suffix is assigned sequentially and is different for

each plotter. This manual applies directly to plotters with the serial prefix shown on the title page.

1-12. If the serial number prefix of your plotter is higher than the one shown, one or more update packages of revised pages are supplied with the manual. Use these new pages to replace the original pages. If two or more update packages are supplied, insert them in order by revision letter; that is, Revision A first, then Revision B, etc. The title page will then show the latest serial prefix and the manual will apply directly to plotters with that prefix.

1-13. In addition to plotter changes, revised pages may correct errors in the manual or include improved procedures.

1-14. If the plotter at hand has a lower serial prefix than the one shown on the title page, information in the Product History section will adapt this manual to that plotter.

1-15. DESCRIPTION

1-16. The Model 7475A accepts digital information to produce graphic plots on ISO A3, 297 × 420 mm (11 × 17 in.) paper or ISO A4, 210 × 297 mm (8-1/2 × 11 in.) paper or special transparency plastic. Disposable pens are available in various ink colors.

1-17. The six-pen capability permits several colors to be used in a plot without stopping the plotter to change pens manually. Pens are automatically capped while they are stored in the pen carousel.

1-18. Seven different line types are provided. Labeling can be done in nineteen character sets plus user-defined characters. Text (labeling) can be written in any direction, upright, or slanted. Character size is also variable. In addition, arc and circle generation as well as area fill with various fill types are provided.

1-19. LINE VOLTAGE AND FUSE SELECTION

CAUTION

To prevent damage to the plotter, make sure the line voltage and fuse selection is correct before connecting line power.

WARNING

The line power cord and power outlet must have a protective earth (ground) terminal.

1-20. The 7475A primary power circuit can be configured to operate from any one of the following power sources at a line frequency of 48 to 66 Hz, single phase. Maximum power used is 35 W.

100 Vac −10%, +5%
120 Vac −10%, +5%
220 Vac −10%, +5%
240 Vac −10%, +5%

1-21. Line voltage selection, and the required fuse ratings for each line voltage setting, are specified on the line voltage label which is visible through the small recessed window in the rear panel. See Figure 1-2.

CAUTION

Applying a line voltage of 220 V or 240 V to the plotter while the line voltage selection is set for 100 V or 120 V operation may damage the plotter circuits.

1-22. The line voltage selection may be changed to conform to the line voltage in a particular area. Use the following procedure.

WARNING

The following procedure should be performed only by service-trained personnel who are aware of the electrical shock hazards involved.

a. Set the plotter LINE switch to OFF (O) and disconnect the line cord.

b. Remove the plotter top case by removing the screws indicated in Figure 1-2. Lift the rear of the top case and the front will then release. When replacing the top case, make sure the PAPER HOLD lever extends through the case, and that the tabs inside the front of the top case align properly above and below the base plate.

c. Line voltage selection is determined by the power input connections to the transformer primary windings. Table 1-2 lists the wire colors and transformer contact connections for each line voltage. The transformer pin numbers are identified on the power module molding. Figure 1-3 illustrates the connections for each voltage. Change the wire connections as required to conform to the desired line voltage selection.

d. Make sure the line fuse is correct according to Table 1-3. The fuseholder cap is the bayonet type. Press and turn counterclockwise to remove, clockwise to lock.

e. Change the position of the line voltage label block so that the voltage selected is right side up. This block snaps in and out of the power module molding.

f. Replace the top case, making sure it fits properly on the front edge of the base and the PAPER HOLD lever extends through the case.

g. Install the proper power cord for the power range selected and type of mains outlet to which the cord is to be connected. See Figure 1-4.

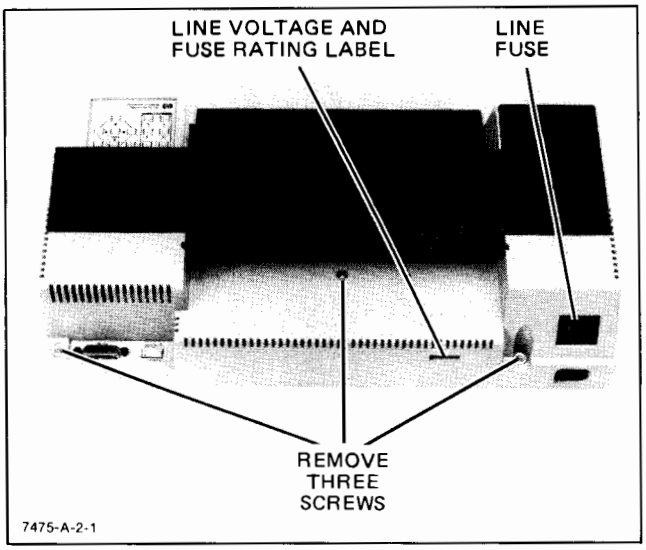


Figure 1-2. Top Case Removal

1-23. GROUNDING REQUIREMENTS

1-24. To protect operating personnel, the plotter must be properly grounded. The plotter is supplied with a three-conductor power cable which, when connected to an appropriate power outlet, grounds the plotter. To preserve this protection feature, do not operate the plotter from a power outlet which has no grounded connection.

1-25. OPTIONS

1-26. The Model 7475A is available with one of two types of interface, designated as the following options:

Option 001	RS-232-C/CCITT V.24
Option 002	Hewlett-Packard Interface Bus

1-27. Option 016 provides a special "eavesdrop" cable for Option 001.

1-28. The line voltage selection ordered is designated as one of the following:

Option 010	100 Vac
Option 012	120 Vac
Option 022	220 Vac
Option 024	240 Vac

1-29. ACCESSORIES SUPPLIED

1-30. The items listed in Table 1-4 are supplied with each plotter.

1-31. RECOMMENDED TEST EQUIPMENT

1-32. Equipment required to maintain the Model 7475A is listed in Table 1-5.

Table 1-2. Line Voltage Selection

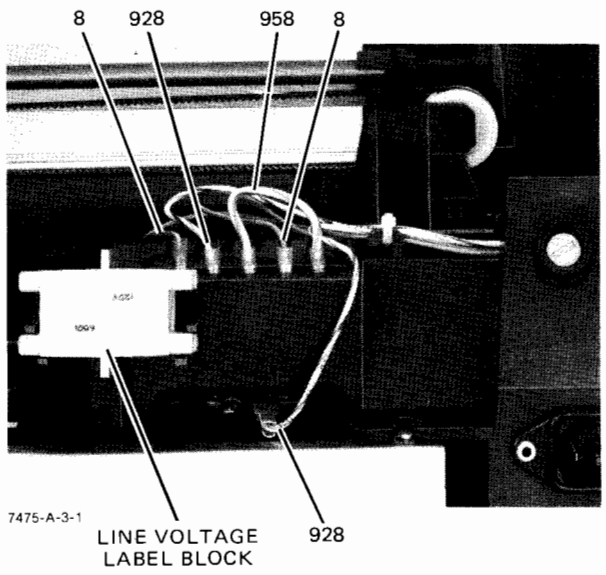
NOMINAL LINE VOLTAGE	TRANSFORMER PRIMARY CONNECTIONS*						
	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
100 V	8	928	958	8	958	NC	928
120 V	8	NC	928	8	928	958	958
220 V	8	958	NC	958	928	8	928
240 V	8	NC	958	958	928	8	928

*Wire identification is by color code:
8 = GRAY
928 = WHITE/RED/GRAY
958 = WHITE/GREEN/GRAY

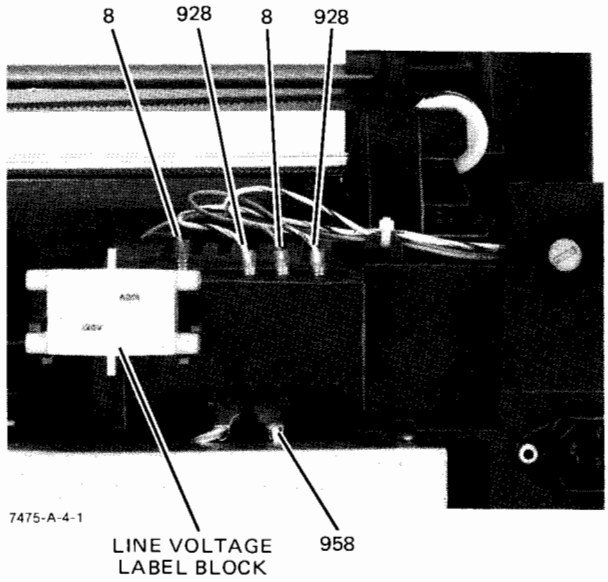
Table 1-3. Line Fuses

LINE VOLTAGE	FUSE RATING	FUSE HP PART NUMBER	FUSEHOLDER CAP HP PART NUMBER
100/120 V	0.6 AT	2110-0016	2110-0565
*220/240 V (0.25 × 1.25 in.)	0.3 AT	2110-0044	2110-0565
(5 × 20 mm)	0.315 AT	2110-0639	2110-0567

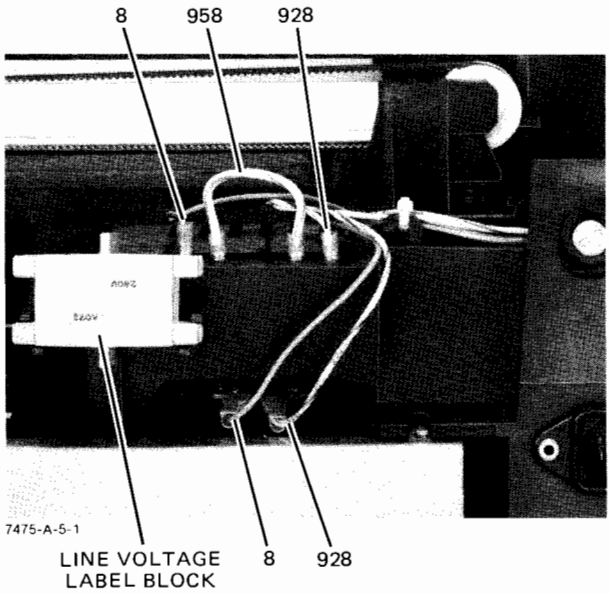
*Either Part No. 2110-0044 or 2110-0449 will provide adequate protection. Part No. 2110-0044 is a standard U.S. fuse for 240 V line; Part No. 2110-0449 is a standard European fuse for 220 V line.



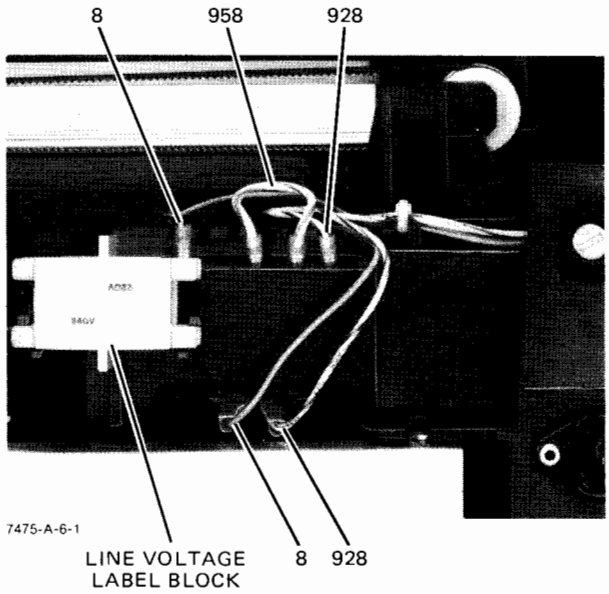
DETAIL A – 100V



DETAIL B – 120V



DETAIL C – 220V



DETAIL D – 240V

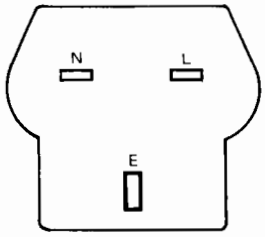
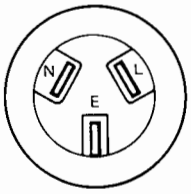
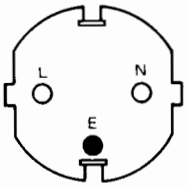
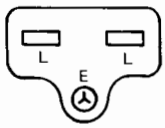
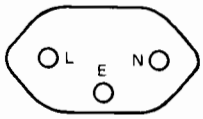
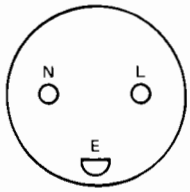
WIRE IDENTIFICATION IS BY COLOR CODE:

8 = GRAY
928 = WHITE/RED/GRAY
958 = WHITE/GREEN/GRAY

CAUTION

MAKE SURE CORRECT FUSE IS INSTALLED. REFER TO TABLE 1-3.

Figure 1-3. Line Voltage Selection

		Option No.
BS 1363A 	HP Part Number 8120-1351; 250 V, 13 A, 1 ϕ plug rating. For use in United Kingdom, Cyprus, Nigeria, Zimbabwe, Singapore.	900
AS C112 	HP Part Number 8120-1369; 250 V, 10 A, 1 ϕ plug rating. For use in Australia, New Zealand.	901
CEE 7-VII 	HP Part Number 8120-1689; 250 V, 10/16 A, 1 ϕ plug rating. For use in East and West Europe, Saudi Arabia, Egypt, South Africa, India.	902
NEMA 5-15P 	HP Part Number 8120-1378; 125 V, 15 A, 1 ϕ plug rating. For use in Canada, Japan, Mexico, Philippines, Taiwan, UL approved in United States.	903
NEMA 6-15P 	HP Part Number 8120-0698; 250 V, 15 A, 1 ϕ plug rating. For use in Canada, UL approved in United States.	904
SEV 1011 	HP Part Number 8120-2104; 250 V, 10 A, 1 ϕ plug rating. For use in Switzerland.	906
DHCK-107 	HP Part Number 8120-2956; .250 V, 10 A, 1 ϕ plug rating. For use in Denmark.	912

NOTE: All plugs are viewed from connector end.

L = Line or Active Conductor (also called "live" or "hot")
N = Neutral or Identified Conductor
E = Earth or Safety Ground

1-A-18-4

Figure 1-4. Power Cord Configurations

1-33. PACKAGING FOR SHIPMENT

1-34. If the plotter is being returned to Hewlett-Packard for service, attach a tag indicating the type of service required, model number, full serial number, and your return address. Also include this information in any correspondence.

1-35. If the original packaging material has been retained, pack the plotter in the same manner as it was received. The following general instructions should be used for packing with commercially available materials.

a. Wrap the plotter in heavy paper or plastic.

b. Use a strong shipping container.

c. Use a layer of shock-absorbing material at least 70 to 100 mm (3 to 4 in.) thick around all sides of the plotter to provide firm cushioning and prevent movement inside the container.

d. Seal container securely. Mark container FRAGILE to ensure careful handling.

Table 1-4. Accessories Supplied

DESCRIPTION	QTY	HP PART NUMBER
Interfacing and Programming Manual	1	07475-90001
Operation and Interconnection Manual	1	07475-90002
Programmer's Reference Card	1	07475-90004
*Plotter paper, pad, 8-1/2 × 11 in. or 210 × 297 mm (A4), 50-sheets	1	17800P 17802P
*Plotter paper, pad, 11 × 17 in. or 297 × 420 mm (A3), 50-sheets	1	17804P 17806P
Package of 5 fiber-tip pens, 0.3 mm nib width, 1 each blue, green, black, aqua, violet	1	17847P
Package of 5 black fiber-tip pens, 0.7 mm nib width	1	17826P
Package of 5 fiber-tip pens, 0.3 mm nib width, 1 each brown, yellow, orange, red, red-violet.	1	17849P
Pen Carousel	1	5061-5080
*Power Cord	1	See Figure 1-4

*Paper size and power cord supplied is based on the destination of the plotter.

Table 1-5. Recommended Test Equipment

TYPE	RECOMMENDED MODEL
Computer/controller	HP 85 Personal Computer with the appropriate interface: HP 82937A HP-IB Parallel Interface HP 82939A RS-232-C Interface and HP 8120-3258 RS-232-C Interface cable
Rom Drawer	HP 82936A
I/O Rom	HP 00085-15003
Digital Multimeter	HP 3465A
Oscilloscope	HP 1740A
Optical Comparator	B&L 81-34-35

SECTION II

OPERATING AND PERFORMANCE TEST

2-1. INTRODUCTION

2-2. The following information is provided to determine whether the plotter is operating properly. If operation is not correct, refer to Section VI of this manual for service information.

2-3. REAR PANEL SWITCHES (Option 001)

2-4. A3/A4. This switch chooses between B/A3 size paper and A/A4 size paper. The switch is used to set the default paper size only at power up. Subsequent paper size changes can be made from the front panel.

2-5. BAUD RATE. Table 2-1 shows the switch settings required. Disregard any markings on the switch itself and use the 1 and 0 markings on the rear panel to determine baud rate.

2-6. PARITY. Two rear panel switches are used for parity selection. When the S1/PARITY switch is set to 1 (ON), the S2/PARITY switch selects odd or even parity.

2-7. MET/US. This switch is used to program the plotting area for four paper sizes:

Paper Size	Switch Position	Maximum Plotting Area
B/A3	MET	275 × 402 mm
	US	10.2 × 16.3 in.
A/A4	MET	192 × 275 mm
	US	7.5 × 10.2 in.

2-8. D/Y. When the EAVESDROP switch is in the Y position, received data is retransmitted and the plotter does not respond unless it is given a "Plotter On" instruction. When this switch is in the D position, the plotter responds to all recognized commands.

2-9. REAR PANEL SWITCHES (Option 002)

2-10. ADDRESS. The plotter's HP-IB address is set by five of the seven switches on the rear panel. Disregard any markings on the switch itself and use the 1 and 0 labels on the rear panel to determine the address in binary coded decimal.

2-11. A3/A4. This switch chooses between B/A3 size paper and A/A4 size paper. The switch is used to set the default paper size only at power up. Subsequent paper size changes can be made from the front panel.

2-12. MET/US. This switch is used to program the plotting area for four paper sizes:

Paper Size	Switch Position	Maximum Plotting Area
B/A3	MET	275 × 402 mm
	US	10.2 × 16.3 in.
A/A4	MET	192 × 275 mm
	US	7.5 × 10.2

2-13. BASIC OPERATING TEST

2-14. The front panel controls can be used to test basic operation of the plotter; however, this procedure does not test the I/O circuits.

a. Make sure six pens are installed in pen carousel.

Table 2-1. Baud Rate Selection

ONE STOP BIT REAR PANEL SWITCHES B4	B3	B2	B1	BAUD RATE	TWO STOP BITS REAR PANEL SWITCHES B4	B3	B2	B1
—	—	—	—	External	0	0	0	0
—	—	—	—	75	0	0	0	1
—	—	—	—	110	0	0	1	0
0	0	1	1	150	—	—	—	—
0	1	0	0	200	—	—	—	—
0	1	0	1	300	1	0	1	1
0	1	1	0	600	1	1	0	0
0	1	1	1	1200	1	1	0	1
1	0	0	0	2400	1	1	1	0
1	0	0	1	4800	1	1	1	1
1	0	1	0	9600	—	—	—	—

1 = Switch Open; 0 = Switch Closed

CAUTION

Before applying power to the plotter, check the line voltage selection (visible through the small window in the rear panel) and make sure the selected line voltage and fuse value are correct. If not, refer to Line Voltage and Fuse Selection in Section I.

b. Apply power to the plotter.

c. With the PAPER LOAD lever in the LOAD position, place a sheet of paper (ISO A4/ 8-1/2 × 11 in. or ISO A3/ 11 × 17 in.) against the left-hand rail and the rear guide. Lower the lever to the PAPER HOLD position and be sure that the plotter is set for the proper paper size.

d. Select a pen by pressing one of the six pen pushbuttons and then operate each of the front-panel controls. Vertical, horizontal, and diagonal lines (using the directional controls with a pen down) should be smooth.

NOTE

If the pen is down, it will lift when either P1 or P2 is pressed. The VIEW pushbutton is a latching control. After VIEW is pressed once, the other controls will not operate until VIEW is pressed a second time. The ERROR light should be on when in the VIEW mode. The ERROR light should be on when the PAPER lever is in the LOAD position. If P1 or P2 is pressed while the lever is in LOAD, the ERROR light should flash. This error may be cleared by moving the lever to HOLD and back to LOAD, or by pressing ENTER and VIEW at the same time, in which case the plotter initializes again. While the plotter is ON, and the PAPER lever is in the HOLD position, the ERROR light flashes very briefly approximately every five seconds when the motor power supply voltage is sensed.

2-15. HEWLETT-PACKARD GRAPHICS LANGUAGE

2-16. The Model 7475A recognizes the Hewlett-Packard Graphic Language (HP-GL) instructions listed in Table 2-2.

2-17. DEMONSTRATION PLOT

2-18. The Model 7475A contains a demonstration plot stored in Read Only Memory (ROM). The running of this plot will verify proper operation of most of the logic circuits as well as the operation of the paper and pen drive mechanisms; however, it does not test the I/O circuitry. To run the demonstration plot proceed as follows:

a. Make sure six pens are installed in carousel.

b. With the PAPER LOAD lever in the LOAD position, place a sheet of paper (A4/ 8-1/2 × 11 in. only) against the left hand rail and the rear guide. Lower the lever to the paper HOLD position.

c. While holding down buttons P1 and P2, apply power to the plotter. See Figure 2-1. Release buttons after initialization starts.

d. The resultant plot is illustrated in Figure 2-2.

2-19. TEST PROGRAM

2-20. The program in Figure 2-3 is written in BASIC language specifically for the HP Model 85 Personal Computer, but may be adapted to other controllers. This program tests the input/output circuits of the 7475A and the majority of the logic circuits, as well as the operation of the paper and pen drive mechanisms. The resultant plot is illustrated in Figure 2-4.

NOTE

Lines beginning with an exclamation point are only explanatory and not part of the plot program. Those lines may be omitted when entering the program.

The addresses shown in lines 130, and 140 are only examples, and may vary with the system or computer used.

2-21. REPEATABILITY

2-22. To verify repeatability specification (Table 1-1) load six new pens in the carousel and run the test program previously described. Using an optical comparator, verify that the repeatability points on the test plot are within 0.1 mm using the same pen, and within 0.2 mm using a different pen. See Figure 2-5.

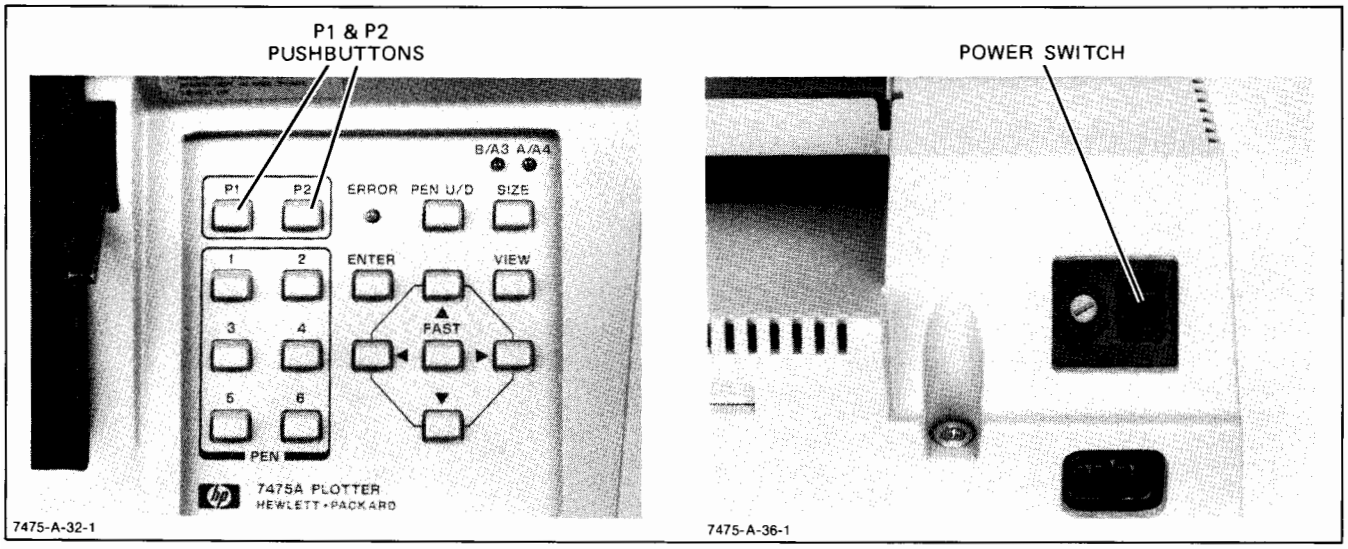


Figure 2-1. P1 and P2 Button and Power Switch Locations

Table 2-2. 7475A HP-GL Instruction Set

INSTRUCTION	DEFINITION
VECTOR GROUP	
PA x,y(,x,y(,—))	Plot absolute (integer format, −32 768 to +32 767)
PR x,y(,x,y(,—))	Plot relative (integer format, −32 768 to +32 767)
PU	Pen up
PD	Pen down
CHARACTER GROUP	
CA n	Designate alternate character set (n = integer from 0 to 4, 6 to 9, or 30 to 39)
CP spaces, lines	Character plot (decimal format, −128 to +127.9999)
CS n	Designate standard set (n = integer, 0 to 4, 6 to 9, or 30 to 39
DI run, rise	Absolute direction (decimal format −128 to +127.9999)
DR run, rise	Relative direction (decimal format −128 to +127.9999)
LB c....c	Label ASCII string (c = ASCII characters)
SA	Select alternate character set
SI wide, high	Absolute character size (decimal format in centimetres)
SL tan angle (+ or −)	Absolute character slant from vertical (decimal format, tangent of angle from vertical)
SR wide, high	Relative character size (decimal format, percentage of P2x − P1x and P2y − P1y)
SS	Select standard character set
UC	User-defined character
DIGITIZE GROUP	
DC	Digitize clear
DP	Digitize point
OC	Output current position and pen status
OD	Output digitized point and pen status
AXES GROUP	
TL tp(,tn)	Tick length (tp = positive length, tn = negative length)
XT	X-axis tick
YT	Y-axis tick
SETUP GROUP	
IP p1x,p1y(,p2x,p2y)	Input P1 (and P2) (integer format −32 768 to +32 767)
IW xlo,ylo,xhi,yhi	Input window (integer format −32 768 to +32 767)
OP	Output P1 and P2

Table 2-2. 7475A HP-GL Instruction Set (Continued)

INSTRUCTION	DEFINITION
CONFIGURATION AND STATUS GROUP	
DF	Set default values
IM e(,s(,p))	Input e, s, and p masks
IN	initialize
OE	Output error
OS	Output status
SC x1,x2,y1,y2	Scale (integer format −32 768 to +32 767)
DT c	Define label terminator (c = ASCII character)
OA	Output actual position and pen status
OO	Output options
OF	Output factors
OI	Output identification
OW	Output window
ARC AND CIRCLE GROUP	
AA x center, y center arc angle(,chord angle)	Draw arc starting with current position
AR x center, y center arc angle(,chord angle)	Draw arc with center relative to current position
CI radius(,chord angle)	Draw circle around current position
AREA FILL GROUP	
FT type (spacing (angle))	Fill type
RA x,y	Shade rectangle, absolute
RR x,y	Shade rectangle, relative
WG radius, start angle, stop angle (,chord angle)	Shade wedge
EA x,y	Edge rectangle, absolute
ER x,y	Edge rectangle, relative
EW radius, start angle, stop angle (,chord angle)	Edge wedge
PT thickness	pen thickness
MISCELLANEOUS GROUP	
RO n	Rotate axes in degrees (n = 0,90)

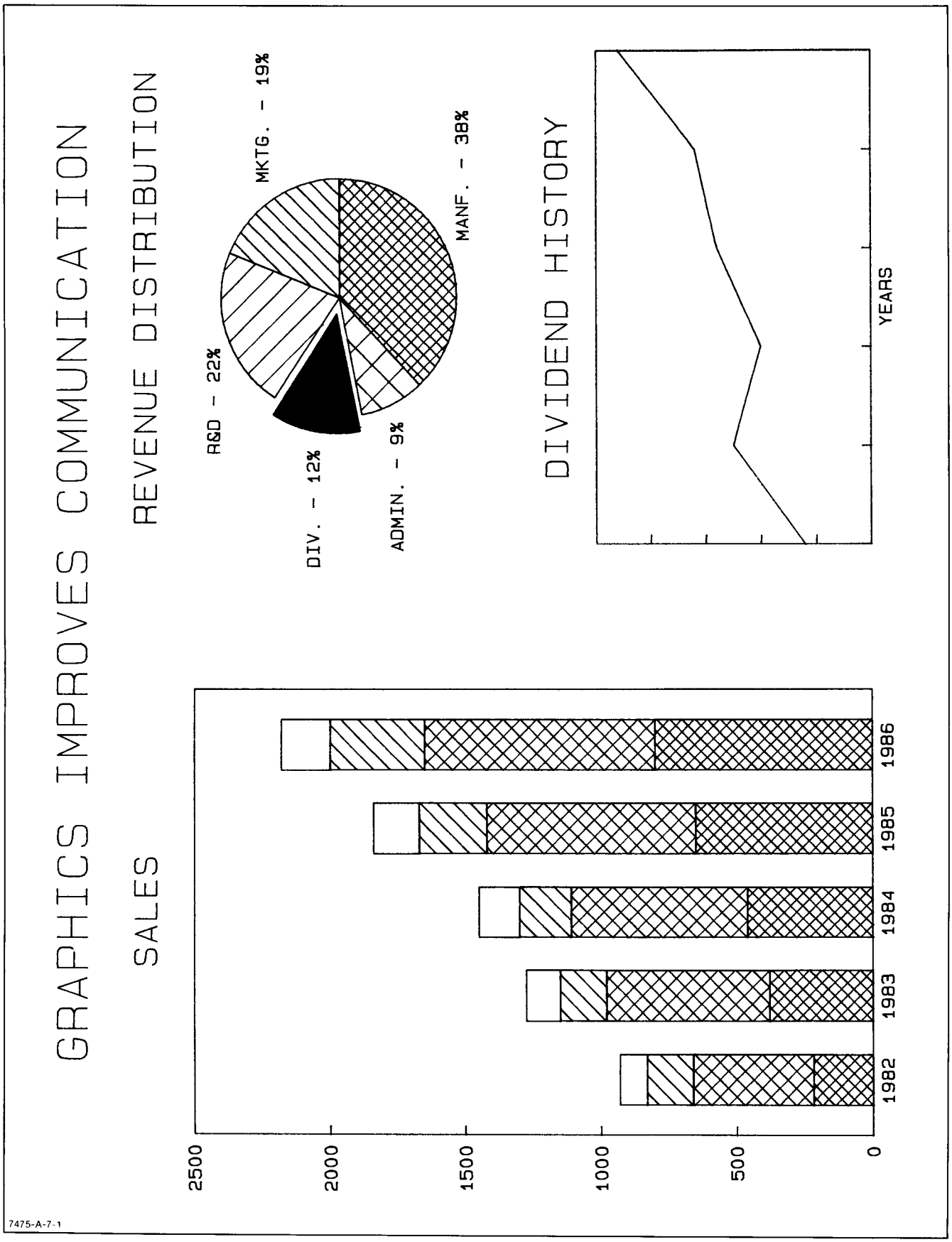


Figure 2-2. Demonstration Plot

```
10 ! "Autost"
20 !
30 !   7475A FEATURES PLOT
40 !
50 !     (JULY 4,1983)
60 !
70 !
80 ! SELECT ADDRESS FOR PLOTTER INTERFACE
90 !
100 CLEAR
110 DISP "ENTER ADDRESS"
120 DISP
130 DISP "  eg. RS-232-C   '10'"
140 DISP "  eg. HP-IB      '705'"
150 DISP
160 INPUT N
170 DISP "ADDRESS IS";N
180 IF N<99 THEN GOSUB 1280
190 !
200 ! INIT 7470A & OUTPUT P1,P2 & WINDOW COORDINATES
210 !
220 OUTPUT N USING "#,K" ; "INOP;"
230 ENTER N ; X1,Y1,X2,Y2
240 OUTPUT N USING "#,K" ; "OW;"
250 ENTER N ; X3,Y3,X4,Y4
260 !
270 ! DRAW + AT P1 & P2 & LABEL COORDINATES
280 !
290 OUTPUT N USING "#,K" ; "SP1PA5080,4064PDPUSM+PA";X1;",";Y1
300 OUTPUT N USING "#,K" ; "CP2,-.3LBP1=(",VAL$(X1),",",VAL$(Y1),")",CHR$(3)
310 OUTPUT N USING "#,K" ; "PA";X2;",";Y2;"SM;"
320 OUTPUT N USING "#,K" ; "CP-16,-.3LBP2=(",VAL$(X2),",",VAL$(Y2),")",CHR$(3)
330 OUTPUT N USING "#,K" ; "PA2022,2464"
340 GOSUB 1180
350 OUTPUT N USING "#,K" ; "PA8088,4064"
360 GOSUB 1220
370 OUTPUT N USING "#,K" ; "FT4,100,45PA9372,6440RR700,700SP2ER700,700"
380 !
390 ! DRAW & LABEL AXIS
400 !
410 OUTPUT N USING "#,K" ; "SP2PA9144,1016PD"
420 FOR I=1 TO 8
430 OUTPUT N USING "#,K" ; "XTPR-1011,0"
440 NEXT I
450 FOR I=1 TO 15
460 OUTPUT N USING "#,K" ; "PR0,400YT"
470 NEXT I
480 OUTPUT N USING "#,K" ; "PUPA2022,4064"
490 GOSUB 1180
500 OUTPUT N USING "#,K" ; "PA8088,5664"
510 GOSUB 1220
520 OUTPUT N USING "#,K" ; "FT4,50,90PA9722,5600WG350,0,360,40SP3EW350,0,360,40"
530 OUTPUT N USING "#,K" ; "SP3PA600,3500DI0,1LBCentimetres",CHR$(3)
540 OUTPUT N USING "#,K" ; "PA700,6966DI"
550 FOR I=15 TO 0 STEP -1
560 IF I<10 THEN OUTPUT N USING "#,K" ; "CP1,0"
570 OUTPUT N USING "#,K" ; "LB",VAL$(I),CHR$(13),CHR$(3),"PR0,-400"
580 NEXT I
590 OUTPUT N USING "#,K" ; "PA2022,5664"
600 GOSUB 1180
610 OUTPUT N USING "#,K" ; "PA2022,2464"
620 GOSUB 1220
630 OUTPUT N USING "#,K" ; "FT1,0,0PA9722,4060PT.5WG700,60,60SP4EW700,60,60"
640 OUTPUT N USING "#,K" ; "PA1032,756SP4"
650 FOR I=0 TO 8
```

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Figure 2-3. Test Program (Sheet 1 of 3)

```
660 OUTPUT N USING "#,K" ; "LB",VAL$(I),CHR$(13),CHR$(3),"PR1011,0"
670 NEXT I
680 OUTPUT N USING "#,K" ; "PA4830,516;LBInches",CHR$(3)
690 OUTPUT N USING "#,K" ; "PA8088,2464"
700 GOSUB 1180
710 OUTPUT N USING "#,K" ; "PA2022,4064"
720 GOSUB 1220
730 OUTPUT N USING "#,K" ; "FT1,0,90PA9722,3570PT.5WG700,240,60SP5EW700,240,60"
740 !
750 ! DRAW CIRCULAR FAN
760 !
770 OUTPUT N USING "#,K" ; "SP4PA5080,4064"
780 FOR I=108 TO 508 STEP 100
790 OUTPUT 705 USING "#,K" ; "CI",I
800 NEXT I
810 OUTPUT 705 USING "#,K" ; "SP6IW3580,2564,6580,5564PA3580,2564ER3000,3000SP5"
820 DEG
830 FOR I=0 TO 345 STEP 15
840 X5=5080+508*COS(I)
850 Y5=4064+508*SIN(I)
860 OUTPUT N USING "#,K" ; "PA";VAL$(INT(X5));",";VAL$(INT(Y5));"PD"
870 X5=5080+2200*COS(I)
880 Y5=4064+2200*SIN(I)
890 OUTPUT N USING "#,K" ; "PA";VAL$(INT(X5));",";VAL$(INT(Y5));"PU"
900 NEXT I
910 OUTPUT N USING "#,K" ; "IWPA8088,4064;"
920 GOSUB 1180
930 OUTPUT N USING "#,K" ; "PA2022,5664"
940 GOSUB 1220
950 OUTPUT N USING "#,K" ; "FT4,50,90PA9722,2030WG350,0,360SP6EW350,0,360;"
960 !
970 ! DRAW LABELS
980 !
990 OUTPUT N USING "#,K" ; "SP6PA3810,6514"
1000 OUTPUT N USING "#,K" ; "VSSI1,1SL.45LB7475A",CHR$(3)
1010 OUTPUT N USING "#,K" ; "PA4645,1778"
1020 OUTPUT N USING "#,K" ; "SISLLBFeatures",,CHR$(3)
1030 OUTPUT N USING "#,K" ; "CP-6,-1LBPlot",CHR$(3)
1040 OUTPUT N USING "#,K" ; "PA8088,5664"
1050 GOSUB 1180
1060 OUTPUT N USING "#,K" ; "PA8088,2464;"
1070 GOSUB 1220
1080 OUTPUT N USING "#,K" ; "FT4,100,45PA9372,490RR700,700SP1ER700,700"
1090 !
1100 ! FRAME WINDOW
1110 !
1120 OUTPUT N USING "#,K" ; "PA5080,4064PDPU";X3;",";Y3
1130 OUTPUT N USING "#,K" ; "EA";X4;",";Y4;"SPOPA";X4;",";Y4;";"
1140 END
1150 !
1160 ! PEN TO PEN REPEATABILITY SUBROUTINES
1170 !
1180 OUTPUT N USING "#,K" ; "PR9,-9PD247,0,0,18,-247,0,0,247,-18,0,0,-247,"
1190 OUTPUT N USING "#,K" ; "-247,0,0,-18,247,0,0,-247,18,0,0,247PU"
1200 RETURN
1210 !
1220 OUTPUT N USING "#,K" ; "PR0,512PD0,-1024PU-512,512PD1024,0PU"
1230 ! OUTPUT N USING "#,K" ; "-512,0,512,0,0,-512,0,512CI512PU;"
1240 RETURN
1250 !
1260 ! HP 85 RS232C INTERFACE SETUP
1270 !
1280 CONTROL 10,1 ; 16 ! RECEIVED DATA GENERATES INTERRUPT
1290 CONTROL 10,2 ; 5 !  ACTIVATES DTR & CTS
1300 CONTROL 10,3 ; 11 ! ACTIVATES RTS,DRS & DTR
```

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Figure 2-3. Test Program (Sheet 2 of 3)

```
1310 CONTROL 10,4 ; 3 !  8 BITS/WORD WITH NO PARITY
1320 CONTROL 10,5 ; 16 ! ENABLES HARDWIRE HANDSHAKE
1330 CONTROL 10,16 ; 0 ! NO CHARACTERS SENT AT EOL
1340 !
1350 ! 7470A-0P001 TURN-ON & CONFIGURATION
1360 !
1370 OUTPUT N USING "#,K" ; "%.(" !          TURN PLOTTER ON    LIST1260
1380 OUTPUT N USING "#,K" ; "%.J" !          ABORT DEVICE CONTROL INSTRUCTION
1390 OUTPUT N USING "#,K" ; "%.K" !          ABORT GRAPHIC INSTRUCTION
1400 OUTPUT N USING "#,K" ; "%.M;;;13;10:" ! TERMINATE OUTPUT WITH Cr & Lf
1410 OUTPUT N USING "#,K" ; "%.@;13:" !      SET HARDWARE HANDSHAKE MODE


1420 OUTPUT N USING "#,K" ; "%.L" !          OUTPUT BUFFER SIZE
1430 ENTER N ; B
1440 DISP "BUFFER SIZE IS";B
1450 RETURN
 9114
```

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Figure 2-3. Test Program (Sheet 3 of 3)

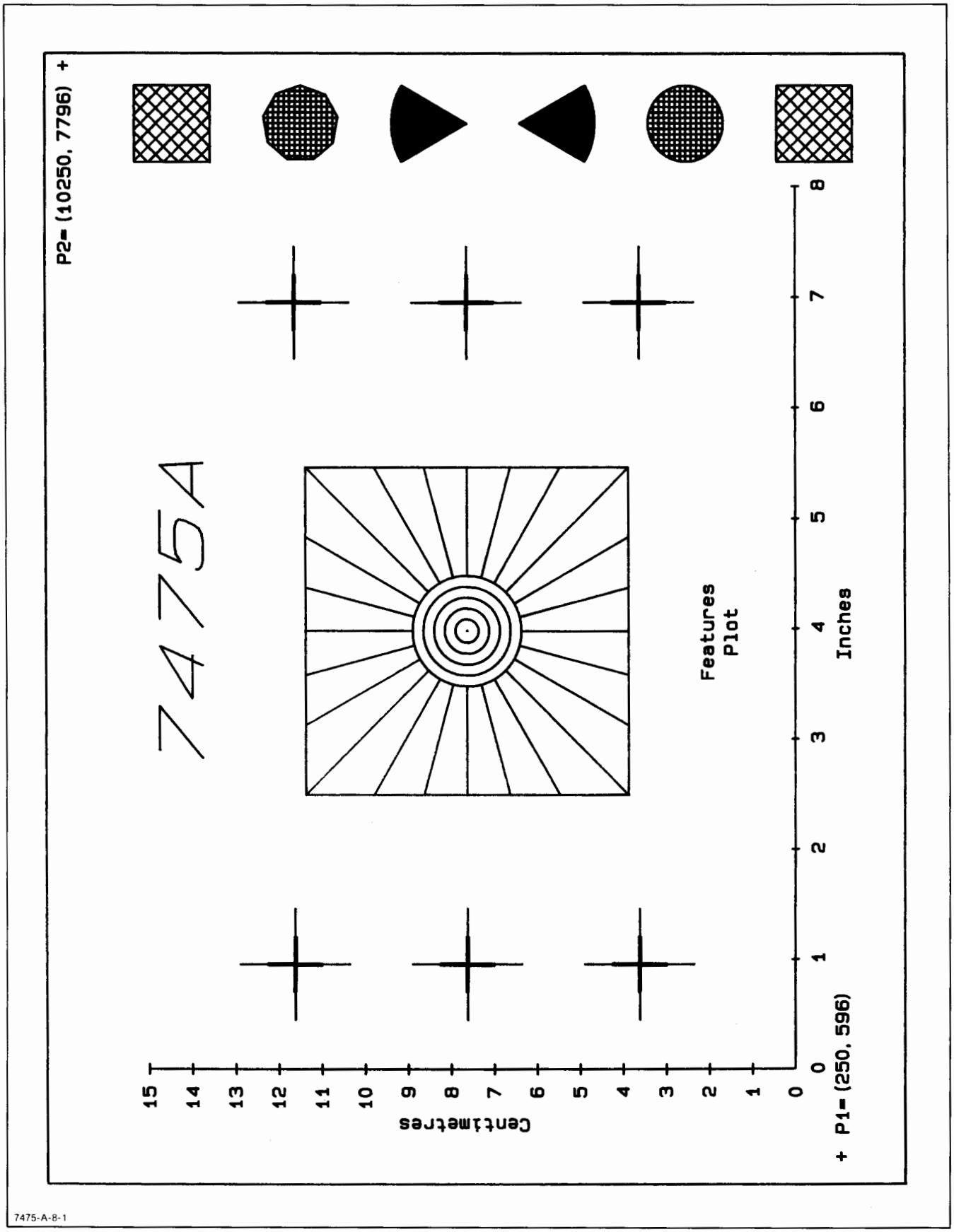


Figure 2-4. Features Test Plot

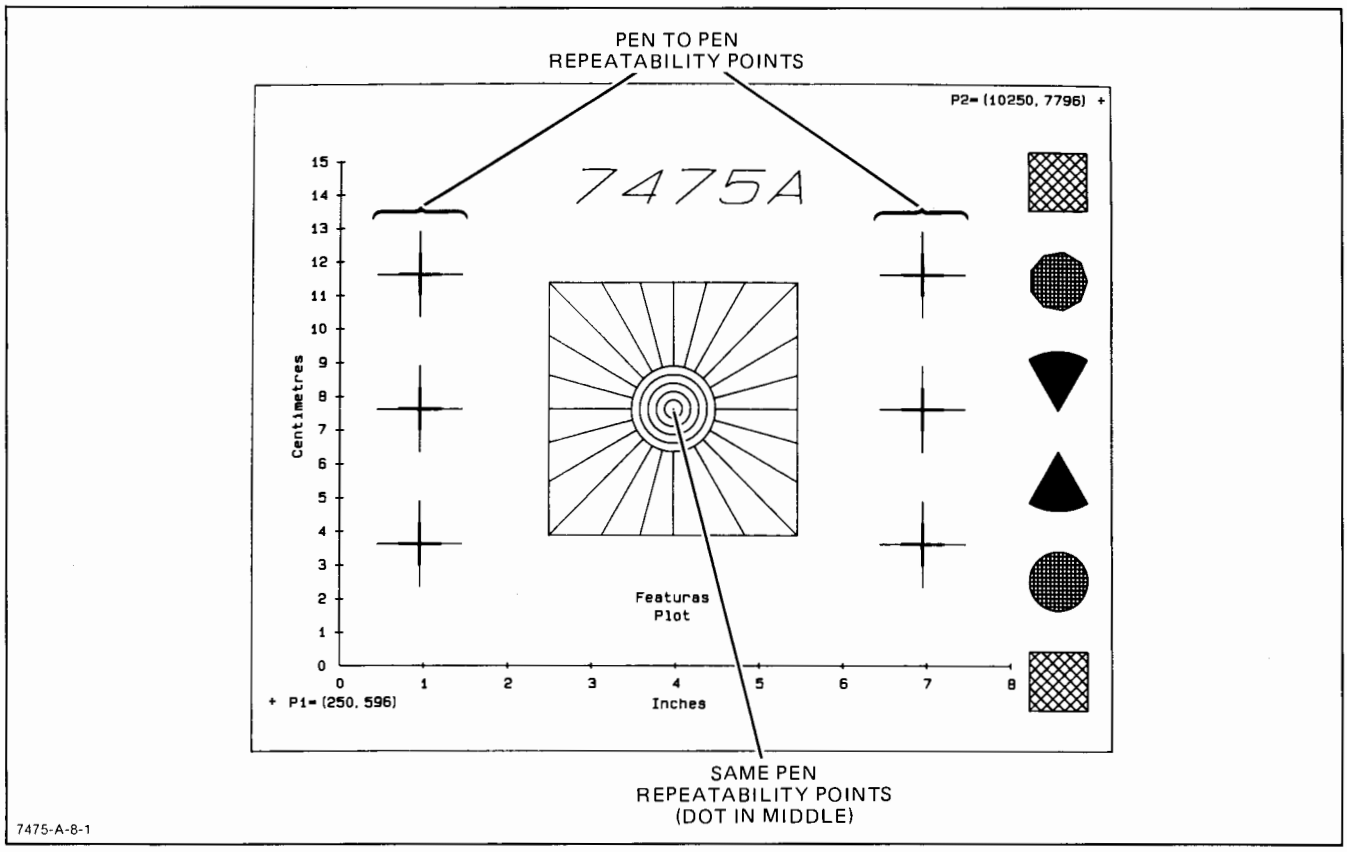


Figure 2-5. Repeatability Test Points

SECTION III

ADJUSTMENTS

3-1. INTRODUCTION

3-2. This section describes mechanical adjustments required to return the HP 7475A to its normal operating condition after repairs have been made. There are no electrical adjustments in the HP 7475A.

3-3. EQUIPMENT REQUIRED

3-4. The adjustment procedures require use of the following tools:

Allen wrench (0.050 in.)
100 mm ruler

3-5. MECHANICAL ADJUSTMENTS

3-6. PEN HEIGHT ADJUSTMENT

3-7. Pen height adjustment is necessary if the pen carriage assembly is disassembled or replaced.

WARNING

The following procedure should be performed only by service-trained personnel who are aware of the electrical shock hazards involved.

a. Set the HP 7475A LINE switch to OFF (O) and disconnect the line cord.

b. Remove the HP 7475A top case by removing the screws indicated in Figure 3-1.

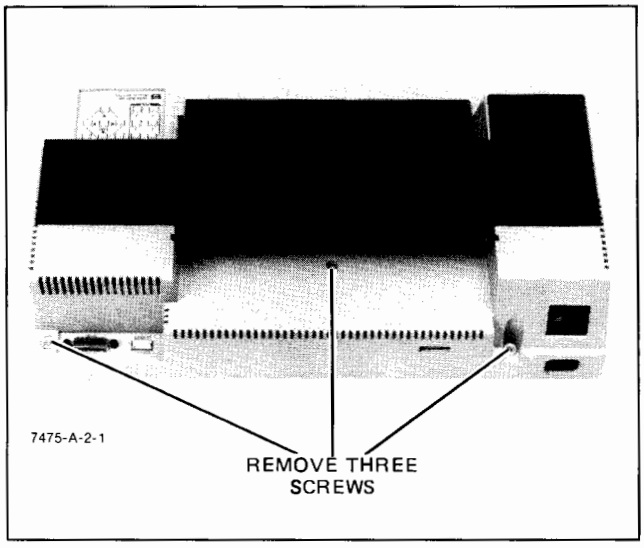


Figure 3-1. Top Case Removal

c. Position pen holder at center of platen.

d. Using the 100 mm ruler, measure the distance from the platen to bottom of pen holder. It should be 10.5 mm. See Figure 3-2.

e. To adjust pen height, insert a 0.050 in. Allen wrench through hole at rear of pen carriage. Turn clockwise to decrease height and counter-clockwise to increase pen height. See Figure 3-3.

f. Reverse procedure to replace top case.

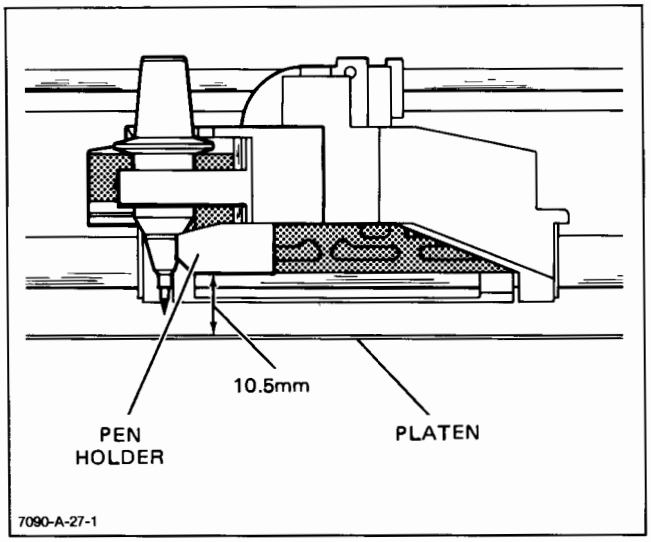


Figure 3-2. Measuring Pen Height

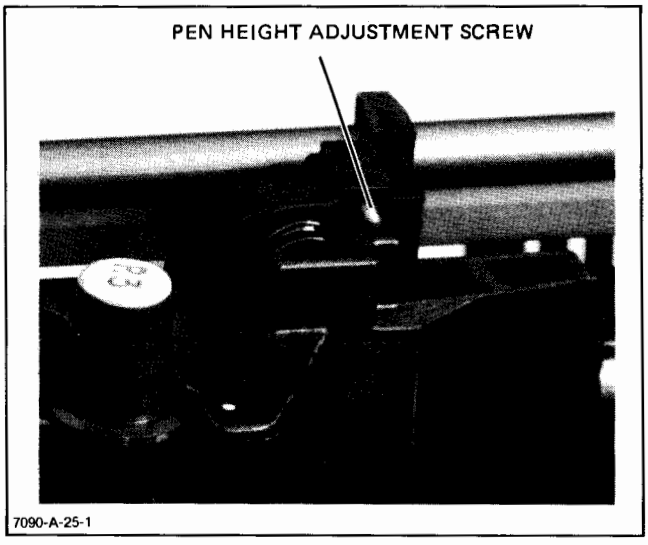


Figure 3-3. Pen Height Adjustment

SECTION IV

REPLACEABLE PARTS

4-1. INTRODUCTION

4-2. This section contains information for ordering parts for the HP Model 7475A Plotter. Included are lists of electrical and mechanical parts and an illustration of mechanical parts.

4-3. EXCHANGE ASSEMBLIES

4-4. Part numbers for assemblies that are available on an exchange basis are listed in the parts lists below the new assembly number. These factory repaired and tested assemblies are available only on a trade-in basis; therefore, the defective assembly must be returned for credit. For this reason, assemblies required for spare parts stock must be ordered by the new part number.

4-5. REPLACEABLE PARTS LISTS

4-6. Electrical parts for the 7475A are listed in Table 4-1 and 4-2. Table 4-3 is a list of mechanical parts which are illustrated in Figure 4-1. Table 4-4 is a list of carousel parts that are illustrated in Figure 4-2.

Table 4-1 = Option 001 PCA
Table 4-2 = Option 002 PCA
Table 4-3 = Mechanical parts
Table 4-4 = Carousel parts

4-7. ORDERING INFORMATION

4-8. To obtain replacement parts or assemblies address an order or inquiry to the nearest Hewlett-Packard Sales and Support Office. Include the HP Part Number, the check digit (listed under the heading "CD" in the parts list), the description, and the quantity required.

4-9. CODE LIST OF MANUFACTURERS

4-10. Table 4-5 lists the five-digit code numbers assigned to the manufacturers of parts in the Model 7475A Plotter. These code numbers appear with the parts in Table 4-1 through 4-4 as an aid for ordering replacement parts directly from the manufacturer.

4-11. DESIGNATIONS AND ABBREVIATIONS

4-12. Table 4-6 lists designations and abbreviations used throughout this manual. Abbreviations in the parts lists are always capital letters. In other parts of the manual both upper- and lower-case abbreviations are used.

Table 4-1. Parts List, Main PCA, RS-232-C, Option 001

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1	07475-60101	1	1	PCA-MAIN RS-232-C (OPTION 001)	28480	07475-60101
A1C1	0180-3251	1	1	CAPACITOR-FXD 68UF 35VDC	28480	0180-3251
A1C2	0180-2887	7	1	CAPACITOR-FXD 2200UF+75-10% 40VDC AL	28480	0180-2887
A1C3	0160-3847	9	19	CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C4	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C5	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C6	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C7	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C8	0160-3533	0	8	CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A1C9	0160-2306	3	1	CAPACITOR-FXD 27PF +-5% 300VDC MICA	28480	0160-2306
A1C10	0140-0202	2	1	CAPACITOR-FXD 15PF +-5% 500VDC MICA	72136	DM15C150J0500WV1CR
A1C11	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C12	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C13	0160-3533	0		CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A1C14	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C15	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C16	0160-3533	0		CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A1C17	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C18	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C19	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C20	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C21	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C22	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C23	0160-3533	0		CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A1C24	0160-3533	0		CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A1C25	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C26	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C27	0180-2879	7	2	CAPACITOR-FXD 22UF+50-10% 25VDC AL	28480	0180-2879
A1C28	0160-4835	7	1	CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A1C29	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C30	0180-0291	3	2	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1C31	0180-2984	5	2	CAPACITOR-FXD 47UF+-20% 50VDC AL	28480	0180-2984
A1C32	0180-3154	3	1	CAPACITOR-FXD 6800UF+-20% 25VDC AL	28480	0180-3154
A1C33	0180-2984	5		CAPACITOR-FXD 47UF+-20% 50VDC AL	28480	0180-2984
A1C34	0180-2879	7		CAPACITOR-FXD 22UF+50-10% 25VDC AL	28480	0180-2879
A1C35	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1C36	0160-6309	4	1	CAPACITOR-FXD .47UF +-20% 63VDC CER	28480	0160-6309
A1C37	0160-0158	9	3	CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A1C38	0180-2986	7	2	CAPACITOR-FXD 330UF+-20% 50VDC AL	28480	0180-2986
A1C39	0160-0158	9		CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A1C40	0160-0158	9		CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A1C41	0180-2986	7		CAPACITOR-FXD 330UF+-20% 50VDC AL	28480	0180-2986
A1C45	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C46	0160-3533	0		CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A1C47	0160-3533	0		CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A1C48	0160-3533	0		CAPACITOR-FXD 470PF +-5% 300VDC MICA	28480	0160-3533
A1CR1	1901-1065	2	1	DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A1CR2	1901-0944	4	4	DIODE-PWR RECT 45V 10A	28480	1901-0944
A1CR3	1901-0944	4		DIODE-PWR RECT 45V 10A	28480	1901-0944
A1CR4	1901-0944	4		DIODE-PWR RECT 45V 10A	28480	1901-0944
A1CR5	1901-0944	4		DIODE-PWR RECT 45V 10A	28480	1901-0944
A1CR6	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1CR7	1901-0704	4	6	DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR8	1901-0704	4		DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR9	1901-1081	2	4	DIODE-PWR RECT 100V 3A	04713	MR501
A1CR10	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR11	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR12	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR13	1901-0704	4		DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR14	1901-0704	4		DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR15	1901-0704	4		DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR16	1901-0704	4		DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR17-20	1901-1065	2	4	DIODE-PWR RECT IN4936 400V 1A	01295	1N4936
A1DS1	1990-0975	8	2	LED-GREEN W/SPACER	28480	1990-0975
A1DS2	1990-0975	8		LED-GREEN W/SPACER	28480	1990-0975
A1DS3	1990-0976	9	1	LED-YELLOW W/SPACER	28480	1990-0976
A1E5	1200-0567	1	1	SOCKET-IC 28-CONT DIP DIP-SLDR	28480	1200-0567
A1E9	1205-0463	6	1	HEAT SINK	28480	1205-0463
A1E10	1205-0472	7	1	HEAT SINK- 6254	28480	1205-0472

Table 4-1. Parts List, Main PCA, RS-232-C, Option 001 (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1E11	2110-0589	7	6	FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E12	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E13	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E14	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E15	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E16	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1F1	2110-0655	8	1	FUSE-3.15A 250V	28480	2110-0655
A1F2	2110-0672	9	1	FUSE-0.8A NM BL	28480	2110-0672
A1F3	2110-0673	0	1	FUSE-1.6A NM BL	28480	2110-0673
A1H1	0361-1125	8	2	RIVET-BLIND PL-THRU DOME-HD .124DIA	28480	0361-1125
A1H2	0361-1125	8		RIVET-BLIND PL-THRU DOME-HD .124DIA	28480	0361-1125
A1H3	0515-1877	4	4	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1877
A1H4	0515-1877	4		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1877
A1H5	0515-1877	4		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1877
A1H6	0515-1877	4		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1877
A1H7	0535-0031	2	2	NUT-HEX W/LKWR M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
A1H8	0535-0031	2		NUT-HEX W/LKWR M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
A1J1	1200-0575	1	2	SOCKET-STRP 4-CONT SIP DIP-SLDR	28480	1200-0575
A1J2	1251-3192	1	2	CONNECTOR 3-PIN M POST TYPE	28480	1251-3192
A1J3	1251-4245	7	2	CONNECTOR 2-PIN M POST TYPE	28480	1251-4245
A1J4	1252-0094	8	1	CONNECTOR 25-PIN F D SUBMIN	28480	1252-0094
A1J5	1251-4245	7		CONNECTOR 2-PIN M POST TYPE	28480	1251-4245
A1J6	1200-0575	1		SOCKET-STRP 4-CONT SIP DIP-SLDR	28480	1200-0575
A1J7	1251-8170	5	1	CONN-POST TYPE .100-PIN-SPCG 2-CONT	28480	1251-8170
A1J8	1251-3276	2	1	CONNECTOR 6-PIN M POST TYPE	28480	1251-3276
A1J9	1251-3192	1		CONNECTOR 3-PIN M POST TYPE	28480	1251-3192
A1L1	9100-1788	6	1	CHOKE-WIDE BAND ZMAX=680 OHM@ 100 MHZ	02114	VK200 20/4B
A1Q1	1854-0921	6	4	TRANSISTOR NPN DARL TO-220AB PD=2W	28480	1854-0921
A1Q2	1854-0921	6		TRANSISTOR NPN DARL TO-220AB PD=2W	28480	1854-0921
A1Q3	1854-0921	6		TRANSISTOR NPN DARL TO-220AB PD=2W	28480	1854-0921
A1Q4	1854-0921	6		TRANSISTOR NPN DARL TO-220AB PD=2W	28480	1854-0921
A1Q5	1853-0509	4	4	TRANSISTOR PNP TO-220AB PD=2W FT=3MHZ	28480	1853-0509
A1Q6	1853-0509	4		TRANSISTOR PNP TO-220AB PD=2W FT=3MHZ	28480	1853-0509
A1Q7	1853-0509	4		TRANSISTOR PNP TO-220AB PD=2W FT=3MHZ	28480	1853-0509
A1Q8	1853-0509	4		TRANSISTOR PNP TO-220AB PD=2W FT=3MHZ	28480	1853-0509
A1Q9	1853-0059	9	1	TRANSISTOR PNP 2N3791 SI TO-3 PD=150W	04713	2N3791
A1Q10	1854-0932	9	1	TRANSISTOR-NPN TIP 31A	28480	1854-0932
A1R1	0699-0982	8	4	RESISTOR-FXD 1K OHM 5% 2W	28480	0699-0982
A1R2	0699-0982	8		RESISTOR-FXD 1K OHM 5% 2W	28480	0699-0982
A1R3	0699-0982	8		RESISTOR-FXD 1K OHM 5% 2W	28480	0699-0982
A1R4	0699-0982	8		RESISTOR-FXD 1K OHM 5% 2W	28480	0699-0982
A1R5	0698-3132	4	3	RESISTOR 261 1%.125W F TC=0+-100	28480	0698-3132
A1R6	0698-3132	4		RESISTOR 261 1%.125W F TC=0+-100	28480	0698-3132
A1R7	0811-3456	7	1	RESISTOR .1 3% 1W PW TC=0+-90	28480	0811-3456
A1R8	0683-1055	5	1	RESISTOR 1M 5% .25W FC TC=-800/+900	01121	CB1055
A1R9	0698-3132	4		RESISTOR 261 1%.125W F TC=0+-100	28480	0698-3132
A1R10	0698-3155	1	3	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	0698-3155
A1R11	0698-3444	1	1	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A1R12	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R13	0757-0441	8	1	RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A1R14	0757-0279	0	1	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A1R15	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R16	0757-0288	1	1	RESISTOR 9.09K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-9091-F
A1R17	0757-0280	3	1	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1R18	0698-4483	0	1	RESISTOR 10.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1072-F
A1R19	0699-0263	8	1	RESISTOR 26.1 2% .25W F TC=0+-100	28480	0699-0263
A1R20	0757-0818	3	1	RESISTOR 825 1% .5W F TC=0+-100	28480	0757-0818
A1R21	0757-0274	5	1	RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
A1R22	0757-0401	0	1	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A1R23	0698-3622	7	1	RESISTOR 120 5% 2W MO TC=0+-200	28480	0698-3622
A1R24	0699-0975	9	2	RESISTOR-FXD 10 OHM 2%	28480	0699-0975
A1R25	0699-0975	9		RESISTOR-FXD 10 OHM 2%	28480	0699-0975
A1R26	0698-3435	0	1	RESISTOR 38.3 1% .125W F TC=0+-100	24546	C4-1/8-T0-38R3-F
A1R27	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1RN1	1810-0279	5	3	NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A1RN2	1810-0643	7	1	NETWORK-RES 5 SIP 4.7K OHM X 4	28480	1810-0643
A1RN3	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A1RN4	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472

Table 4-1. Parts List, Main PCA, RS-232-C, Option 001 (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1S1	3101-2655	4	1	SWITCH-SL 9-1A DIP-SLIDE-ASSY .1A 50VDC	28480	3101-2655
A1S2	0363-0193	2	1	CONTACT-SWITCH HOOK SHAPE; 302 SST	28480	0363-0193
A1U1	1820-2715	9	3	IC DRVR TTL NAND DUAL 2-INP	01295	SN75447P
A1U2	1820-2715	9		IC DRVR TTL NAND DUAL 2-INP	01295	SN75447P
A1U3	1820-2744	4	2	IC-1MC3-0005	28480	1820-2744
A1U4	1820-2744	4		IC-1MC3-0005	28480	1820-2744
A1U5	1820-2754	6	1	IC MISC CMOS	31471	UA-4 MASKED
A1U6	1820-2753	5	1	IC MISC CMOS	31471	UA-4 MASKED
A1U7	1820-1470	1	1	IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS157N
A1U8	1820-2715	9		IC DRVR TTL NAND DUAL 2-INP	01295	SN75447P
A1U9	1820-0990	8	2	IC RCVR DTL NAND LINE QUAD	01295	SN75189AJ
A1U10	1826-0138	8	1	IC COMPARATOR GP QUAD 14-DIP-P PKG	01295	LM339N
A1U11	1820-0509	5	1	IC DRVR DTL LINE DRVR QUAD	04713	MC1488L
A1U12	1820-1438	1	3	IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS257AN
A1U13	1820-2470	3	1	IC-DIGITAL MC6850P	28480	1820-2470
A1U14	1820-2099	2	1	IC MICPROC NMOS 8-BIT	04713	MC6802P
A1U15	1818-3290	2	1	ROM	28480	1818-3290
A1U16	1818-3291	3	1	ROM	28480	1818-3291
A1U17	1818-3022	8	1	IC CMOS (16K) STAT RAM 200-NS 3-S	28480	1818-3022
A1U18	1820-1196	8	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
A1U19	1820-2274	5	1	IC DRVR TTL QUAD	13606	ULN-2068B
A1U20	1820-1438	1		IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS257AN
A1U21	1826-0904	6	1	IC-LM330T-5.0	28480	1826-0904
A1U22	1820-1199	1	1	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A1U23	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A1U24	1820-1197	9	2	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A1U25	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A1U26	1820-0990	8		IC RCVR DTL NAND LINE QUAD	01295	SN75189AJ
A1U27	1820-1438	1		IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS257AN
A1VR1	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A1VR2	1902-3094	3	1	DIODE-ZNR 5.11V 2% DO-35 PD=.4W	28480	1902-3094
A1VR3	1902-0551	1	2	DIODE-ZNR 6.2V 5% PD=1W IR=10UA	28480	1902-0551
A1VR4	1902-0551	1		DIODE-ZNR 6.2V 5% PD=1W IR=10UA	28480	1902-0551
A1VR5	1902-3114	8	2	DIODE-ZNR 6.19V 2% DO-35 PD=.4W	28480	1902-3114
A1VR6	1902-3114	8		DIODE-ZNR 6.19V 2% DO-35 PD=.4W	28480	1902-3114
A1VR7	1902-1379		1	DIODE-ZNR 3.9V	28480	1902-1379
A1Y1	0410-1334	6	1	CRYSTAL-QUARTZ 4 MHZ HC-18/U-HLDR	28480	0410-1334

Table 4-2. Parts List, Main PCA, HP-IB, Option 002

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1	07475-60102	2	1	PCA-MAIN HP-IB (OPTION 002)	28480	07475-60102
A1C1	0180-3251	1	1	CAPACITOR-FXD 68UF 35VDC	28480	0180-3251
A1C2	0180-2887	7	1	CAPACITOR-FXD 2200UF+75-10% 40VDC AL	28480	0180-2887
A1C3	0160-3847	9	18	CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C4	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C5	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C6	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C7	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C8	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C9	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C10	0160-2306	3	1	CAPACITOR-FXD 27PF +-5% 300VDC MICA	28480	0160-2306
A1C11	0140-0202	2	1	CAPACITOR-FXD 15PF +-5% 500VDC MICA	72136	DM15C150J0500WV1CR
A1C12	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C13	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C14	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C15	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C16	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C17	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C18	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C19	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C20	0180-2079	7	2	CAPACITOR-FXD 22UF+50-10% 25VDC AL	28480	0180-2879
A1C21	0160-4835	7	1	CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A1C22	0180-0291	3	2	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1C23	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C24	0180-3154	3	1	CAPACITOR-FXD 6800UF+-20% 25VDC AL	28480	0180-3154
A1C25	0180-2879	7		CAPACITOR-FXD 22UF+50-10% 25VDC AL	28480	0180-2879
A1C26	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A1C27	0160-6309	4	1	CAPACITOR-FXD .47UF +-20% 63VDC CER	28480	0160-6309
A1C28	0160-0159	0	3	CAPACITOR-FXD 6800PF +-10% 200VDC POLYE	28480	0160-0159
A1C29	0160-0159	0		CAPACITOR-FXD 6800PF +-10% 200VDC POLYE	28480	0160-0159
A1C30	0160-0159	0		CAPACITOR-FXD 6800PF +-10% 200VDC POLYE	28480	0160-0159
A1C31	0180-2984	5	2	CAPACITOR-FXD 47UF+-20% 50VDC AL	28480	0180-2984
A1C32	0180-2984	5		CAPACITOR-FXD 47UF+-20% 50VDC AL	28480	0180-2984
A1C33	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1C34	0160-3847	9		CAPACITOR-FXD .01UF +100-0% 50VDC CER	28480	0160-3847
A1CR1	1901-1065	2	1	DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A1CR2	1901-0944	4	4	DIODE-PWR RECT 45V 10A	28480	1901-0944
A1CR3	1901-0944	4		DIODE-PWR RECT 45V 10A	28480	1901-0944
A1CR4	1901-0944	4		DIODE-PWR RECT 45V 10A	28480	1901-0944
A1CR5	1901-0944	4		DIODE-PWR RECT 45V 10A	28480	1901-0944
A1CR6	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1CR7	1901-0704	4	4	DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR8	1901-0704	4		DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR9	1901-1081	2	4	DIODE-PWR RECT 100V 3A	04713	MR501
A1CR10	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR11	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR12	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR13	1901-0704	4		DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1CR14	1901-0704	4		DIODE-PWR RECT 1N4002 100V 1A DO-41	01295	1N4002
A1DS1	1990-0975	8	2	LED-GREEN W/SPACER	28480	1990-0975
A1DS2	1990-0975	8		LED-GREEN W/SPACER	28480	1990-0975
A1DS3	1990-0976	9	1	LED-YELLOW W/SPACER	28480	1990-0976
A1E4	1200-0567	1		SOCKET-IC 28-CONT DIP DIP-SLDR	28480	1200-0567
A1E12	1205-0463	6	1	HEAT SINK	28480	1205-0463
A1E13	1205-0472	7	1	HEAT SINK- 6254	28480	1205-0472
A1E14	2110-0589	7	6	FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E15	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E16	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E17	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E18	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1E19	2110-0589	7		FUSEHOLDER-CLIP TYPE 10A 250 V	28480	2110-0589
A1F1	2110-0655	8	1	FUSE-3.15A 250V	28480	2110-0655
A1F2	2110-0672	9	1	FUSE-0.8A NM BL	28480	2110-0672
A1F3	2110-0673	0	1	FUSE-1.6A NM BL	28480	2110-0673
A1H1	0361-1125	8	2	RIVET-BLIND PL-THRU DOME-HD .124DIA	28480	0361-1125
A1H2	0361-1125	8		RIVET-BLIND PL-THRU DOME-HD .124DIA	28480	0361-1125
A1H3	0515-1877	4	4	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1877
A1H4	0515-1877	4		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1877
A1H5	0515-1877	4		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1877

Table 4-2. Parts List, Main PCA, HP-IB, Option 002 (Continued)

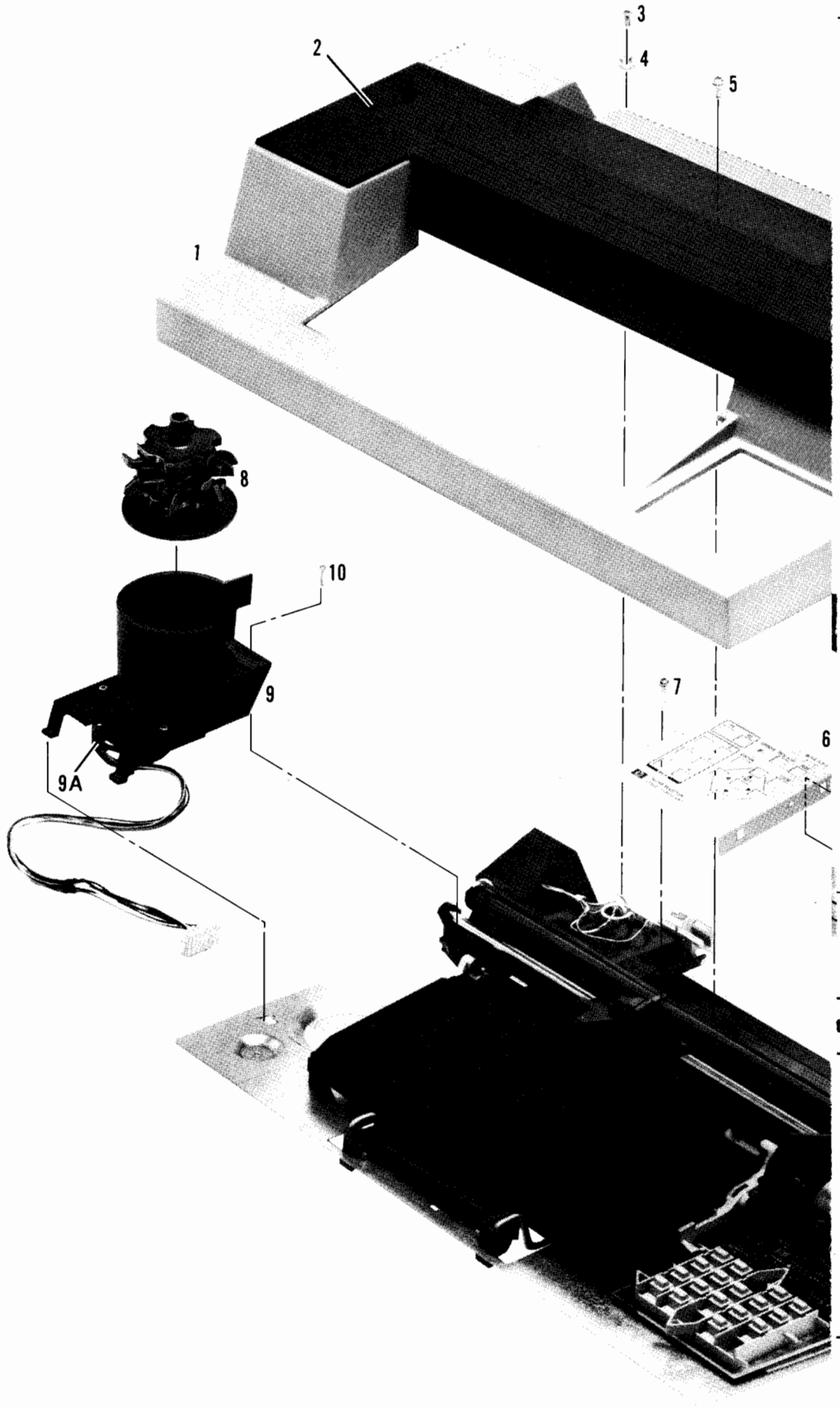
Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1H6	0515-1877	4		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-1877
A1H7	0535-0031	2	2	NUT-HEX W/LKWR M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
A1H8	0535-0031	2		NUT-HEX W/LKWR M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
A1J1	1200-0575	1	2	SOCKET-STRP 4-CONT SIP DIP-SLDR	28480	1200-0575
A1J2	1251-3192	1	2	CONNECTOR 3-PIN M POST TYPE	28480	1251-3192
A1J3	1251-4245	7	2	CONNECTOR 2-PIN M POST TYPE	28480	1251-4245
A1J4	1252-1323	8	1	CONNECTOR 24-PIN F MICRO RIBBON	28480	1252-1323
A1J5	1251-4245	7		CONNECTOR 2-PIN M POST TYPE	28480	1251-4245
A1J6	1200-0575	1		SOCKET-STRP 4-CONT SIP DIP-SLDR	28480	1200-0575
A1J7	1251-8170	5	1	CONN-POST TYPE .100-PIN-SPCG 2-CONT	28480	1251-8170
A1J8	1251-3276	2	1	CONNECTOR 6-PIN M POST TYPE	28480	1251-3276
A1J9	1251-3192	1		CONNECTOR 3-PIN M POST TYPE	28480	1251-3192
A1L1	9100-1788	6	1	CHOKE-WIDE BAND ZMAX=680 OHM@ 180 MHZ	02114	VK200 20/4B
A1Q1	1854-0921	6	4	TRANSISTOR NPN DARL TO-220AB PD=2W	28480	1854-0921
A1Q2	1854-0921	6		TRANSISTOR NPN DARL TO-220AB PD=2W	28480	1854-0921
A1Q3	1854-0921	6		TRANSISTOR NPN DARL TO-220AB PD=2W	28480	1854-0921
A1Q4	1854-0921	6		TRANSISTOR NPN DARL TO-220AB PD=2W	28480	1854-0921
A1Q5	1853-0509	4	4	TRANSISTOR PNP TO-220AB PD=2W FT=3MHZ	28480	1853-0509
A1Q6	1853-0509	4		TRANSISTOR PNP TO-220AB PD=2W FT=3MHZ	28480	1853-0509
A1Q7	1853-0509	4		TRANSISTOR PNP TO-220AB PD=2W FT=3MHZ	28480	1853-0509
A1Q8	1853-0509	4		TRANSISTOR PNP TO-220AB PD=2W FT=3MHZ	28480	1853-0509
A1Q9	1853-0059	9	1	TRANSISTOR PNP 2N3791 SI TO-3 PD=150W	04713	2N3791
A1Q10	1854-0932	9	1	TRANSISTOR-NPN TIP 31A	28480	1854-0932
A1R1	0699-0982	8	4	RESISTOR-FXD 1K OHM 5% 2W	28480	0699-0982
A1R2	0698-3132	4	3	RESISTOR 261 1%.125W F TC=0+-100	28480	0698-3132
A1R3	0699-0982	8		RESISTOR-FXD 1K OHM 5% 2W	28480	0699-0982
A1R4	0699-0982	8		RESISTOR-FXD 1K OHM 5% 2W	28480	0699-0982
A1R5	0699-0982	8		RESISTOR-FXD 1K OHM 5% 2W	28480	0699-0982
A1R6	0698-3132	4		RESISTOR 261 1%.125W F TC=0+-100	28480	0698-3132
A1R7	0811-3456	7	1	RESISTOR .1 3% 1W PW TC=0+-90	28480	0811-3456
A1R8	0683-1055	5	1	RESISTOR 1M 5% .25W FC TC=-800/+900	01121	CB1055
A1R9	0698-3132	4		RESISTOR 261 1%.125W F TC=0+-100	28480	0698-3132
A1R10	0698-3444	1	1	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A1R11	0698-3155	1	1	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R12	0757-0441	8	1	RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A1R13	0757-0279	0	2	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A1R14	0757-0288	1	1	RESISTOR 9.09K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-9091-F
A1R15	0757-0280	3	1	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1R16	0698-4483	0	1	RESISTOR 10.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1872-F
A1R17	0699-0263	8	2	RESISTOR 26.1 2% .25W F TC=0+-100	28480	0699-0263
A1R18	0757-0818	3	1	RESISTOR 825 1% .5W F TC=0+-100	28480	0757-0818
A1R19	0698-0085	0	1	RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A1R20	0757-0401	0	1	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A1R21	0699-0263	8		RESISTOR 26.1 2% .25W F TC=0+-100	28480	0699-0263
A1R22	0698-3435	0	1	RESISTOR 38.3 1% .125W F TC=0+-100	24546	C4-1/8-T0-38R3-F
A1R23	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	28480	0757-0279
A1RN1	1810-0279	5	3	NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A1RN2	1010-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A1RN3	1810-0643	7	1	NETWORK-RES 5-SIP 4.7K OHM X 4	28480	1810-0643
A1RN4	1010-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A1S1	3101-1973	7	1	SWITCH-SL 7-1A DIP-SLIDE-ASSY .1A 50VDC	28480	3101-1973
A1S2	0363-0193	2	1	CONTACT-SWITCH HOOK SHAPE; 302 SST	28480	0363-0193
A1U1	1820-2715	9	3	IC DRVR TTL NAND DUAL 2-INP	01295	SN75447P
A1U2	1820-2715	9		IC DRVR TTL NAND DUAL 2-INP	01295	SN75447P
A1U3	1820-2744	4	2	IC-1MC3-0005	28480	1820-2744
A1U4	1820-2744	4		IC-1MC3-0005	28480	1820-2744
A1U5	1820-2754	6	1	IC MISC CMOS	31471	UA-4 MASKED
A1U6	1820-2753	5	1	IC MISC CMOS	31471	UA-4 MASKED
A1U7	1820-1470	1	1	IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS157N
A1U8	1820-2715	9		IC DRVR TTL NAND DUAL 2-INP	01295	SN75447P
A1U9	1826-0138	8	1	IC COMPARATOR GP QUAD 14-DIP-P PKG	01295	LM339N
A1U10	1820-2424	7	2	IC MISC TTL OCTL	04713	MC3447P
A1U11	1820-2424	7		IC MISC TTL OCTL	04713	MC3447P
A1U12	1820-2219	8	1	IC MICPROC-ACCESS NMOS 8-BIT	04713	MC6480P
A1U13	1820-2099	2	1	IC MICPROC NMOS 8-BIT	04713	MC6802P
A1U14	1818-3288	8	1	ROM	28480	1818-3288
A1U15	1818-3289	9	1	ROM	28480	1818-3289
A1U16	1818-3022	9	1	IC CMOS (16K) STAT RAM 200-NS 3-S	28480	1818-3022
A1U17	1820-1196	8	1	IC FF TTL LS D-TYPE POS EDGE-TRIG COM	01295	SN74LS174N
A1U18	1820-2274	5	1	IC DRVR TTL QUAD	13606	ULN-2068B
A1U19	1820-1430	1	1	IC MUXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS257AN
A1U20	1826-0904	6	1	IC-LM330T-5.0	28480	1826-0904

Table 4-2. Parts List, Main PCA, HP-IB, Option 002 (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1U21	1820-1199	1	1	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A1U22	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A1U23	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A1U24	07475-60103	3	1	ASSEMBLY-DIODE	28480	07475-60103
A1VR1	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A1VR2	1902-3094	3	1	DIODE-ZNR 5.11V 2% DO-35 PD=.4W	28480	1902-3094
A1VR3	1902-3114	8	2	DIODE-ZNR 6.19V 2% DO-35 PD=.4W	28480	1902-3114
A1VR4	1902-3114	8		DIODE-ZNR 6.19V 2% DO-35 PD=.4W	28480	1902-3114
A1Y1	0410-1334	6	1	CRYSTAL-QUARTZ 4 MHZ HC-18/U-HLDR	28480	0410-1334

Table 4-3. Parts List, Mechanical Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
1	07475-40101	9	1	TOP CASE	28480	07475-40101
2	07475-40102	0	1	WINDOW	28480	07475-40102
3	0515-1013	0	2	SCREW-MACH M4 X 0.7 12MM-LG	28480	0515-1013
4	07470-20012	4	2	STANDOFF	28480	07470-20012
5	0515-0771	5	1	SCREW-MACHINE ASSEMBLY M4 X 0.7 12M-LG	28480	0515-0771
6	07475-00010	5	1	FRONT PANEL	28480	07475-00010
7	0515-0751	1	1	SCREW-MACH M4 X 0.7 20MM-LG PAN-HD	28480	0515-0751
8	5061-5080	1	1	PEN CAROUSEL ASSEMBLY	28480	5061-5080
9	07475-60175	9	1	PEN CAROUSEL HOUSING ASSEMBLY W/MOTOR	28480	07475-60175
9A	3140-0687	0	1	CAROUSEL MOTOR ONLY	28480	3140-0687
10	0624-0591	8	2	SCREW-TPG 3-24 .5-IN-LG PAN-HD-PHL STL	00000	ORDER BY DESCRIPTION
11	5020-6306	0	1	IDLER PULLEY	28480	5020-6306
12	07470-40027	3	1	BELT TENSIONER	28480	07470-40027
13	1460-1940	6	1	SPRING-CPRSN .36-IN-OD .875-IN-OA-LG	28480	1460-1940
14	1460-2027	2	1	SPRING	28480	1460-2027
15	07475-60020	3	1	PEN HOLDER	28480	07475-60020
16	1460-1950	8	1	SPRING-PEN DOWN	28480	1460-1950
17	5040-8672	9	1	END CAP	28480	5040-8672
18	07475-40005	2	1	SILICONE RUBBER DAMPER SIL-R8R	28480	07475-40005
19	5040-8650	3	1	PEN CARRIAGE	28480	5040-8650
20	1460-2024	9	1	SPRING	28480	1460-2024
21	1500-0649	6	1	BELT-GEAR .188-WD 392-T .082-P	28480	1500-0649
22	5020-6302	6	1	PEN LIFT BAR	28480	5020-6302
23	5020-6301	5	1	SLIDER ROD	28480	5020-6301
24	07470-40016	0	1	PEN LIFT CAP	28480	07470-40016
25	0515-0296	9	4	SCREW-MACH M4 X 0.7 35MM-LG PAN-HD	28480	0515-0296
26	07470-40049	9	2	MOTOR CLAMP	28480	07470-40049
27	07470-60180	1	1	PEN DRIVE MOTOR ASSEMBLY	28480	07470-60180
28	5040-8668	3	1	PEN DROP SHIELD	28480	5040-8668
29	5090-1471	7	1	NUT SHEET METAL	28480	5090-1471
30	5040-8673	0	1	BUSHING	28480	5040-8673
31	07470-40037	5	1	PEN LIFT BUMPER	28480	07470-40037
32	0515-0733	9	1	SCREW	28480	0515-0733
33	07475-60015	6	1	SOLENOID	28480	07475-60015
34	1460-2043	2	1	SPRING-SOLENOID	28480	1460-2043
35	0510-0015	0	2	RETAINER-RING E-R EXT .125-IN-DIA STL	28480	0510-0015
36	07475-40030	3	2	PINCH ROLLER	28480	07475-40030
37	1460-2033	0	2	SPRING-PINCHROLLER ARM	28480	1460-2033
38	5040-8652	3	1	ARM-PINCHROLLER (RIGHT)	28480	5040-8652
39	5040-8647	8	1	ARM-PINCHROLLER (LEFT)	28480	5040-8647
40	07470-60175	4	1	PAPER DRIVE MOTOR ASSEMBLY	28480	07470-60175
41	5040-8674	1	1	RING-COUPLER	28480	5040-8674
42	07470-40005	7	1	COUPLER-GRIT WHEEL SHAFT	28480	07470-40005
43	5061-5074	3	1	GRIT WHEEL SHAFT ASSEMBLY	28480	5061-5074
44	5040-8669	4	1	CLAMP-BEARING	28480	5040-8669
45	5040-8663	8	1	HANDLE-PINCHROLLER	28480	5040-8663
46	5040-8646	7	1	CHASSIS	28480	5040-8646
47	0905-0996	3	4	O-RINGS, RUBBER	28480	0905-0996
48	0515-0070	7	1	SCREW-MACH M4 X 0.7 6MM-LG PAN-HD	28480	0515-0070
49	2110-0567	1	1	FUSEHOLDER CAP 12A MAX FOR UL (METRIC)	28480	2110-0567
	2110-0565	9	1	FUSEHOLDER CAP 12A MAX FOR UL (U.S.)	28480	2110-0565
50	2110-0016	5	1	FUSE .6A 250V TD 1.25X .25 UL	75915	313.600
	2110-0639	8		FUSE .315A 250V IEC	28480	2110-0639
	2110-0044	9		FUSE .3A250V TD 1.25X .25 UL	75915	313.300
51	0360-2073	5	1	JUMPER-TRANSFORMER	28480	0360-2073
52	07475-40067	6	1	BLOCK-DISPLAY	28480	07475-40067
53	07470-60124	3	1	POWER MODULE ASSEMBLY	28480	07470-60124
	1251-4470	0	1	CONNECTOR-SGL CONT SKT .08-IN-BSC-SZ RND	28480	1251-4470
	2110-0610	5	1	FUSEHOLDER-EXTR POST 16A 250V	28480	2110-0610
	2110-0569	3	1	FUSEHOLDER COMPONENT NUT; THREAD M12.7	28480	2110-0569
	3101-2697	4	1	SWITCH	28480	3101-2697
54	9100-4238	7	1	TRANSFORMER 76.2MMX70MMX63.5MM	28480	9100-4238
55	07475-40021	2	1	BRACKET-PAPER BAIL	28480	07475-40021
56	07475-20005	0	1	BAIL-PAPER	28480	07475-20005
57	07475-60025	8	1	BASE ASSEMBLY	28480	07475-60025
58	07475-60101	1	1	PCA-MAIN RS-232-C (OPTION 001)	28480	07475-60101
	07475-66101	3		PCA-MAIN (OPTION 001) REBUILT	28480	07475-66101
	07475-60102	2		PCA-MAIN HP-IB (OPTION 002)	28480	07475-60102
	07475-66102	4		PCA-MAIN (OPTION 002) REBUILT	28480	07475-66102
59	07475-60011	2	1	PANEL-REAR, OPTION 001	28480	07475-60011
	07475-60012	3	1	PANEL-REAR, OPTION 002	28480	07475-60012
60	2190-0034	5	2	WASHER-LK- .194 ID. OPTION 002 ONLY	28480	2190-0034
61	1251-7828	8	2	STANDOFF-OPTION 001 ONLY	28480	1251-7828
62	1251-7999	4	1	DUSTCOVER-CONNECTOR OPTION 002 ONLY	28480	1251-7999
63	07475-00015	0	1	INSULATOR	28480	07475-00015
64	07475-00001	4	1	RETAINER, SOLENOID	28480	07475-00001
65	5040-8665	0	1	SPACER	28480	5040-8665
67	5040-8662	7	1	CLAW-PEN	28480	5040-8662
68	5020-6308	2	1	PIN-DOWEL	28480	5020-6308



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20. 66, 67, 68
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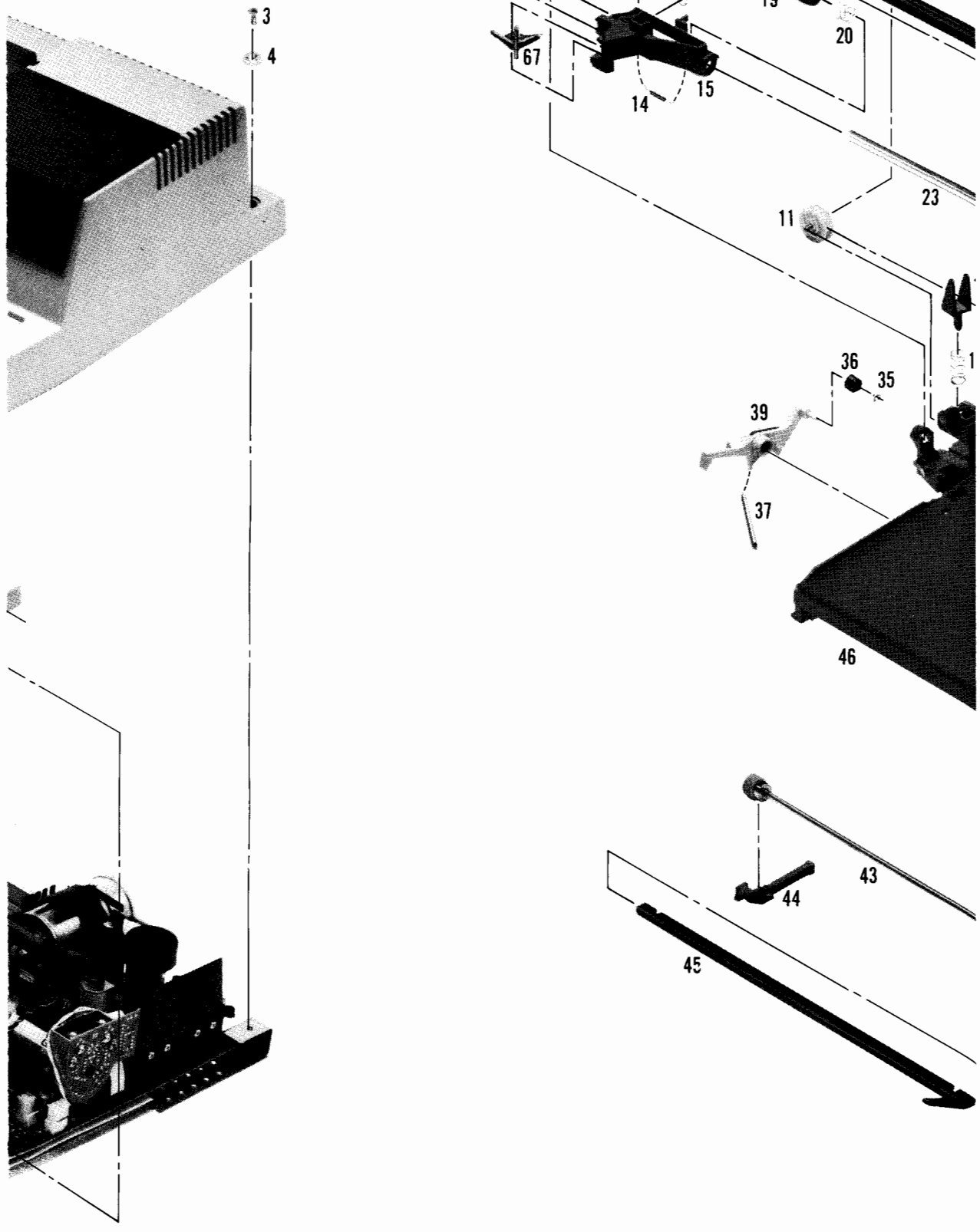

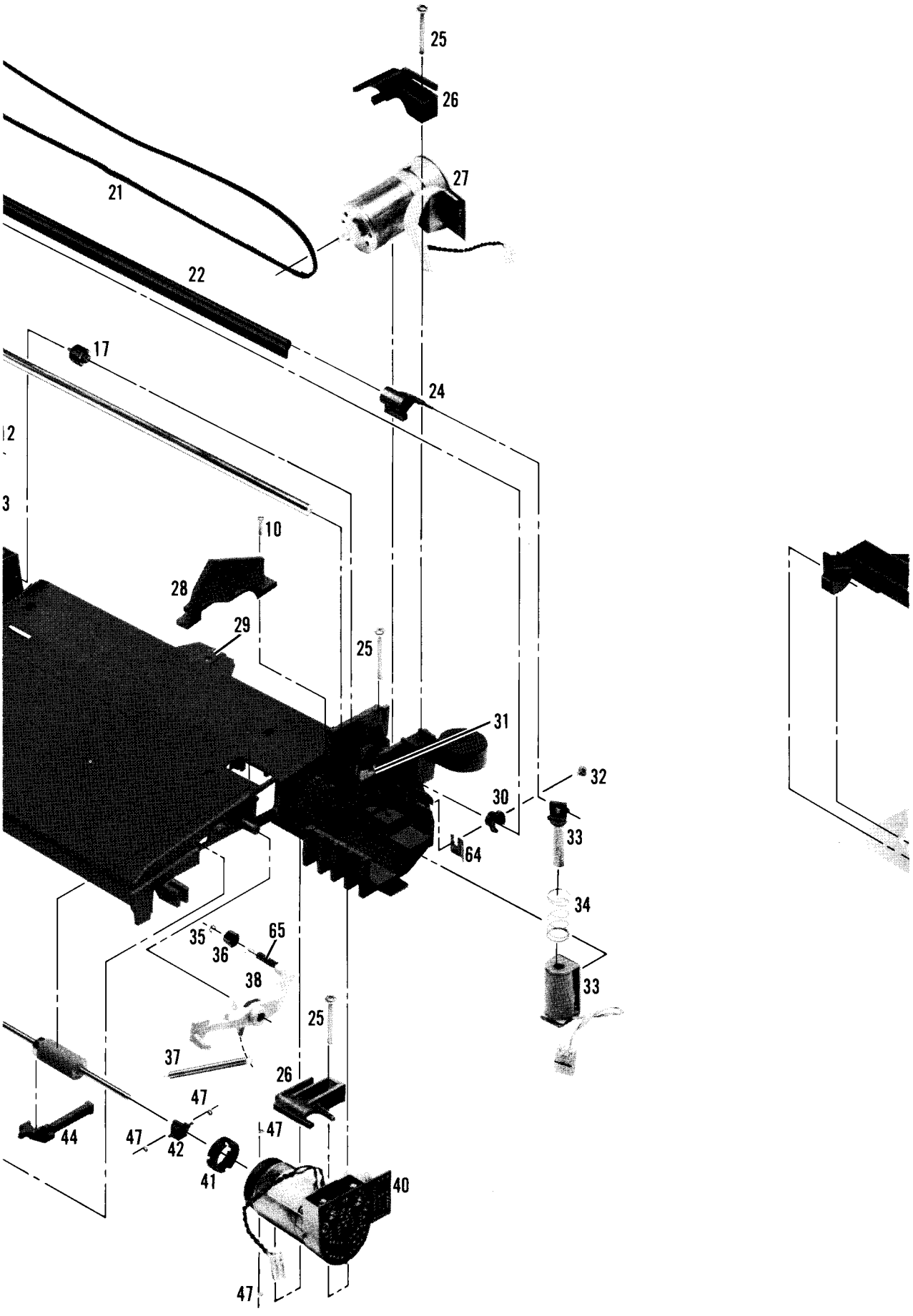
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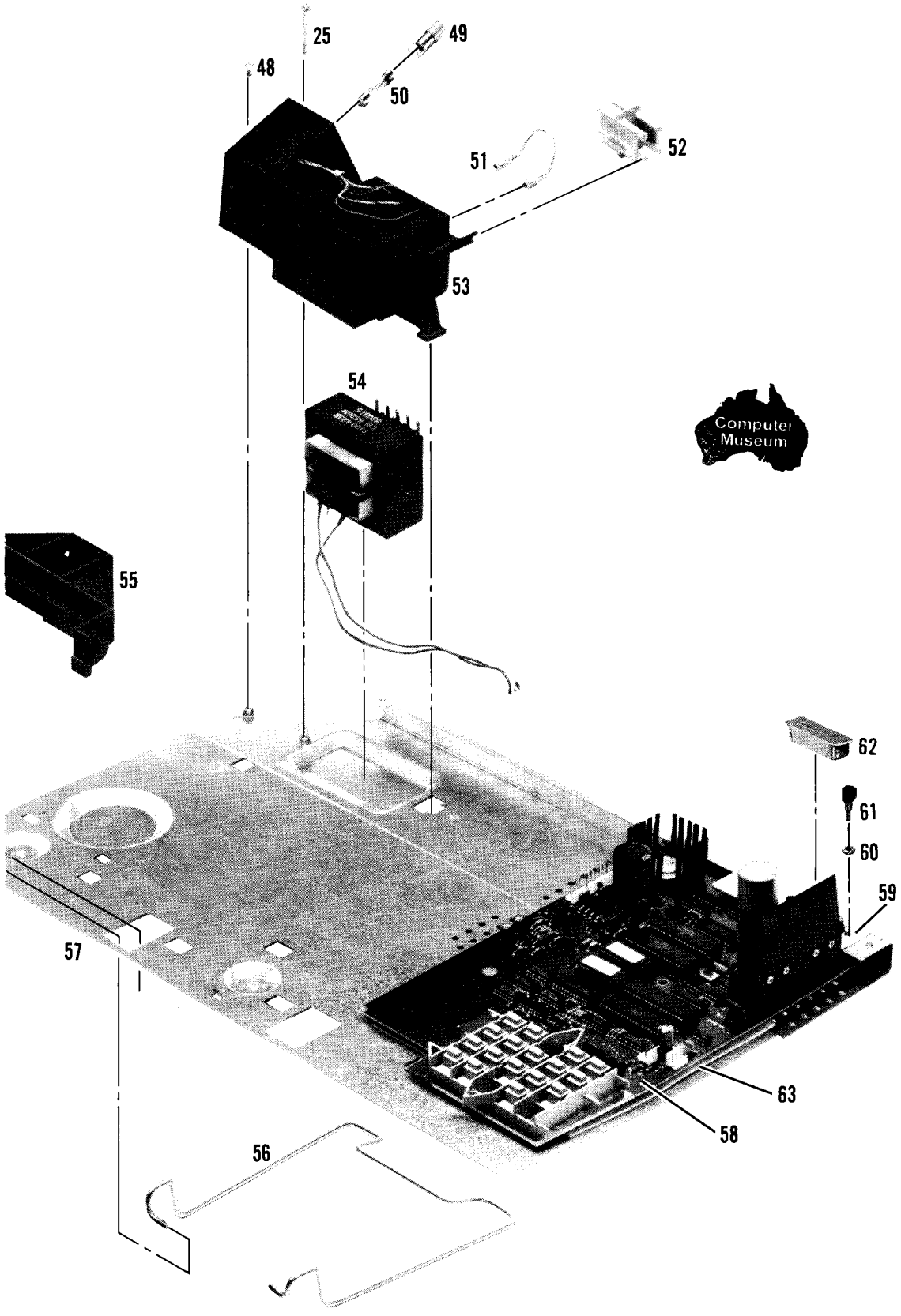


Figure 4-1. Model 7475A Exploded View

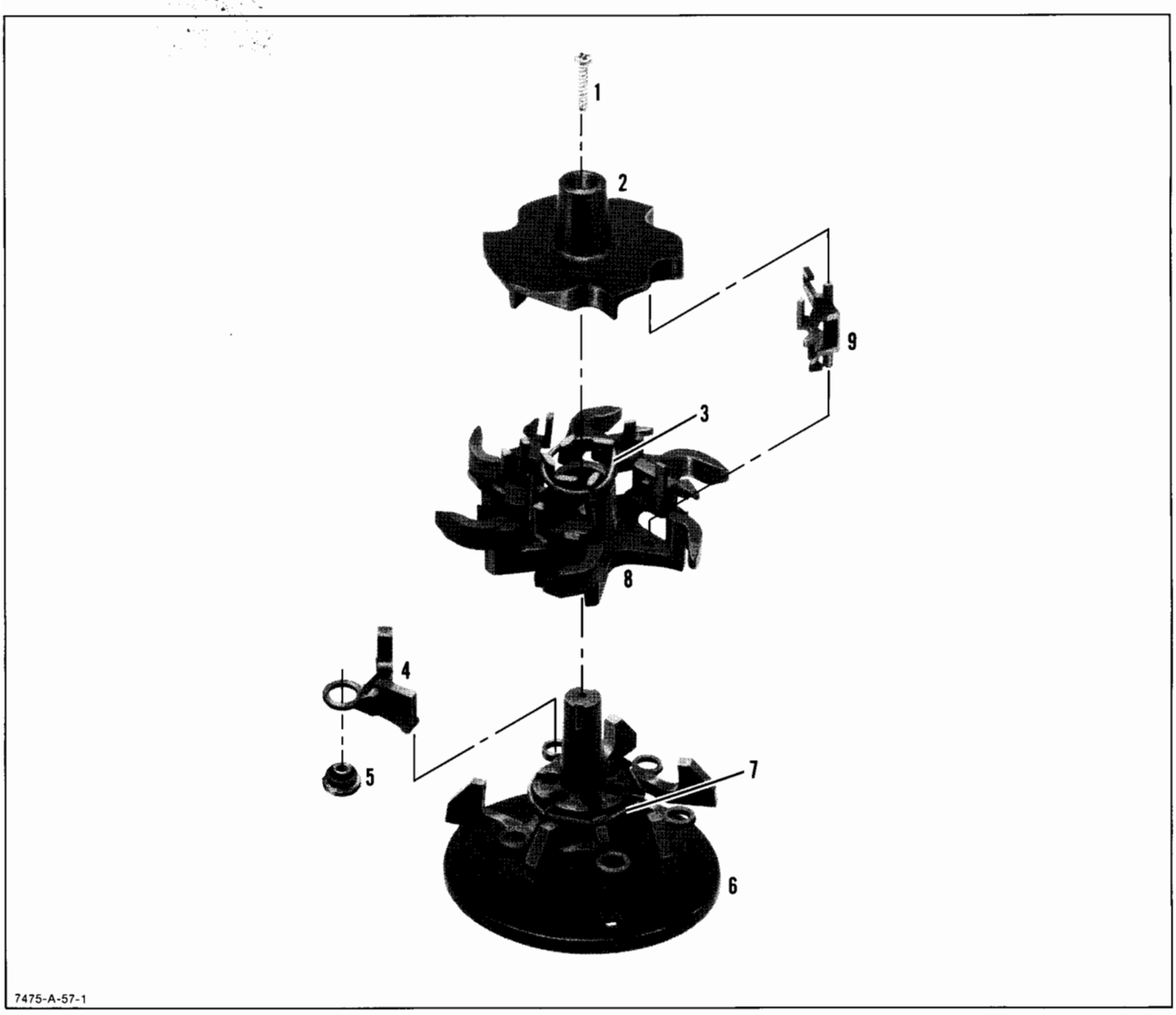


Figure 4-2. Pen Carousel Parts

Table 4-4. Parts List, Pen Carousel Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
1	0624-0591	8	1	SCREW-SELF TAPPING	28480	0624-0591
2	5040-8661	6	1	PLATE-CAROUSEL TOP	28480	5040-8661
3	1460-2034	1	1	SPRING-PAWL	28480	1460-2034
4	5040-8658	1	6	CAPPER-PEN	28480	5040-8658
5	07475-40002	9	6	BOOT-PEN	28480	07475-40002
6	5040-8657	0	1	HUB-CAROUSEL	28480	5040-8657
7	1460-2106	8	1	SPRING-CAPPER	28480	1460-2106
8	5040-8659	2	1	SPIDER-CAROUSEL	28480	5040-8659
9	5040-8660	5	6	PAWL-CAROUSEL	28480	5040-8660

Table 4-5. Code List of Manufacturers

MFR. NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
00000	Any Satisfactory Supplier		
0003J	Nippon Electric Company		
00779	Amp, Inc.	Harrisburg, PA	17105
00853	Sangamo Electric Company, South Carolina Div.	Pickens, SC	29671
01121	Allen-Bradley Company	Milwaukee, WI	53204
01295	Texas Instruments, Inc., Semiconductor Component Div.	Dallas, TX	75222
0192B	RCA Corporation, Solid State Div.	Somerville, NJ	08876
02111	Spectrol Electronics Corp.	City of Industry, CA	91745
02114	Ferroxcube Corporation	Saugerties, NY	12477
03508	GE Company, Semiconductor Prod. Dept.	Syracuse, NY	13201
03888	KDI Pyrofilm Corporation	Whippany, NJ	07981
04713	Motorola Semiconductor Products	Phoenix, AZ	85062
07263	Fairchild Semiconductor Div.	Mountain View, CA	94042
11815	Cherry Rivet Div., Townsend Company	Santa Ana, CA	92707
13606	Sprague Electric Company, Semiconductor Div.	Concord, NH	03301
14936	General Instruments Corp., Semiconductor Prod. GP	Hicksville, NY	11802
19701	Mepco/Electra Corporation	Mineral Wells, TX	76067
24355	Analog Devices, Inc.	Norwood, MA	02062
24546	Corning Glass Works (Bradford)	Bradford, PA	16701
24655	General Radio Co.	Concord, MA	01742
27014	National Semiconductor Corporation	Santa Clara, CA	95051
27167	Corning Glass Works (Wilmington)	Wilmington, NC	28401
28480	Hewlett-Packard Company, Corporate Headquarters	Palo Alto, CA	94304
31471	American Micro Systems, Inc.	Santa Clara, CA	95051
32293	Intersil, Inc.	Cupertino, CA	95014
32694	Optron, Inc.	Carrollton, TX	75006
34649	Intel Corporation	Mountain View, CA	95051
56289	Sprague Electric Company	North Adams, MA	01247
72136	Electro Motive Corporation, Sub. IEC	Willimantic, CT	06226
75042	TRW, Inc., Philadelphia Div.	Philadelphia, PA	19108
75915	Littlefuse, Inc.	Des Plaines, IL	60016
83259	Parker Seal Co., Div. Parker-Hannifin	Culver City, CA	90231
84411	TRW, Capacitor Div.	Ogallala, NE	69153
86928	Seastrom Mfg. Co.	Glendale, CA	91201
91637	Dale Electronics, Inc.	Columbus, NE	68601

Table 4-6. Reference Designations and Abbreviations

REFERENCE DESIGNATIONS

A ..... assembly
AT ..... attenuator; isolator; termination
B ..... fan; motor
BT ..... battery
C ..... capacitor
CP ..... coupler
CR ..... diode; diode thyristor; varactor
DC ..... directional coupler
DL ..... delay line
DS ..... annunciator; signaling device (audible or visual); lamp; LED
E ..... miscellaneous electrical part
F ..... fuse
FL ..... filter
H ..... hardware
HY ..... circulator
J ..... electrical connector (stationary portion) jack
K ..... relay
L ..... coil; inductor
M ..... meter
MP ..... miscellaneous mechanical part
P ..... electrical connector (movable portion); plug
Q ..... transistor; SCR; triode thyristor
R ..... resistor
RT ..... thermistor
S ..... switch
T ..... transformer
TB ..... terminal board
TC ..... thermocouple
TP ..... test point
U ..... integrated circuit; microcircuit
V ..... electron tube
VR ..... voltage regulator; breakdown diode
W ..... cable; transmission path; wire
X ..... socket
Y ..... crystal unit (piezo-electric or quartz)
Z ..... tuned cavity; tuned circuit

ABBREVIATIONS

A ..... ampere
ac ..... alternating current
ACCESS ..... accessory
ADJ ..... adjustment
A/D ..... analog-to-digital
AF ..... audio frequency
AFC ..... automatic frequency control
AGC ..... automatic gain control
AL ..... aluminum
ALC ..... automatic level control
AM ..... amplitude modulation
AMPL ..... amplifier
APC ..... automatic phase control
ASSY ..... assembly
AUX ..... auxiliary
avg ..... average
AWG ..... American wire gauge
BAL ..... balance
BCD ..... binary coded decimal
BD ..... board
BE CU ..... beryllium copper
BFO ..... beat frequency oscillator
BH ..... binder head
BKDN ..... breakdown
BP ..... bandpass
BPF ..... bandpass filter
BRS ..... brass
BWO ..... backward-wave oscillator
CAL ..... calibrate
ccw ..... counter-clockwise
CER ..... ceramic
CHAN ..... channel
cm ..... centimetre
CMO ..... cabinet mount only
COAX ..... coaxial
COEF ..... coefficient
COM ..... common
COMP ..... composition
COMPL ..... complete
CONN ..... connector
CP ..... cadmium plate
CRT ..... cathode-ray tube
CTL ..... complementary transistor logic
CW ..... continuous wave
cw ..... clockwise
cm ..... centimetre
D/A ..... digital-to-analog
dB ..... decibel
dBm ..... decibel referred to 1 mW
dc ..... direct current
deg ..... degree (temperature interval) or difference
° ..... degree (plane angle)
°C ..... degree Celsius (centigrade)
°F ..... degree Fahrenheit
°K ..... degree Kelvin
DEPC ..... deposited carbon
DET ..... detector
diam ..... diameter
DIA ..... diameter (used in parts list)
DIFF AMPL ..... differential amplifier
div ..... division
DPDT ..... double-pole, double-throw
DR ..... drive
DSB ..... double sideband
DTL ..... diode transistor logic
DVM ..... digital voltmeter
ECL ..... emitter coupled logic
EMF ..... electromotive force
EDP ..... electronic data processing
ELECT ..... electrolytic
ENCAP ..... encapsulated
EXT ..... external
F ..... farad
FET ..... field-effect transistor
F/F ..... flip flop
FH ..... flat head
FIL H ..... fillister head
FM ..... frequency modulation
FP ..... front panel
FREQ ..... frequency
FXD ..... fixed
g ..... gram
GE ..... germanium
GHz ..... gigahertz
GL ..... glass
GRD ..... ground(ed)
H ..... henry
h ..... hour
HET ..... heterodyne
HEX ..... hexagonal
HD ..... head
HDW ..... hardware
HF ..... high frequency
HG ..... mercury
HI ..... high
HP ..... Hewlett-Packard
HPF ..... high pass filter
HR ..... hour (used in parts list)
HV ..... high voltage
Hz ..... Hertz
IC ..... integrated circuit
ID ..... inside diameter
IF ..... intermediate frequency
IMPG ..... impregnated
in ..... inch
INCD ..... incandescent
INCL ..... include(s)
INP ..... input
INS ..... insulation
INT ..... internal
kg ..... kilogram
kHz ..... kilohertz
kΩ ..... kilohm
kV ..... kilovolt
lb ..... pound
LC ..... inductance-capacitance
LED ..... light-emitting diode
LF ..... low frequency
LG ..... long
LH ..... left hand
LIM ..... limit
LIN ..... linear taper (used in parts list)
lin ..... linear
LK WASH ..... lock washer
LO ..... low; local oscillator
LOG ..... logarithmic taper (used in parts list)
log ..... logarithm(ic)
LPF ..... low pass filter
LV ..... low voltage
m ..... metre (distance)
mA ..... milliampere
MAX ..... maximum
MΩ ..... megohm
MEG ..... meg (10^6) (used in parts list)
MET FLM ..... metal film
MET OX ..... metallic oxide
MF ..... medium frequency; microfarad (used in parts list)
MFR ..... manufacturer
mg ..... milligram
MHz ..... megahertz
mH ..... millihenry
mho ..... mho
MIN ..... minimum
min ..... minute (time)
′ ..... minute (plane angle)
MINAT ..... miniature
mm ..... millimetre
MOD ..... modulator

NOTE

All abbreviations in the parts list will be in upper-case.

1-A-24-3

Table 4-6. Reference Designations and Abbreviations (Continued)

MOM ..... momentary
MOS ..... metal-oxide semiconductor
ms ..... millisecond
MTG ..... mounting
MTR ..... meter (indicating device)
mV ..... millivolt
mVac ..... millivolt, ac
mVdc ..... millivolt, dc
mVpk ..... millivolt, peak
mVp-p ..... millivolt, peak-to-peak
mVrms ..... millivolt, rms
mW ..... milliwatt
MUX ..... multiplex
MY ..... mylar
μA ..... microampere
μF ..... microfarad
μH ..... microhenry
μmho ..... micromho
μs ..... microsecond
μV ..... microvolt
μVac ..... microvolt, ac
μVdc ..... microvolt, dc
μVpk ..... microvolt, peak
μVp-p ..... microvolt, peak-to-peak
μVrms ..... microvolt, rms
μW ..... microwatt
nA ..... nanoampere
NC ..... no connection
N/C ..... normally closed
NEG ..... negative
nF ..... nanofarad
NI PL ..... nickel plate
N/O ..... normally open
NOM ..... nominal
NORM ..... normal
NPN ..... negative-positive-negative
NPO ..... negative-positive zero (zero temperature coefficient)
NRFR ..... not recommended for field replacement
NSR ..... not separately replaceable
ns ..... nanosecond
nW ..... nanowatt
OBD ..... order by description
OD ..... outside diameter
OH ..... oval head
OP AMPL ..... operational amplifier
OPT ..... option
OSC ..... oscillator
OX ..... oxide
oz ..... ounce
Ω ..... ohm
P ..... peak (used in parts list)
PAM ..... pulse-amplitude modulation
PC ..... printed circuit
PCM ..... pulse-code-modulation; pulse-count modulation
PDM ..... pulse-duration modulation
pF ..... picofarad
PIV ..... peak inverse voltage
pk ..... peak
PNP ..... positive-negative-positive
P/O ..... part of
POLY ..... polystyrene
PORC ..... porcelain
POS ..... positive; position(s) (used in parts list)
POSN ..... position
POT ..... potentiometer
p-p ..... peak-to-peak
PP ..... peak-to-peak (used in parts list)
PPM ..... pulse-position modulation; parts per million
PREAMPL ..... preamplifier
PRF ..... pulse-repetition frequency
PRR ..... pulse repetition rate
ps ..... picosecond
PT ..... point
PTM ..... pulse-time modulation
PWN ..... pulse-width modulation
PWV ..... peak working voltage
RC ..... resistance-capacitance
RECT ..... rectifier
REF ..... reference
REG ..... regulated
REPL ..... replaceable
RF ..... radio frequency
RFI ..... radio frequency interference
RH ..... round head; right hand
RLC ..... resistance-inductance-capacitance
RMO ..... rack mount only
rms ..... root-mean-square
RND ..... round
ROM ..... read only memory
R & P ..... rack and panel
RWV ..... reverse working voltage
S ..... scattering parameter
s ..... second (time)
″ ..... second (plane angle)
S-B ..... slow-blow (fuse) (used in parts list)
SCR ..... silicon controlled rectifier; screw
SE ..... selenium
SECT ..... sections
SEMICON ..... semiconductor
SHF ..... superhigh frequency
SI ..... silicon
SIL ..... silver
SL ..... slide
SNR ..... signal-to-noise ratio
SPDT ..... single-pole, double-throw
SPG ..... spring
SR ..... split ring
SPST ..... single-pole, single-throw
SSB ..... single sideband
SST ..... stainless steel
STL ..... steel
SQ ..... square
SWR ..... standing-wave ratio
SYNC ..... synchronize
T ..... timed (slow-blow fuse)
TA ..... tantalum
TC ..... temperature coefficient
TD ..... time delay
TERM ..... terminal
TFT ..... thin-film transistor
TGL ..... toggle
THD ..... thread
THRU ..... through
TI ..... titanium
TOL ..... tolerance
TRIM ..... trimmer
TSTR ..... transistor
TTL ..... transistor-transistor logic
U ..... micro (10^{-6}) (used in parts list)
UF ..... microfarad (used in parts list)
UHF ..... ultrahigh frequency
UNREG ..... unregulated
V ..... volt
VA ..... voltampere
Vac ..... volts, ac
VAR ..... variable
Vdc ..... volts, dc
VDCW ..... volts, dc, working (used in parts list)
Vpk ..... volts, peak
Vp-p ..... volts, peak-to-peak
Vrms ..... volts, rms
VTVM ..... vacuum-tube voltmeter
V(X) ..... volts, switched
W ..... watt
W/ ..... with
WIV ..... working inverse voltage
WW ..... wirewound
W/O ..... without
Z_o ..... characteristic impedance

NOTE

All abbreviations in the parts list will be in upper-case.

MULTIPLIERS

Abbreviation	Prefix	Multiple
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
da	deka	10
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
μ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}
a	atto	10^{-18}

1-A-25-3

SECTION V

PRODUCT HISTORY

5-1. INTRODUCTION

5-2. This section describes the differences between earlier models of the HP 7475 and the latest version documented in this manual. These earlier models are identified by their serial prefix number, and the date codes on their printed-circuit assemblies (PCAs). For ease of reference this section is divided into two major topics; History of Serial Prefix Numbers and History of Printed Circuit Assemblies.

5-3. HISTORY OF ASSEMBLIES BY SERIAL PREFIX NUMBER

5-4. Table 5-1 is a quick-reference table that lists, by plotter serial prefix number, the assemblies that differ from those documented in this manual. Also referenced are Item Numbers under which these differences are described in this section.

5-5. Table 5-2 lists the assemblies that are described under each Item.

5-6. Knowing the serial prefix number of the plotter, the user can see in Table 5-1 which assemblies are documented in this section. In Table 5-2 the user can see if more than one change has been made to the assembly in question and which Items in this section to refer to.

Table 5-1. Assemblies by Plotter Serial Prefix Number

S/N PREFIX	ASSEMBLIES	ITEM
2325A	A1 Main PCA	See PCA History
	Chassis Assembly	5

NOTE

Assemblies designated with an asterisk (*) denote changes made during the plotter production cycle.

Table 5-2. Item Description

ITEM	ASSEMBLIES
5	Main Chassis
	Pinch Roller Arm (Left)

5-7. HISTORY OF PRINTED CIRCUIT ASSEMBLIES

5-8. Hewlett-Packard's printed-circuit assemblies have three major identification features:

a. **Part Number.** All PCAs having the same part number are directly interchangeable. If a PCA is revised in any way that makes it non-interchangeable with previously issued PCAs, a new part number is assigned to the revised PCA.

b. **Revision Letter.** This letter identifies the most recent revision to the etched circuit pattern. The original issue is identified with the letter 'A'. If the master artwork for a PCB is revised in order to alter performance or manufacture, the revision letter is changed to the next letter in the alphabetical sequence.

c. **Assembly Date Code.** The date code on the PCA is a four-digit number which identifies the assembly level. The first two digits represent the last two digits of the current year and are derived by subtracting 60 from the current year; the last two digits are the number of the week in that year, i.e. 2314 = fourteenth week in 1983. Any digits following a hyphen in the date code represent the division that manufactured the assembly.

5-9. Table 5-3 is a quick-reference table that lists PCAs by part number and date code. Listed next to the part number and date code of the PCAs are the Items located in this section that describe the differences between the PCA in question and the level of that PCA described in the main body of this manual.

Table 5-3. Date Codes

PCA	DATE CODE	ITEM
A1 (07475-60101)	2314-11	1
A1 (07475-60102)	2314-11	2
A1 (07475-60101)	2420-11	3
A1 (07475-60102)	2420-11	4

ITEM 1

Date code 2314-11 is the date code on the original PCA installed in the plotter at the time of product introduction. Except for the following part numbers, PCAs having a date code of 2314-11 have the same components as those listed in Section IV.

MAIN PCA, RS-232-C, OPTION 001

REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION	CHECK DIGIT
A1DS1-2	1990-0485	LED	5
A1DS3	1990-0487	LED	7
A1E4	1200-0567	SOCKET	1
A1E8	1200-0654	SOCKET	7
A1E11-16	2110-0597	FUSEHOLDER	7
A1E18-20	07470-40038	SPACER	6
A1H3-6	0515-0055	SCREW	8
A1H9-12	0535-0031	NUT	2
A1J4	1251-4946	CONNECTOR	5

ITEM 2

Date code 2314-11 is the date code on the original PCA installed in the plotter at the time of product introduction. Except for the following part numbers, PCAs having a date code of 2314-11 have the same components as those listed in Section IV.

MAIN PCA, HP-IB, OPTION 002

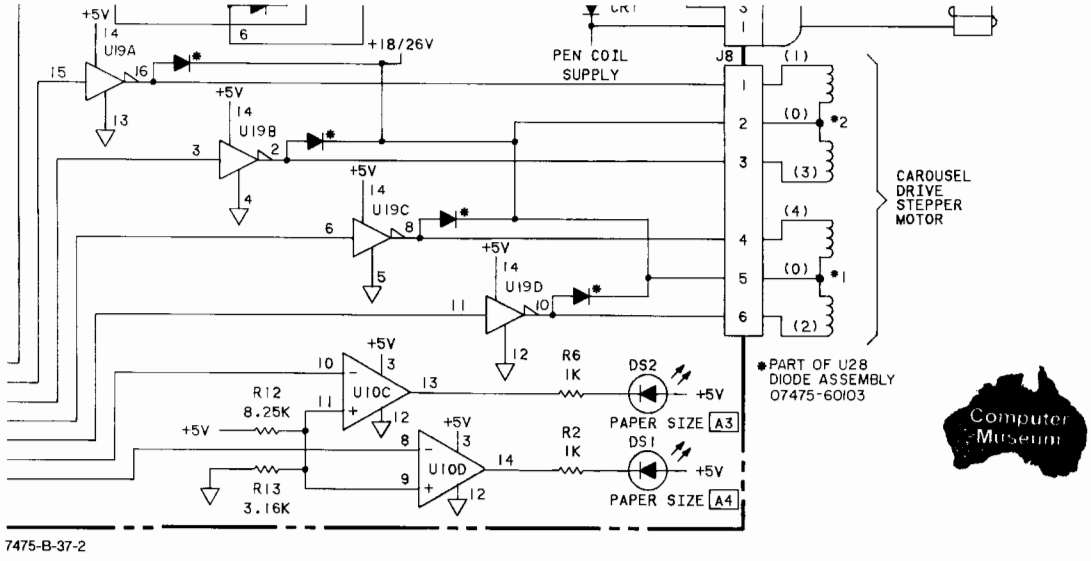
REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION	CHECK DIGIT
A1DS1-2	1990-0485	LED	5
A1DS3	1990-0487	LED	7
A1E3	1200-0567	SOCKET	1
A1E6	1200-0654	SOCKET	7
A1E14-19	2110-0597	FUSEHOLDER	7
A1E21-23	07470-40038	SPACER	6
A1H3-6	0515-0055	SCREW	8
A1H9-12	0535-0031	NUT	2

ITEM 3

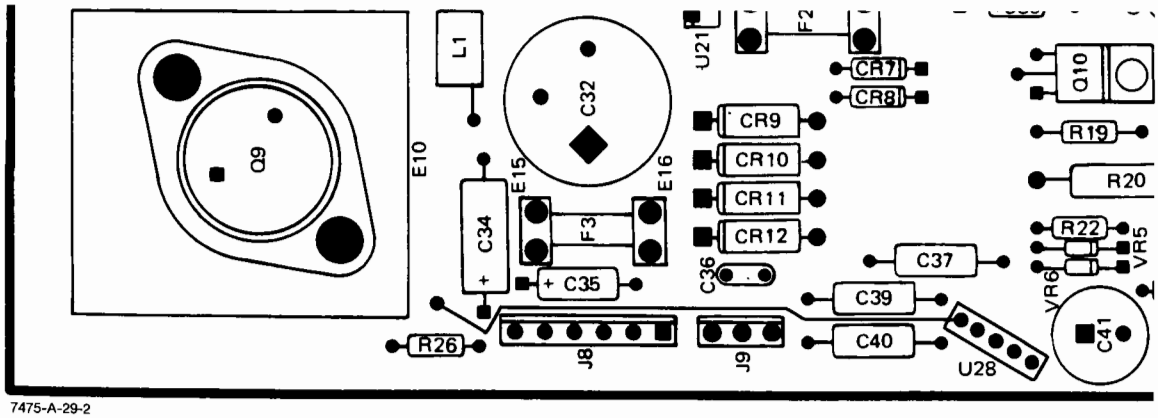
Date code 2420-11 introduced a design change that eliminated inductive voltage spikes in the motor drivers when the plotter was switched off. The part numbers that differ from those listed in Section IV; and the effect of these component differences on the schematic diagram and parts location figure in Section VI, are as follows:

MAIN PCA, RS-232-C, OPTION 001

REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION	CHECK DIGIT
A1DS1-2	1990-0485	LED	5
A1DS3	1990-0487	LED	7
A1E4	1200-0567	SOCKET	1
A1E8	1200-0654	SOCKET	7
A1E11-16	2110-0597	FUSEHOLDER	7
A1E18-20	07470-40038	SPACER	6
A1H3-6	0515-0055	SCREW	8
A1H9-12	0535-0031	NUT	2
A1J4	1251-4946	CONNECTOR	5
A1U28	07475-60103	DIODE AY	3



Partial View of RS-232-C Main PCA Option 001 Schematic Diagram (Date Code 2420-11)



Partial View of RS-232-C Main PCA Option 001 Parts Location Diagram (Date Code 2420-11)

ITEM 4

Date code 2420-11 introduced a design change that eliminated inductive voltage spikes in the motor drivers when the plotter was switched off. The part numbers that differ from those listed in Section IV are:

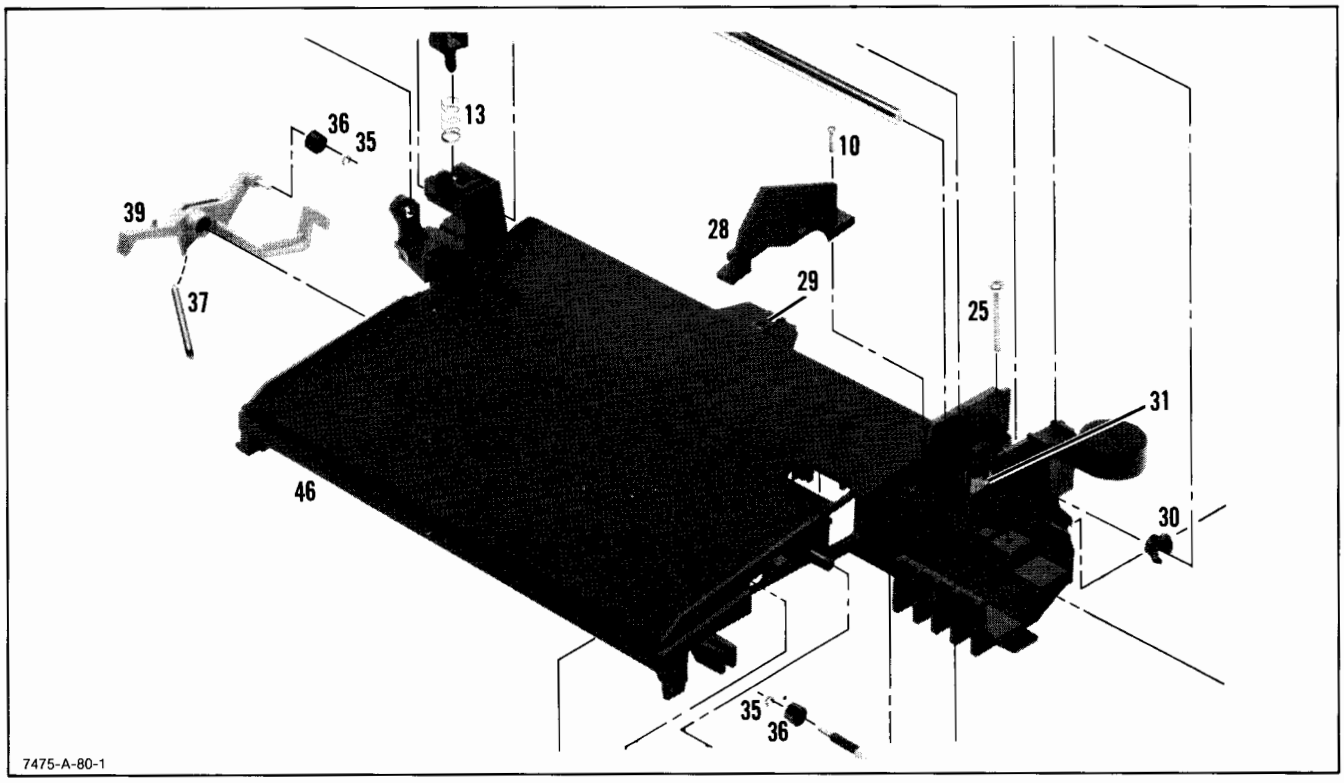
MAIN PCA, HP-IB, OPTION 002

REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION	CHECK DIGIT
A1DS1-2	1990-0485	LED	5
A1DS3	1990-0487	LED	7
A1E3	1200-0567	SOCKET	1
A1E6	1200-0654	SOCKET	7
A1E14-19	2110-0597	FUSEHOLDER	7
A1E21-23	07470-40038	SPACER	6
A1H3-6	0515-0055	SCREW	8
A1H9-12	0535-0031	NUT	2

ITEM 5

Serial number prefix 2325A is the original serial number prefix of the plotter at the time of product introduction. Except for the following part numbers, all plotters with the serial number prefix 2325A have the same parts as those listed in Section IV of this manual.

REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION	CHECK DIGIT
16	1460-2023	SPRING-SILVER 2.54 CM-L	8
	1460-2029	SPRING-COPPER 3.0 CM-L	4
	1460-2030	SPRING-CHROME 3.33 CM-L	7
39	5040-8666	ARM-PINCH ROLLER (LEFT)	1
46	5040-8667	CHASSIS	2



Partial Diagram of Model 7475A Exploded View

SECTION VI

SERVICE

6-1. INTRODUCTION

6-2. This section contains information needed for maintenance and repair of the Model 7475A, including:

Circuit Description
Troubleshooting Information
Parts Removal and Replacement
Cleaning
Schematic Diagrams
Component Location Figures

6-3. SIMPLIFIED THEORY OF OPERATION

6-4. The Model 7475A uses microprocessor-based logic to convert digital instructions into a graphic plot. The microprocessor receives instructions from either an internal ROM program or an external controller through the I/O (input/output) circuits. It then issues data to the pen drive and paper drive motor servo systems and the pen down circuit to produce the plot. Figure 6-1 is a simplified block diagram of the 7475A plotter.

6-5. The two drive motors are reversible dc motors. Encoders on each motor transmit rotation data back to their respective servo IC. One motor drives grit wheels which move the plotting medium, while the other motor moves the pen across the plotting surface.

6-6. There are two optional I/O (input/output) circuits available for the Model 7475A. Option 001 is the RS-232-C/CCITT V.24 serial interface. Option 002 is the HP-IB (Hewlett-Packard Interface Bus) parallel data interface which is compatible with IEEE standard 488-1978.

6-7. RS-232-C/CCITT V.24 INTERFACE CIRCUIT (Option 001)

6-8. The Option 001 I/O (Input/Output) is an asynchronous full-duplex bit-serial interface for hardwired connection to a computer or terminal. Interface connections are shown on the schematic diagram at the end of this section. This interface is compatible with EIA Standard RS-232-C and with CCITT V.24. Input and output are controlled in the 7475A by the Asynchronous

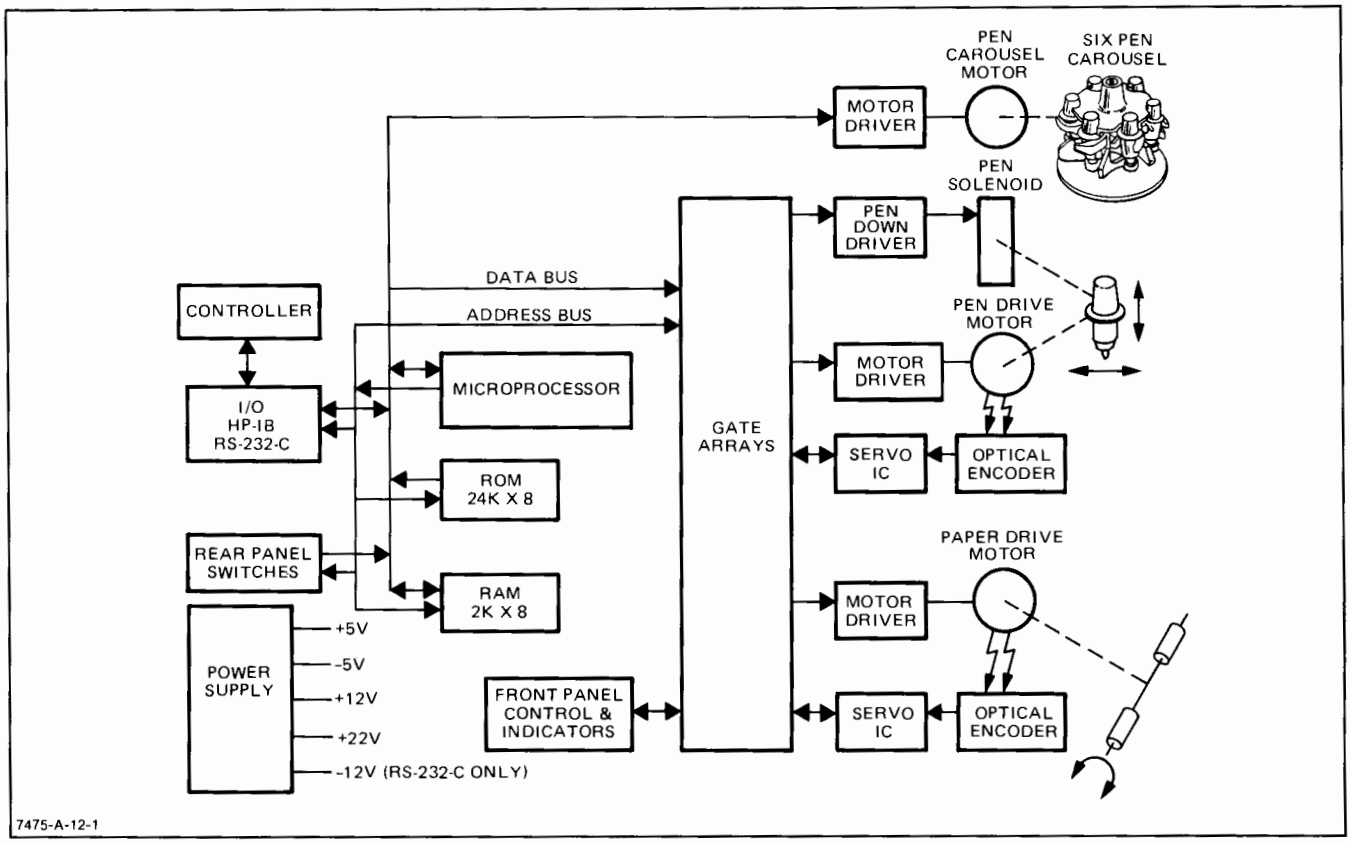


Figure 6-1. 7475A Simplified Block Diagram

Communication Information Adapter (ACIA) U13, and 2 multiplexers U12 and U27. See Figure 6-2 and 6-24.

6-9. DATA INPUT AND OUTPUT CIRCUITS. Because signals within the 7475A are positive-true TTL levels, inverting line drivers and receivers, U9, U11, and U26, are used to convert the logic and voltage between the levels required by the interface system (shown in Table 6-1) and the internal levels. Figure 6-2 is a diagram of the I/O circuits and the ACIA.

6-10. ACIA. The logic level on the Read/Write input controls the direction of data flow through the data bus interface. When the RS (Register Select) input is high, the R/W input selects either the receive or transmit data register. When RS is low, the control/status registers are selected. The 1 MHz signal at the E input clocks data in and out of the ACIA on the data bus (D0-D7) and the RX/TX clock (Baud Rate Clock) clocks data in and out on the RXD (Received Data) and TXD (Transmitted Data) lines.

6-11. MULTIPLEXER U12. When the address line (EIO0) is high, the 7475A transmitted data goes out on the Transmitted Data line (pin 2). The Secondary Transmitted Data line (pin 14) is held at a negative voltage. When EIO0 is low, information on the Secondary Received Data line is retransmitted on the Transmitted Data line (pin 2), and the 7475A transmitted data goes out on the Secondary Transmitted Data line (pin 14).

6-12. MULTIPLEXER U27. When the address line (EIO3) is low and chip select (CS) from U6, gate array B, is low, three control lines are passed onto the data bus. The functions of these control lines are as follows:

a. DATA SET READY (DSR) — Activated by the modem to tell the plotter that the modem is operational.

b. CLEAR TO SEND (CTS) — Activated by the modem to tell the plotter that it is ready to receive and re-transmit data from the terminal.

c. DATA TERMINAL READY (DTR) — Activated by the plotter to tell the modem that the terminal is operational.

6-13. BAUD RATE. The internal baud rate (transmit/receive) clock signal is derived in U5, Gate Array A, from the 4 MHz clock signal. The baud rate clock frequency is sixteen times the desired baud rate. Baud rate may be selected by means of the rear-panel switches, or an external clock signal may be used.

6-14. HP-IB INTERFACE (Option 002)

6-15. HP-IB interface connections are shown on the schematic diagram at the end of this section. Input/Output voltage levels must meet TTL requirements (low = −0.8 V; high = −2.0 V). All signals are active low (true). Figure 6-3 is a block diagram of the HP-IB Interface Circuits.

6-16. All data and control signals to and from the HP-IB go through U10 and U11, the bus transceivers, which are enabled to transmit or to receive by U12, the interface adapter in response to HP-IB commands. The interface adapter automatically handles all handshake requirements on the HP-IB. When the plotter power is on, the bus transceiver inputs are high impedance to prevent loading the data lines. When the plotter power is off, the bus transceivers present an open circuit to all data lines; consequently, the plotter does not interfere with other HP-IB operations.

6-17. A 16 line bus is used to carry data and control information and is divided into three sets of lines.

a. Data bus — 8 signal lines — DIO1 through DIO8.

b. Data transfer control — 3 signal lines — (Handshake).

c. Interface management — 5 signal lines.

6-18. The data bus transfers 8-bit data or control words between the controller and the plotter. The words are in bit parallel byte serial form. The words are transferred bi-directionally and asynchronously.

6-19. The three data transfer control lines, or "handshake lines" are used to control the transfer of information on the data bus. These lines are identified as follows:

a. DATA VALID (DAV) — Used to indicate that valid information is available on the data lines.

b. NOT READY FOR DATA (NRFD) — Used to indicate the readiness of the Plotter to accept information.

c. NOT DATA ACCEPTED (NDAC) — Used to indicate the acceptance of information by the Plotter.

Table 6-1. RS-232-C/CCITT V.24 Interface Signal Levels

NOTATION	INTERCHANGE VOLTAGE	
	NEGATIVE (More Negative than −3 V)	POSITIVE (More Positive than +3 V)
Binary State	1	0
Signal Condition	Marking	Spacing
Function	off	on

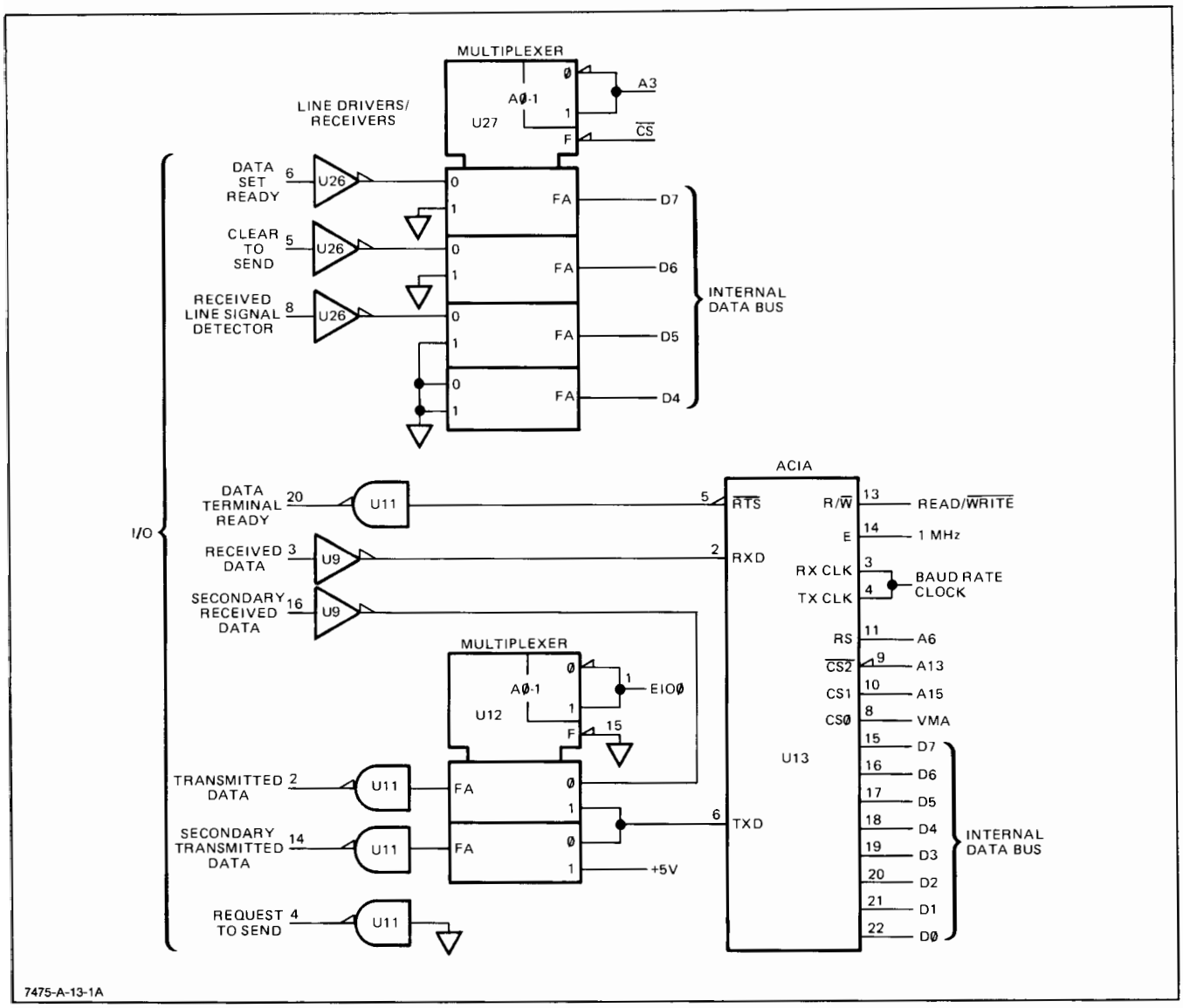


Figure 6-2. RS-232-C/CCITT V.24 Interface Circuits

6-20. The five interface management lines are used to provide an orderly flow of information accross the interface bus. The lines are identified as follows:

a. ATTENTION (ATN) — Used by the controller to specify how data on the DIO signal lines are to be interpreted, (command, data, or parallel poll response) and which devices on the bus must respond to the data.

b. SERVICE REQUEST (SRQ) — Used to indicate that the plotter needs attention and to request an interruption of the current sequence of events.

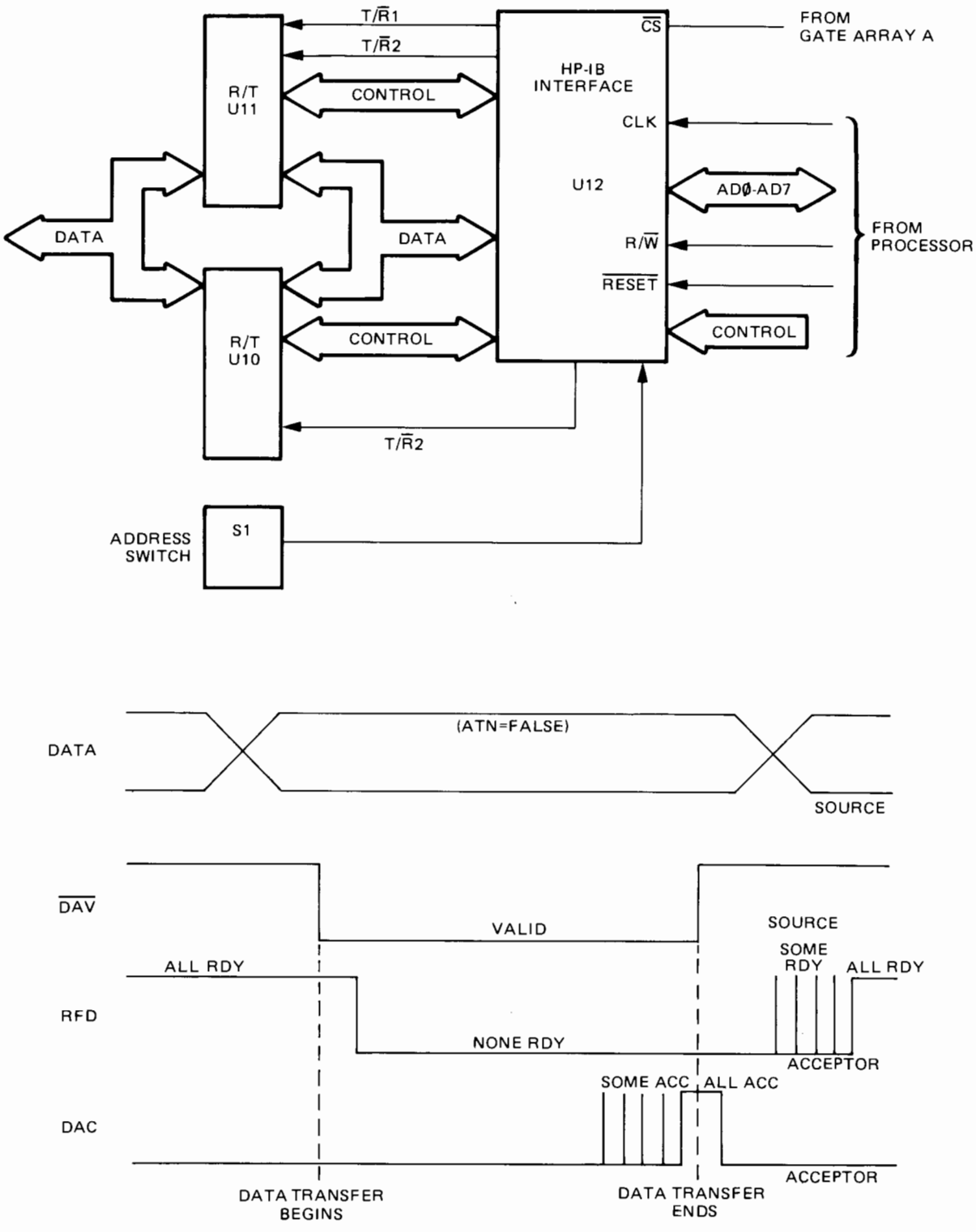
c. INTERFACE CLEAR (IFC) — Used by the controller to place the bus in a known quiescent condition.

d. END OR IDENTIFY (EOI) — Used by a talker to indicate the end of a multiple-byte transfer sequence or, in conjunction with ATN to execute a polling sequence.

e. REMOTE ENABLE (REN) — Used to enable a remote control mode.

6-21. Positive true logic is used within the plotter circuitry. Therefore a positive false NRFD on the HP-IB bus will be converted to a positive true RFD within the plotter.

6-22. When the HP-IB interface IC U12 receives a RESET pulse from the microprocessor U13 it sets the DAC and RFD lines passive true, indicating the ready condition. The controller will set ATN true indicating a bus message or address, and put the device address on data lines DIO1 through DIO5. The interface chip compares the address on the bus with the setting of the HP-IB address switch read at power up. If the address is valid, the HP-IB chip will then decode the lines DIO6 and DIO7, to determine if the 7475A is being addressed as an acceptor (listener) or source (talker). When the controller sends a valid address with DIO6 true and DIO7 false, the plotter is being addressed as a listener. When the controller is



Note; signals shown are HP-IB device levels and are complements of the bus.

7475-A-14-1

Figure 6-3. HP-IB Interface Circuits and Handshake Timing Diagram

ready to transfer data on the bus it sends ATN false and EOI false. Refer to Figure 6-3 for the handshake timing. When the plotter receives these two signals it starts the handshake sequence:

a. The plotter indicates that it is ready to accept data by setting RFD true and DAC false.

b. After RFD has gone true the controller places a data byte on the eight-data line and sets DAV true.

c. After the DAV line has gone true, the plotter sets the RFD false, accepts the data and sets DAC true.

d. After the DAC line has gone true, the controller can set DAV false again and take the data off the line. When DAV goes false, the plotter sets DAC false.

e. When the plotter can accept a new byte of data it puts RFD true and the sequence is ready to start from step a.

6-23. When the ATN input is true, the plotter compares the data on the HP-IB DIO lines to the address set by the rear panel address switches, and responds when addressed by the bus controller to listen or talk. When the ATN input is false and the plotter is addressed to listen, the interface adapter accepts and processes the data on the DIO lines.

6-24. The interface adapter is enabled by a low true Chip Select (CS) signal from Gate Array A. When the interface adapter is enabled and its Read/Write (R/W) input is high, data can be read from the adapter, and when the R/W input is low, data can be written by the processor into the adapter. The R/W input and the three register selection inputs, RS0-RS2, select the proper register in the interface adapter.

NOTE

In the following theory Option 001 designators are listed first. Option 002 (HP-IB) plotter components are in parenthesis.

6-25. MICROPROCESSOR CIRCUIT

6-26. The 6802 microprocessor U14 (U13) used in the 7475A has an internal clock circuit controlled by an external 4 MHz crystal. In addition to 4 MHz, the clock circuit has a 1 MHz output which is used to clock several other ICs.

6-27. ADDRESS. The processor outputs a 16-bit address. A high VMA (Valid Memory Address) output indicates that the address is valid.

6-28. RESET. An external RC circuit R18 (R16) and C27 (C20) provides a reset delay signal to the processor and other circuits at the time power is switched on.

6-29. READ ONLY MEMORY CIRCUIT

6-30. The Read Only Memory (ROM) U15 (U14) and U16 (U15) contains 24K of fixed routines required for plotter operation. Each ROM is enabled by address lines from the microprocessor. Because the parallel data outputs are 3-state, they are effectively disconnected from the data bus while the ROM is not enabled.

6-31. RANDOM ACCESS MEMORY CIRCUIT

6-32. The Random Access Memory (RAM) U17 (U16) provides 2K of storage for current plotter instructions. The RAM is enabled by a signal from Gate Array A, and directed to read or write by the Read/Write (R/W) signal from the microprocessor. Data bytes are clocked in and out of the RAM by the 1 MHz signal from the microprocessor.

6-33. GATE ARRAYS A AND B

6-34. The two gate arrays U5 and U6 contain all of the circuitry needed to support the logic circuits and driver section of the electronics. The circuit functions for gate array A include the baud rate generator, interrupt timer, servo control and status ports, memory decode, pen drive motor control, and servo gain adjust. The circuit functions in gate array B include the pen solenoid pulse width modulator, power supply voltage measurement circuit, front panel input ports, memory decode, paper drives motor control, and servo gain adjust. Some of these functions will be discussed in later circuit descriptions.

6-35. PEN CAROUSEL

6-36. The pen carousel is driven by a reversible, dual coil stepper motor. To drive the motor, the STEPPER CLOCK (STCK) from U5 and READ/WRITE (R/W) from the microprocessor are enabled to clock four (4) data lines through the gating flip-flops U18 (U17) to the motor drivers U19 (U18) and onto the motor coils. The resulting quadrature waveforms, shown in Figure 6-4 (A & B), drive the motor either clockwise (A) or counterclockwise (B). When at rest all four motor coils are open, i.e., all four lines are at logic 0.

6-37. MOTOR SERVO SYSTEMS

6-38. Two identical servo systems are used to drive the the motors. Figure 6-5 is a block diagram of a motor servo system.

NOTE

The axes on the 7475A are referred to as the pen drive axis and the paper drive axis instead of X and Y. This is due to the fact that the axes will change with a change in paper size. If A/A4 size paper is loaded, longest edge across the platen, the pen drive becomes the X-axis and the paper drive becomes the Y-axis. If B/A3 size is loaded, the pen drive will become the Y-axis and the paper drive will become the X-axis. On the schematic diagrams for these circuits X and Y are used to designate logic functions which control the paper drive and pen drive movements respectively. Since these designations become variable with changes in paper size, they should be used for reference purposes only.

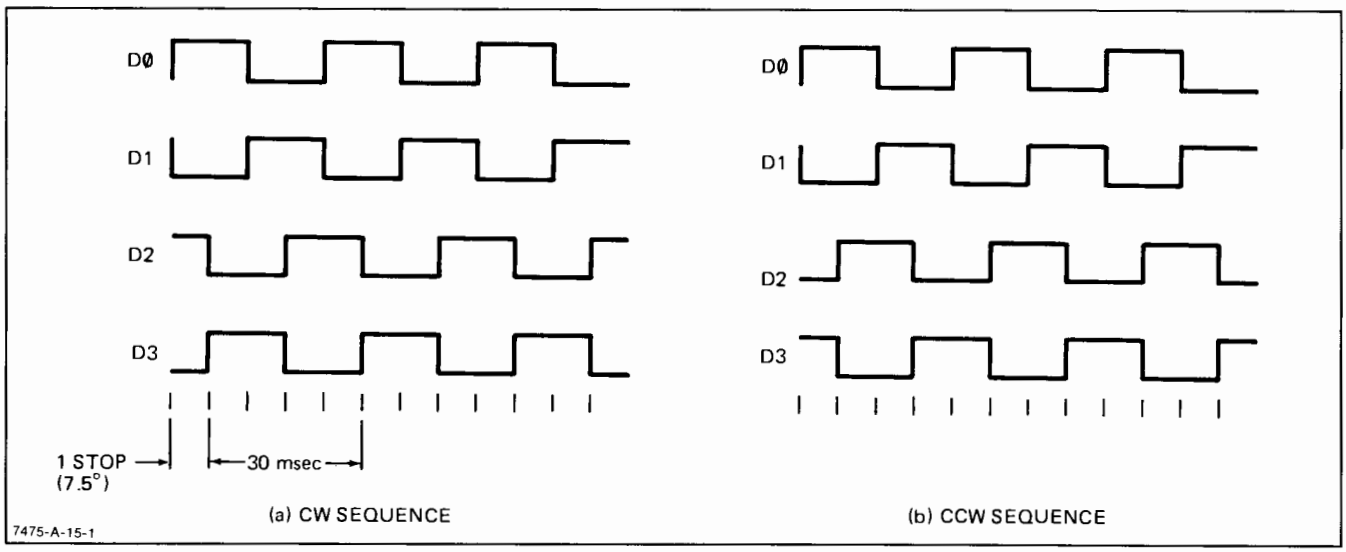


Figure 6-4. Quadrature Waveforms

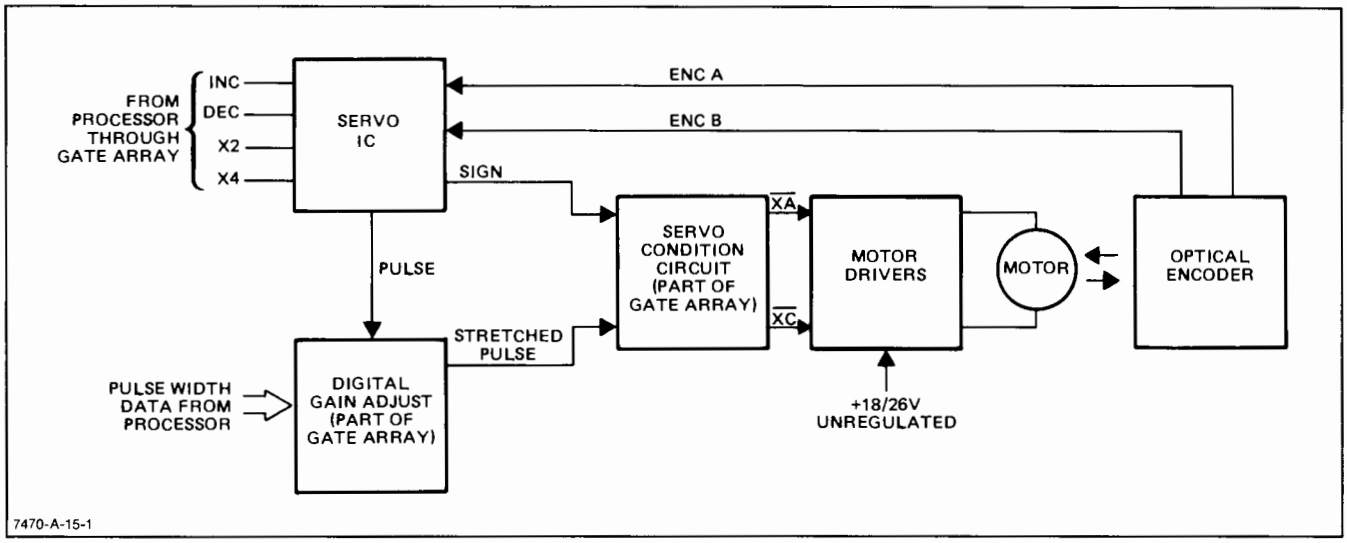


Figure 6-5. Motor Servo System Block Diagram

6-39. Digital move commands are generated and sent by the microprocessor through the gate array U5 to the servo chips U3 and U4. The servo chips provide the interface to the microprocessor, decodes the encoder signals, sums position errors, estimates velocity and sums it, and transforms the servo error to a pulse-width-modulated output. The servo chips output the pulse-width-modulated signal back to the gate array where the motor drive pulses are stretched to the proper width in the digital gain circuit. The servo conditioning circuit, also in the gate array, then passes the pulses on to the motor drivers through either the XA or XC line, depending on the direction of rotation indicated by the sign voltage from the servo chip. As the mechanical system moves, optical encoders mounted on the shaft of each motor send back digital pulses to the servo chip to close the servo loop.

6-40. To maintain a consistant and predictable movement, it is essential to control the amount of power applied to the motor by each pulse. The pulse amplitude depends on the actual voltage output of the motor drive power supply. The pulse width is modified to compensate for pulse amplitude so that the pulse represents the proper amount of power.

6-41. MOTOR SUPPLY SENSOR CIRCUIT

6-42. The power supply for the drive motors is unregulated. For the gate array logic to know how much to stretch the servo chip pulse width, the microprocessor must know the level of unregulated voltage supplied to the motors. The voltage sensing circuit uses comparator U10 (U9) to provide single bit analog to digital conversion at intervals of approximately five seconds. The resulting digital information is used to regulate power through the motor drive circuits.

6-43. A divider R16 (R14) and R17 (R15) places one-tenth of the power supply voltage at the non-inverting input to the comparator. Pulses of known value from U6 Gate Array B are applied to an integrating capacitor C11 (C8) at the inverting input to the comparator. The pulse

width is increased until the comparator output inverts. This pulse width information is used by the microprocessor to regulate power to the motor drive circuits.

6-44. MOTOR CURRENT SENSOR CIRCUIT

6-45. Motor drive current flows through a 0.1 Ω resistor, R7. The resulting voltage developed across this resistor is applied to the inverting input of the comparator amplifier U10 (U9). The other input to the amplifier is fixed at approximately +0.315 V. Consequently, if motor current reaches about 3.15 A, the comparator output changes from high to low, indicating excessive motor drive current.

6-46. PEN DOWN CIRCUIT

6-47. When the microprocessor receives a pen down instruction, a 15.6 kHz pulse signal is issued to the pen down driver U1. Because more power is required to activate the pen solenoid than is needed to hold it after activation, the pulse is widened for a short period of time to provide this extra power. The duration of the pulse-width-modulated signal is controlled by the gate array U6 as a function of the 18/26 Vdc unregulated supply voltage. An air damper slows the descent of the pen to protect the pen tip.

6-48. POWER SUPPLIES

6-49. Four major voltages are generated by the 7475A circuitry. Low current linear supplies provide the +12 V and −5 V required for the servo IC's. The +5 V supply provides the power for the remaining logic circuitry. Regulation for the +5 V linear supply is provided by U21 (U20). The fourth supply is the unregulated 18/26 V supplied to the main drive motors and the pen carousel drive motor. The 18/26 V supply can be unregulated because of the voltage sensing and servo gain adjust circuitry described in earlier paragraphs. In addition to these supplies, a −12 V source is provided on the RS-232-C (Option 001) version. This source is used in conjunction with the +12 V supply to operate the I/O (input/output) line drivers.

6-50. RECOMMENDED TEST EQUIPMENT

6-51. Test equipment needed to maintain the 7475A is listed in Table 6-2. Models other than those listed may be used if their specifications equal or exceed those of the models listed.

6-52. TROUBLESHOOTING

6-53. If the plotter does not operate properly, make sure the input/output connector is seated correctly. If this is not the problem, remove the top case as instructed in **Top Case Removal**, and make sure all cables are secure in their connectors.

6-54. EXCHANGE PRINTED CIRCUIT ASSEMBLY

6-55. The printed circuit assembly is available on an exchange basis; that is, a factory-repaired and tested assembly may be ordered and the defective assembly returned for credit. Refer to Section IV for ordering instructions and the exchange part number for your particular assembly. Because of the complexity of the circuits, it is recommended that you replace and return a defective printed circuit assembly to Hewlett-Packard rather than attempt repair.

6-56. DRIVE MOTORS AND PEN SOLENOID

6-57. The drive motor/encoder assemblies and the pen solenoid are not repairable. Motor and encoder cables are replaceable. The motor cable (twisted pair) is P/N 07470-60016. The encoder (flat) cable is P/N 8128-4027.

WARNING

Maintenance described herein is performed with power applied to the plotter and the top case removed. Such maintenance should be performed only by service-trained personnel who are aware of the hazards involved (for example, fire and electrical shock). Where maintenance can be performed without power applied, the line cord should be disconnected.

Table 6-2. Recommended Test Equipment

TYPE	RECOMMENDED MODEL
Computer/controller	HP Model 85 Personal Computer with the appropriate interface: HP 82937A HP-IB Parallel Interface HP 82939A RS-232-C Interface and HP 8120-3258 RS-232-C Interface cable
Rom Drawer	HP 82936A
I/O Rom	HP 00085-15003
Digital Multimeter	HP 3465A
Oscilloscope	HP 1740A
Optical Comparator	B&L 81-34-35

6-58. TROUBLESHOOTING TABLE

6-59. Table 6-3 lists trouble symptoms with possible causes and procedures.

6-60. TEST A

6-61. This test exercises:

Both motor drive circuits
Both motors and encoders
The servo chips
Error light circuit
Gate arrays
Microprocessor
ROM

a. Load a sheet of paper.

b. Manually move the pen carriage near the center of its travel.

c. Hold the ENTER pushbutton down while setting the LINE switch to ON. The ERROR light should remain ON.

d. Press the ← cursor pushbutton.

1. ERROR light should turn ON and OFF continuously (approximately one second for each state).

2. Pen carriage should move left and right about 6.4 mm (0.25 in.) continuously.

3. Paper should move back and forth about 6.4 mm (0.25 in.) continuously.

NOTE

Test may be stopped by pressing ENTER and resumed by pressing ←. Plotter will not operate in any other mode until power has been turned OFF and ON.

6-62. TEST B

6-63. This test helps to isolate problems to motors/encoders or logic circuits when a failure is accompanied by the ERROR light flashing ON/OFF at about one second per cycle. An oscilloscope is required.

a. Disconnect the interface cable for this test.

b. Hold down each of the four cursor directional pushbuttons, one at a time. If a control stops the ERROR light from flashing (stays either ON or OFF while the button is held down) the failure is associated with one of the following general areas.

↑ — X saturation line
↓ — X error line
} Paper Drive

← — Y saturation line
→ — Y error line
} Pen Drive

Table 6-3. Troubleshooting

SYMPTOMS	POSSIBLE CAUSES/PROCEDURES
Does not respond to any front-panel controls. ERROR light is OFF with PAPER lever in LOAD position.	Rear-panel line fuse (see Table 1-3). Power supplies. Check voltages and power supply fuses on PCA. 4 MHz clock Gate Array B
Responds to front-panel controls but not to external controller.	I/O connector not seated properly (may produce an error indication at controller). Test I/O circuits by sending: "SP1;SP2" from controller.
Does not operate properly. ERROR light flashes (PAPER lever in HOLD) about 1 second per ON/OFF cycle.	Go to Test B in this section.
Pen up/down does not operate.	Check fuse (A1F2) and pen supply voltage. Check solenoid continuity.
Paper slips while plotting.	Pinchroller worn. Replace both pinchrollers. Pinchroller arm spring loose or broken.
Diagonal lines not straight: Especially near horizontal lines Especially near vertical lines	Defective pen drive motor/encoder assembly Defective paper drive motor/encoder assembly Deposits on gritwheels, pinchrollers or slider rod. Clean slider rod and pinchrollers with a dry wiper.

c. Remove the top case as instructed in **Top Case Removal**.

d. Connect the power cord. Hold the ENTER pushbutton down while setting the LINE switch to ON.

e. Press the ↓ pushbutton.

f. Disconnect (from the printed circuit assembly) the motor drive cable (twisted pair) indicated by the results of step b.

g. Use an oscilloscope to look at the drive signal at the connector. This should be a series of narrow pulses. See Figure 6-6. If not, the problem is in the motor drive circuit, servo IC, gate array, or the microprocessor.

h. If the signal in step g. is correct, monitor the signal at pin 4 of the encoder cable (with the cable connected to the PCA) while rotating the motor manually. This should produce pulses varying with the speed of motor rotation. If not, the encoder is defective. Replace the motor/encoder assembly. If pulses are present, the problem is probably in the servo IC.

NOTE

Plotter will not operate in any other mode until power has been turned OFF and ON.

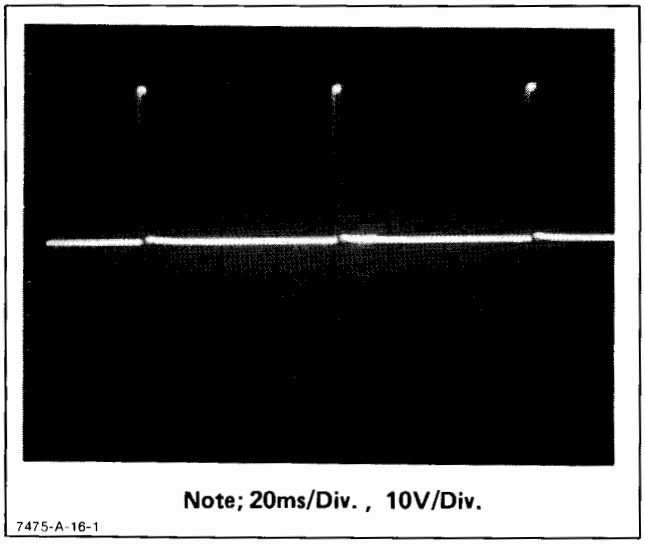


Figure 6-6. Drive Signal Pulses

6-64. PART REMOVAL AND REPLACEMENT

NOTE

All screws in the 7475A are metric sizes except the No. 3 self-tapping screws securing the pen carousel housing and the pen drop shield.

6-65. TOP CASE REMOVAL

a. Set the LINE switch of OFF (O) and disconnect the power cord and interface cable.

b. Remove the screws at the rear of the plotter. See Figure 6-7.

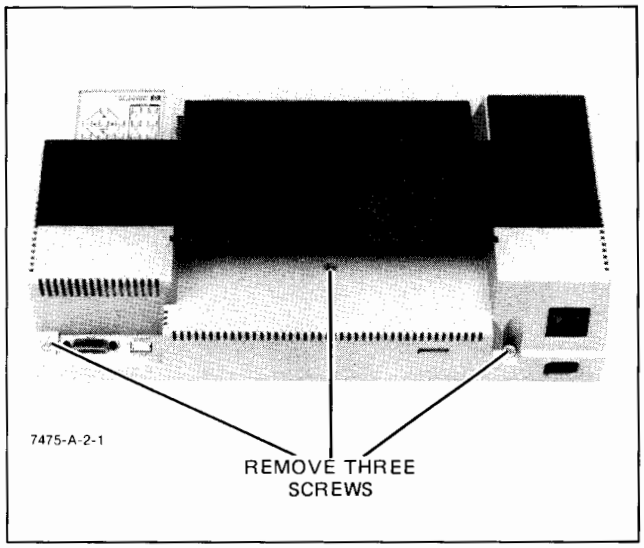


Figure 6-7. Top Case Removal

c. Lift the rear of the top case, then the front will release from the base.

NOTE

When replacing the top case, make sure the PAPER LOAD/HOLD lever extends through the case and the tabs inside the front align properly above and below the base plate.

6-66. PEN CAROUSEL HOUSING REMOVAL

a. Remove the top case as described in the preceeding paragraph.

b. Disconnect the pen carousel cable from J8 on the main printed circuit assembly as shown in Figure 6-8.

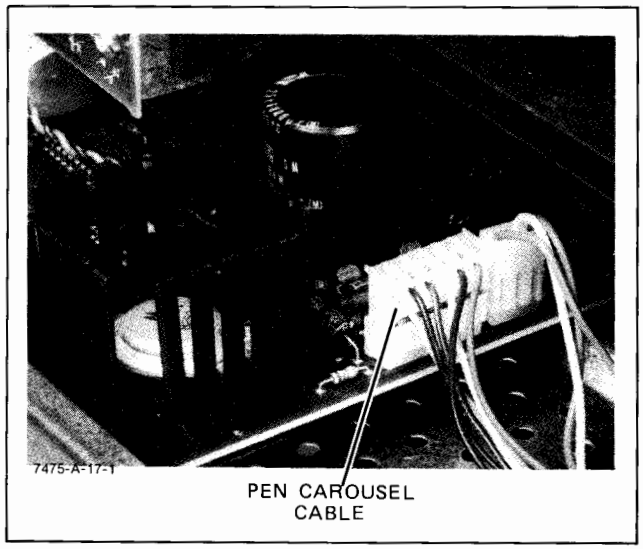


Figure 6-8. Pen Carousel Cable

c. Remove the screw that secures the pen carousel housing to the chassis assembly. See Figure 6-9.

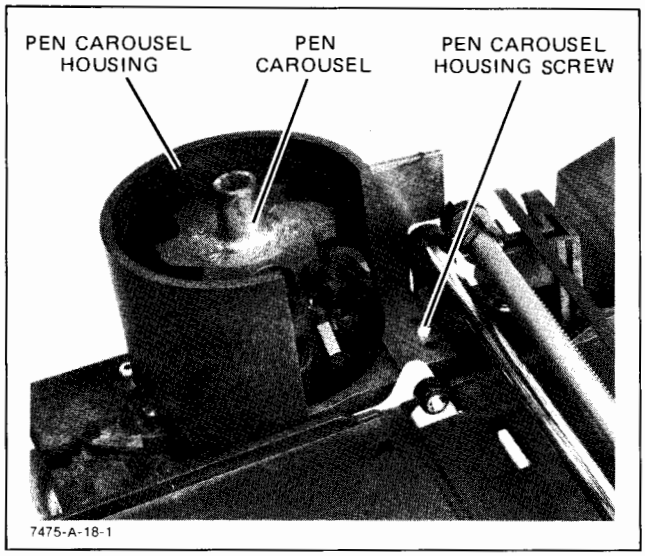


Figure 6-9. Pen Carousel Housing

d. Tip the pen carousel housing forward and lift straight up being careful not to catch the cable connector on the chassis assembly.

e. To reassemble, reverse steps a. through d.

6-67. PAPER DRIVE MOTOR ASSEMBLY REMOVAL

a. Remove the top case. Refer to **Top Case Removal.**

CAUTION

Do not remove the encoder printed circuit assembly or the drive coupler from the motor. The entire unit must be assembled and calibrated at the factory.

b. Disconnect the paper drive motor cable (twisted pair) from J3 and the flat encoder cable from J1 on the main printed circuit assembly. See Figure 6-10.

c. Remove the pen drop shield. See Figure 6-11.

d. Loosen the motor clamp and remove the motor from its mounting. See Figure 6-11.

e. When replacing the motor, make sure that the rubber O-rings on the drive shaft coupler and the motor shaft coupler fit inside the grooves of the coupler ring, and the boss (key) on the underside of the motor casting fits into the corresponding hole in the chassis. See Figure 6-12.

f. Make sure the pen carriage slider rod is all the way to the left, then replace the motor clamp. The arm on the clamp should hold the slider rod to the left. Tighten the clamp screw securely.

g. Loosen the clamping screw in the paper drive shaft coupler just enough to allow the coupler to slide on the shaft. Make sure the nut remains in the coupler.

h. Hold the drive shaft to the left by pushing (with a finger) on the left gritwheel, and push the drive shaft coupler to the right (with another finger) so that the coupler parts fit together snugly. Tighten the shaft coupler clamping screw securely.

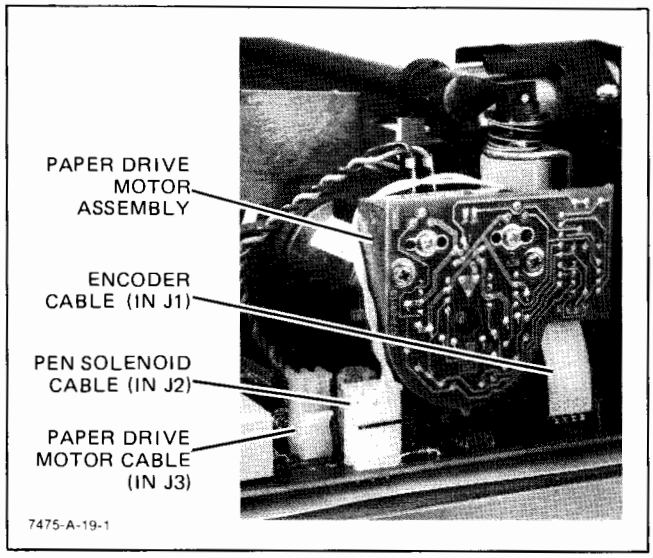


Figure 6-10. Paper Drive Motor and Solenoid Cables

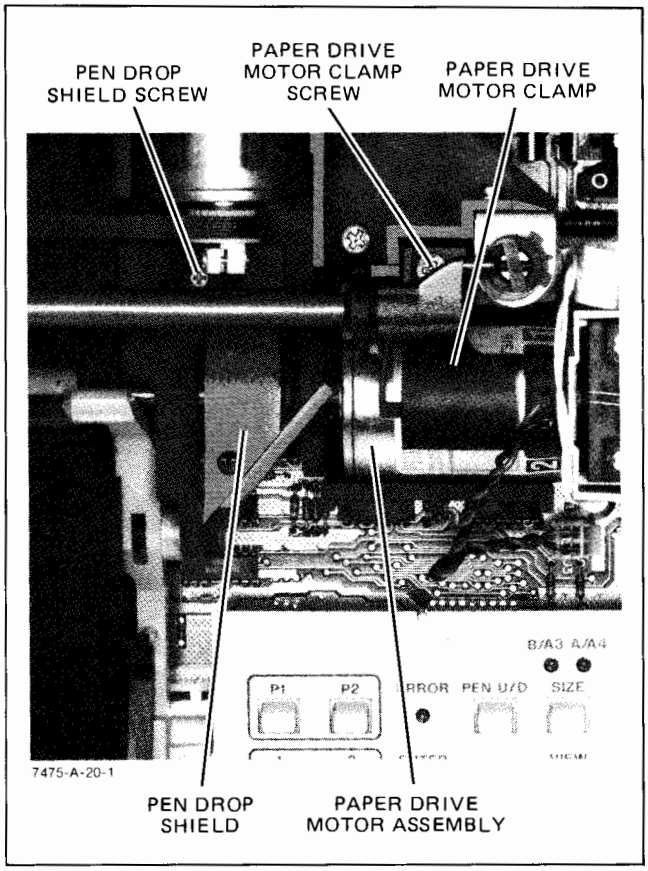


Figure 6-11. Paper Drive Motor Clamp and Pen Drop Shield

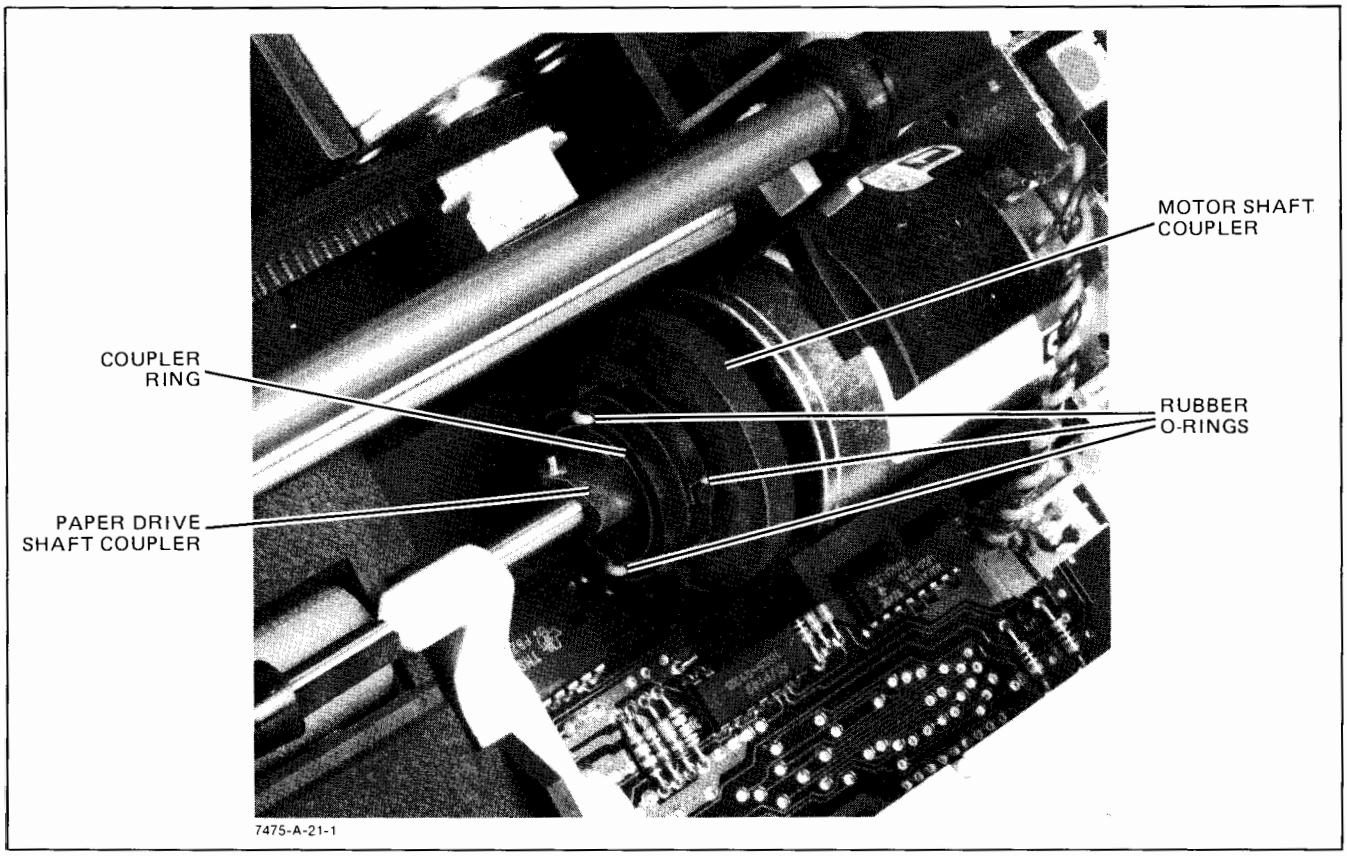


Figure 6-12. Paper Drive Coupler Parts

i. Reconnect the cables to the PCA. To prevent electrical interference, ensure the motor wires are intertwined up to the connector and fitted away from the encoder assembly.

6-68. PEN SOLENOID

a. Remove the top case. Refer to **Top Case Removal.**

b. Loosen the paper drive motor clamp enough to slide the motor to the right about 2 cm (3/4 in.). See Figure 6-11. (Lift the right end of the motor slightly to release the motor from the chassis.)

c. Disconnect the solenoid cable from J2 on the printed circuit assembly. See Figure 6-10.

d. Loosen the solenoid mounting screw enough to allow removal of the solenoid. See Figure 6-13.

e. When replacing the motor, make sure that the O-rings on the drive shaft coupler and the motor shaft coupler fit inside the grooves of the coupler ring, and the boss (key) on the underside of the motor casting fits into the corresponding hole in the chassis. See Figure 6-12.

f. Make sure the pen carriage slider rod is all the way to the left, then replace the motor clamp. The arm on the clamp should hold the slider rod to the left. Tighten the clamp screw securely.

g. Loosen the clamping screw in the paper drive shaft coupler just enough to allow the coupler to slide on the shaft. Make sure the nut remains in the coupler.

h. Hold the drive shaft to the left by pushing (with a finger) on the left gritwheel, and push the drive shaft coupler to the right (with another finger) so that the coupler parts fit together snugly. Tighten the shaft coupler clamping screw securely.

6-69. PEN DRIVE MOTOR AND BELT

6-70. To remove the pen drive motor and belt, proceed as follows:

a. Remove the top case. Refer to **Top Case Removal.**

CAUTION

Do not remove the encoder printed circuit assembly or drive pulley from the motor. The entire assembly must be assembled and calibrated at the factory.

b. Disconnect the pen drive motor cable (twisted pair) from J5 and the flat encoder cable from J6 on the main printed circuit assembly. See Figure 6-13.

c. Remove the belt tensioner by pressing downward on the tensioner and sliding the tang at the bottom out of the slot in the chassis. See Figure 6-14.

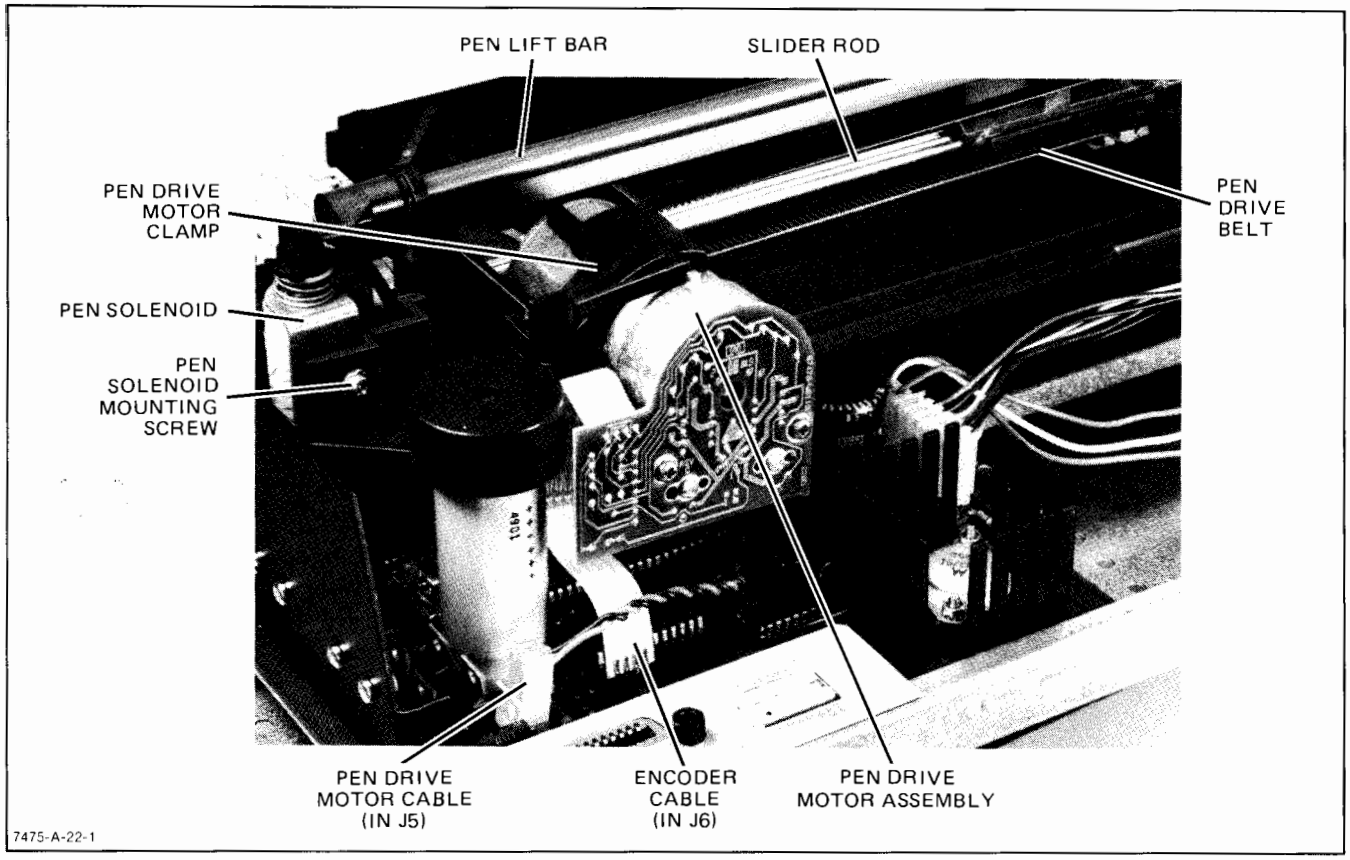


Figure 6-13. Pen Solenoid and Pen Drive

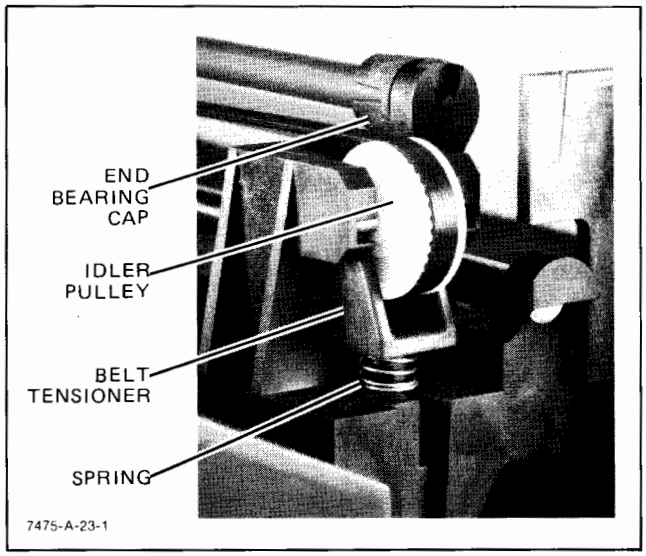


Figure 6-14. Pen Drive Belt Tensioner

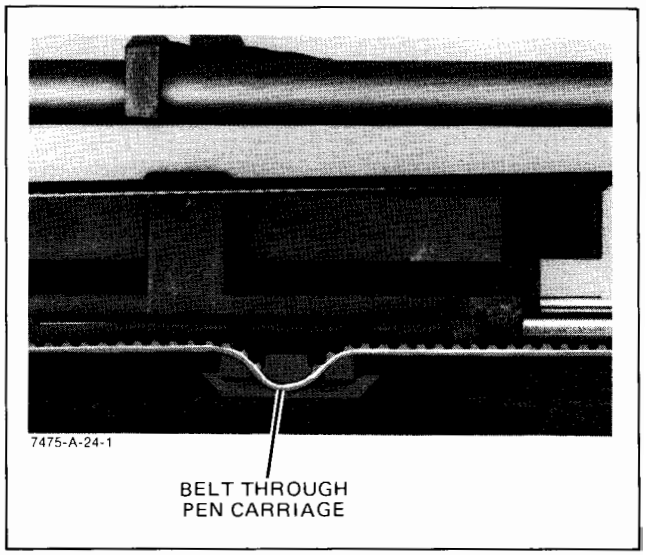


Figure 6-15. Pen Carriage

d. Loosen the pen drive motor clamp and remove the motor. See Figure 6-13.

e. To remove the belt, slide it from the pen carriage. See Figure 6-15.

f. Loosen the pen solenoid mounting screw shown in Figure 6-13. Slide the solenoid to the right and remove the armature and spring.

g. Slide the pen lift bar to the right just far enough to allow removal of the belt.

6-71. To replace the belt and motor, proceed as follows:

a. Replace the belt in position and replace the pen lift bar.

b. Replace the solenoid spring and armature and secure the solenoid back into place.

c. Slide the belt into the pen carriage. See Figure 6-15.

d. Place the idler pulley in position.

e. Slide the pen drive motor into place and tighten the clamp. (A boss on the side of the motor casting must fit into a notch in the chassis.)

f. Place the belt over the drive pulley.

g. Replace the belt tensioner and spring. Move the pen carriage from side to side and make sure the belt and pulleys are properly aligned.

h. Connect the motor and encoder cables to the main printed circuit assembly. To prevent electrical interference, ensure the motor wires are intertwined up to the connector and fitted away from the encoder assembly.

i. Replace the top case, making sure the PAPER LOAD/HOLD lever extends through the case and the tabs inside the front of the case align properly above and below the base plate.

6-72. PEN CARRIAGE, PENHOLDER, AND DAMPER REMOVAL

6-73. To remove the pen carriage, penholder, and damper, proceed as follows:

a. Remove the top case. Refer to **Top Case Removal**.

b. Remove the paper drive motor. Refer to **Paper Drive Motor Assembly Removal**.

c. Remove the pen solenoid. Refer to **Pen Solenoid Removal**.

d. Remove the pen drive motor. Refer to **Pen Drive Motor and Belt Removal**, steps b., c., and d.

e. Slide the belt from the pen carriage and move the pen carriage to the left. See Figure 6-15.

CAUTION

Two springs will be released during the next two steps —the pen down spring and a preload spring on the slider rod between the carriage and penholder parts. Proceed carefully.

f. Remove the end bearing cap while sliding the pen lift bar to the right and out of the carriage assembly. See Figure 6-14. (To replace the end cap on the lift bar, merely slide the cap onto the bar.)

g. Move the slider rod to the right just far enough to release the left end of the rod from its mounting. See Figure 6-13. Slide the rod to the left and out of the carriage/penholder assembly.

h. The plastic damper is merely pressed into the carriage and penholder parts. Remove carefully.

6-74. To reassemble, proceed as follows:

a. Carefully replace the damper.

b. Place the pen down and preload springs into position and hold the parts together while inserting the slider rod from the left. Make sure the preload spring is positioned over the rod properly so that it does not drag on the slider rod.

c. Replace the slider rod in the chassis.

d. Replace the pen lift bar.

e. Replace the pen solenoid.

f. Replace the paper drive motor, making sure that the rubber O-rings on the drive shaft coupler and the motor shaft coupler fit inside the grooves of the coupler ring, and the boss (key) on the under side of the motor casting fits into the corresponding hole in the chassis. See Figure 6-12.

g. Make sure the pen carriage slider rod is all the way to the left, then replace the motor clamp. The arm on the clamp should hold the slider rod to the left. Tighten the clamp screw securely.

h. Loosen the clamping screw in the paper drive shaft coupler just enough to allow the coupler to slide on the shaft. Make sure the nut remains in the coupler.

i. Hold the drive shaft to the left by pushing (with a finger) on the left gritwheel, and push the drive shaft coupler to the right (with another finger) so that the coupler parts fit together snugly. Tighten the shaft coupler clamping screw securely.

j. Reconnect the cables to the PCA.

k. Replace the pen drive motor and belt as instructed in **Pen Drive Motor and Belt**.

l. Measure the pen down force by using a gram gauge. To do this, it is necessary to apply power to the plotter, and select and lower a pen onto the platten. Place the tip of the gram gauge under the lip of the pen body and check that the pen just starts to lift with 19 ±10 grams. See Figure 6-16. If the pen does not start to rise within 10 to 29 grams, replace the pen down spring. Refer to Table 4-3 for part number.

m. Replace the top case, making sure the PAPER LOAD/HOLD lever extends through the case and the tabs inside the front of the case are aligned properly above and below the base plate.

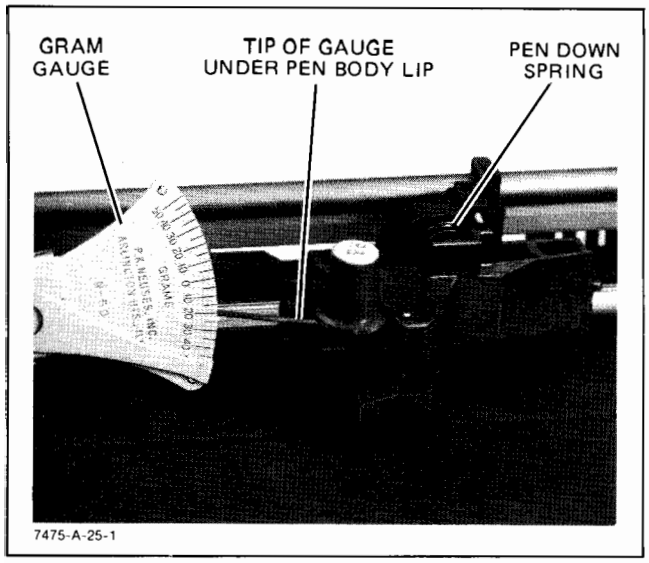


Figure 6-16. Measuring Pen Down Force

6-75. PINCH ROLLERS REMOVAL AND REPLACEMENT

a. Remove the top case. Refer to **To Case Removal.**

b. Remove the retaining ring that secures the pinch roller. See Figure 6-17.

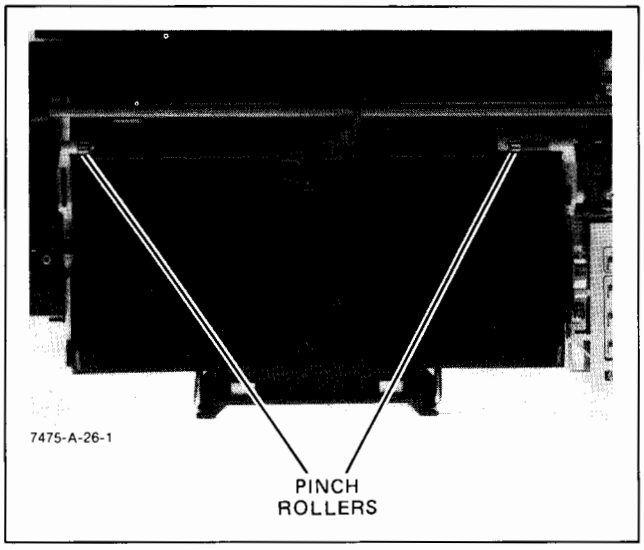


Figure 6-17. Pinch Rollers

c. Remove the pinch roller.

d. Replace the pinch roller. The larger diameter end of the pinch roller must be toward the outer edge of the plotting surface. This is necessary to keep the plotting media in place.

e. Replace the retaining ring.

f. Replace the pen carousel and top case making sure the PAPER LOAD/HOLD lever extends through the case and the tabs inside the front of the case are aligned properly above and below the base plate.

6-76. PRINTED CIRCUIT ASSEMBLY REMOVAL

a. Remove the top case. Refer to **Top Case Removal.**

b. Disconnect all cables from the printed circuit assembly.

c. Remove the pen carousel housing. Refer to **Pen Carousel Housing Removal.**

d. Remove the screw holding the front panel, and remove the panel. See Figure 6-18.

e. Remove the recessed screw between the pen solenoid and the pen drive motor. See Figure 6-18.

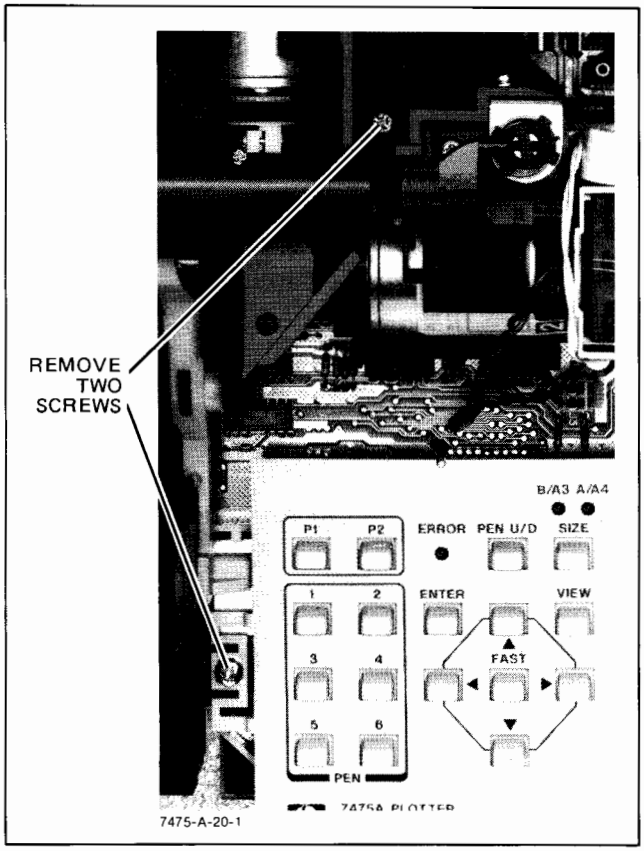


Figure 6-18. Chassis Assembly Removal

f. Lift the right side of the chassis assembly. Tabs on the left side will release from the base plate.

g. Remove the screws or studs holding the rear panel interface connector.

h. Lift the front end of the printed circuit assembly and remove from the base plate.

i. Reassemble in reverse order. When replacing the top case, make sure the PAPER LOAD/HOLD lever extends through the case and the tabs inside the front are aligned properly above and below the base plate.

6-77. PINCH ROLLER MECHANISM REMOVAL

6-78. To remove the pinch roller lever and bar or the right or left pinch roller arm, proceed as follows:

a. Remove the top case. Refer to **Top Case Removal**.

b. To remove the right pinch roller arm, the pen drop shield must be removed. See Figure 6-11.

c. Remove the chassis assembly as instructed in **Printed Circuit Assembly Removal**, steps b. through f.

d. Place the chassis assembly upside down on the work surface. See Figure 6-19.

e. Remove the pinch roller spring.

f. To remove the pinch roller lever and bar, move the lever in an upward position and merely slip out of the chassis.

g. Slide the pinch roller arm from its pivot and remove from the chassis.

h. Replace all parts in reverse order.

6-79. PAPER DRIVE SHAFT AND COUPLER REMOVAL

a. Remove the chassis assembly as instructed in **Printed Circuit Assembly Removal**, steps a. through f.

b. Remove the right and left pinch roller springs and pinch roller arms.

c. Remove both bearing clamps by pressing down and inward on the clamps. See Figure 6-19.

d. Remove paper drive shaft toward the left.

CAUTION

Do not attempt to replace grit wheels or bearings individually. The grit wheels must be press fitted at the factory to the proper position.

e. Loosen the coupler clamping screw and remove the coupler from the shaft.

f. When replacing the coupler and drive shaft, place the coupler on the end of the shaft, leaving the clamping screw loose enough to allow the coupler to slide.

g. Place the drive shaft in position, making sure that the rubber O-rings on the drive shaft coupler and the motor shaft coupler fit inside the grooves of the coupler ring. Replace the bearing clamps. See Figure 6-12.

h. Place the chassis assembly right side up.

NOTE

Step i. assumes that the paper drive motor is in position and its clamp tightened securely. If not, refer to **Paper Drive Motor Assembly**.

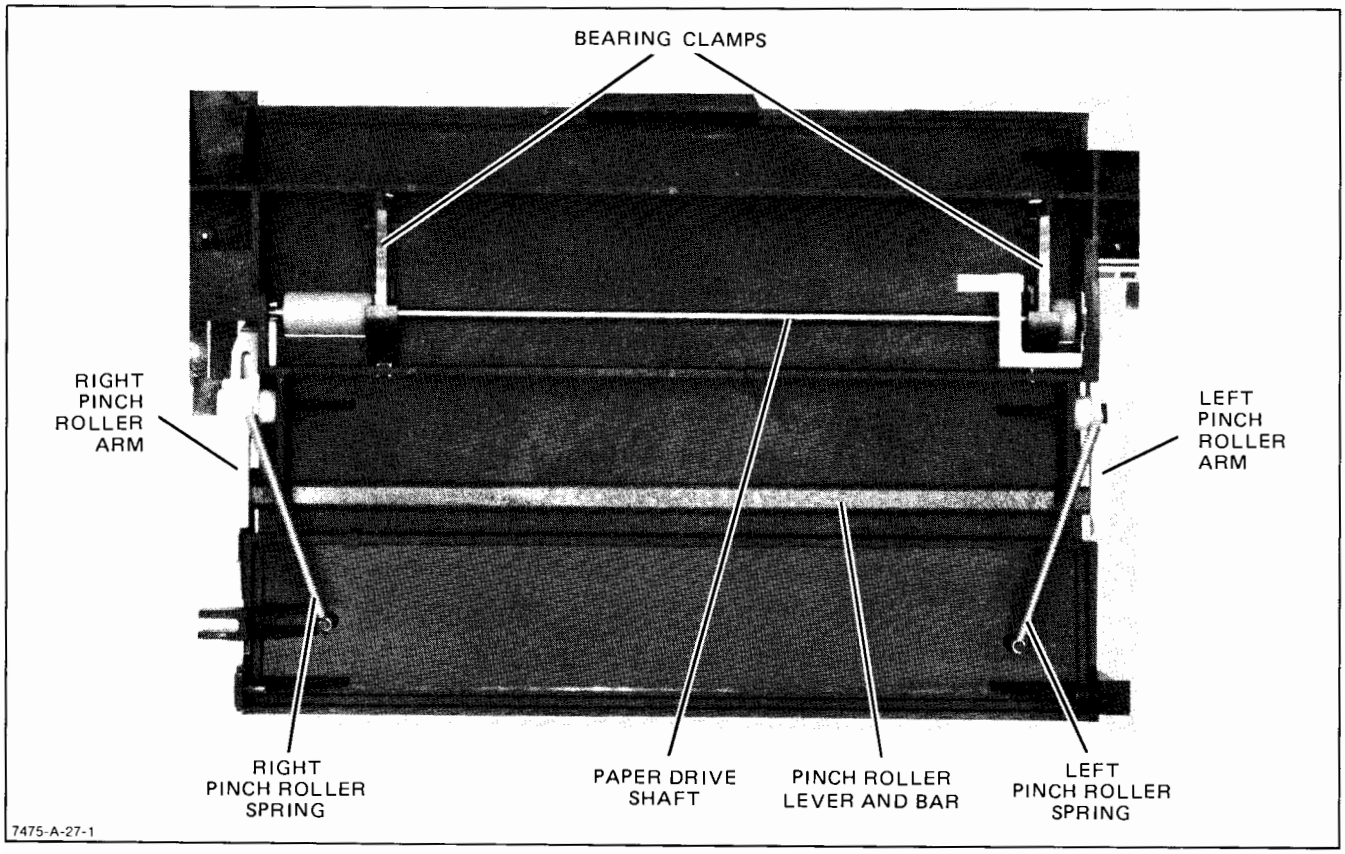


Figure 6-19. Underside of Chassis Assembly

i. Hold the drive shaft to the left by pushing (with a finger) on the left gritwheel, and push the drive shaft coupler to the right (with another finger) so that the coupler parts fit together snugly. Tighten the shaft coupler clamping screw securely.

j. Replace all parts in reverse order.

6-80. POWER MODULE AND TRANSFORMER

a. Remove the top case. Refer to **Top Case Removal**.

b. Remove the chassis assembly. Refer to **Printed Circuit Assembly Removal**, steps b. through f.

NOTE

The transformer is held in place by the power module molding.

c. Remove the safety earth (ground) wire screw at the left end of the power module. See Figure 6-20.

d. Disconnect the three-wire secondary power cable from the printed circuit assembly.

e. Disconnect the primary wires from the transformer.

f. Remove the screw in the power module. See Figure 6-20.

g. Lift the left end of the module. The right end is held by a tab which fits into the base plate.

h. Replace in reverse order.

CAUTION

When connecting the transformer primary wires, refer to Section I, Line Voltage and Fuse Selection, for correct wiring.

WARNING

To protect against possible electrical shock, Be sure to replace the safety earth (ground) wire and tighten the screw securely. See Figure 6-20.

6-81. POWER MODULE WIRING

6-82. The power module is available as a prewired unit including the power input connector, switch, and fuseholder (less cap and fuse). The part number for this assembly is 07470-60120. This does not include the power transformer. It is recommended that if replacement of any part of the unit is required, the entire unit be replaced. However, if this it is not possible and any part must be replaced separately, refer to Figure 6-21 for the correct wiring information.

6-83. CLEANING

WARNING

Disconnect the plotter from the power source prior to performing any maintenance. DO NOT allow water to run onto electrical components and circuits or through openings in the enclosure as this may create a shock hazard.

CAUTION

Do not attempt to clean the microgrip drive wheels. Cleaning solutions may dissolve the adhesive which secures the grit particles to the wheels.

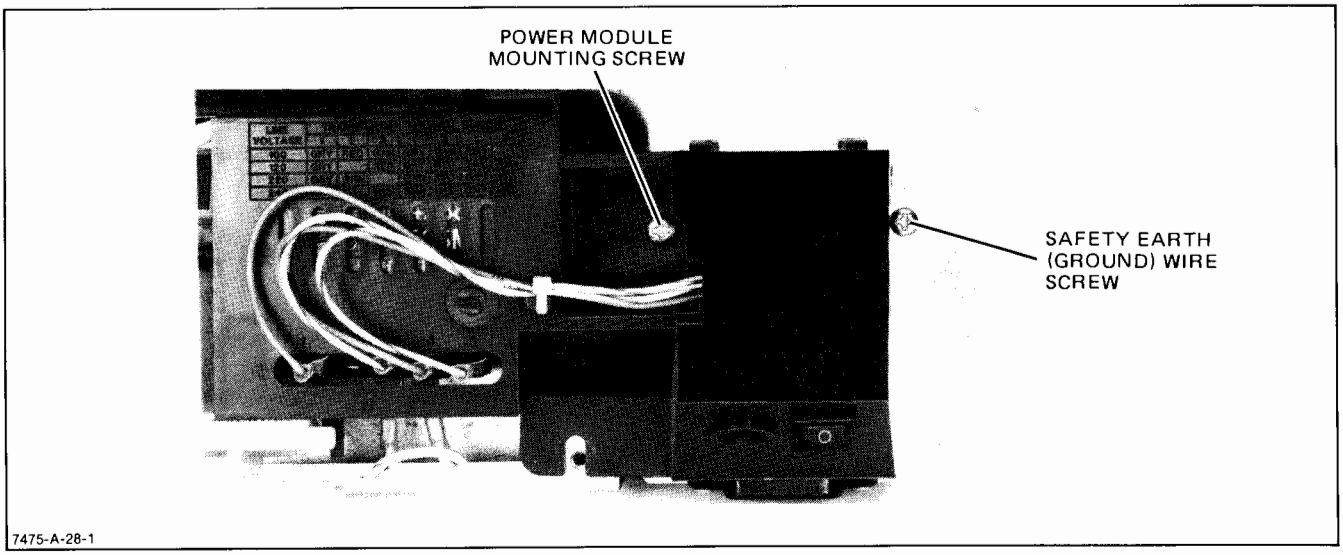


Figure 6-20. Power Module Removal

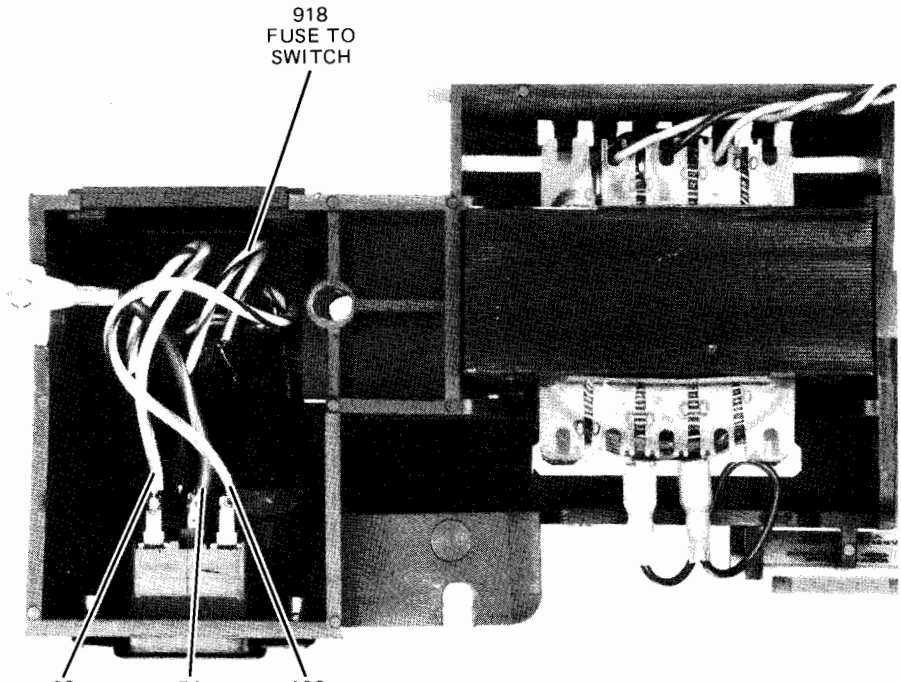


Figure 6-21. Power Module Wiring

6-84. Thorough cleaning should be performed periodically. Cleaning intervals are determined by the type of operation, local air contamination, and climatic conditions. Cleaning procedures should include the following:

a. Blow away the dust accumulation with compressed air, if available. Dust may also be removed with a lint-free cloth.

b. Clean the outer surface of the plotter with a damp sponge or cloth. Use a mild soap and water solution if necessary. Wipe dry after cleaning.

NOTE

To prevent sratching, do not use abrasive cleaners on the plastic cover. The cover should be cleaned with a mild solution of soap and water and wiped dry with a lint-free cloth.

6-85. PEN STALL CLEANING

6-86. Before using overhead transparency pens, remove leftover ink from the capping hole in the pen stalls of the carousel using a cotton swab. This will prevent the transfer of other inks to the plots.

6-87. DIAGRAMS

6-88. Figure 6-22 explains symbols which may appear on the schematic diagrams, and Figure 6-23 illustrates logic symbols used. Figures 6-24 through 6-26 are schematic diagrams of the 7475A circuits.

SCHEMATIC DIAGRAM NOTES

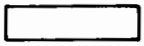
Resistance in ohms, capacitance in microfarads, inductance in millihenries unless otherwise noted.

* Asterisk denotes a factory-selected value. Value shown is typical. Part might be omitted.

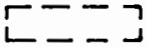
Indicates a NOTE on the schematic diagram.

Tool-aided adjustment.

Manual control.



Encloses a front-panel or circuit assembly silkscreened designator.



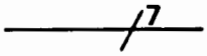
Encloses a rear-panel silkscreened designator.

Circuit assembly borderline.

Other assembly borderline. Also used to indicate mechanical interconnection (ganging) and RF shielding.

Heavy line with arrows indicates path and direction of main signal.

Heavy dashed line with arrows indicates path and direction of main feedback.



Indicates cable run with seven lines.

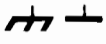
Wiper moves toward CW with clockwise rotation of control (as viewed from shaft or knob).

Numbered Test point. Measurement aid (metal post, circuit pad, etc.) provided.

Lettered Test point. No measurement aid provided.

( ) Encloses wire color code. Code used is the same as the resistor color code. First number identifies the base color, second number identifies the wider stripe, third number identifies the narrower stripe (e.g., (947) denotes white base, yellow wide stripe, violet narrow stripe).

A direct conducting connection to the earth, or a conducting connection to a structure that has a similar function (e.g., the frame of an air, sea, or land vehicle).



A conducting connection to a chassis or frame.

Common connections. All like-designated points are connected. When accompanied by a letter, indicates the type common (i.e., A = Analog, D = Digital, F = Floating).

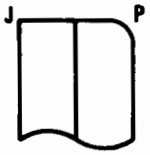
1-A-1-2

Figure 6-22. Schematic Diagram Notes (Sheet 1 of 2)

SCHEMATIC DIAGRAM NOTES (Continued)

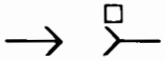
Light Emitting Diode (LED).

Photo-Transistor.

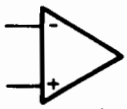


Cable and circuit assembly connectors.

J – Fixed Portion
P – Moveable Portion



Circuit assembly square-pin connectors.



Operational Amplifier (integrated circuit).

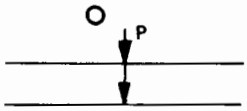
Voltage regulator (breakdown diode).

Denotes Field Effect transistor (FET) with N-type base.

Denotes FET with P-type base.

Denotes Silicon Controlled Rectifier (SCR).

Denotes spring-loaded switch.



Indicates twisted pair.

Identifies service sheet for quick reference.

Signal line identification.

Combined service sheet and signal line identification.

1-A-2-1A

Figure 6-22. Schematic Diagram Notes (Sheet 2 of 2)

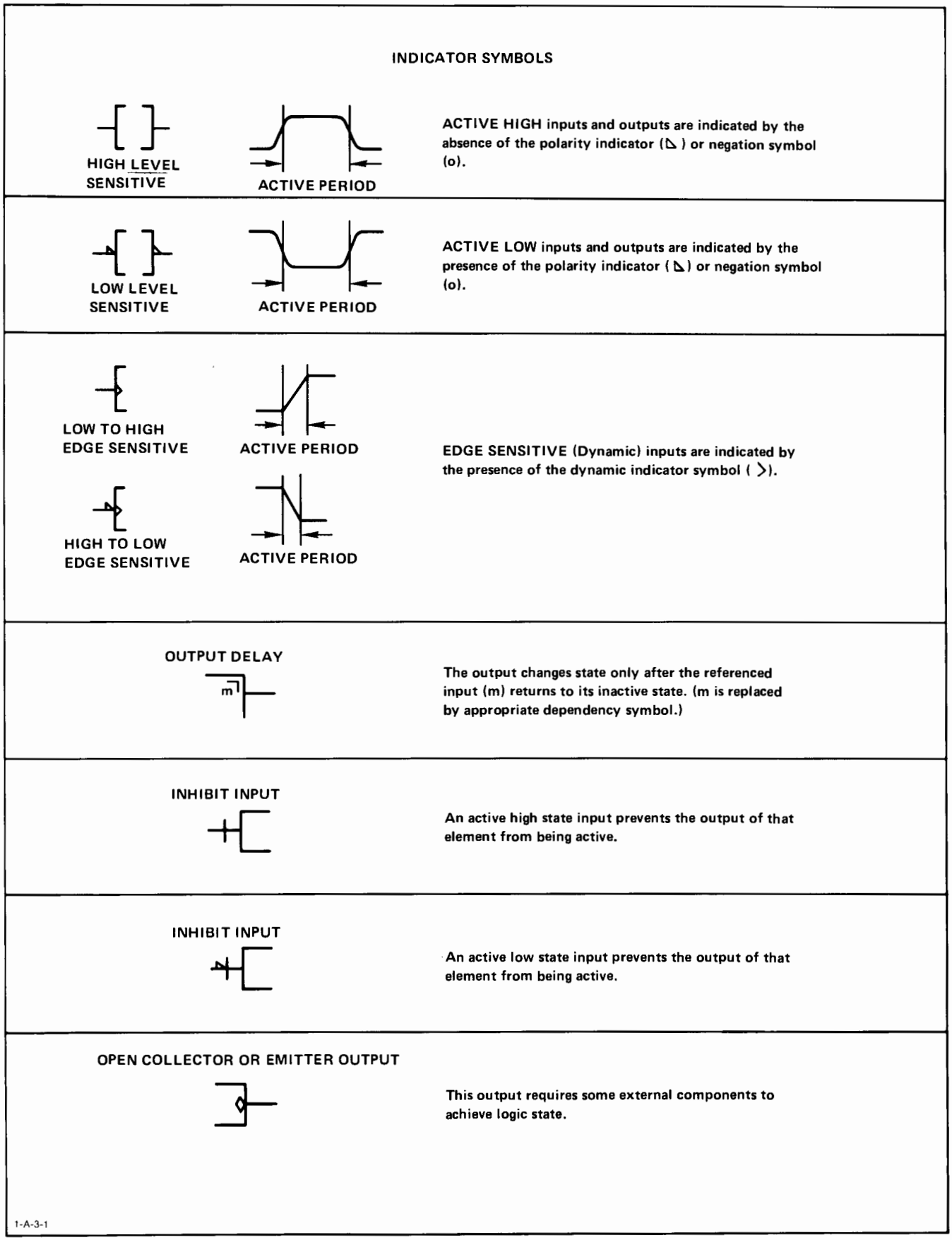


Figure 6-23. ANSI Y32.14 Logic Symbols (Sheet 1 of 6)

INDICATOR SYMBOLS (Continued)

SCHMITT TRIGGER

AND GATE WITH HYSTERESIS

Schmitt Trigger-⊓ indicates that hysteresis exists in the device.

Dependency Notation

G1
1

The input that controls or gates other inputs is labeled with a "C" or a "G", followed by an identifying number. The controlled or gated input or output is labeled with the same number. In this example, "1" is controlled by "G1".

G1
X_1

OR

G1
1X

When the controlled or gated input or output already has a functional label (X is used here), that label will be prefixed or subscripted by the identifying number.

C
X_C

If a particular device has only one gating or control input then the identifying number may be eliminated and the relationship shown with a subscript.

G1
G2
1,2X

If the input or output is affected by more than one gate or control input, then the identifying numbers of each gate or control input will appear in the prefix or subscript, separated by commas. In this example "X" is controlled by "G1" and "G2".

G1
G2
$X_{1,2}$

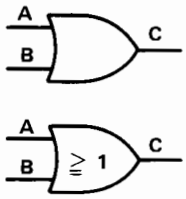
GATE	IEEE STANDARD 91 ANSI Y32.14	TRUTH TABLE	FLIP FLOP	ANSI Y32.14 CONTROL DESIGNATIONS FOR F.F.	DESCRIPTION
AND	A, B → C; A, B, & → C	A B C: L L L; H H H; L H L; H L L	R-S	R, S → Q, $\overline{Q}$	R S Q $\overline{Q}$: L L N/C N/C; L H H L; H L L H; H H undetermined

1-A-4-1

Figure 6-23. ANSI Y32.14 Logic Symbols (Sheet 2 of 6)

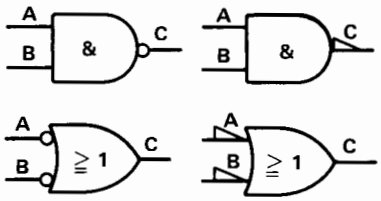
INDICATOR SYMBOLS (Continued)

OR



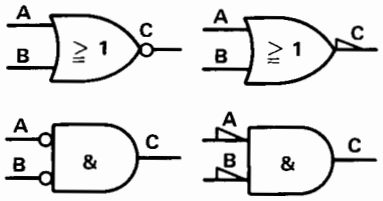
A	B	C
L	L	L
H	H	H
L	H	H
H	L	H

NAND



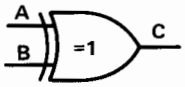
A	B	C
L	L	H
H	H	L
L	H	H
H	L	H

NOR



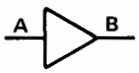
A	B	C
L	L	H
H	H	L
L	H	L
H	L	L

XOR



A	B	C
L	L	L
H	H	L
L	H	H
H	L	H

BUF-FER

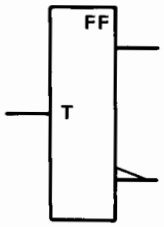


A	B
1	1
0	0

INVERT-ER

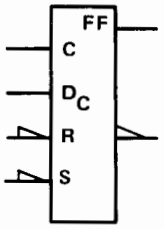
A	B
1	0
0	1

T



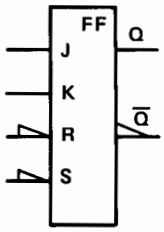
Toggles with every clock pulse

D



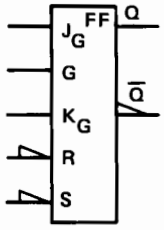
Data output follows data input. Input is gated by C.

J-K



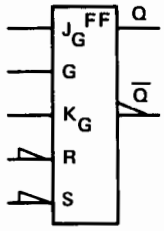
J	K	Q	Q̄
L	L	N/C	N/C
L	H	L	H
H	L	H	L
H	H	toggles	

J-K (gated)



J and K inputs are gated by G.

J-K (master slave)



This output is dependent upon negative going edge of the signal.

S Set input – when active causes the flip-flop to set (Asynchronous)

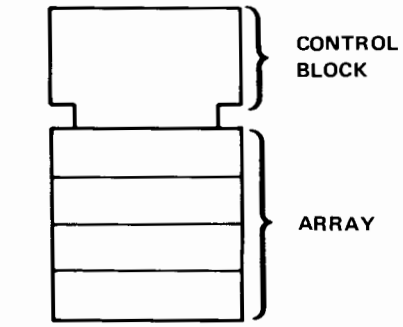
R Reset input – when active causes the flip-flop to reset (Asynchronous)

N/C No Change

1-A-5-1

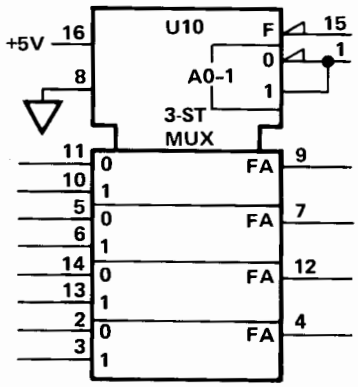
Figure 6-23. ANSI Y32.14 Logic Symbols (Sheet 3 of 6)

INDICATOR SYMBOLS (Continued)



COMMON CONTROL BLOCK

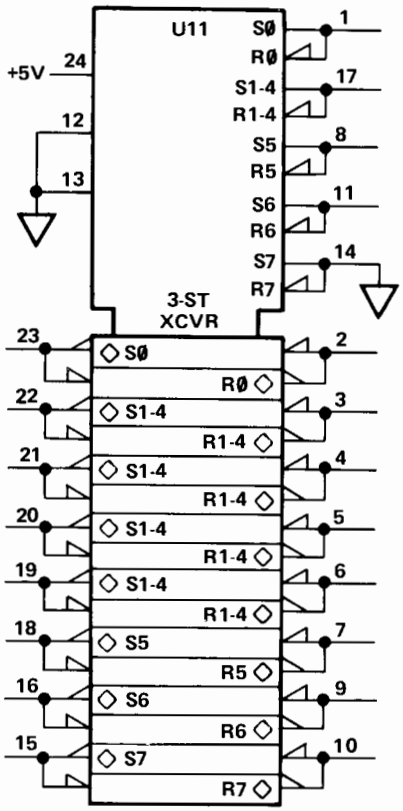
The Control Block is used to show when common control signals are applied to a group of mechanically connected, but functionally separate units.



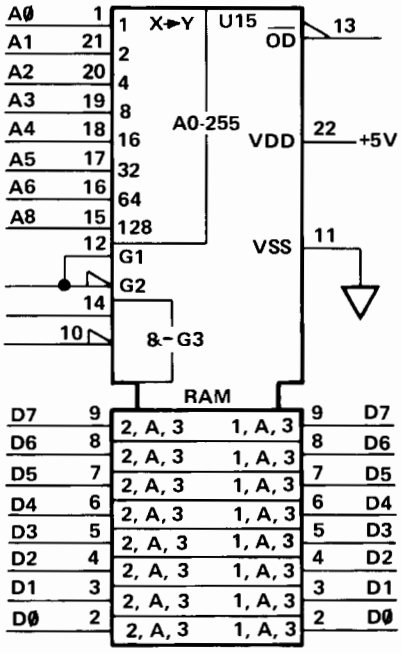
F input must be low to enable outputs. When F is high, outputs are high impedance. Address input determines whether 0 or 1 input will pass to output.

1-A-6-2

Figure 6-23. ANSI Y32.14 Logic Symbols (Sheet 4 of 6)



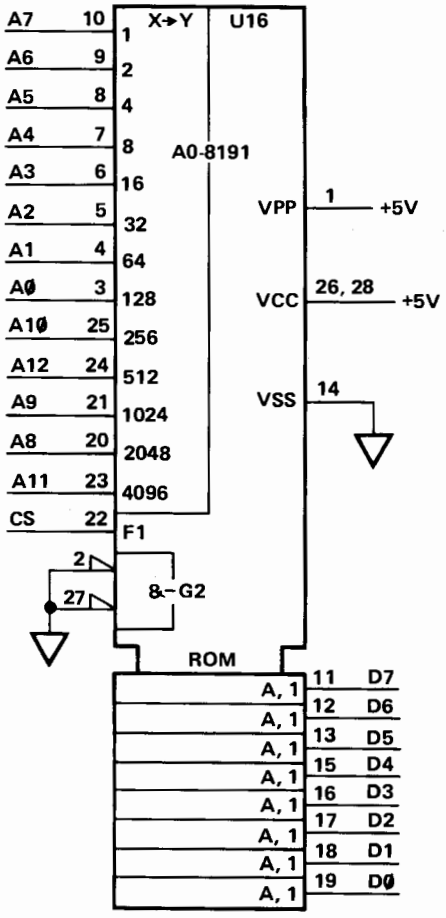
Level of inputs in control block (S/R) determines direction of data flow.



Random access memory with 256 addresses and 8-bit parallel inputs and outputs on the same pins. Each data location is selected by the 8-bit address in the upper left corner of the control block. The data input (write) function is enabled when gates G1/G2 are low and G3 is true (pin 14 high, pin 10 low). The read function when G1/G2 are high and G3 is true.

1-A-28-1

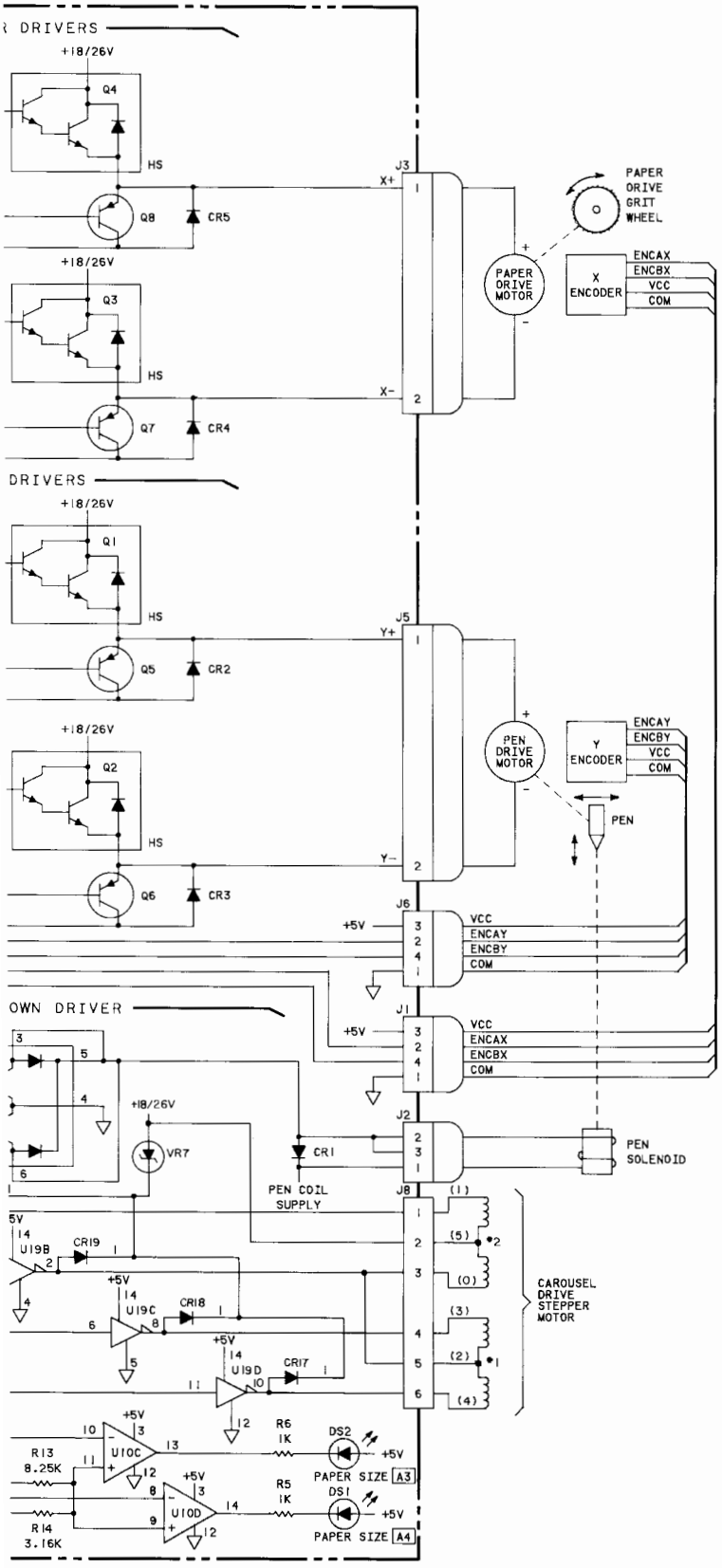
Figure 6-23. ANSI Y32.14 Logic Symbols (Sheet 5 of 6)



Read only memory with 8192 addresses and 8-bit parallel output. Each output byte is selected by the 12-bit address in the upper left corner of the control block. Output is enabled only when F1 is high and G2 is low.

1-A-27-1

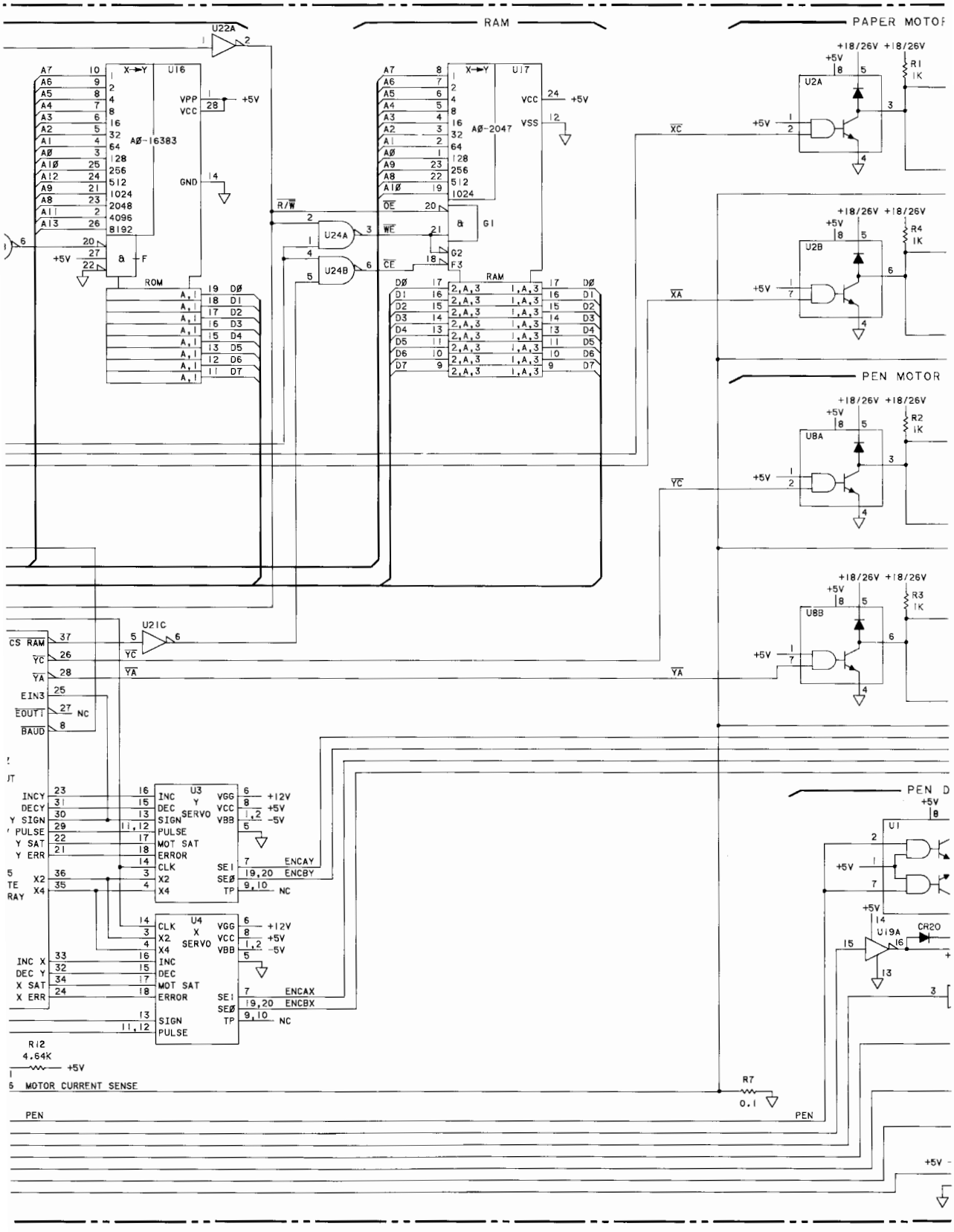
Figure 6-23. ANSI Y32.14 Logic Symbols (Sheet 6 of 6)



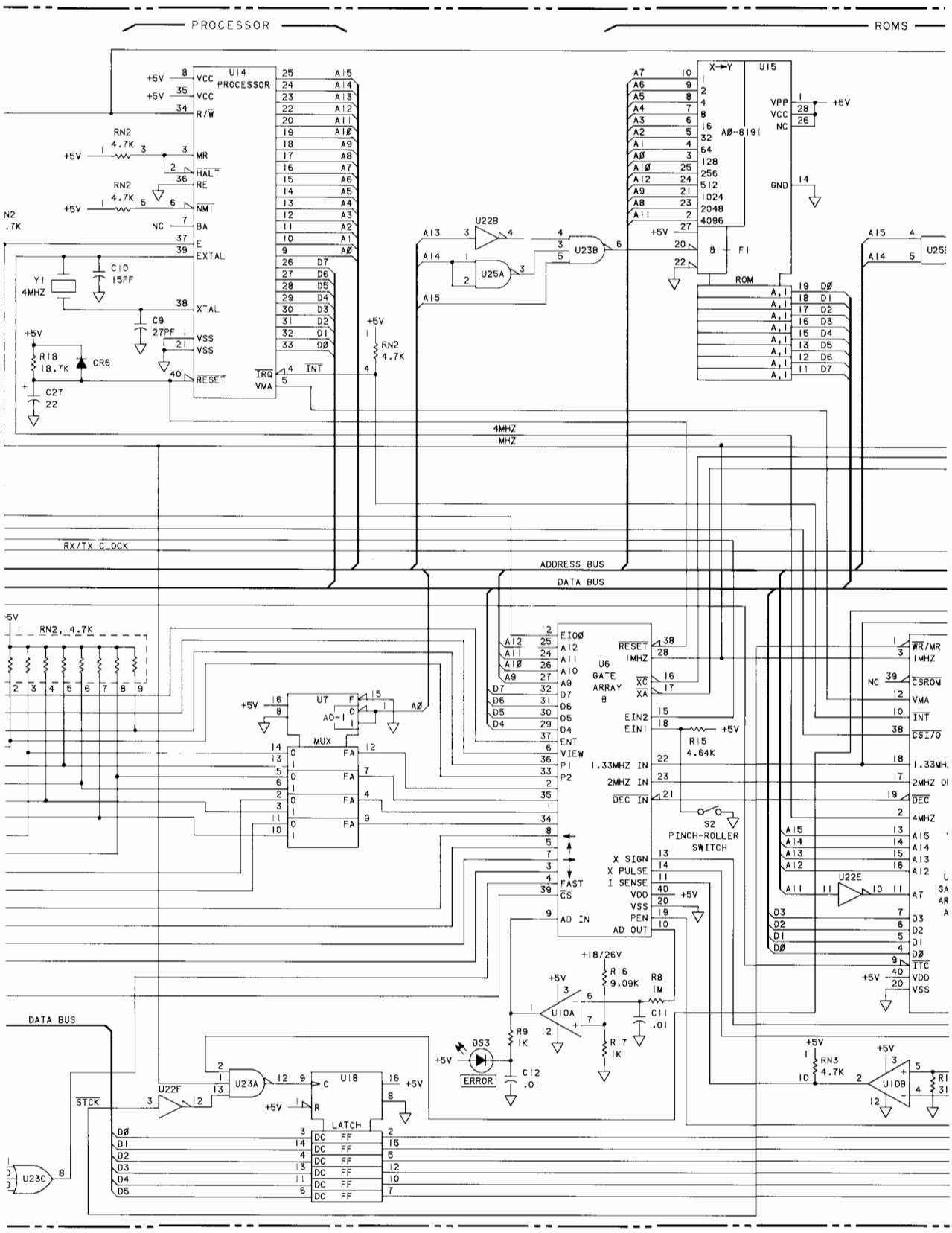
1

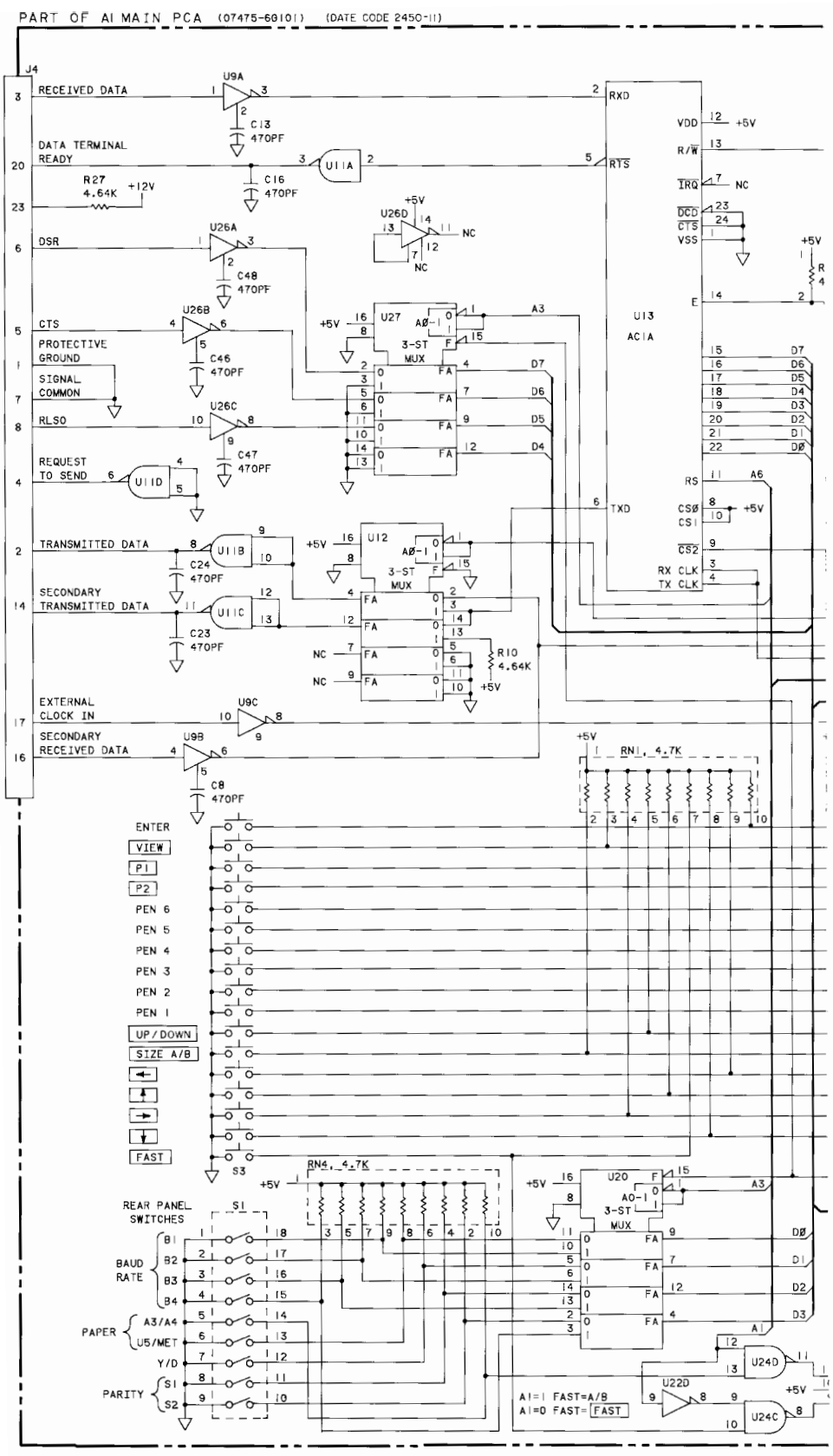
SERVICE SHEET

Figure 6-24. RS-232-C, Option 001 Schematic Diagram

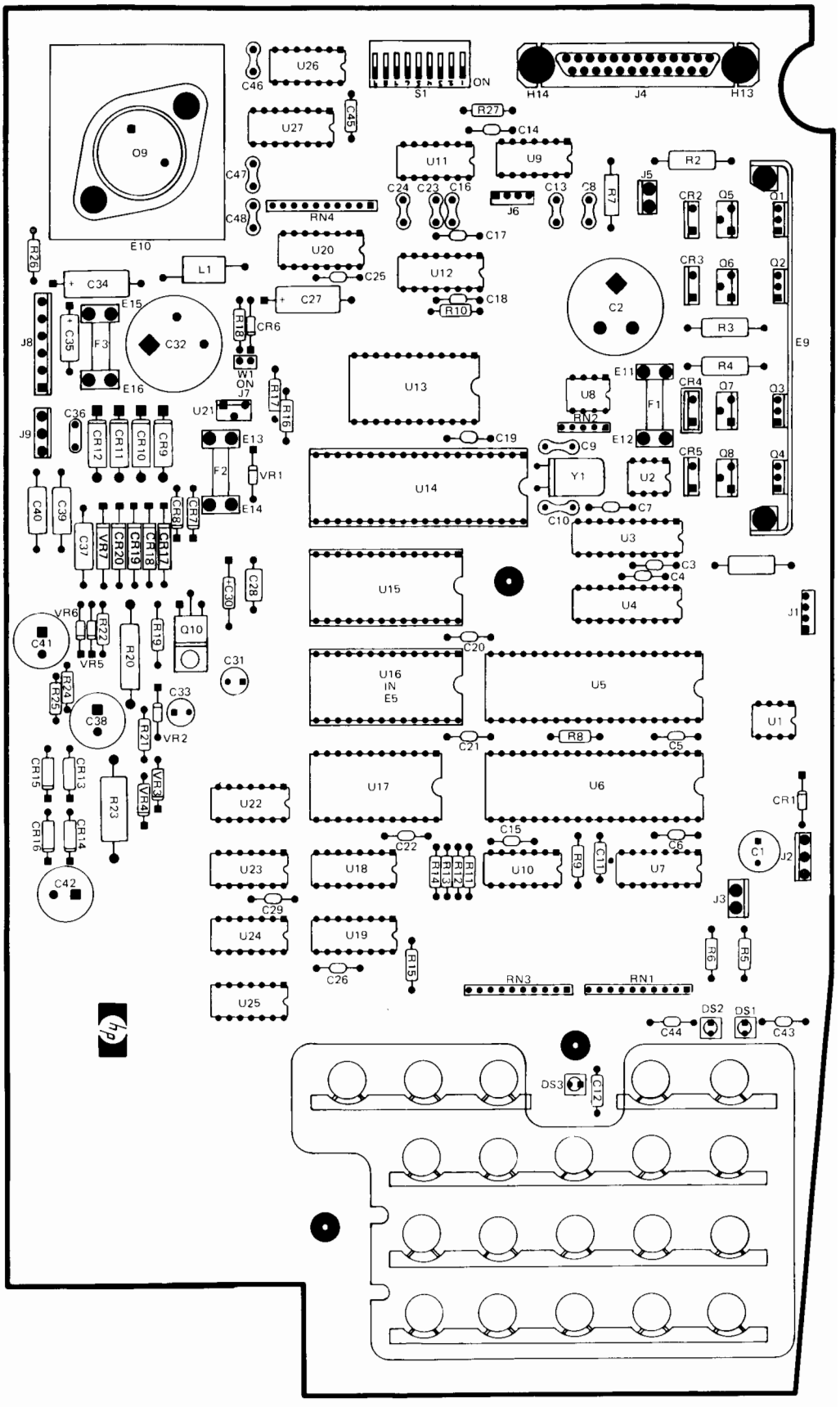


NOTE
ON THIS SCHEMATIC DIAGRAM, X DESIGNATES THE LOGIC FUNCTIONS CONTROLLING THE PAPER DRIVE AND Y DESIGNATES THE LOGIC FUNCTIONS CONTROLLING THE PEN DRIVE


PROCESSOR
ROMS
U14
PROCESSOR
VCC
R/W
MR
HALT
RE
NMI
NC
BA
E
EXTAL
XTAL
VSS
RESET
IRQ
VMA
INT
D7
D6
D5
D4
D3
D2
D1
D0
A15
A14
A13
A12
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0
+5V
RN2
4.7K
Y1
4MHZ
C10
15PF
C9
27PF
R18
18.7K
CR6
C27
22
U22B
U25A
U23B
U15
X→Y
A0-8191
VPP
VCC
NC
GND
ROM
4MHZ
1MHZ
RX/TX CLOCK
ADDRESS BUS
DATA BUS
U7
MUX
AD-1
U6
GATE
ARRAY
8
RESET
XC
XA
EIN2
EIN1
R15
4.64K
1.33MHZ IN
2MHZ IN
DEC IN
S2
PINCH-ROLLER
SWITCH
X SIGN
X PULSE
I SENSE
VDD
VSS
PEN
AD OUT
FAST
CS
AD IN
+18/26V
R16
9.09K
R8
1M
U10A
C11
.01
R9
1K
R17
1K
DS3
ERROR
C12
.01
U10B
RN3
4.7K
U22E
U22F
U23A
U23C
U18
LATCH
DC FF
STCK
DATA BUS
WR/MR
CSROM
VMA
INT
CSI/O
1.33MHZ
2MHZ OUT
DEC
ITC


PART OF A1 MAIN PCA (07475-60101) (DATE CODE 2450-11)
J4
RECEIVED DATA
DATA TERMINAL READY
DSR
CTS
PROTECTIVE GROUND
SIGNAL COMMON
RLSD
REQUEST TO SEND
TRANSMITTED DATA
SECONDARY TRANSMITTED DATA
EXTERNAL CLOCK IN
SECONDARY RECEIVED DATA
U9A
U9B
U9C
U11A
U11B
U11C
U11D
U26A
U26B
U26C
U26D
U27
U12
U13
U20
U22D
U24C
U24D
C13 470PF
C16 470PF
C48 470PF
C46 470PF
C47 470PF
C24 470PF
C23 470PF
C8 470PF
R27 4.64K +12V
R10 4.64K
RN1, 4.7K
RN4, 4.7K
RXD
TXD
RTS
VDD +5V
R/W
IRQ NC
DCD
CTS
VSS
E
RS
CSØ
CS1
CS2
RX CLK
TX CLK
3-ST MUX
ENTER
VIEW
P1
P2
PEN 6
PEN 5
PEN 4
PEN 3
PEN 2
PEN 1
UP/DOWN
SIZE A/B
FAST
S3
REAR PANEL SWITCHES
S1
BAUD RATE
B1
B2
B3
B4
PAPER
A3/A4
US/MET
Y/D
PARITY
S1
S2
A1=1 FAST=A/B
A1=0 FAST=FAST

7475-J-37-1C


U26
C46
S1
ON
H14
J4
H13
R27
C14
C45
U27
U11
U9
R2
C47
C24
C23
C16
J6
C13
C8
R7
J5
CR2
Q5
C1
O9
C48
RN4
C17
E10
U20
C25
U12
CR3
Q6
Q2
R26
C34
L1
C27
C18
R10
C2
R3
E9
J8
C35
E15
F3
C32
R18
CR6
W1
ON
J7
U21
R17
R16
E16
U13
E11
U8
R4
CR4
Q7
Q3
J9
C36
CR12
CR11
CR10
CR9
RN2
C19
C9
E12
F1
E13
F2
VR1
U14
Y1
U2
CR5
Q8
Q4
C40
C39
CR8
CR7
E14
C10
C7
U3
C37
VR7
CR20
CR19
CR18
CR17
C3
C4
U15
C28
+C30
U4
J1
VR6
C41
R22
VR5
R19
Q10
C20
C31
U16
IN
E5
U5
R20
R24
R25
C38
C33
U1
R21
VR2
C21
R8
C5
CR15
CR13
U17
U6
R23
VR4
VR3
CR1
U22
C15
C6
C22
C1
J2
CR16
CR14
U23
U18
R14
R13
R12
R11
U10
R9
C11
U7
C42
C29
J3
U24
U19
R6
R5
C26
R15
RN3
RN1
U25
DS2
DS1
C44
C43
DS3
C12

7475-B-29-1A

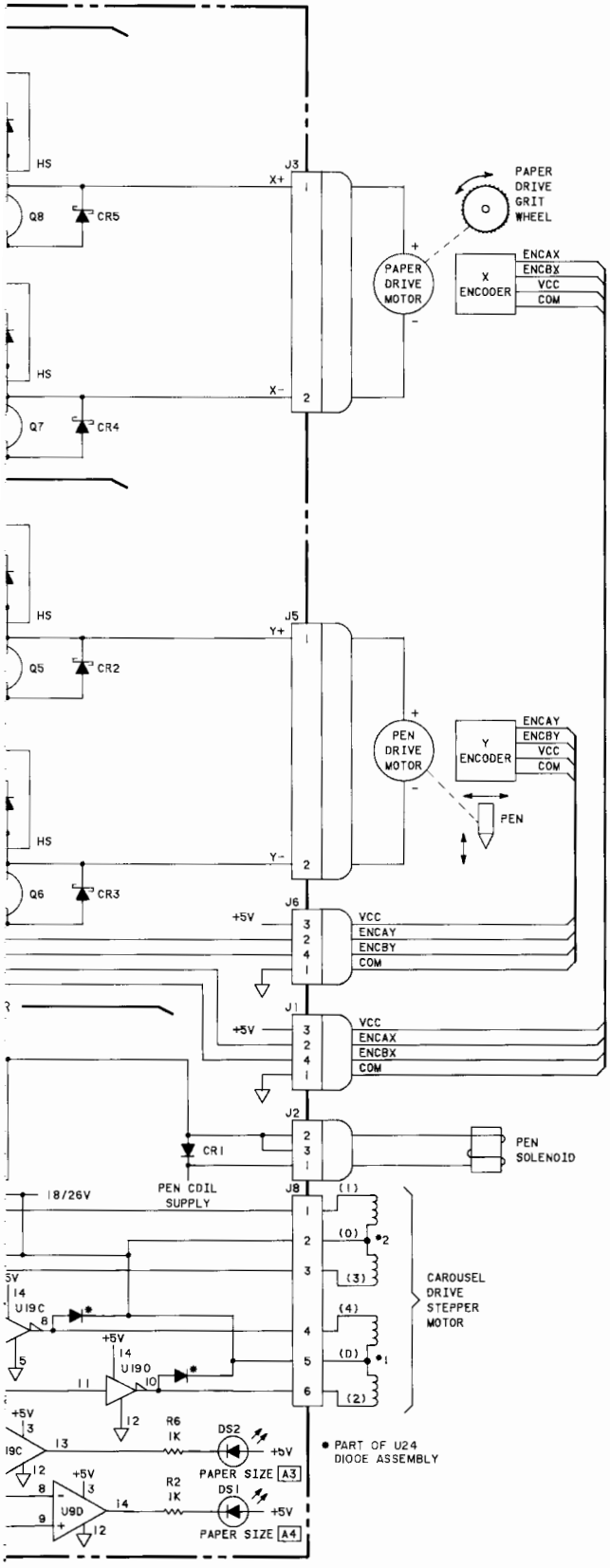


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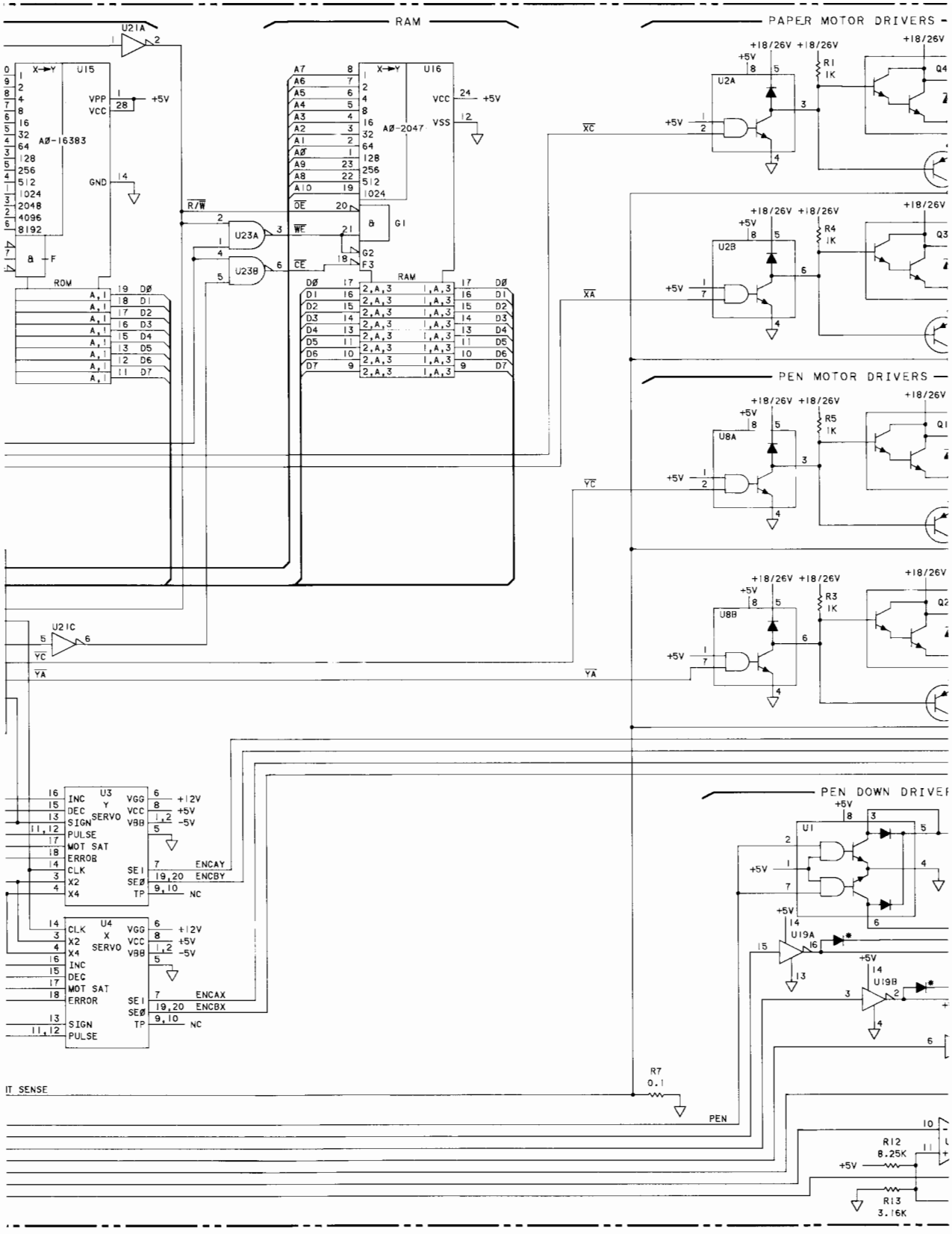
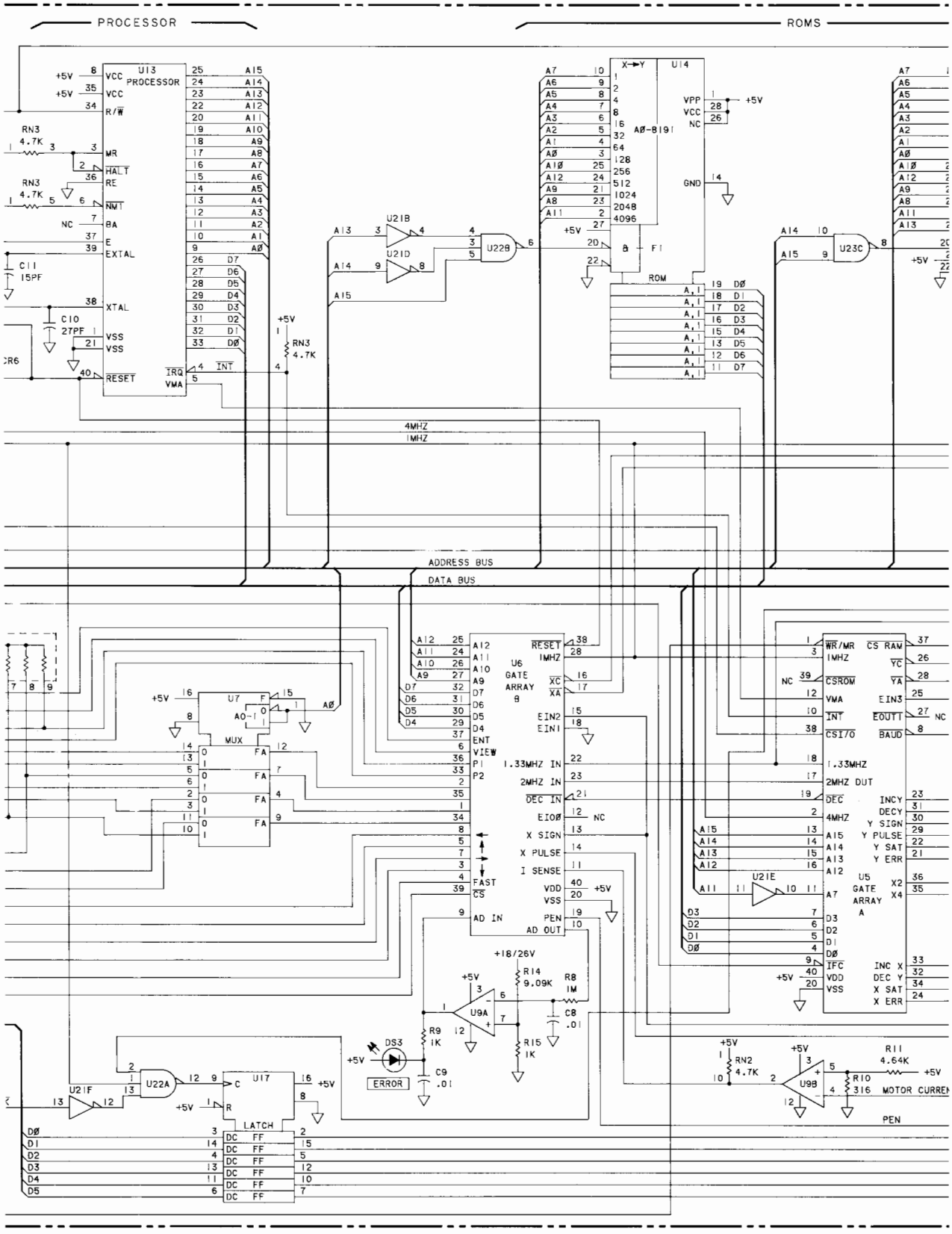
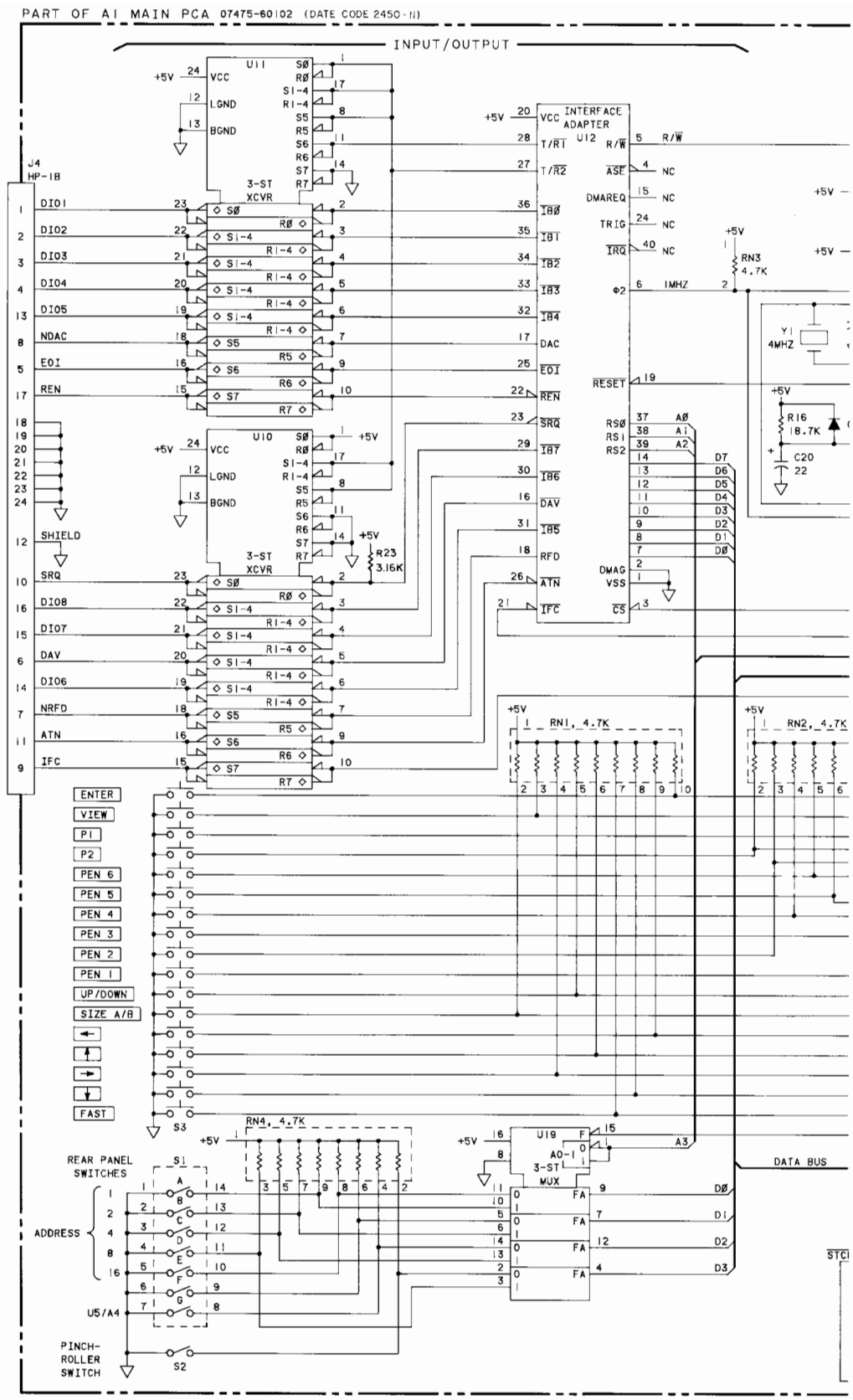
Figure 6-25. HP-IB, Option 002 Schematic Diagram



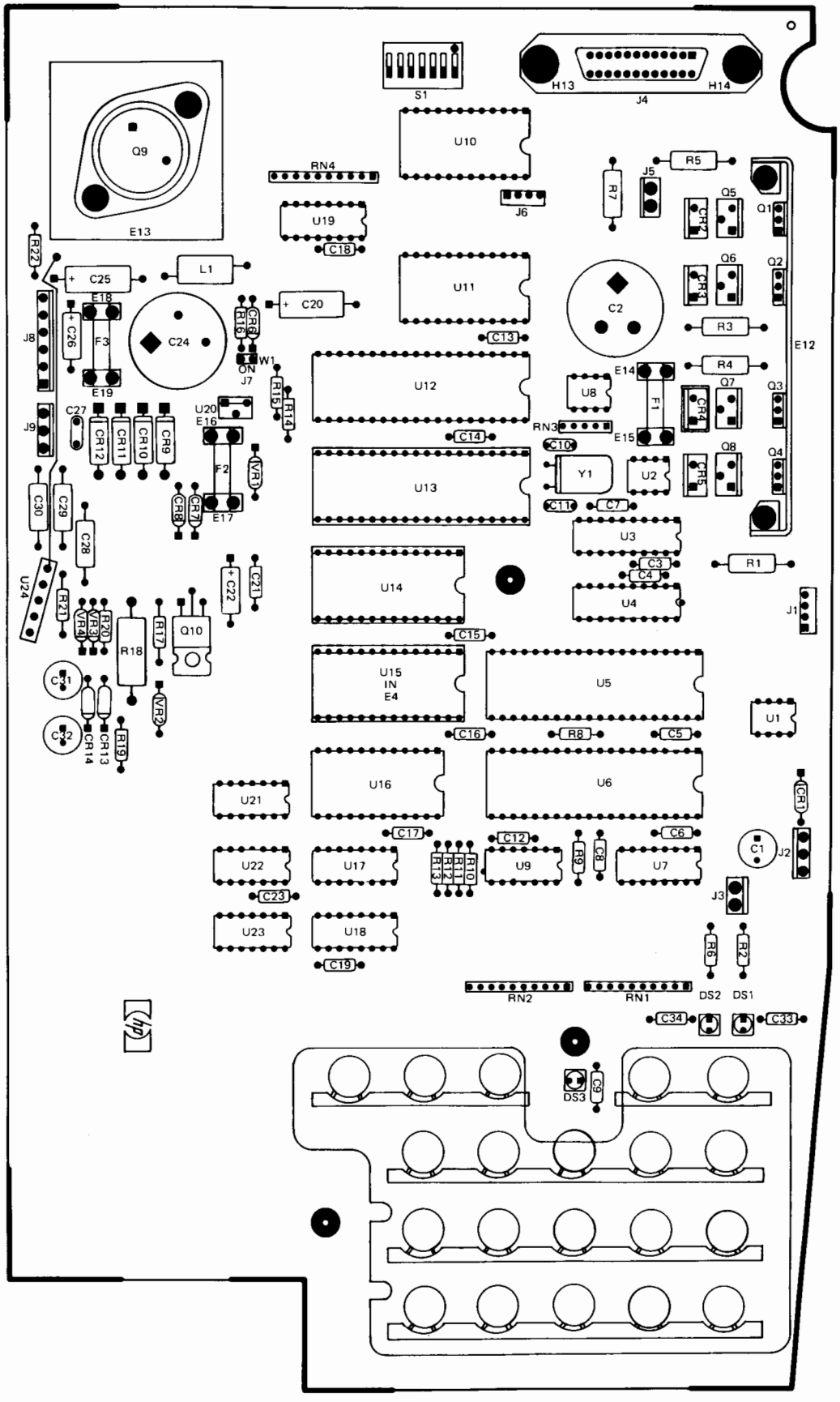
NOTE

ON THIS SCHEMATIC DIAGRAM, X DESIGNATES THE LOGIC FUNCTIONS CONTROLLING THE PAPER DRIVE AND Y DESIGNATES THE LOGIC FUNCTIONS CONTROLLING THE PEN DRIVE.


PROCESSOR
ROMS
U13 PROCESSOR
U14
U21B
U21D
U22B
U23C
U21E
U21F
U22A
U7 MUX
U17 LATCH
U6 GATE ARRAY B
U5 GATE ARRAY A
U9A
U9B
RN3 4.7K
RN2 4.7K
C11 15PF
C10 27PF
C9 .01
C8 .01
R14 9.09K
R8 1M
R9 1K
R15 1K
R10 316
R11 4.64K
DS3
ERROR
ROM
4MHZ
1MHZ
ADDRESS BUS
DATA BUS
+18/26V
MOTOR CURRENT
PEN


PART OF A1 MAIN PCA 07475-60102 (DATE CODE 2450-11)
INPUT/OUTPUT
J4
HP-IB
U11
U10
3-ST XCVR
INTERFACE ADAPTER U12
DIO1
DIO2
DIO3
DIO4
DIO5
NDAC
EOI
REN
SHIELD
SRQ
DIO8
DIO7
DAV
DIO6
NRFD
ATN
IFC
R23 3.16K
RN1, 4.7K
RN2, 4.7K
RN3 4.7K
RN4, 4.7K
Y1 4MHZ
R16 18.7K
C20 22
RESET
DMAG VSS
ENTER
VIEW
P1
P2
PEN 6
PEN 5
PEN 4
PEN 3
PEN 2
PEN 1
UP/DOWN
SIZE A/B
FAST
S3
REAR PANEL SWITCHES
S1
ADDRESS
U5/A4
PINCH-ROLLER SWITCH
S2
U19
MUX
DATA BUS

7475-J-38-1C


S1
H13
H14
J4
Q9
E13
U10
RN4
U19
C18
J6
R7
J5
R5
Q5
CR2
Q1
R22
C25
L1
C20
U11
C2
Q6
CR3
Q2
E18
C26
F3
C24
R16
CR6
W1
ON
J7
C13
R3
E12
J8
E19
U12
E14
U8
R4
Q7
CR4
Q3
C27
U20
E16
R15
R14
RN3
C14
E15
F1
J9
CR12
CR11
CR10
CR9
C10
Y1
U2
CR5
Q8
Q4
U13
F2
VR1
CR8
CR7
E17
C11
C7
C30
C29
C28
U3
C3
R1
U14
C4
U4
J1
U24
R27
C22
C21
VR4
VR3
R20
R18
R17
Q10
C15
U15
IN
E4
U5
C31
C32
CR14
CR13
R19
VR2
C16
R8
C5
U1
U16
U6
U21
C17
C12
C6
CR1
C1
J2
U22
U17
R13
R12
R11
R10
U9
R9
C8
U7
C23
J3
U23
U18
R6
R2
C19
RN2
RN1
DS2
DS1
C34
C33
DS3
C9

7475-B-30-1A

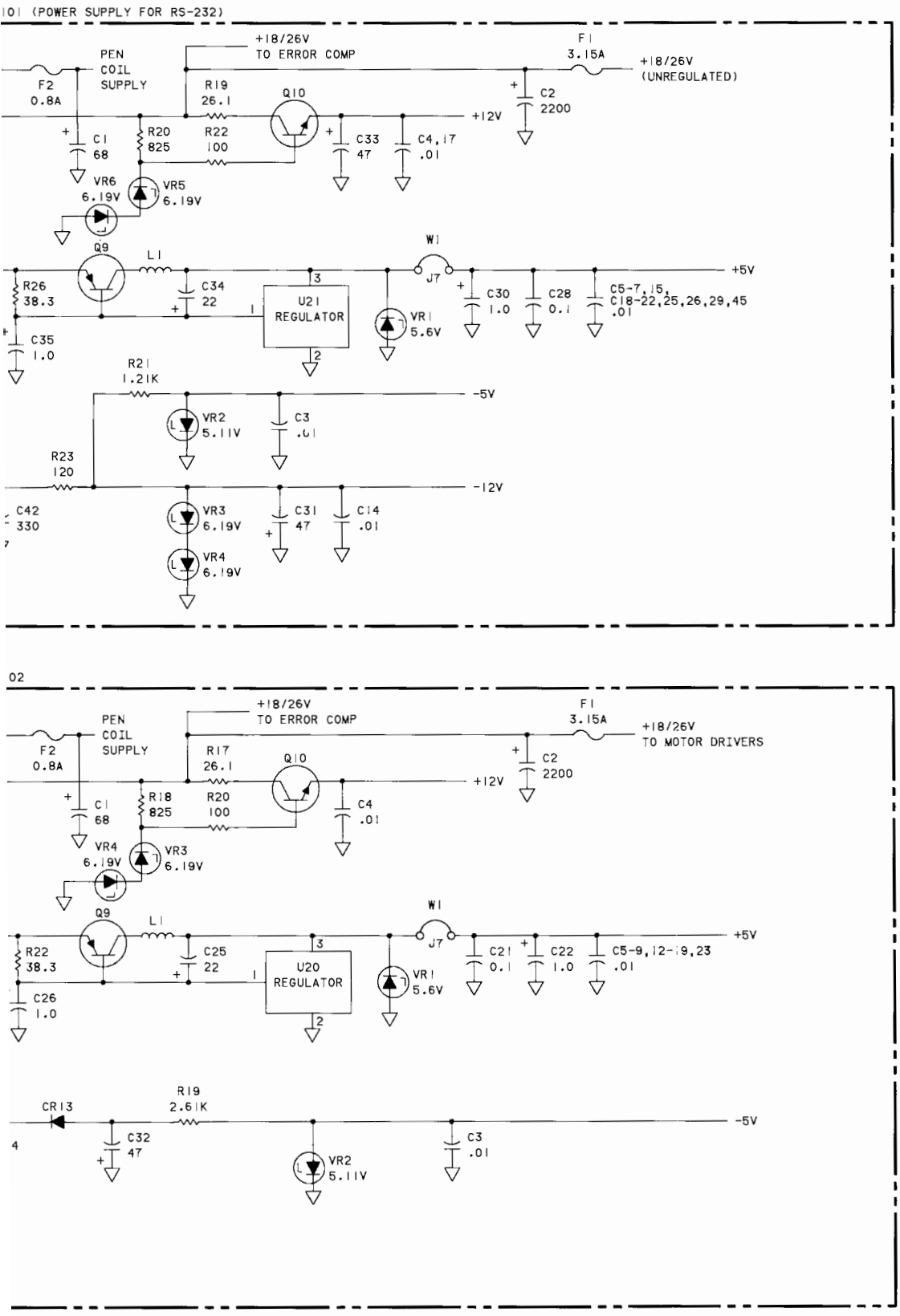


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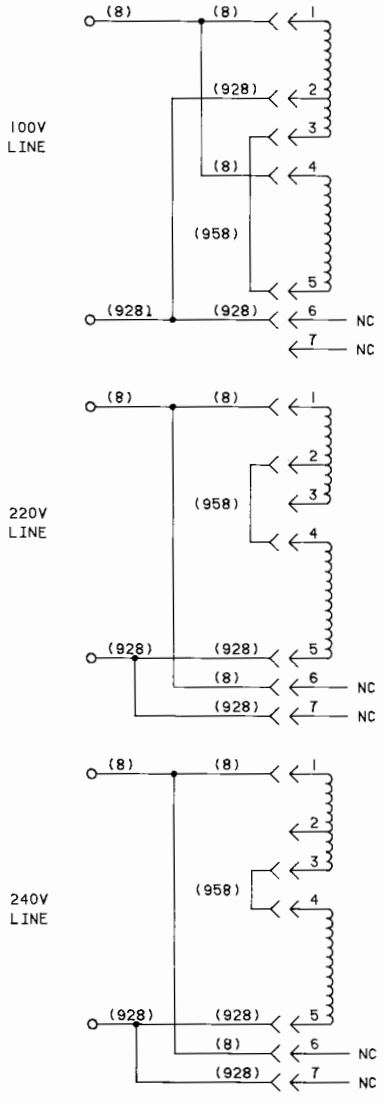
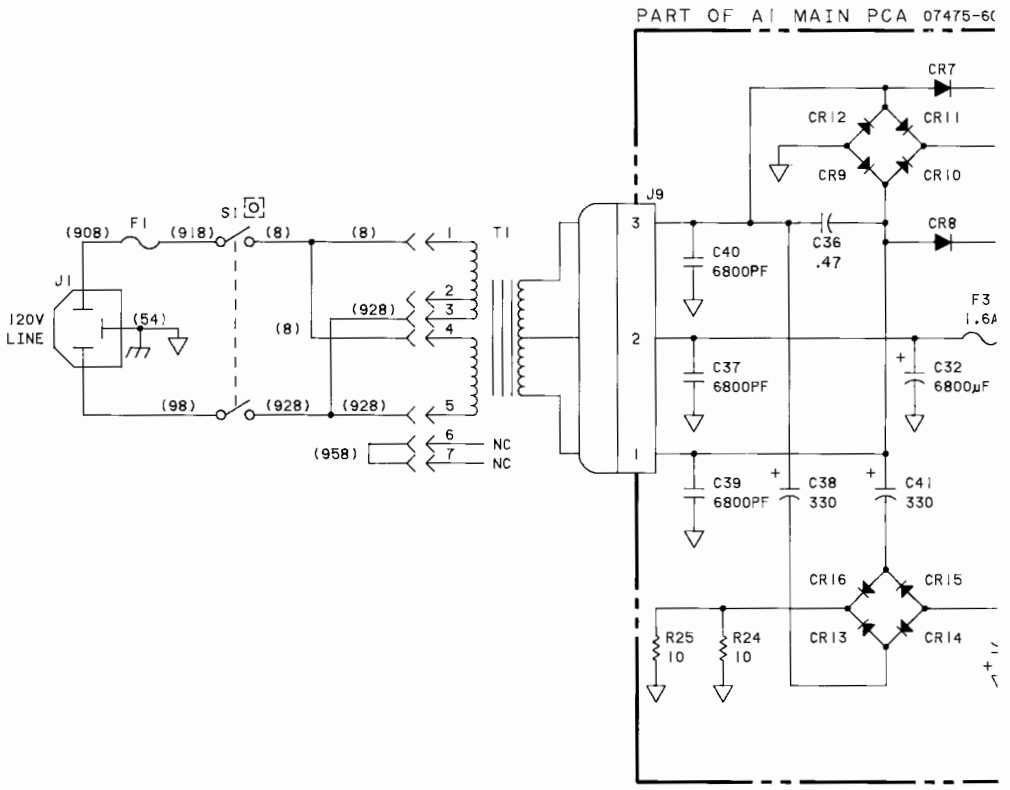
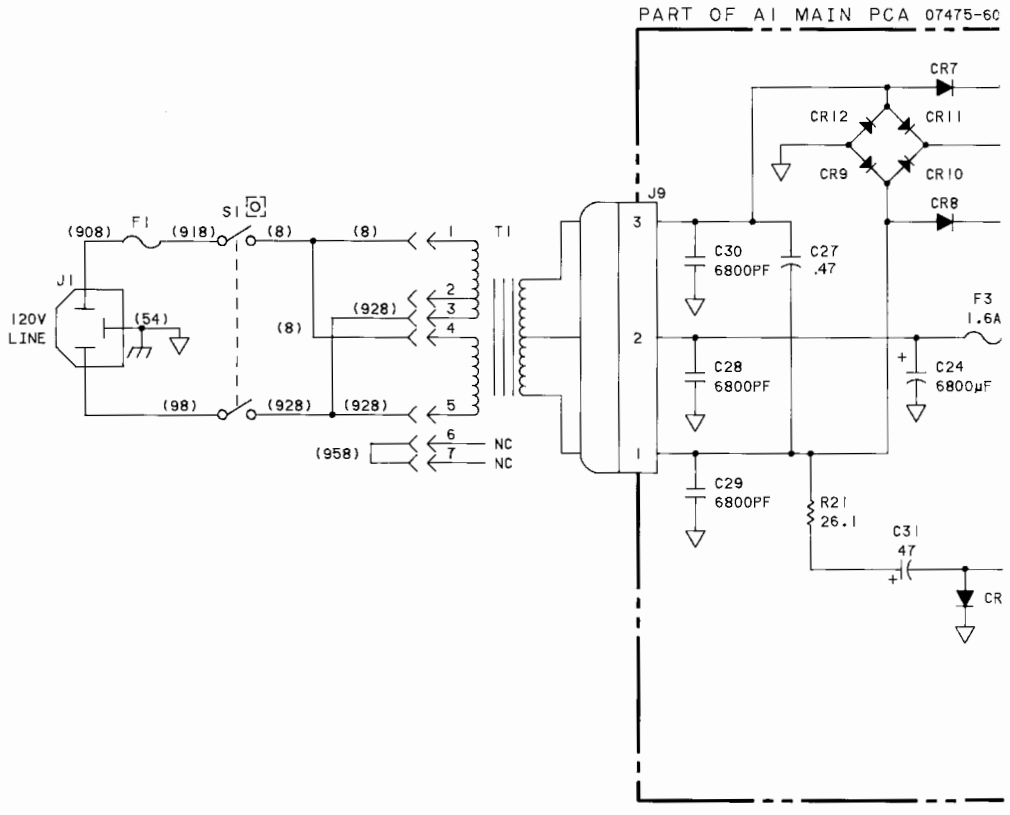
Figure 6-26. Power Supply, Schematic Diagram


100V LINE
220V LINE
240V LINE
(8)
(928)
(958)
NC


PART OF A1 MAIN PCA 07475-6(
(908)
F1
(918)
S1
(8)
(928)
(98)
(958)
J1
120V LINE
(54)
T1
J9
NC
CR7
CR12
CR11
CR9
CR10
CR8
C40 6800PF
C36 .47
F3 1.6A
C37 6800PF
C32 6800µF
C39 6800PF
C38 330
C41 330
CR16
CR15
CR13
CR14
R25 10
R24 10


PART OF A1 MAIN PCA 07475-6(
(908)
F1
(918)
S1
(8)
(928)
(98)
(958)
J1
120V LINE
(54)
T1
J9
NC
CR7
CR12
CR11
CR9
CR10
CR8
C30 6800PF
C27 .47
F3 1.6A
C28 6800PF
C24 6800µF
C29 6800PF
R21 26.1
C31 47
CR