HEWLETT PACKARD

SERVICE MANUAL

HP 7550A
GRAPHICS PLOTTER

SERIAL NUMBERS

This manual applies directly to plotters with serial numbers prefixed 2520A.

Product History for plotters with serial number prefixes below 2520A is provided in Section V.

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. 07550-90000
Microfiche Part No. 07550-90050

Printed: JANUARY 1986

Notes

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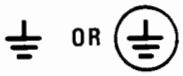
ILLUSTRATIONS (Continued)

NOTES

General Definitions of Safety Symbols Used On Equipment

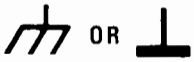
International caution symbol (refer to manual): the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.

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.

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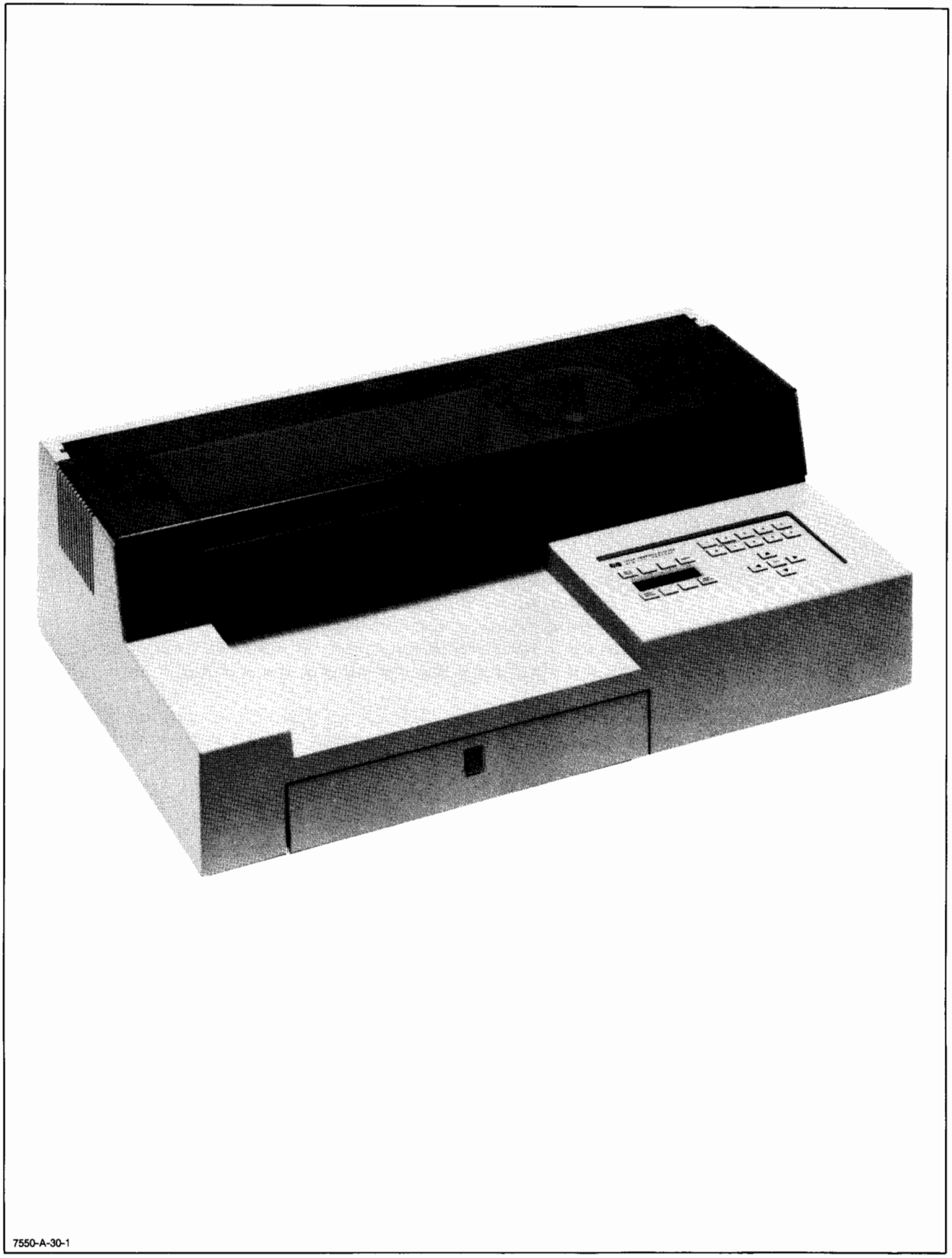


Figure 1-1. Hewlett-Packard Model 7550A Graphics Plotter

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This Service Manual contains information necessary to test and service the Hewlett-Packard Model 7550A Graphics Plotter, which is shown in Figure 1-1. For ease of reference, this manual is divided into six sections as follows:

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

1-3. Herein the Hewlett-Packard Model 7550A Graphics Plotter will also be referred to as the Model 7550A and/or the plotter. The RS-232-C/CCITT V.24 serial interface may also be referred to as the RS-232-C or serial interface.

1-4. Information on interfacing, operating, and programming of the Model 7550A is shipped with the plotter and contained in the following HP publications:

Publication Title	HP Part Number
HP Model 7550A Interfacing and Programming Manual	07550-90001
HP Model 7550A Operation and Interconnection Manual	07550-90002
HP Model 7550A Programmer's Reference Card	07550-90003

1-5. Listed on the title page of this manual is a microfiche part number. This number can be used to order 4 × 6-inch microfilm transparencies of this manual. Each microfiche contains up to 96 photo duplicates of the manual pages. The microfiche package also includes the latest Manual Update Packages.

1-6. SPECIFICATIONS

1-7. Plotter specifications are listed in Table 1-1. These specifications are the performance standards or limits against which the plotter is tested. Table 1-2 lists supplemental characteristics. Supplemental characteristics are not specifications but are typical characteristics included as additional information for the user.

1-8. SAFETY CONSIDERATIONS

1-9. The HP Model 7550A is a Safety Class I instrument (provided with terminal for protective earthing) and has been manufactured and tested according to international safety standards.

Table 1-1. Plotter Specifications

REPEATABILITY For a given pen on paper or vellum: 0.10 mm (0.004 in.)
NOTE: Specifications apply only when using Hewlett-Packard authorized supplies.

1-10. Safety symbols used with Hewlett-Packard instruments are illustrated on page vii. of the front matter. The safety considerations, symbols, and instructions should be reviewed before service work is performed. **BEFORE APPLYING POWER** verify that the power transformer primary hook-up is set to match the available line voltage and the correct rated fuse is installed. Information on line voltage and fuse selection for the HP Model 7550A is given in Section II of this manual.

1-11. PLOTTERS COVERED BY MANUAL

1-12. The plotter serial number label is attached to the back side of the top cover. See Figure 1-2. The serial number prefix consists of the first four digits and letter and is the same for all identical plotters. The serial number prefix only changes when a change is made to the plotter. The serial number suffix consists of the last five digits and is assigned sequentially, thereby differing for each plotter. The contents of this manual apply directly to plotters with the serial number prefix(es) listed under **SERIAL NUMBERS** on the title page.

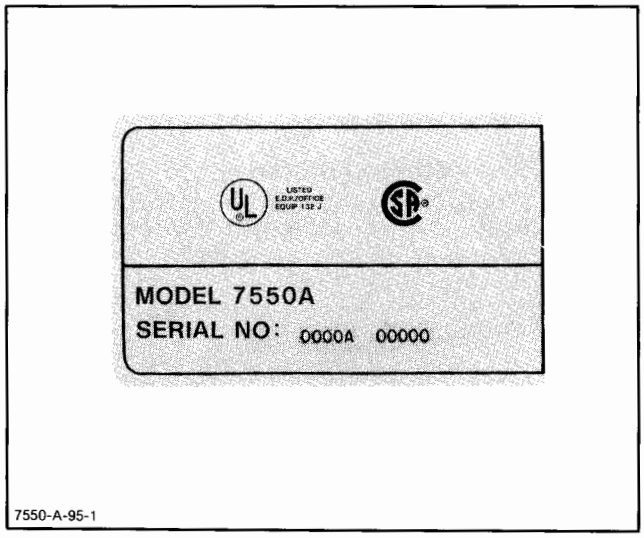


Figure 1-2. Model 7550A Identification

Table 1-2. Supplemental Characteristics

RESOLUTION

Smallest Addressable Move: 0.025 mm (0.001 in.)
Mechanical Resolution: 0.006 mm (0.00024 in.)

PLOTTING AREA

Media Size: Accommodates media 210 × 297 mm, 8½ × 11 in., 297 × 420 mm, and 11 × 17 in. Includes standard sizes A4/A and A3/B.

Maximum Plotting Area: Dependent on media size as follows:

Media Size	Maximum Plotting Area
A	197 × 255 mm (7.8 × 10.0 in.)
A4	191 × 265 mm (7.5 × 10.4 in.)
B	255 × 391 mm (10.0 × 15.4 in.)
A3	265 × 379 mm (10.4 × 14.9 in.)

SPEED

Pen Down:
Maximum: 80 cm/s (31.5 in./s) independent of vector direction.
Programmable: 1 to 80 cm/s (0.4 to 31.5 in./s) in 1 cm/s increments.
Front Panel Selectable: From 10 to 80 cm/s (4 to 31.5 in./s) in 5 cm/s increments.
Pen Up: 80 cm/s (31.5 in./s) independent of vector direction.

ACCELERATION

Maximum: 5880 cm/s² (193 ft/s²)

FORCE

Pen Force: Programmable and Front Panel selectable;
15 to 66 gram weights in 8 increments.

PENS

Number of Pens: 8/carousel.
Pen Types: Fiber-tip — paper, fiber-tip — transparency, capillary drafting, roller-ball.

MEDIA

Most standard paper, vellum, double-matte polyester film, and overhead transparency material from 0.05 mm (0.002 in.) to 0.1 mm (0.004 in.) thick.

BUFFER SIZE

12.8K bytes

POWER REQUIREMENTS

Source: 100 V, 120 V, 220 V, 240 V (+5%, −10%).

Frequency: 48 to 66 Hz, single phase.

Consumption: 105 W maximum.

Maximum Line Current:

100 V	1.3 A
120 V	1.1 A
220 V	600 mA
240 V	550 mA

ENVIRONMENTAL RANGE

Operating: Temperature 0°C to 55°C.
With Auto Sheet Feed Operating: 10°C to 40°C.
Relative Humidity: 20% to 80%
Non-Operating: Temperature −40°C to 75°C.

SIZE/WEIGHT

Height: 215 mm (8.5 in.)
Width: 670 mm (26.4 in.)
Depth: A4/A with loading tray, no paper catch — 432 mm (17.0 in.)
A4/A with loading tray and paper catch — 682 mm (26.9 in.)
A3/B with loading tray, no paper catch — 635 mm (25.0 in.)
A3/B with loading tray and paper catch — 896 mm (35.3 in.)
Net Weight: 17.3 kg (38 lbs)
Shipping Weight: approximately 25 kg (55 lbs)

1-13. If the serial number prefix of your plotter is higher than the one shown on the title page, one or more of the Update Packages supplied with the manual must be folded-in. This will ensure that this manual applies directly to your plotter. See the Manual Update Package for instructions.

1-14. If the serial number prefix of your plotter is lower than the one shown on the title page, information in the Product History section, Section V, will adapt this manual to that plotter.

1-15. In addition to plotter modification information, revised pages contained in the Update Package may correct errors in the manual or include improved procedures. 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.

1-16. DESCRIPTION

1-17. The Hewlett-Packard Model 7550A Graphics Plotter is a microprocessor controlled plotter providing graphic displays of computer program output data. The Model 7550A operates with a number of HP computer systems, graphics terminals, and desktop computer systems to produce printed and/or graphic copy. The Model 7550A can be used with either HP-IB or RS-232-C external controllers. RS-422-A capability using an adaptor cable (HP P/N 17855A) is also available.

1-18. The Model 7550A is equipped with such capabilities as point digitizing, labeling, axes generation and automatic pen selection. Multicolor plots of high resolution and quality in sizes ANSI A, ISO A4, ANSI B, and ISO A3 for reports, reproduction, or graphic presentations are generated by the Model 7550A. Some major features of the Model 7550A are an integral automatic sheet feeding mechanism, polygon mode and area fill capability, replot capability, front-panel message display, and four user-definable function keys.

1-19. The Model 7550A incorporates a low inertia dc servo motor drive system for pen positioning and media transport. Internal diagnostic capabilities are provided as aids for troubleshooting.

1-20. Four styles of rotating pen carousels for roller-ball, fiber-tip, transparency, and capillary drafting pens are available. Each carousel holds up to eight pens, including different colors and/or line widths. An automatic pen return and capping feature is used in the plotter to increase pen life. If a drafting-pen carousel is installed in the plotter, the pen in the pen holder is automatically returned to the carousel stable after 15 seconds if no plotting instructions are detected. If a fiber-tip or roller-ball carousel is installed, the pen is returned after 65 seconds if no plotting instructions are detected. A grooved platen and vacuum fan are utilized in the plotter for improved line quality and longer pen life. The plotter will draw on paper, vellum, double-matte polyester film and transparency media. The carousel type is electronically sensed to establish default pen speed, force, and acceleration parameters. Media size is also electronically sensed to establish plot limits. Default conditions are automatically established for all other plotting parameters. The default parameters can be overridden using front panel controls or HP-GL programming instructions.

1-21. Plotter firmware provides the ability to interpret 83 HP-GL instructions and 22 Device Control Instructions. A reconfigurable 12.8K-byte buffer permits storing of incoming graphic plot instructions which can be replotted by a single instruction or by front-panel control. Twenty resident character sets are provided in two character fonts including European languages and Katakana characters.

1-22. OPTIONS

1-23. Power cord options are listed in Section II of this manual. The power cord shipped with the plotter is dependent upon the country of destination for the plotter.

1-24. The Model 7550A has no order options.

1-25. ACCESSORIES SUPPLIED

1-26. Accessories supplied with the Model 7550A Graphics Plotter are listed in Table 1-3.

1-27. ACCESSORIES AVAILABLE

1-28. Accessories available for use with the Model 7550A Graphics Plotter are listed in the HP Computer Users Catalog.

1-29. RECOMMENDED TEST EQUIPMENT AND TOOLS

1-30. Test equipment recommended to maintain the Model 7550A Plotter is listed in Table 1-4. Substitute equipment must meet or exceed the specifications of the equipment required.

Table 1-3. Accessories Supplied

DESCRIPTION	HP PART NUMBER
HP 7550A Interfacing and Programming Manual	07550-90001
HP 7550A Operation and Interconnection Manual	07550-90002
HP 7550A Programmer's Reference Card	07550-90003
2 Pen Carousels:	
overhead transparency pen carousel	07550-60050
fiber-tip pen carousel	07550-60051
Pens:	
fiber-tip — paper — package of 4, 0.3 mm, 1 each red, blue, green, black	5060-6810
fiber-tip — paper — package of 6, 0.3 mm, 1 each orange, violet, brown, turquoise, gold, lime green	5060-6894
fiber-tip — paper — package of 5, 0.3 mm, black	5060-6787
fiber-tip — transparency — package of 4, 0.3 mm, 1 each black, red, blue, green	5060-6818
fiber-tip — transparency — package of 4, 0.3 mm, 1 each black, orange, violet, brown	5060-6834
Media: Based upon destination of plotter	
A (8½ × 11 in.)	
Blank plotter media, package of 50 sheets	9280-0589
Overhead transparency film, package of 5 sheets	07550-60213
or	
A4 (210 × 297 mm)	
Blank plotter media, package of 50 sheets	9280-0588
Overhead transparency film, package of 5 sheets	07550-60214
Media Loading Tray: Based upon destination of plotter	
A For 8½ × 11 in. media	07550-60152
or	
A4 For 210 × 297 mm media	07550-60158
Paper Catcher: For A/A4 size media	07550-40167
Grit Wheel Brush	8710-1386
Power Cord	As ordered

Table 1-4. Recommended Test Equipment and Tools

INSTRUMENT TYPE	SUGGESTED MODEL
Digital Multimeter	HP 3435A or equivalent
Oscilloscope	HP 182C or equivalent
Vertical Plug-in; Dual Channel Amplifier	HP 1801A
Time Base Plug-in; 10 ns to 1 s	HP 1820C
Expense Tool Package	17189A
Inventory Support Package (Exchange PCAs included)	17190A
Optical Comparator	Bausch and Lomb measuring magnifier #81-34-35
HP 85 Service System	N/A
HP 85/Plotter Service Tape	5010-2585 (date code 2412)

SECTION II

PERFORMANCE TESTS

2-1. INTRODUCTION

2-2. This section describes the performance tests that can be used to verify that the essential functions of the plotter are operational and the plotter's performance meets the specifications listed in Section I. If test results indicate a malfunction, refer to the service information in Section VI.

2-3. SAFETY CONSIDERATIONS

2-4. The Safety Symbols used with Hewlett-Packard instruments are illustrated on page vii. of the front matter of this manual. **WARNING** and **CAUTION** symbols and instructions should be reviewed before service work is performed. These warnings and cautions must be followed for your protection and to avoid damage to the plotter.

2-5. EQUIPMENT REQUIRED

2-6. The only equipment required for the performance tests is an optical comparator, Bausch and Lomb #81-34-35, and an HP-85 Controller. Substitute equipment must meet or exceed the specifications of the equipment recommended.

2-7. PREPARATION FOR USE

2-8. LINE VOLTAGE AND FUSE SELECTION

2-9. The Model 7550A will operate from a power source of 100, 120, 220, or 240 Vac +5–10%, 48 to 66 Hz, single phase. Power consumption is 105 W maximum. When shipped from the factory, the power transformer primary leads are set and an appropriate fuse installed for operating in the country of destination.

CAUTION

Applying line voltage of 220 or 240 volts to the plotter while the power transformer primary leads are set for 100 or 120 volt operation will cause damage to the plotter circuits.

2-10. The line voltage label block visible in the voltage select door on the power module assembly indicates the voltage setting. See Figure 2-1. To match the plotter line input circuit to the applied line voltage, perform the following steps:

WARNING

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

a. Set the plotter LINE switch to OFF (O) and disconnect the ac power cord from the plotter.

b. Install correct rated fuse and fuseholder cap for the voltage setting, (1.5 A for 100, 120 V) or (0.8 A for 220, 240 V). See Table 2-1.

c. Pry open the voltage select door to access the power transformer and line voltage label block.

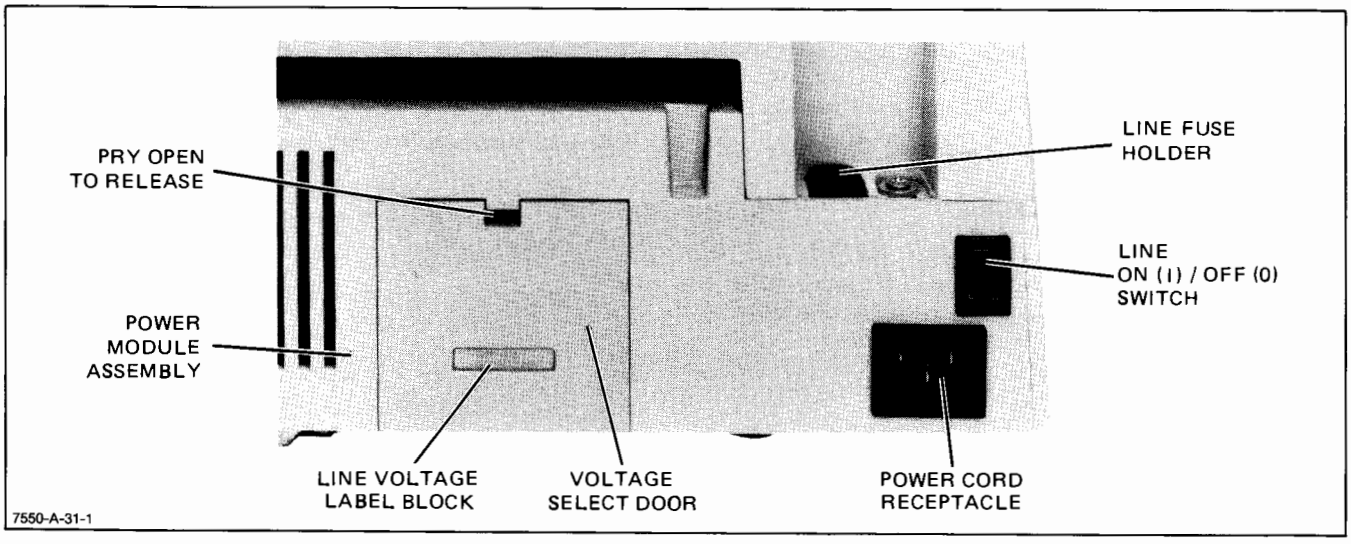


Figure 2-1. Power Module Assembly

Table 2-1. Line Fuse/Fuseholder Cap Selection

LINE VOLTAGE	FUSE RATING	FUSE HP PART NUMBER	FUSEHOLDER CAP HP PART NUMBER
100 V/120 V			
U.S.	1.5 AT (SB)	2110-0304	2110-0565
METRIC	1.6 AT (SB)	2110-0495	2110-0567
220 V/240 V			
U.S.	0.8 AT (SB)	2110-0020	2110-0565
METRIC	800 mAT (SB)	2110-0496	2110-0567
U.S. fuses are 1/4 × 1-1/4 in. Metric fuses are 5 × 20 mm			

d. Position the power transformer primary leads to the appropriate line voltage positions. The leads can be configured for 100, 120, 220, or 240 volt operation. See Figure 2-2.

e. The line voltage label block is labeled for 100, 120, 220, or 240 volt operation. Mount the label block to match the line voltage being used.

f. Close the voltage select door.

g. Install correct power cord.

2-11. POWER CORD CONFIGURATIONS

2-12. The power cord supplied with the plotter is dependent upon the country of destination. Power cord configurations are illustrated in Figure 2-3.

2-13. PEN CAROUSEL LOADING

2-14. Each of the four types of pen carousels available for use in the Model 7550A is configured with a specific pen cap design for longer pen life. The pen carousel type also determines the default values for the plotter's speed, force, and acceleration. To assure plot quality, it is important to select the correct carousel for the type of pens to be used. Additional pen and carousel information is contained in the HP Model 7550A Operation and Interconnection Manual.

2-15. To load pens into the carousel, proceed as follows:

a. Select the carousel and pen type to be used.

b. Uncap the pens.

c. Pull the carousel stable plunger down.

d. Slip the pen into the pen stable such that the pen collar is engaged between the stable pawl and the carousel top plate. See Figure 2-4. Make sure that the pen is fully positioned in the stable.

e. Release the plunger.

f. Repeat steps c. and d. for each stable to be filled.

g. Raise the plotter carriage cover and insert the pen carousel into the plotter. The plotter default parameters will be set upon sensing of the carousel during plotter initialization.

2-16. PEN SPEED AND FORCE

2-17. Plotter pen speed and pen force default values are established upon sensing of the pen carousel type. The pen carousel type is sensed during plotter power-up initialization and whenever a carousel is inserted into the plotter. Default values for the pen carousels are listed in Table 2-2.

Table 2-2. Pen Carousel Default Values

CAROUSEL TYPE	FORCE (grams)	SPEED (cm/s)
Fiber-Tip	24	50
Roller-Ball	54	60
Drafting	15	25
Transparency	24	10

2-18. Speed and force values differing from the default values can be assigned to the pens in the carousel. The values selected will remain in effect until either manually changed or the default values are reestablished. Altering the pen speed and force values from the default values or inserting different pen types into a carousel will affect plot quality. Refer to the HP Model 7550A Operation and Interconnection Manual for pen speed and force values that will provide the best plot quality for the type of media and pens being used.

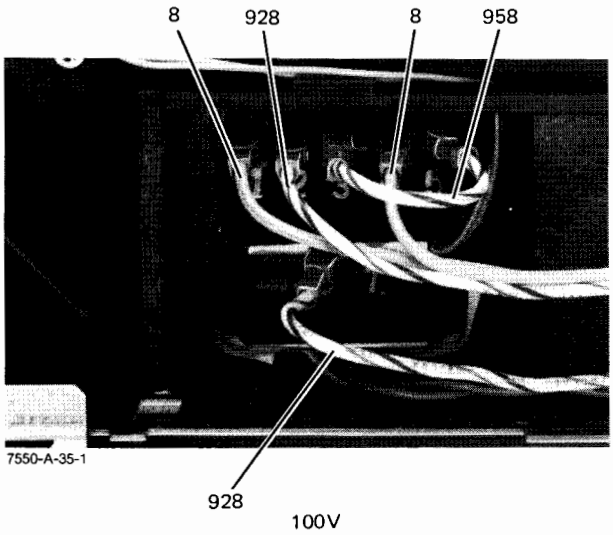
2-19. The procedure is similar for setting either pen speed or force. To change the pen speed or force, perform the following steps:

a. Press the NEXT DISPLAY pushbutton on the front panel until the pen SPEED and FORCE functions appear in the display module.

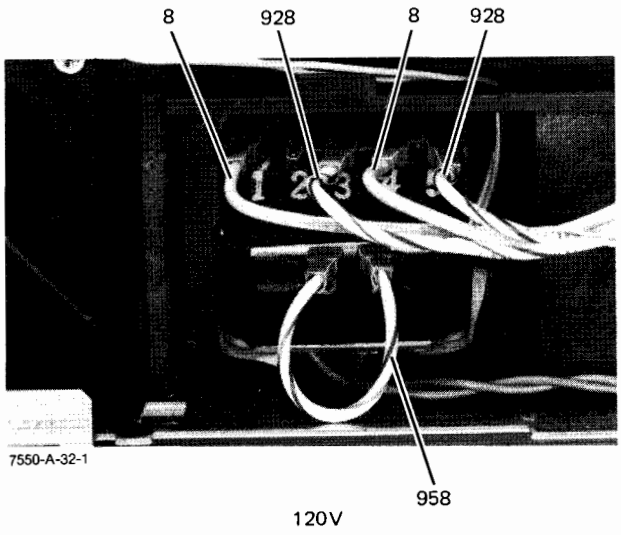
b. Press the function key which is designated SPEED or FORCE in the display to enter the appropriate function.

c. Press the function key which is designated PEN= in the display to assign the speed or force to either ALL of the pens, or continue to press the PEN= key until the desired pen stable number (1-8) appears.

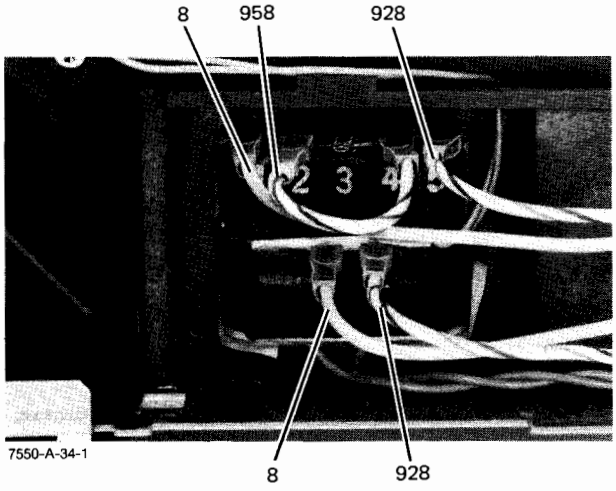
(Continued on page 2-5)



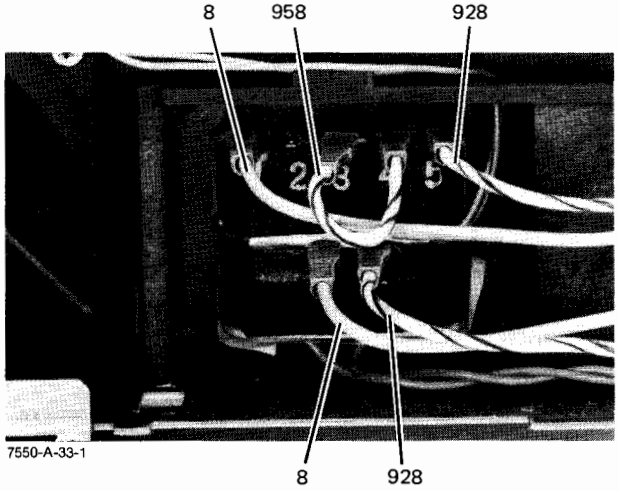
100V



120V



220V

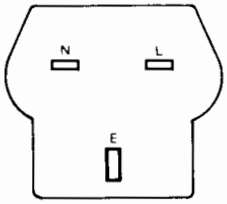
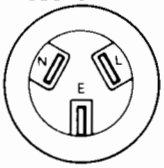
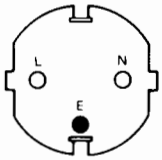
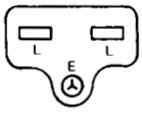
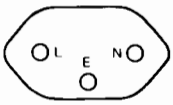
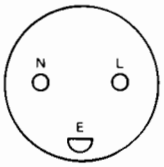
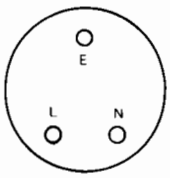


240V

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	928	NC
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

Figure 2-2. Power Transformer Line Voltage Configurations

		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, Egypt.	**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, Saudi Arabia, 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**
SABS-164 	HP Part Number 8120-4211; 250 V, 10 A, 1 ϕ plug rating. For use in India, Republic of South Africa.	**917**

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-18-6

Figure 2-3. Power Cord Configurations

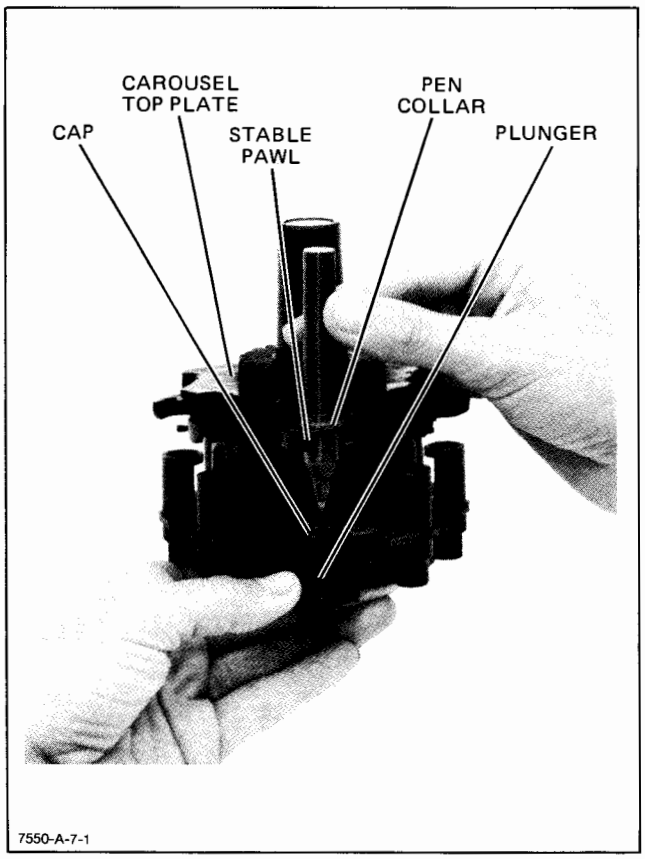


Figure 2-4. Pen Carousel Loading

d. The pen SPEED may be incremented in steps of 5 cm/s from 10 to 80 cm/s. Press the function key designated SPEED= until the desired speed is displayed. Press the ENTER pushbutton to set the speed for the pen selected.

e. The pen FORCE can be incremented in 8 steps from 15 to 66 grams. A number (1-8) will appear which represents the following pen FORCE values:

	Number	Force (in grams)
FORCE=	1	15
	2	24
	3	30
	4	36
	5	45
	6	54
	7	57
	8	66

Press the function key designated FORCE= in the display until the number corresponding to the desired force is displayed. Press the ENTER pushbutton to set the force for the pen selected.

f. Repeat the above steps for each pen requiring a different SPEED or FORCE value.

2-20. MEDIA SIZE CONFIGURATION

2-21. The HP 7550A is designed for use with four sizes of drawing media:

ISO A4 (210 × 297 mm)	ANSI A (8½ × 11 in.)
ISO A3 (297 × 420 mm)	ANSI B (11 × 17 in.)

When shipped from the factory, the plotter is set and a media tray supplied for operation in the country of destination. Additional media information is contained in the HP Model 7550A Operation and Interconnection Manual.

2-22. To determine and/or change the plotter media size configuration, refer to Figure 2-5 and the following steps:

a. Note the position of the right-hand pinch wheel and spacer on the pinch wheel axle. The pinch wheel should be left of the spacer for A/B-size media and right of the spacer for A4/A3-size media. Lift the spacer off of the axle, slide the pinch wheel to the desired position, and snap the spacer back onto the axle.

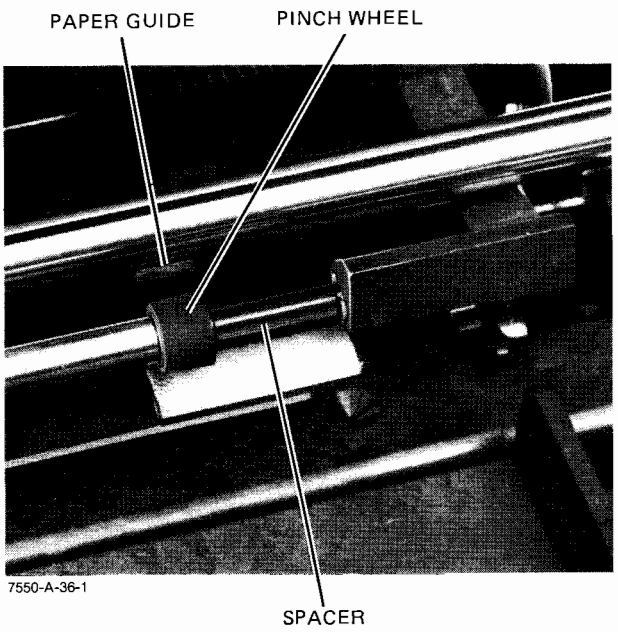
b. Note the position of the right-hand paper guide in the XY-carriage assembly. The right-hand paper guide should be in the left slot, as viewed from the front of the plotter, for A/B-size media or in the right slot for A4/A3-size media. Reach behind the plotter and carefully pull the paper guide out. Insert the paper guide into the desired slot and push the guide fully in until an audible click is heard.

c. Note the position of the paper tray media guides and backstops in the media loading tray. For A-size media, the left- and right-hand backstops should be in the slots closest to the front of the tray and the left-hand media guide, as viewed from the back of the tray, in the slots closest toward the center of the tray. For A4-size media, the left- and right-hand backstops should be in the slots closest to the back of the tray and the left-hand media guide, as viewed from the back of the tray, in the slots closest to the left-hand side of the tray. Remove the right-hand backstop retaining screw, lift the backstop out, and position it in the appropriate slots. Insert and tighten the retaining screw. Remove the left-hand backstop and left-hand media guide retaining screws, position the guide first and then the backstop into the appropriate slots, insert and tighten the retaining screws.

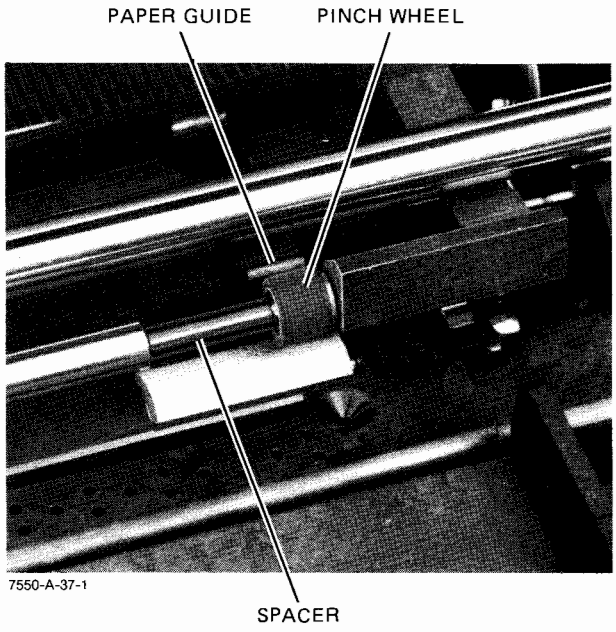
2-23. AUTOMATIC MEDIA LOADING

2-24. Only transparency sheets and standard plotter paper can be loaded automatically by the Model 7550A plotter. All other types of media must be loaded manually. The media tray is removed from the plotter by grasping the lower-front edge of the tray and pulling the tray out toward you. Load paper into the media tray making sure that the paper corners are inserted beneath the tabs located at the back ends of the media tray guides. See Figure 2-6. The media tray will hold up to 150 sheets of paper. Insert the media tray fully into the front of the plotter.

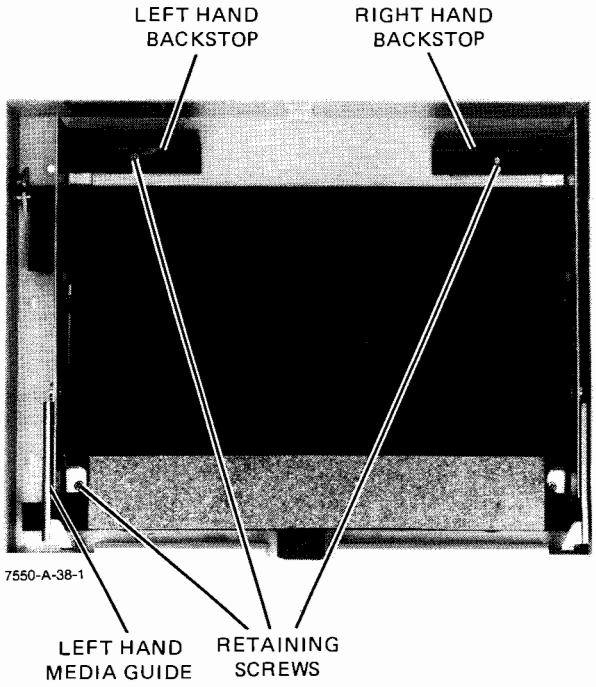
2-25. If an asterisk (*) does not appear in the upper-left corner of the display module, press the front panel AUTO FEED pushbutton. An asterisk (*) will appear



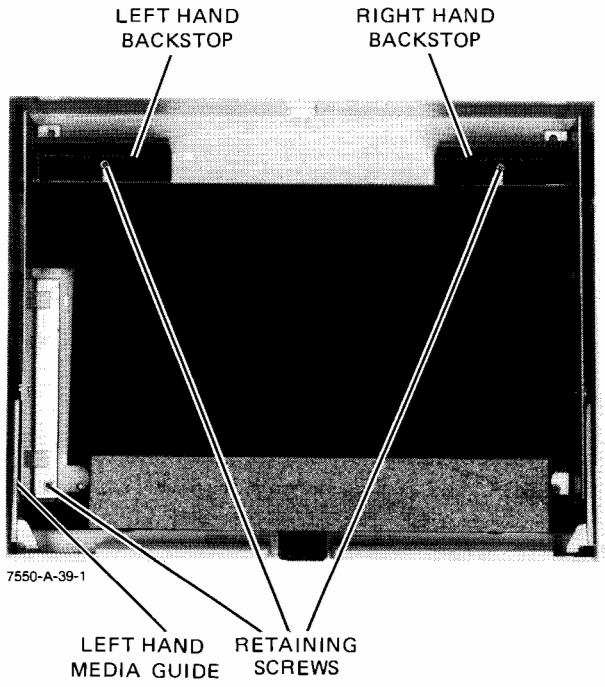
A AND B SIZE POSITION



A4 AND A3 SIZE POSITION



A SIZE POSITION



A4 SIZE POSITION

(SIMILAR FOR B/A3 MEDIA TRAY)

Figure 2-5. Media Size Configuration

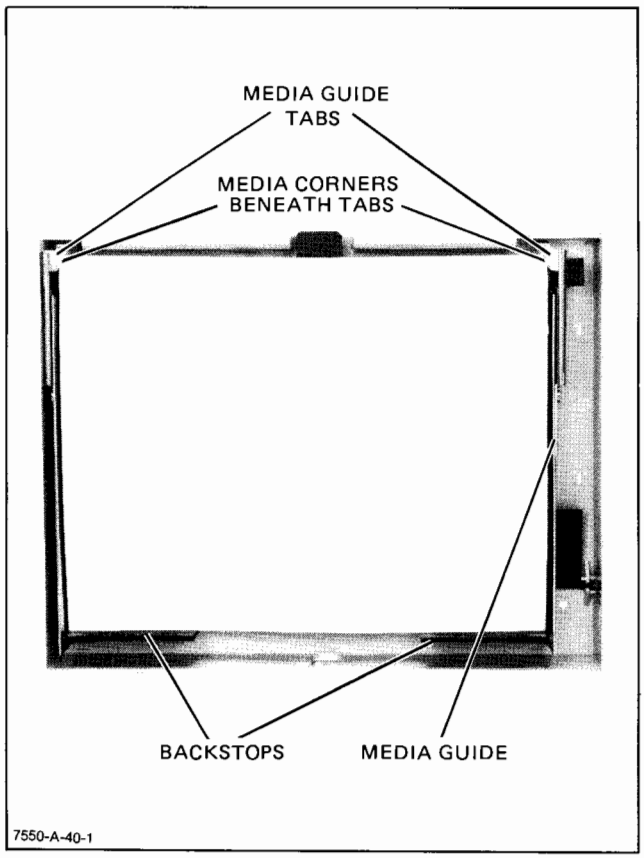


Figure 2-6. Media Loading Tray

indicating that the AUTO FEED function is enabled. Press the front-panel LOAD/UNLOAD pushbutton. The paper will be automatically loaded onto the platen surface and the paper size electronically sensed. To unload the paper, press the LOAD/UNLOAD pushbutton on the front panel. The paper will automatically be ejected to the rear of the plotter.

2-26. If an automatic paper load failure occurs, an error message, PAPER LOAD FAILED, will appear in the display module. Clear the paper load failure by pulling out the media loading tray and removing the misloaded piece of paper. If the paper is lodged in the paper deflector slot, turn the plotter LINE switch to OFF (O). Raise the carriage cover, move the pen carriage fully to the left, and pull the paper out from the top. Check the paper in the tray and insert the tray into the plotter. Turn the plotter LINE switch to ON (I) and repeat the loading sequence. If a paper load failure immediately reoccurs, replace the paper with a fresh stack and reload.

2-27. MANUAL MEDIA LOADING

2-28. Manual loading is required for all media other than transparency sheets and standard plotter paper, which may be either manually or automatically loaded. Place the media on the platen surface flush against the left edge of the platen. A- and A4-size media are loaded with the long side parallel to the pinch wheels. B- and A3-size media are loaded with the long side perpendicular to the pinch wheels. Slide the media forward into the plotter until the leading edge of the media passes between the pinch wheels and the grit wheels. See Figure 2-7.

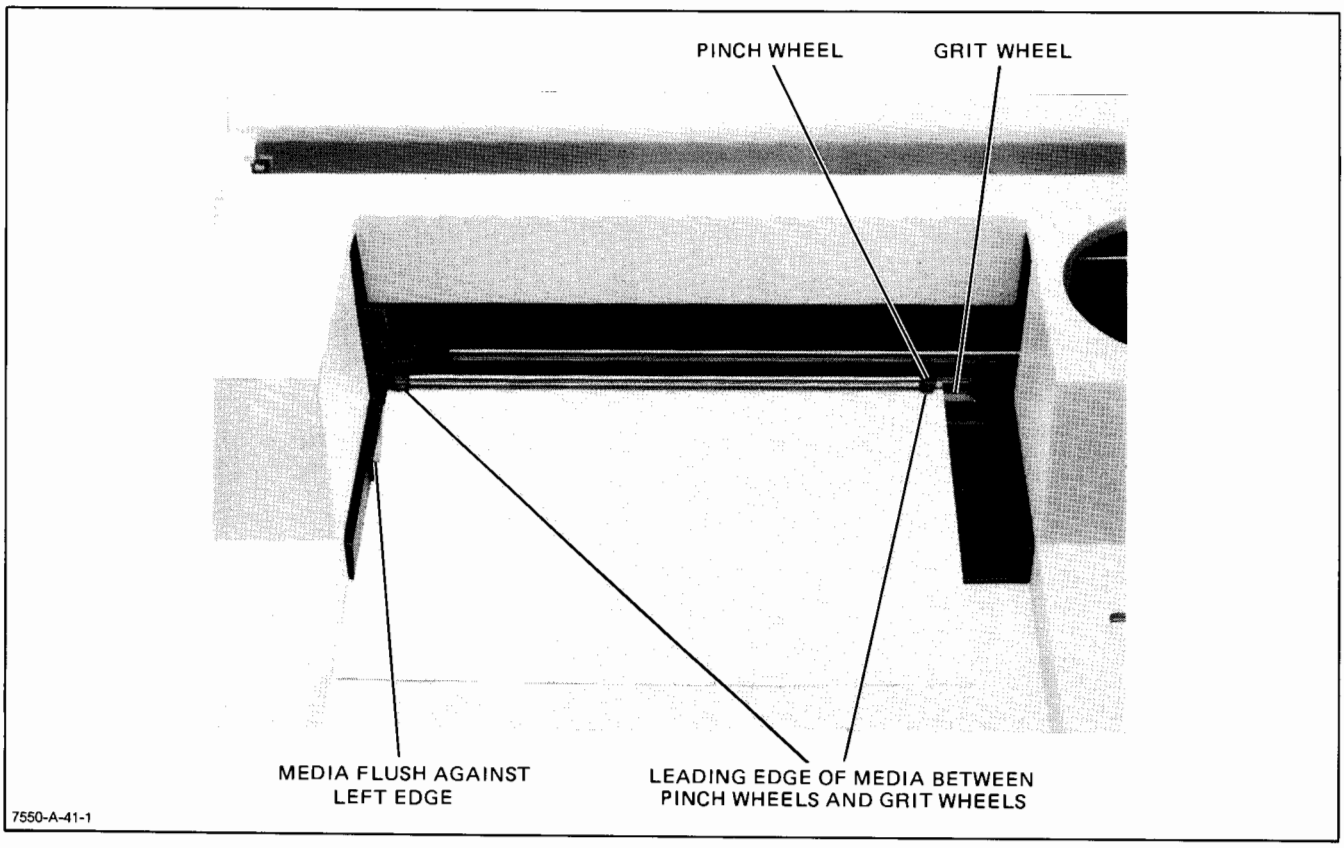


Figure 2-7. Manual Media Loading

2-29. If an asterisk (*) appears in the upper-left corner of the display module, press the AUTO FEED pushbutton. This will disable the AUTO FEED function. Press the front panel LOAD/UNLOAD pushbutton. The media will load and the media size will be electronically sensed. To unload the media, press the LOAD/UNLOAD pushbutton on the front panel. The media will be released and may be removed manually.

2-30. If the media is not loaded properly, an error message, PAPER LOAD FAILED, will appear in the display module. Unload the media to clear and then reload.

2-31. OPERATING CHARACTERISTICS

2-32. When ON, the plotter is always in one of three mutually exclusive states: NOT-READY, VIEW or REMOTE. The plotter enters the NOT-READY state upon power-up and for media loading or unloading. The VIEW state is entered by pressing the front-panel function key designated VIEW in the display module. The REMOTE state is automatically entered upon successful loading and edge sensing of the media. State transition to VIEW or REMOTE cannot be invoked programmatically. The VIEW state, however, can be entered programmatically from the REMOTE state by executing the HP-GL instruction NR. The operational state diagram for the Model 7550A is illustrated in Figure 2-8. The three operational states are defined as follows:

STATE	PLOTTER ACTION
NOT-READY	Data sent to the plotter is of two forms, Device Control Instructions and Graphic Instructions. Control Instructions are acted upon immediately. Graphic (plot) Instructions are routed to a buffer until they are used in the REMOTE state. Pinch wheels are up and media must be loaded before a state transition can be effected. Graphic parameters are undefined.
VIEW	Plotting action is suspended by operator front-panel intervention for media viewing. Graphic position unchanged until front-panel activity changes it. Control Instructions are acted upon immediately. Graphic (plot) Instructions are routed to a buffer until they are used in the REMOTE state.
REMOTE	Graphic (plot) Instructions received through the buffer are processed and plotting action initiated. Control Instructions are acted upon immediately. Data flow is under microprocessor control.

2-33. FRONT PANEL CONTROLS

2-34. The front panel assembly contains 23 pushbuttons and an LCD (liquid crystal display) display module. Alphanumeric representations of the front-panel functions and plotter activities are provided in the display. Figure 2-9 represents the hierarchy of functions

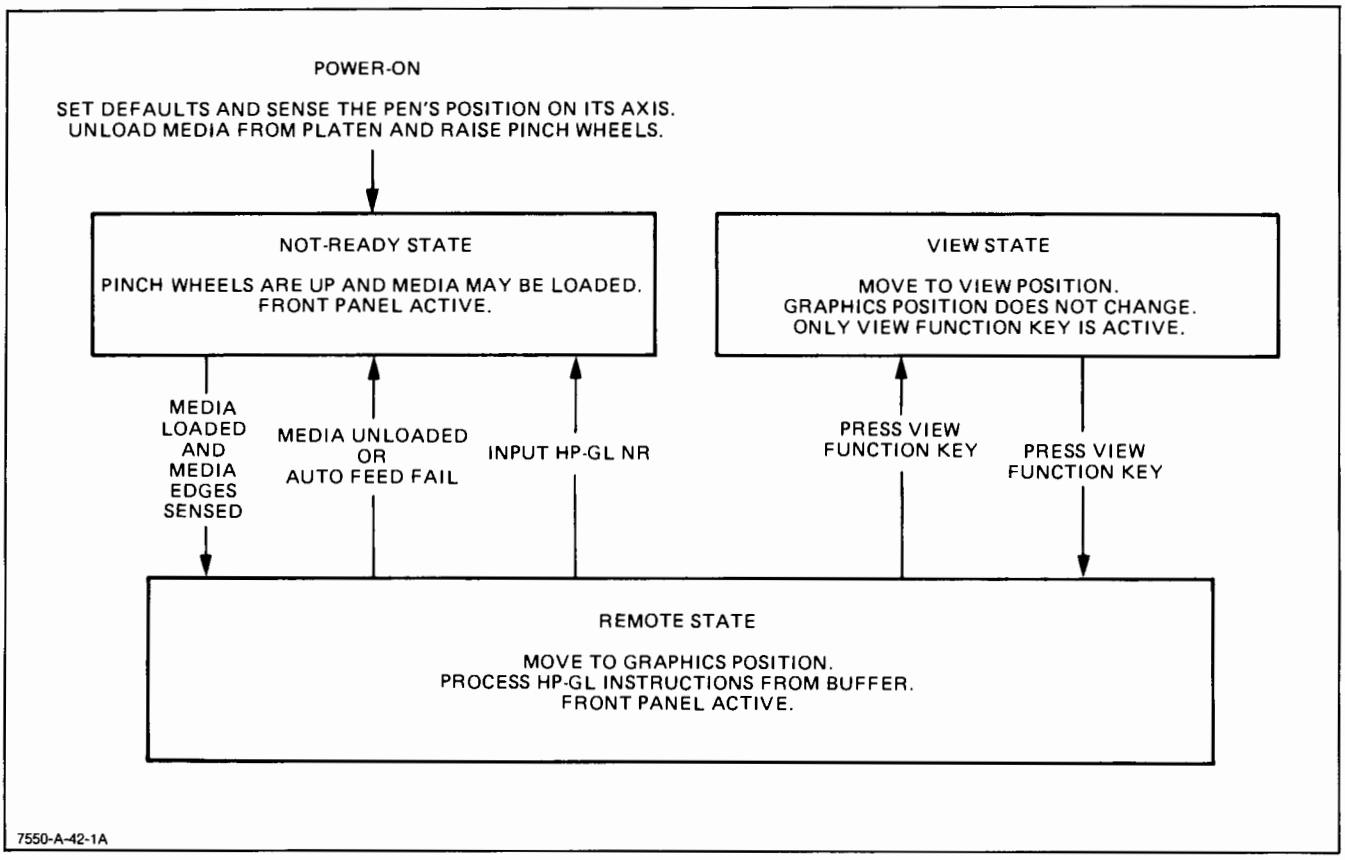


Figure 2-8. Model 7550A State Diagram

accessible through the front-panel controls and is provided as an aid for accessing or exiting the functions.

2-35. Specific information on the purpose and function of each control is contained in the Model 7550A Operation and Interconnection Manual (07550-90002).

2-36. HP 7550A INSTRUCTION SET

2-37. The HP Model 7550A uses the HP-GL (Hewlett-Packard Graphics Language) instructions listed in Table 2-3. The instructions are programmed into the plotter through an external controller.

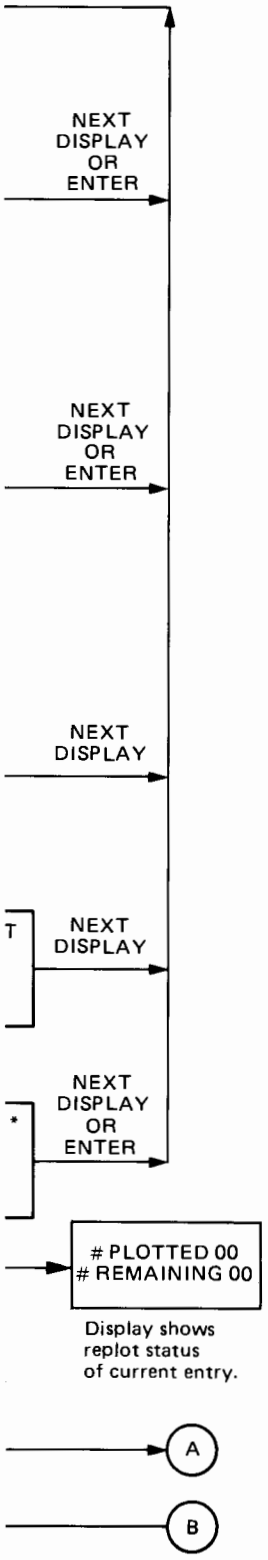
Table 2-3. HP Model 7550A HP-GL Instruction Set

INSTRUCTION		DEFINITION
Vector Group:		
PA	x,y(,x,y(,...))	Plot Absolute (i)
PD	x,y(,x,y(,...))	Plot Absolute after pen down (i)
PU	x,y(,x,y(,...))	Plot Absolute after pen up (i)
PR	x,y(,x,y(,...))	Plot Relative (i)
PD	x,y(,x,y(,...))	Plot Relative after pen down (i)
PU	x,y(,x,y(,...))	Plot Relative after pen up (i)
PD		Pen Down
PU		Pen Up
AA	x,y,arc(,chord)	Arc Absolute x,y (i); arc,chord tolerance (d)
AR	x,y,arc(,chord)	Arc Relative x,y (i); arc,chord tolerance (d)
CI	radius(,chord)	CIrcle radius (i);chord tolerance (d)
Polygon Group:		
RA	x,y;	fill Rectangle Absolute
RR	x,y;	fill Rectangle Relative
WG	radius, start angle, sweep angle (,chord angle)	fill WedGe
EA	x,y;	Edge rectangle Absolute
ER	x,y;	Edge rectangle Relative
EW	radius, start angle, sweep angle (,chord angle)	Edge Wedge
PM	polygon mode	Polygon Mode
FP	;	Fill Polygon
EP	;	Edge Polygon
Character Group:		
CA	n	designate Alternate Character set n (i)
CP	spaces,lines	Character Plot (d)
CS	m	designate Standard Character set m (i)
DI	run,rise	absolute DIrection (d)
DR	run,rise	Relative Direction (d)
LB	c...c	LaBel ASCII string (c)
SA		Select Alternate character set
SI	wide,high	absolute character SIze (d)
SL	tan angle	absolute character SLant from vertical (d)
SR	wide,high	Relative character Size (d)
SS		select Standard Set
UC	x,y,pen(,....)	User-defined Character (i)
CC	chord angle	Character Chord angle (d)
DT	c	Define label Terminator (c)
LO	n	Label Origin at n position (i)
BL	c...c	Buffer Label (c)
PB		Print label Buffer
ES	s(,1)	Extra Space (s) between printing characters and 1 between lines (d)
OL		Output label buffer Length (d ret)
DS	gset,charset	DeSignate charset into gset
IV	slot,left	InVoke slot number
CM	switch,fallback	Character Mode
DL	char,charinfo	DownLoad char with char info

Table 2-3. HP Model 7550A HP-GL Instruction Set (Continued)

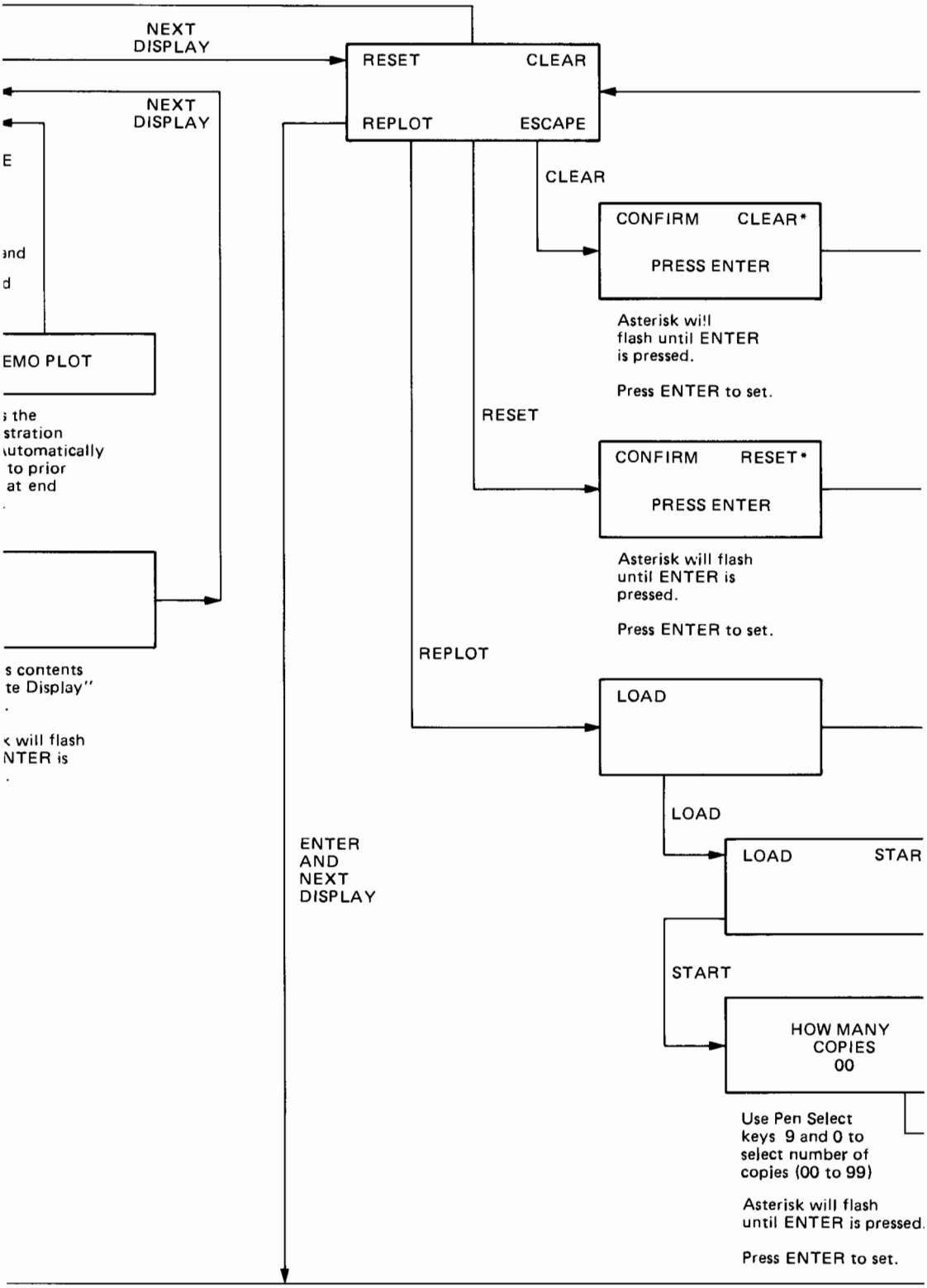
INSTRUCTION		DEFINITION
Line Type Group:		
LT	t(,l)	designate Line Type t and Length l (d)
SM	c	Symbol Mode (c)
SP	n	Select Pen n (i)
VS	v(,n)	Select Velocity v for pen n (i)
FS	f(,n)	Select tip Force f for pen n (i)
AS	a(,n)	Select Acceleration a for pen n (i)
FT	Type ((,spacing),angle)	Fill Type specification
PT	pen-thickness	Pen Thickness
CV		CurVed line generation
UF	(spacing(,spacing))	User-defined Fill
Digitize Group:		
DC		Digitize Clear
DP		Digitize Point
OD		Output Digitized point and pen status (i ret)
Axes Group:		
TL	tp(,tn)	Tick Length (d)
XT		X-axis Tick
YT		Y-axis Tick
Configuration and Status Group:		
IW	x1,y1,x2,y2	Input Window (i)
OW		Output Window
IP	p1x,p1y,(,p2x,p2y)	InPut p1 and p2 (i)
OP		Output Point p1 and p2 (i ret)
AP	n	Automatic Pen operations (i)
DF		set DeFault values
IM	e(,s(,p))	Input e,s, and p Masks (i)
IN		INitialize
OE		Output Error (i ret)
OS		Output Status (i ret)
OC		Output Commanded position and pen status (i ret)
SC	x1,x2,y1,y2	interger SCale (i)
RO	n	ROtate coordinate system (i)
CT	n	set Chord Tolerance mode (i)
NR		go to the Not-Ready state
OA		Output Actual position and pen status (i ret)
OH		Output Hardclip limits (i ret)
OO		Output Options (i ret)
OF		Output Factors (i ret)
OI		Output Identification (c . . . c ret)
OT		Output current Turret ID (i ret)
Front Panel and Display Group:		
KY	kynum, listnum	define KeY
GC	countnum	Group Count (i ret)
OG		Output Group (i i ret)
WD	c . . . c term	Write c . . . c to Display
OK		Output Keyboard (i,ret)
Buffer Plot and Page Advance Group:		
AF,AH		Advance Full page, Advance Half page
BF		BuFfer plot
PG		PaGe (same as AF)
RP	n	RePlot n times

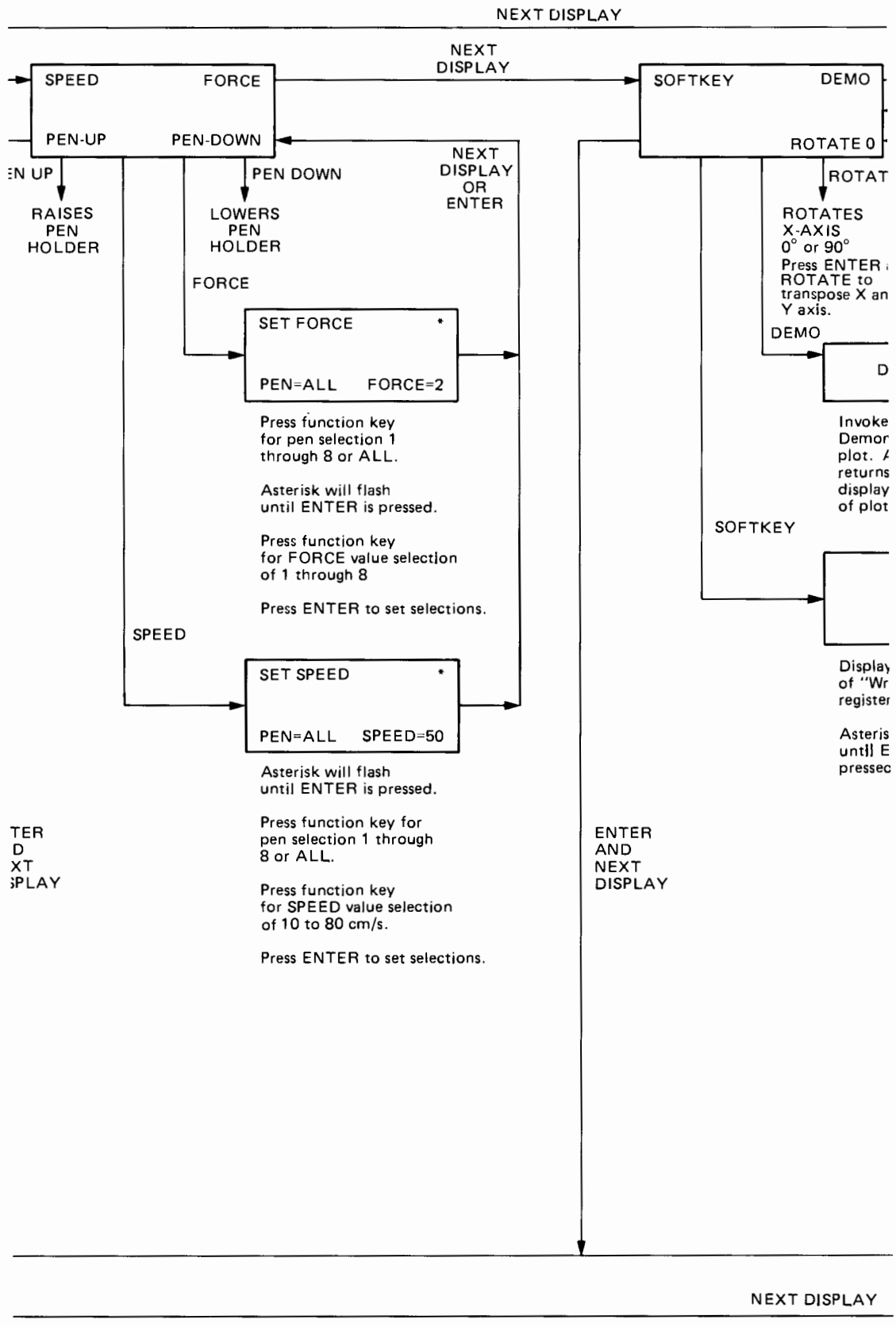
(i) = integer format data between $\pm (2^{23}-1)$
(d) = decimal format data between $\pm (2^{23}-1)$
(c) = ASCII character



7550-B-43-1A

Figure 2-9. HP Model 7550A Front Panel Hierarchy (Sheet 1 of 2)

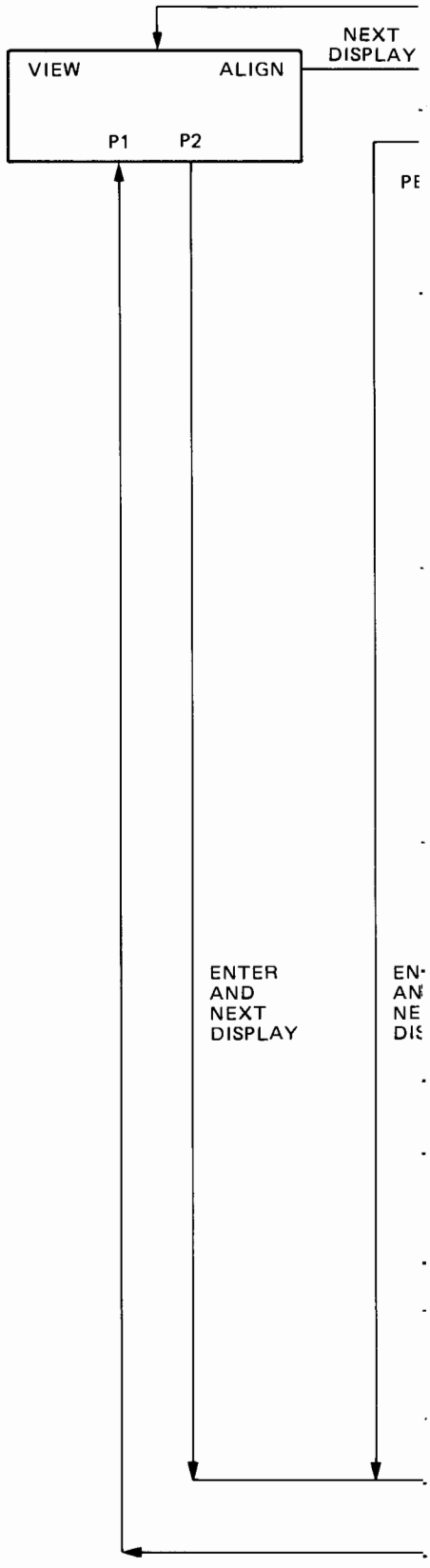

NEXT
DISPLAY
RESET
CLEAR
NEXT
DISPLAY
REPLOT
ESCAPE
E
CLEAR
CONFIRM
CLEAR*
PRESS ENTER
Asterisk will
flash until ENTER
is pressed.
Press ENTER to set.
EMO PLOT
RESET
CONFIRM
RESET*
PRESS ENTER
Asterisk will flash
until ENTER is
pressed.
Press ENTER to set.
REPLOT
LOAD
LOAD
LOAD
STAR
ENTER
AND
NEXT
DISPLAY
START
HOW MANY
COPIES
00
Use Pen Select
keys 9 and 0 to
select number of
copies (00 to 99)
Asterisk will flash
until ENTER is pressed.
Press ENTER to set.


NEXT DISPLAY
NEXT DISPLAY
SPEED
FORCE
PEN-UP
PEN-DOWN
SOFTKEY
DEMO
ROTATE 0
EN UP
RAISES PEN HOLDER
PEN DOWN
LOWERS PEN HOLDER
NEXT DISPLAY OR ENTER
ROTAT
ROTATES X-AXIS 0° or 90°
Press ENTER ROTATE to transpose X an Y axis.
FORCE
SET FORCE *
PEN=ALL FORCE=2
DEMO
D
Press function key for pen selection 1 through 8 or ALL.
Asterisk will flash until ENTER is pressed.
Press function key for FORCE value selection of 1 through 8
Press ENTER to set selections.
Invoke Demor plot. A returns display of plot
SOFTKEY
SPEED
SET SPEED *
PEN=ALL SPEED=50
Displa of "Wr registe
Asteris until E pressec
Asterisk will flash until ENTER is pressed.
Press function key for pen selection 1 through 8 or ALL.
Press function key for SPEED value selection of 10 to 80 cm/s.
Press ENTER to set selections.
TER D XT SPLAY
ENTER AND NEXT DISPLAY
NEXT DISPLAY

7550-B-43-1A

NOTE

The text in the boxes represents the current display in the display module. The text outside the boxes indicates which front-panel control must be pressed to access the next display indicated by the direction of the arrows. A flashing asterisk (*) in the top-right corner of the display module indicates that the ENTER pushbutton must be pressed to invoke the specified function.



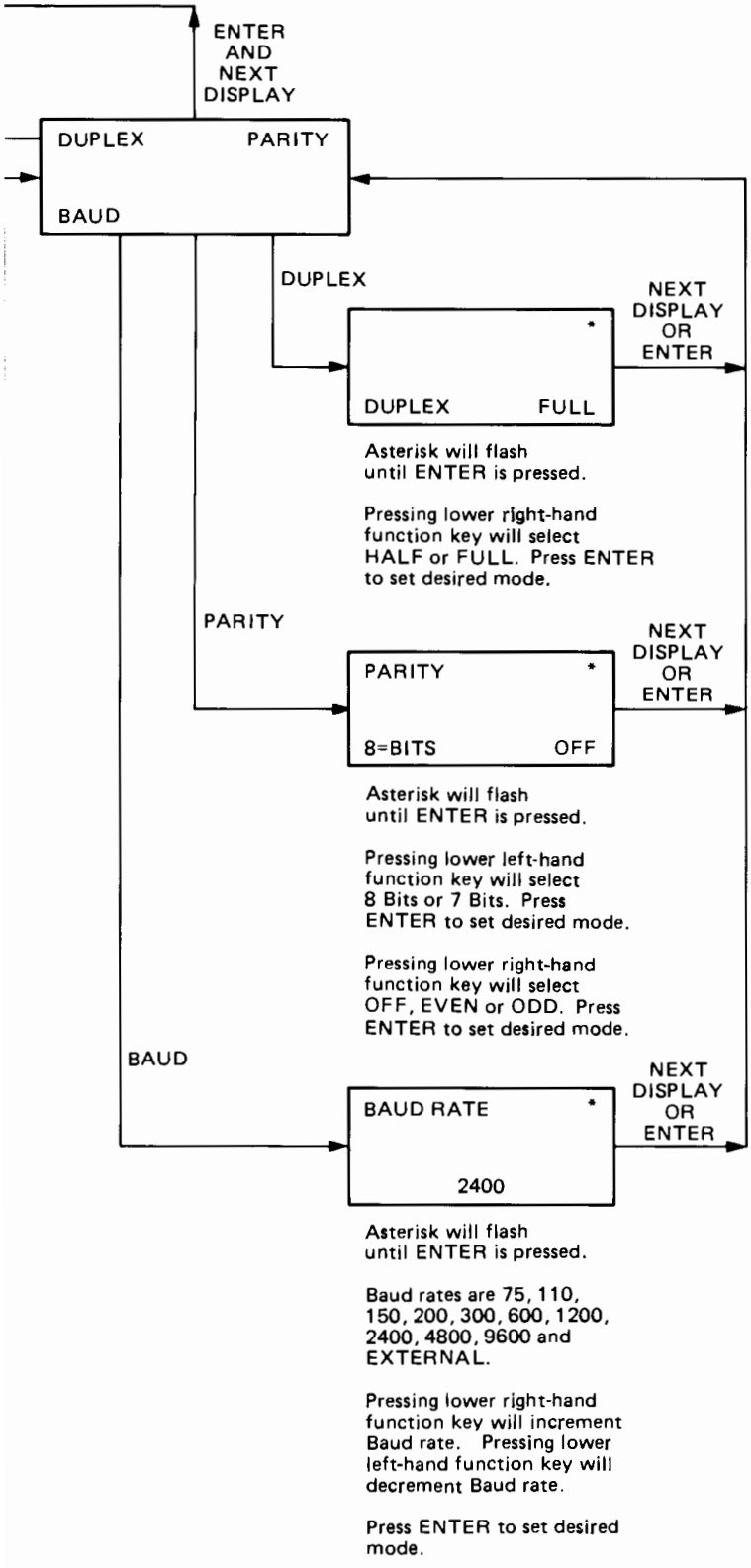
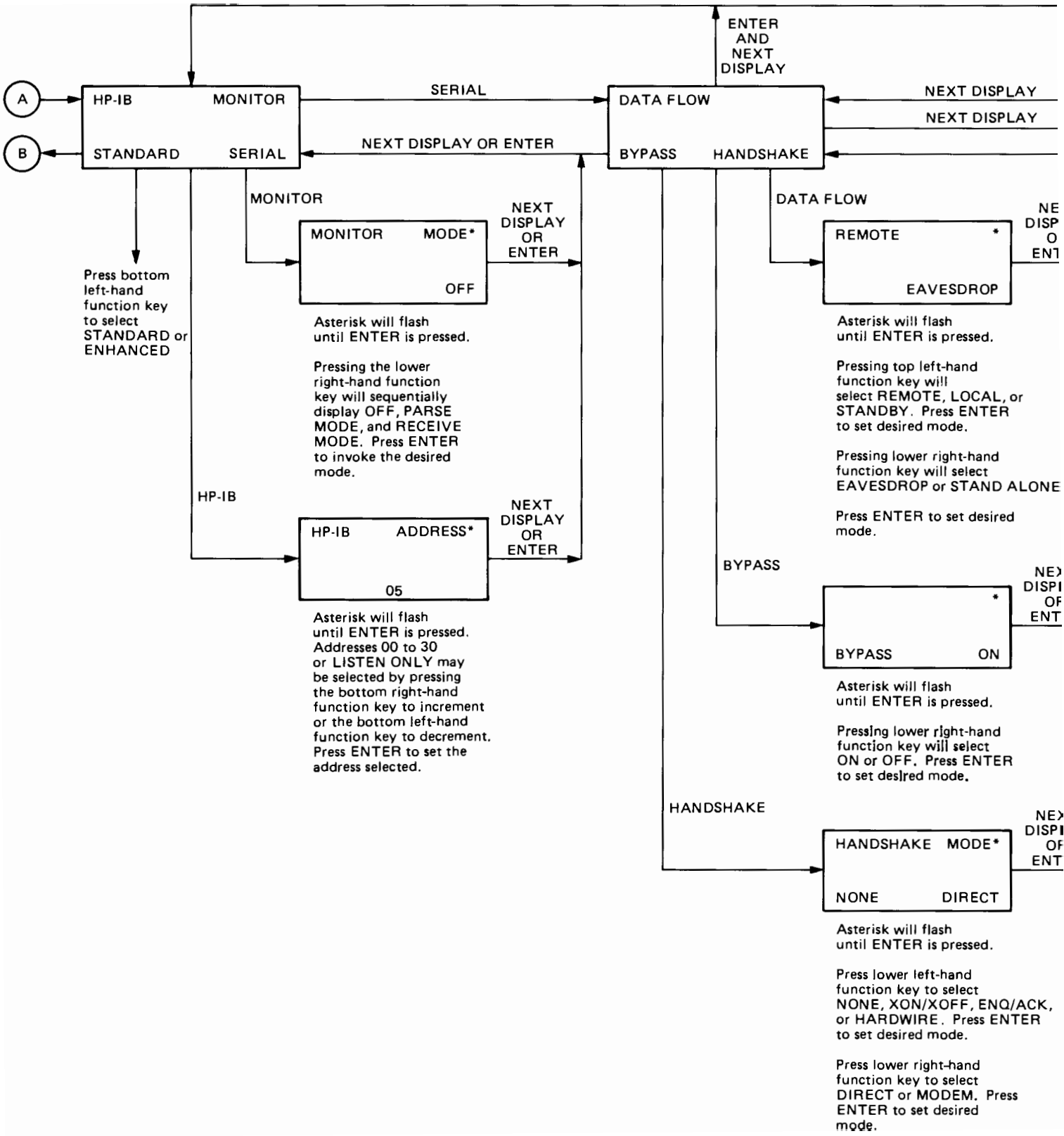


Figure 2-9. HP Model 7550A Front Pan
Hierarchy (Sheet 2 of


ENTER AND NEXT DISPLAY
A
B
HP-IB MONITOR
STANDARD SERIAL
SERIAL
NEXT DISPLAY OR ENTER
DATA FLOW
BYPASS HANDSHAKE
NEXT DISPLAY
NEXT DISPLAY
Press bottom left-hand function key to select STANDARD or ENHANCED
MONITOR
MONITOR MODE*
OFF
NEXT DISPLAY OR ENTER
Asterisk will flash until ENTER is pressed.
Pressing the lower right-hand function key will sequentially display OFF, PARSE MODE, and RECEIVE MODE. Press ENTER to invoke the desired mode.
HP-IB
HP-IB ADDRESS*
05
NEXT DISPLAY OR ENTER
Asterisk will flash until ENTER is pressed. Addresses 00 to 30 or LISTEN ONLY may be selected by pressing the bottom right-hand function key to increment or the bottom left-hand function key to decrement. Press ENTER to set the address selected.
DATA FLOW
REMOTE *
EAVESDROP
Asterisk will flash until ENTER is pressed.
Pressing top left-hand function key will select REMOTE, LOCAL, or STANDBY. Press ENTER to set desired mode.
Pressing lower right-hand function key will select EAVESDROP or STAND ALONE
Press ENTER to set desired mode.
BYPASS
*
BYPASS ON
Asterisk will flash until ENTER is pressed.
Pressing lower right-hand function key will select ON or OFF. Press ENTER to set desired mode.
HANDSHAKE
HANDSHAKE MODE*
NONE DIRECT
Asterisk will flash until ENTER is pressed.
Press lower left-hand function key to select NONE, XON/XOFF, ENQ/ACK, or HARDWIRE. Press ENTER to set desired mode.
Press lower right-hand function key to select DIRECT or MODEM. Press ENTER to set desired mode.

2-38. PERFORMANCE TESTS

2-39. Built-in performance verification tests can be used to verify proper operation of the Model 7550A. These tests can be performed without access to the interior of the plotter.

WARNING

Avoid personal contact with moving media. Long hair or ties and other clothing could get caught on the surface of the media and become entangled in the plotter mechanics resulting in personal injury. Lacerations could also occur due to contact with the edges of the moving media.

2-40. DEMONSTRATION PLOT

2-41. In order for the user to easily verify that the essential functions of the plotter are operational, an automatic 'DEMO' plot test is built into the Model 7550A. The DEMO plot will verify proper operation of most of the plotter logic circuits as well as the operation of the pen and media drive mechanics, however, the DEMO plot does not test the Interface circuits. To perform the 'DEMO' plot, proceed as follows:

a. Load pens into the carousel and insert the carousel into the plotter.

b. Turn the plotter LINE switch to ON (I).

c. Load a sheet of paper onto the platen surface and close the cover.

d. Press the NEXT DISPLAY pushbutton on the front panel **twice** to access the 'DEMO' plot function.

e. Press the function key designated 'DEMO' in the display module. The plotter will automatically perform the DEMO plot. The DEMO plot is shown in Figure 2-10.

f. At completion of the test, press the LOAD/UNLOAD pushbutton to release the plot.

g. Press the NEXT DISPLAY pushbutton **twice** to return to the first level of front-panel functions.

2-42. FEATURES PLOT

2-43. The HP Model 7550A Features Plot program is a multi-purpose program that demonstrates how to communicate with the plotter using HP-GL instructions from an HP-85A Controller. The program also gives examples of how to plot polygons and use area fill. Pen-to-pen repeatability is also displayed using the crosses drawn on both sides of the Features Plot.

2-44. A listing of the Model 7550A Features Plot program is given in Figure 2-11. Note that the lines beginning with an exclamation point are only commentary and do not impart any action in the program. These lines may be omitted when entering the program into the controller. The Model 7550A Features Plot, a graphic representation of the Features Plot program, is shown in Figure 2-12. Use A/A4-size paper only for the Model 7550A Features Plot.

2-45. To generate the Model 7550A Features Plot, connect an HP-85A Controller to the plotter and input the Features Plot program. Note that since HP-IB addresses are usually greater than 100 (e.g., 705), an address less than 100 will cause the program to branch to a subroutine which sets up the RS-232-C Interface. Be sure to input the correct address for the type of interface being used.

2-46. Lines 420, 580, 700, 810, 1160, and 1290 in the program give examples of HP-GL instructions used for the plotting of rectangles and wedges. These figures are visible on the right-hand side of the plot. Line 940 has examples of the polygon fill and edge instructions as depicted by the filled bull's-eye rings in the center of the plot.

2-47. RWM/ROM TEST

2-48. This test is designed to assure correct data patterns in the RWM (READ/WRITE MEMORY) and the ROM (READ-ONLY MEMORY). The RWM is tested for stuck data bits, shorted adjacent data lines, and stuck or shorted address lines. The ROM is tested for stuck or shorted data and address lines.

2-49. To invoke the RWM/ROM TEST, perform the following steps:

a. Turn the plotter LINE switch to OFF (O).

b. While pressing the front-panel ENTER and Pen Select 1 pushbuttons down, turn the plotter LINE switch to ON (I). Release the pushbuttons.

c. An 8-bit pattern summarizing the test results will be displayed in the display module. The results should indicate the following:

DISPLAY	RESULTS
10000000	Test in progress
00000000	Test Complete

NOTE

The plotter display will indicate when the test is complete, wait 1 second, and automatically repeat the test until manually suspended. A display other than the above indicates a test failure.

d. If a test failure occurs, refer to the troubleshooting information given in Section VI of this manual.

e. To suspend the RWM/ROM TEST, turn the plotter LINE switch to OFF (O).

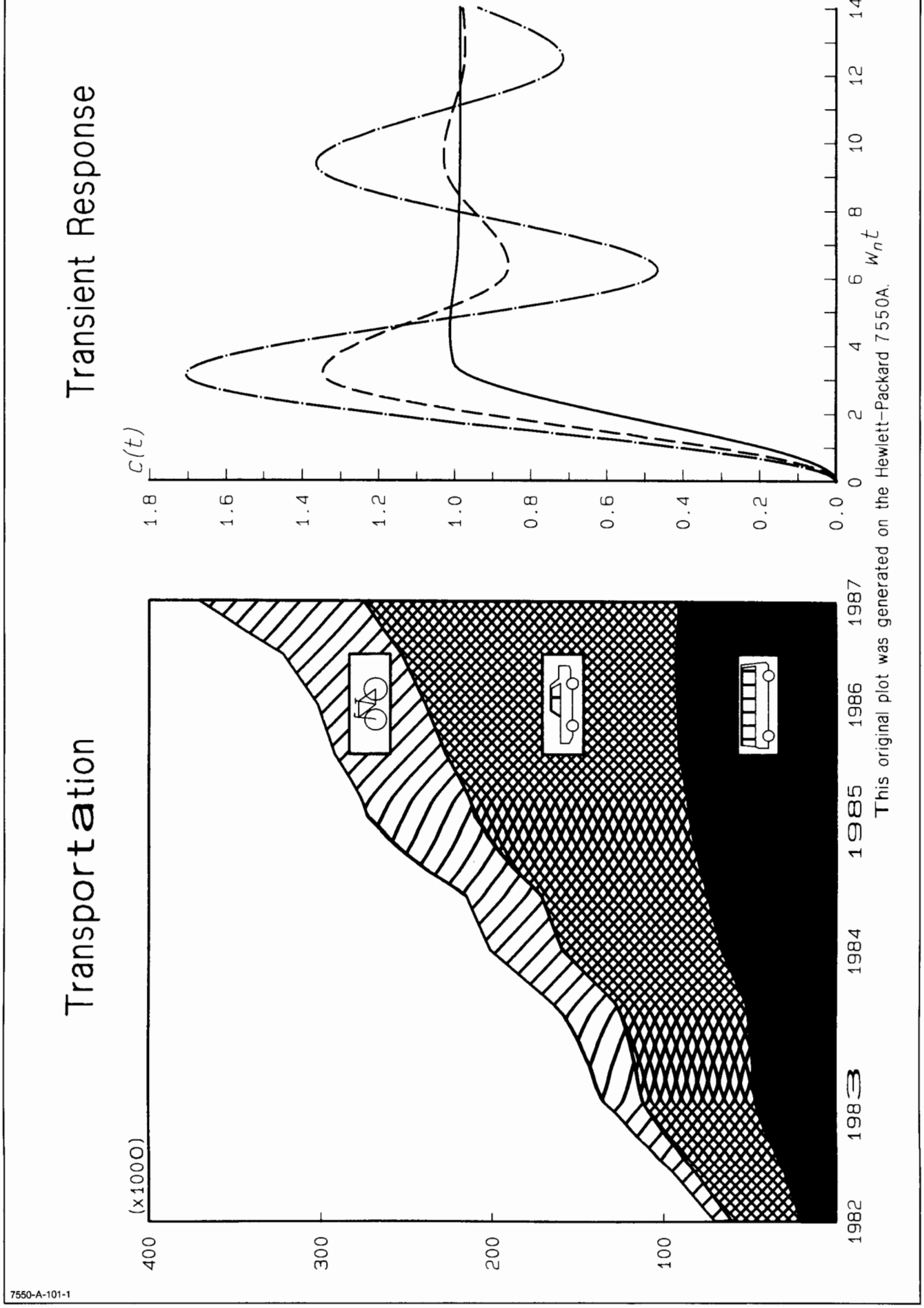


Figure 2-10. HP Model 7550A Demonstration Plot

```
10 !
20 !   7550A FEATURES PLOT
30 !
40 !     (APRIL 1,1984)
50 !
60 !
70 ! SELECT ADDRESS FOR PLOTTER INTERFACE
80 !
90 CLEAR
100 DISP "ENTER ADDRESS"
110 DISP
120 DISP "  eg. RS-232-C   '10'"
130 DISP "  eg. HP-IB     '705'"
140 DISP
150 INPUT N
160 DISP "ADDRESS IS";N
170 IF N<99 THEN GOSUB 1500
180 !
190 ! INIT 7470A & OUTPUT P1,P2 & WINDOW COORDINATES
200 !
210 OUTPUT N USING "#,K" ; CHR$(27)&".T1000;6000;0;0;5800:" ! SETUP BUFFER
220 OUTPUT N USING "#,K" ; CHR$(27)&".L" !                    I/O BUFFER
230 ENTER N ; B
240 DISP "BUFFER SIZE IS";B
250 OUTPUT N USING "#,K" ; "PGINOP;"
260 ENTER N ; X1,Y1,X2,Y2
270 OUTPUT N USING "#,K" ; "OW;"
280 ENTER N ; X3,Y3,X4,Y4
290 !
300 ! DRAW + AT P1 & P2 & LABEL COORDINATES
310 !
320 P=1
330 OUTPUT N USING "#,K" ; "SP1PA5100,4064PDSM+PU";X1;",";Y1
340 OUTPUT N USING "#,K" ; "CP2,-.3LBP1=(",VAL$(X1),",",VAL$(Y1),")",CHR$(3)
350 OUTPUT N USING "#,K" ; "PA";X2;",";Y2;"SM;"
360 OUTPUT N USING "#,K" ; "CP-16,-.3LBP2=(",VAL$(X2),",",VAL$(Y2),")",CHR$(3)
370 OUTPUT N USING "#,K" ; "PA2032,6236"
380 GOSUB 1380
390 OUTPUT N USING "#,K" ; "PA8128,1892"
400 GOSUB 1430
410 P=2
420 OUTPUT N USING "#,K" ; "FT4,100,45PA9372,6440RR700,700SP2ER700,700"
430 !
440 ! DRAW & LABEL AXIS
450 !
460 OUTPUT N USING "#,K" ; "PA9124,1016PD"
470 FOR I=1 TO 8
480 OUTPUT N USING "#,K" ; "XTPR-1016,0"
490 NEXT I
500 FOR I=1 TO 15
510 OUTPUT N USING "#,K" ; "PR0,400YT"
520 NEXT I
530 OUTPUT N USING "#,K" ; "PUPA2032,4788"
540 GOSUB 1380
550 OUTPUT N USING "#,K" ; "PA8128,3340"
560 GOSUB 1430
570 P=3
580 OUTPUT N USING "#,K" ; "FT4,50,90PA9722,5600WG350,0,360,40SP3EW350,0,360,40"

590 OUTPUT N USING "#,K" ; "SP3PA600,3500DIO,1LBCentimetres",CHR$(3)
600 OUTPUT N USING "#,K" ; "PA700,6966DI"
610 FOR I=15 TO 0 STEP -1
620 IF I<10 THEN OUTPUT N USING "#,K" ; "CP1,0"
630 OUTPUT N USING "#,K" ; "LB",VAL$(I),CHR$(13),CHR$(3),"PR0,-400"
640 NEXT I
650 OUTPUT N USING "#,K" ; "PA2032,3340"
660 GOSUB 1380
```

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Figure 2-11. Features Plot Program (Sheet 1 of 3)

```
670 OUTPUT N USING "#,K" ; "PA8128,4788"
680 GOSUB 1430
690 P=4
700 OUTPUT N USING "#,K" ; "UF10,5,5FT5PA9722,4060PT.5WG700,60,60SP4EW700,60,60"

710 OUTPUT N USING "#,K" ; "PA948,756SP4"
720 FOR I=0 TO 8
730 OUTPUT N USING "#,K" ; "LB",VAL$(I),CHR$(13),CHR$(3),"PR1016,0"
740 NEXT I
750 OUTPUT N USING "#,K" ; "PA4810,516;LBInches",CHR$(3)
760 OUTPUT N USING "#,K" ; "PA2032,1892"
770 GOSUB 1380
780 OUTPUT N USING "#,K" ; "PA8128,6236"
790 GOSUB 1430
800 P=5
810 OUTPUT N USING "#,K" ; "UF12,8FT5PA9722,3570PT.5WG700,240,60SP5EW700,240,60"

820 OUTPUT N USING "#,K" ; "PU8128,6236"
830 GOSUB 1380
840 OUTPUT N USING "#,K" ; "PA2032,1892"
850 GOSUB 1430
860 !
870 ! DRAW CIRCULAR FAN
880 !
890 OUTPUT N USING "#,K" ; "PA5100,4064PM0"
900 FOR I=108 TO 608 STEP 100
910 OUTPUT N USING "#,K" ; "CI",I,"PM1"
920 NEXT I
930 P=7
940 OUTPUT N USING "#,K" ; "PM2UFFT5FPSP6EPSP7"
950 OUTPUT N USING "#,K" ; "PA8128,3340"
960 GOSUB 1380
970 OUTPUT N USING "#,K" ; "PA2032,4788"
980 GOSUB 1430
990 !
1000 P=8
1010 OUTPUT N USING "#,K" ; "IW3600,2564,6600,5564PA3600,2564ER3000,3000SP8"
1020 DEG
1030 FOR I=0 TO 345 STEP 15
1040 X5=INT(5100+608*COS(I))
1050 Y5=INT(4064+608*SIN(I))
1060 OUTPUT N USING "#,K" ; "PU";X5;",";Y5
1070 X5=INT(5100+2200*COS(I))
1080 Y5=INT(4064+2200*SIN(I))
1090 OUTPUT N USING "#,K" ; "PD";X5;",";Y5
1100 NEXT I
1110 OUTPUT N USING "#,K" ; "IWPU8128,1892"
1120 GOSUB 1380
1130 OUTPUT N USING "#,K" ; "PA2032,6236"
1140 GOSUB 1430
1150 P=6
1160 OUTPUT N USING "#,K" ; "FT4,50,90PA9722,2030WG350,0,360SP6EW350,0,360"
1170 !
1180 ! DRAW LABELS
1190 !
1200 OUTPUT N USING "#,K" ; "PA3610,6514"
1210 OUTPUT N USING "#,K" ; "VSSI1,1SL.45LB7550A",CHR$(3)
1220 OUTPUT N USING "#,K" ; "PA4645,1778"
1230 OUTPUT N USING "#,K" ; "SISLLBFeatures",,CHR$(3)
1240 OUTPUT N USING "#,K" ; "CP-6,-1LBPlot",CHR$(3)
1250 OUTPUT N USING "#,K" ; "PA8128,4788"
1260 GOSUB 1380
1270 OUTPUT N USING "#,K" ; "PA2032,3340"
1280 GOSUB 1430
1290 OUTPUT N USING "#,K" ; "FT4,100,45PA9372,490RR700,700SP1ER700,700"
1300 !
1310 ! FRAME WINDOW
1320 !
```

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Figure 2-11. Features Plot Program (Sheet 2 of 3)

```
1330 OUTPUT N USING "#,K" ; "PU";X3;",";Y3;"ER";X4;",";Y4
1340 OUTPUT N USING "#,K" ; "PU5100,4064CI25SP0PR";X4;",";Y4;";"
1350 END
1360 !
1370 ! PEN TO PEN REPEATABILITY SUBROUTINES
1380 !
1390 OUTPUT N USING "#,K" ; "SICP-1.2,.4LB";VAL$(P);CHR$(3)&"CP.2,-.4"
1400 OUTPUT N USING "#,K" ; "PR9,-9PD247,0,0,18,-247,0,0,247,-18,0,0,-247,"
1410 OUTPUT N USING "#,K" ; "-247,0,0,-18,247,0,0,-247,18,0,0,247PU"
1420 RETURN
1430 !
1440 OUTPUT N USING "#,K" ; "CP.4,-.8LB";VAL$(P);CHR$(3)&"CP-1.4,.8"
1450 OUTPUT N USING "#,K" ; "PR0,512PD0,-1024PU-512,512PD1024,0PU"
1460 RETURN
1470 !
1480 ! HP 85 RS232C INTERFACE SETUP
1490 !
1500 CONTROL N,1 ; 16 ! RECEIVED DATA GENERATES INTERRUPT
1510 CONTROL N,2 ; 5 ! ACTIVATES DTR & CTS
1520 CONTROL N,3 ; 11 ! SET BAUD RATE TO 2400
1530 CONTROL N,4 ; 3 ! 8 BITS/WORD WITH NO PARITY
1540 CONTROL N,5 ; 16 ! ENABLES HARDWIRE HANDSHAKE
1550 CONTROL N,16 ; 0 ! NO CHARACTERS SENT AT EOL
1560 !
1570 ! 7470A-0P001 TURN-ON & CONFIGURATION
1580 !
1590 OUTPUT N USING "#,K" ; CHR$(27)&".(" ! TURN PLOTTER ON
1600 OUTPUT N USING "#,K" ; CHR$(27)&".J" ! ABORT DEVICE CONTROL INST.
1610 OUTPUT N USING "#,K" ; CHR$(27)&".K" ! ABORT GRAPHIC INST.
1620 !
1630 OUTPUT N USING "#,K" ; CHR$(27)&".M;;;13;10:" ! TERMINATE WITH Cr & Lf
1640 OUTPUT N USING "#,K" ; CHR$(27)&".@;15:" ! SET HARDWARE HANDSHAKE
1650 RETURN
```

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Figure 2-11. Features Plot Program (Sheet 3 of 3)

2-50. SENSOR AND MOTOR TEST

2-51. This test checks the operation of the media feed and carousel sensors and exercises all of the plotter motors. The X- and Y-axis motors are slowly rotated back and forth with the servo control system active while the carousel and media feed motors are continuously half-stepped.

2-52. To invoke the SENSOR AND MOTOR TEST, perform the following steps:

a. Turn the plotter LINE switch to OFF (O).

b. Remove the media loading tray.

c. While pressing the front-panel ENTER and Pen Select 2 pushbuttons down, turn the plotter LINE switch to ON (I). Release the pushbuttons.

d. A summarization of the test results will be displayed in the display module. The following letter designations cross-reference the positions of the displayed results to the items tested.

DISPLAY

A B C DD EE FF
GGGGGG H

e. The items tested and the test results should indicate the following:

A: Media Feed Sensor
Display **0** light sensed
Display **1** light not sensed
As the paper sensor gear rotates, the display will be **1** until the timing slot in the paper sensor gear allows the paper sensor photo-beam to pass through it. The display will be **0** while the beam is not interrupted.

B: Carousel Sensor
Display **0** light sensed after LED enabled
Display **1** light not sensed after LED enabled
As the pen carousel rotates, the display will be **1** while the carousel sensor photo-beam is interrupted and **0** while the photo-beam is not interrupted.

C: Power Supply Measurement and X, Y-Gain
Display 0 through 7 (5 typically is displayed)
The display should be relatively constant at **5** but may fluctuate slightly.

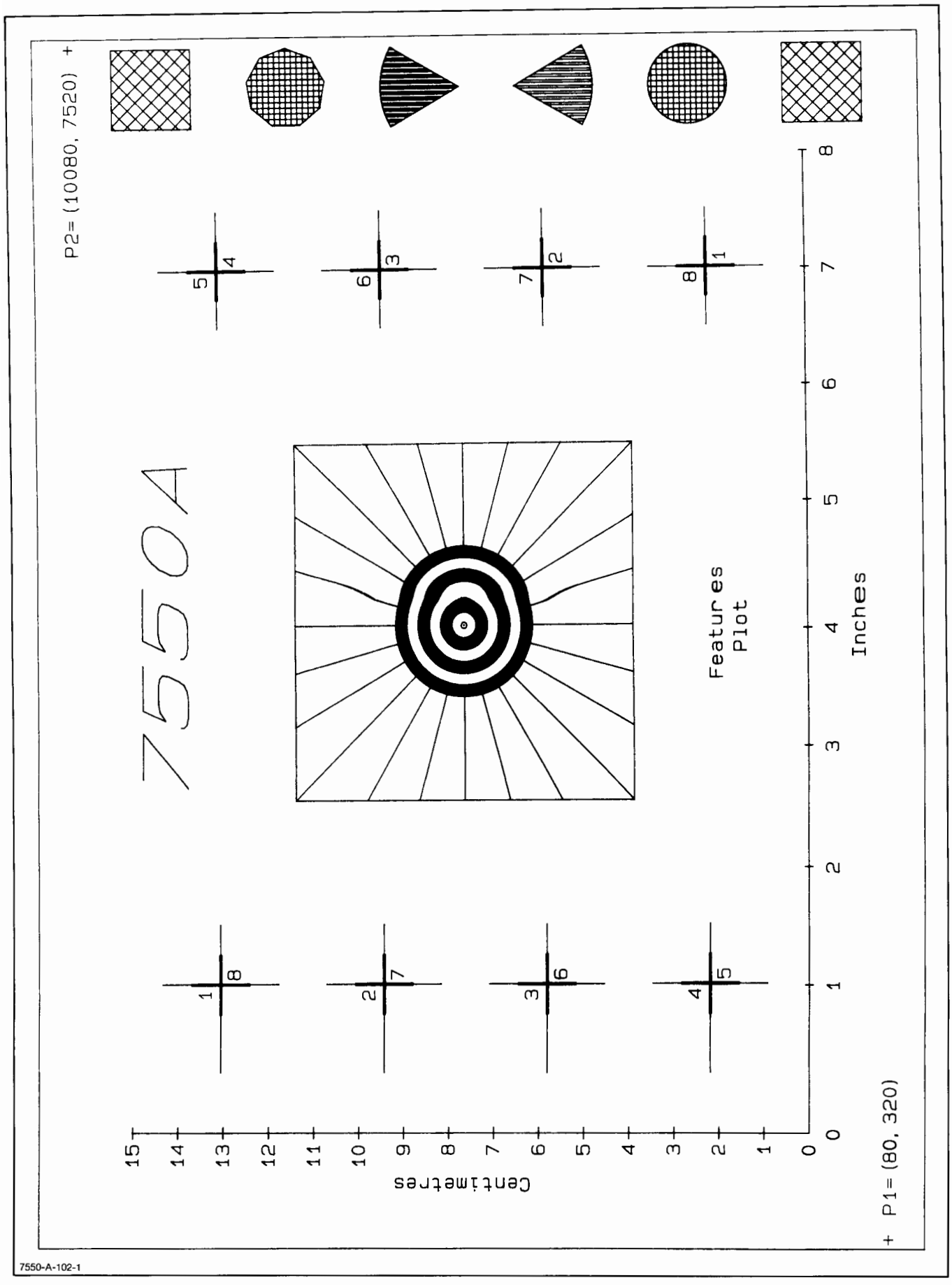

Figure 2-12. HP Model 7550A Features Plot

DD: Penlift Encoder
Display 8-bit hex code
The 8-bit hex code display should be constant unless the pen holder is being raised or lowered.
Pressing the ENTER and NEXT DISPLAY pushbuttons simultaneously will energize the penlift coil and cause the coil to generate a buzzing noise.

EE: X-Axis Encoder

Display 8-bit hex code
The 8-bit hex code display will change as the X-axis encoder data changes while exercising the X-axis drive motor.

FF: Y-Axis Encoder
Display 8-bit hex code
The 8-bit hex code display will change as the Y-axis encoder data changes while exercising the Y-axis drive motor.

GGGGGG: Front Panel Switch Bit Map
Display 24-bit hex code
The 24-bit hex code display should be constant zeroes (**000000**) unless a front-panel pushbutton is pressed or shorted. Pressing the front-panel pushbuttons should cause the 24-bit hex code to change as follows:

Front-Panel Pushbutton	**GGGGGG** 24-bit Hex Code Display
1	**080000**
2	**040000**
3	**020000**
4	**010000**
5	**800000**
6	**400000**
7	**200000**
8	**100000**
9	**000020**
0	**000010**
←	**000008**
→	**000004**
↑	**000002**
↓	**000001**
FAST	**000080**
AUTO FEED	**000800**
Top Left Function Key	**000400**
Top Right Function Key	**000200**
ENTER	**000100**
LOAD/UNLOAD	**008000**
Bottom Left Function Key	**004000**
Bottom Right Function Key	**002000**
NEXT DISPLAY	**001000**

H: X- and Y-Axis Servos
Display (should be blank). An X- or Y- indicates a failure in the respective axis drive circuitry.

NOTE

Manual testing of the above items can be performed. Pressing the front-panel ENTER and AUTO FEED pushbuttons simultaneously will cease automatic testing. To manually test the items, raise the carriage cover and perform the remaining steps as follows:

WARNING

These procedures should be performed only by service-trained personnel. The procedures involve exposure to and manipulation of gears and drive assemblies while power is applied to the plotter.

f. To manually test the media feed sensor, reach into the media tray opening in the front of the plotter and rotate the paper drive wheels. The display A will be **1** while the paper sensor photo-beam is interrupted and will change to **0** when the timing slot in the paper sensor gear allows the photo-beam to pass through.

g. To manually test the carousel sensor, rotate the pen carousel. The display B will be **1** while the carousel sensor photo-beam is interrupted and will change to **0** when the photo-beam is not interrupted.

h. To manually test the penlift encoder, press the pen holder down. The 8-bit hex code display DD will change as the pen holder is raised or lowered indicating a good encoder.

i. To manually test the X-axis encoder, apply pressure to the grit wheel and gently rock the grit wheel back and forth. Do NOT cause the grit wheel to rotate or an error will be indicated at location **H** of the test display. The 8-bit hex code display EE will change as the grit wheel is rocked back and forth indicating a good encoder.

j. To manually test the Y-axis encoder, grasp the pen carriage drive belt and gently rock the drive belt left and right. Do NOT cause the pen carriage to move or an error will be indicated at location **H** of the test display. The display FF will change as the pen carriage drive belt is rocked left and right indicating a good encoder.

k. To manually test the front-panel switch bit map, refer to step e. of this procedure and press the pushbuttons as indicated. The resultant display GGGGGG should match the display given to indicate a good front-panel switch matrix.

l. If a test failure occurs, refer to the troubleshooting information given in Section VI of this manual.

m. To suspend the test, turn the plotter LINE switch to OFF (O).

2-53. EAROM TEST

2-54. This test is designed to check the validity code of the EAROM, Electrically Alterable Read-Only Memory. When correctly set, the code indicates that the EAROM has been initialized with valid data.

2-55. To invoke the EAROM TEST, perform the following steps:

a. Turn the plotter LINE switch to OFF (O).

b. While pressing the front-panel ENTER and Pen Select 9 pushbuttons down, turn the plotter LINE switch to ON (I). Release the pushbuttons.

c. An 8-bit pattern summarizing the test results will be displayed in the display module. The results should indicate the following:

DISPLAY	RESULTS
10000000	Test in progress
00000000	Test complete (≅15 seconds after start)
00010000	Error in the EAROM

d. If a test failure occurs, refer to the troubleshooting information given in Section VI of this manual.

e. To suspend the EAROM TEST, turn the plotter LINE switch to OFF (O).

NOTE

During plotter operation the EAROM stores parameters which are retained when the plotter is powered OFF (O). The operator can reset the user-defined (external) parameters to default values by pressing down the FAST pushbutton while cycling plotter power ON (I). External defined parameters include constants such as baud rate, parity mode, and HP-IB address selection. The EAROM is also used to store internal plotter parameters such as servo gain constants. Internal parameters can be recalibrated by holding down the ENTER and Pen Select 4 pushbuttons while cycling plotter power ON (I).

Both the internal and external parameters can be reset simultaneously by holding down the ENTER and LOAD/UNLOAD pushbuttons while cycling plotter power ON (I). Internal parameters should not be recalibrated unless required by repair procedures.

2-56. I/O SELF-TEST

2-57. The I/O SELF-TEST routine checks the HP-IB and RS-232-C Interface circuits in the Model 7550A. Entering the I/O SELF-TEST routine accesses four individual tests. Any of the first three may be run individually or simultaneously. The HP-IB Echo Test requires that the Model 7550A be connected to the HP-85A and a special test program be loaded. The four tests are described as follows:

SERIAL IC TEST
Tests the communication path between the DART (Dual Asynchronous Receiver Transmitter) and the microprocessor.

HP-IB IC TEST
Tests the communication path between the HP-IB interface TALKER/LISTENER and the microprocessor.

SERIAL LOOPBACK
Tests the communication path from the microprocessor to the DART, through an external cable connected to the I/O connectors, back to the DART, and back to the microprocessor.

HP-IB ECHO TEST
Tests the basic operation of the HP-IB by returning transmitted characters back to the controller. Tests all control lines except REN (Remote Enable).

2-58. To invoke the I/O SELF-TEST routine, perform the following steps:

a. Turn the plotter LINE switch of OFF (O).

b. If the SERIAL LOOPBACK test is to be performed, connect a Male-to-Female RS-232-C cable between the MODEM and TERMINAL connectors at the back of the plotter. RS-232-C cable (HP P/N 31391A) may be used.

c. If the HP-IB ECHO TEST is to be performed, connect the HP-IB connector at the back of the plotter to the HP-85A controller. HP-IB cables (HP P/N 10833A or 10833B or equivalent) may be used.

d. While pressing the front-panel ENTER and Pen Select 3 pushbuttons down, turn the plotter LINE switch to ON (I). Release the pushbuttons.

e. The plotter will enter the I/O SELF-TEST routine as displayed on the front-panel display module.

f. To access the four individual tests, press the function key designated START in the display module. Pressing the function key designated END will exit the test routine and the display will return to the first level of front panel functions.

g. After pressing the function key designated START, the plotter will access the SERIAL IC TEST as shown in the display module.

h. To perform the SERIAL IC TEST, press the function key designated YES in the display module. To bypass this test, press the function key designated NO.

i. After pressing the desired function key for the SERIAL IC TEST, the plotter will access the HP-IB IC TEST as shown in the display module.

j. To perform the HI-IB IC TEST, press the function key designated YES in the display module. To bypass this test, press the function key designated NO.

k. After pressing the desired function key for the HP-IB IC TEST, the plotter will access the SERIAL LOOPBACK TEST as shown in the display module.

l. To perform the SERIAL LOOPBACK TEST, press the function key designated YES in the display module. To bypass this test, press the function key designated NO.

m. After pressing the desired function key for the SERIAL LOOPBACK TEST, the plotter will access the HP-IB ECHO TEST as shown in the display module.

n. To perform the HP-IB ECHO TEST, refer to the HP 7550A HP-IB ECHO TEST procedure given in this section. To bypass this test, press the function key designated NO.

2-59. At successful completion of each test, the I/O SELF-TEST routine will advance to the next test requested. The I/O SELF-TEST routine will continuously loop through the test areas selected until suspended by the operator or until a test failure occurs. A test failure will suspend the I/O SELF-TEST routine and the failed test area will be displayed in the display module. If a test failure occurs, refer to the troubleshooting information given in Section VI of this manual.

2-60. To exit the I/O SELF-TEST routine, press the function key designated END in the display module **twice.** The HP 7550A will initialize and normal operation may be resumed.

2-61. HP 7550A HP-IB ECHO TEST

2-62. This test is designed to check the basic operation of the HP-IB data, management, and handshake lines by echoing transmitted characters back to the HP-IB controller. The ECHO TEST is a function of the I/O SELF-TEST routine given earlier in this section.

2-63. Using an HP-85A Controller connected to the HP-IB connector on the plotter, input the HP 7550A ECHO TEST program. The program may be entered either through the HP-85 Plotter Service Tape (HP P/N 5010-2585, date code 2412), or manually using the program listed in Figure 2-13. Note that lines beginning with an exclamation point (!) are only commentary and do not impart any action in the program. Commentary lines may be omitted when entering the program into the controller. Figure 2-14 shows the HP-85A access and test displays for the HP-IB ECHO TEST when using the HP-85 Plotter Service Tape. Insert the service tape into the controller and then turn the HP-85A to ON. The tape will automatically load and display access instructions on the HP-85A display.

2-64. The ECHO TEST program provides three levels of functional checks as follows:

Level 1: Tests the Data Input/Output (DIO) lines by receiving and echoing ASCII characters in groups of three, (32,33,34 through 124,125,126). A display "LEVEL 1 PASSED" on the HP-85A indicates that all ASCII characters were received and echoed with proper recognition of the ATTENTION (ATN) management line, and the DATA VALID (DAV), NOT READY FOR DATA (NFRD), and NOT DATA ACCEPTED (NDAC) handshake lines.

Level 2: Tests the DIO lines for shorts and opens by receiving and echoing characters in a sequence emulating 'marching ones' (1,2,4,. . 128), and 'marching zeroes' (254,253,251,. . 127). A display "LEVEL 2 PASSED" on the HP-85A indicates there are no shorts or opens on the DIO lines.

Level 3: Tests the presence of a SERVICE REQUEST (SRQ) or END OR IDENTIFY (EOI) when required and the acknowledgement of an INTERFACE CLEAR (IFC). A display "LEVEL 3 PASSED" on the HP-85A indicates recognition and proper operation of the SRQ, EOI, and IFC management lines.

2-65. If a test failure occurs, refer to the troubleshooting information given in Section VI of this manual.

2-66. To repeat the HP-IB ECHO TEST if the program was manually entered, press the RUN key on the HP-85A Controller when indicated by the controller. To repeat the test if the program was entered through the HP-85 Plotter Service Tape, press the plotter function keys designated END then START in the plotter display, and then press the HP-85A REPEAT function key. To exit the HP-IB ECHO TEST, press the function key designated END in the plotter display module **twice.** The plotter will initialize and normal plotter operation may be resumed.

2-67. HP 7550A DYNAMIC PERFORMANCE TEST

2-68. The dynamic performance of the Model 7550A can be verified through the QA (Quality Assurance) test program on the HP-85 Plotter Service Tape, HP P/N 5010-2585 (date code 2412).

2-69. Using an HP-85A Controller connected to the plotter, insert the service tape into the controller and then turn the HP-85A to ON. The tape will automatically load and display access instructions on the HP-85A display. The HP 7550A dynamic performance plot is shown in Figure 2-15.

2-70. REPEATABILITY

2-71. The following procedure tests the REPEATABILITY of the Model 7550A Plotter using the specification, 0.10 mm (0.004 in.), of Table 1-1 as the standard. REPEATABILITY measures how closely a plotter returns a

(Continued on page 2-28)

```
10 !    7550A HP-IB ECHO TEST
20 !
30 !        (APRIL 1,1984)
40 !
50 DISP "      7550A HP-IB"
60 DISP "       ECHO TEST"
70 DISP ""
80 DISP "POWER ON 7550 WHILE PRESSING"
90 DISP "  'ENTER' & '3' KEYS."
100 DISP ""
110 DISP "ANSWER 7550'S QUESTIONS:"
120 DISP "I/O SELF TEST      PRESS 'START'"
130 DISP "SERIAL IC TEST?    PRESS 'NO'"
140 DISP "HPIB IC TEST?      PRESS 'NO'"
150 DISP "SERIAL LOOPBACK?   PRESS 'NO'"
160 DISP "HPIB ECHO TEST?    PRESS 'YES'"
170 DISP ""
180 DISP "PRESS 'CONT' ON 85 TO CONTINUE."
190 PAUSE
200 CLEAR
210 DIM S$[4],T$[4]
220 M=7 !                                   I/F ADDRESS
230 N=705 !                                 I/F & 7550 ADDRESS
240 ON TIMEOUT 7 GOTO 1090
250 SET TIMEOUT M;10 !                      SETUP 10ms TIMEOUT
260 ! ***********************************
270 ! LEVEL 1 TEST (ASCII I/O)
280 ! PARTIALLY TEST DI01-DI08
290 ! TEST DAV, NRFD, NDAC, AND ATN
300 ! ***********************************
310 L=1
320 FOR I=32 TO 124
330 T$=CHR$(I)&CHR$(I+1)&CHR$(I+2)
340 GOSUB 990
350 CLEAR @ DISP "TEST IN PROGRESS"
360 NEXT I
370 DISP "" @ DISP "LEVEL 1 PASSED" @ DISP ""
380 ! ***********************************
390 ! LEVEL 2 TEST (MARCHING 1'S AND 0'S)
400 ! FULLY TEST DI01-DI08
410 ! TEST DAV, NRFD, NDAC, AND ATN
420 ! ***********************************
430 L=2
440 T$=CHR$(1)&CHR$(2)&CHR$(4)
450 GOSUB 990
460 T$=CHR$(8)&CHR$(16)&CHR$(32)
470 GOSUB 990
480 T$=CHR$(64)&CHR$(128)&CHR$(254)
490 GOSUB 990
500 T$=CHR$(253)&CHR$(251)&CHR$(247)
510 GOSUB 990
520 T$=CHR$(239)&CHR$(223)&CHR$(191)
530 GOSUB 990
540 T$=CHR$(127)&CHR$(85)&CHR$(170)
550 GOSUB 990
560 DISP "LEVEL 2 PASSED" @ DISP ""
570 ! ***********************************
580 ! LEVEL 3 TEST
590 ! TEST SRQ, EOI, AND IFC LINES
600 ! ***********************************
610 L=3
620 OFF INTR M !                            CANCELS EOL BRANCHING ON INTERUPT
630 CONTROL M,1 ; 0 !                       DISABLES INTERUPT CONTROL REGISTER
640 Q=0
650 A=-1
660 ON INTR M GOSUB 900 !                   ENABLE EOL BRANCHING ON 'SRQ'
```

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Figure 2-13. HP-IB Echo Test Program (Sheet 1 of 2)

```
670 T$=CHR$(153)&CHR$(51)&CHR$(102)
680 OUTPUT N USING "#,K" ; T$&CHR$(10) !  ADRESSES 7550 TO BE A LISTENER
690 TRIGGER M !                           I/F PUTS A 'GET' ON HP-IB
700 Q=1
710 ENABLE INTR M;8 !                     I/F ENABLED FOR 'SRQ' FROM 7550
720 WAIT .01 !                            TIME FOR I/F TO CONFIRM 'SRQ'
730 IF A<>68 THEN GOTO 1110 !             TESTS IF 'SRQ' ASSERTED
740 A=-1
750 ENTER N USING "%,%K" ; S$ !           I/F SETUP TO ACKNOWLEDGE 'EOI'
760 IF S$<>T$[1,1] THEN GOTO 1120 !       TESTS IF 'EOI' ASSERTED WITH CHR$(153)


770 ENTER N USING "%,%K" ; S$ !           TESTS IF 7550 SENT CHR$(51),(102)&(10)

780 IF S$<>T$[2,3] THEN GOTO 1130 !       S$ SHOULD CONTAIN ONLY CHR$(51)&(102)
790 OUTPUT N USING "#,K" ; T$&CHR$(10) !  ADDRESSES 7550 TO BE A LISTENER
800 ABORTIO M !                           I/F ASSERTS 'IFC' UNADDRESSING 7550
810 TRIGGER M !                           I/F PUTS A 'GET' ON HP-IB
820 WAIT .01 !                            TIME FOR I/F TO CONFIRM 'SRQ'
830 IF A<>-1 THEN GOTO 1140 !             TESTS IF 7550 DIDN'T ASSERT 'SRQ'
840 ENTER N USING "K" ; S$
850 IF S$<>T$ THEN GOTO 1150 !            TESTS IF 7550 ECHOED T$ CORRECTLY
860 DISP "LEVEL 3 PASSED" @ DISP ""
870 DISP "TO REPEAT PRESS 'RUN'"
880 END
890 ! ***********************************
900 ! INTERUPT SERVICE ROUTINE
910 ! ***********************************
920 STATUS M,1 ; B
930 IF Q<>1 THEN GOTO 1160 !               TESTS IF 'SRQ' ASSERTEDW/O TRIGGER
940 A=SPOLL(N) !                           SERIAL POLL RESPONSE SHOULB BE 68
950 Q=2
960 ENABLE INTR M;8 !                      I/F REENABLED TO ACKNOWLEDGE A 'SRQ'
970 RETURN
980 ! ***********************************
990 ! HPIB OUTPUT AND ECHO CHECK
1000 ! **********************************
1010 OUTPUT N USING "#,K" ; T$&CHR$(10)
1020 ENTER N USING "%,%K" ; S$
1030 IF S$<>T$ THEN GOTO 1100 !            TESTS IF 7550 ECHOED T$ CORRECTLY
1040 RETURN
1050 ! ***********************************
1060 ! ERROR DISPLAY ROUTINE
1070 ! ***********************************
1080 BEEP
1090 DISP "LEVEL #";L;"TIMEOUT FAILURE" @ END
1100 DISP "LEVEL #";L;"FAILED WHEN T$ = ";T$[1,3] @ DISP @ END
1110 DISP "LEVEL #3 FAILED AS 'SRQ' WAS NOTASSERTED" @ END
1120 DISP "LEVEL #3 FAILED AS 'EOI' WAS NOTASSERTED" @ END
1130 DISP "LEVEL #3 FAILED AS 'EOI' WAS    ASSERTED" @ END
1140 DISP "LEVEL #3 FAILED AS 'IFC' WAS NOTACKNOWLEDGED" @ END
1150 DISP "LEVEL #3 FAILED WHEN T$ = ";T$[1,3] @ END
1160 DISP "LEVEL #3 FAILED AS 85'S 'SRQ'   ACKNOWLEDGE WAS ENABLED" @ END
```

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Figure 2-13. HP-IB Echo Test Program (Sheet 2 of 2)

Plotter connected to HP-85 Controller.
HP-85 Plotter Service Tape inserted in Controller.

HP-85 Access Display:

```
        7550A HP-IB ECHO TEST
              (4/1/84)

POWER ON 7550 WHILE PRESSING
  'ENTER' & '3' KEYS.

ANSWER 7550'S QUESTIONS:
I/O SELF TEST      PRESS 'START'
SERIAL IC TEST?    PRESS 'NO'
HPIB IC TEST?      PRESS 'NO'
SERIAL LOOPBACK?   PRESS 'NO'
HPIB ECHO TEST?    PRESS 'YES'

PRESS 'CONT' ON 85 TO CONTINUE.
```

Test Display:

```
TEST IN PROGRESS

LEVEL 1 PASSED

LEVEL 2 PASSED

LEVEL 3 PASSED
```

Exit/Repeat:

```
      KEY      DECISION
       1        P-MENU
       2        REPEAT

Select with FUNCTION KEY
--------------------------------

P-MENU  REPEAT
```

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Figure 2-14. HP-IB ECHO TEST Using HP-85 Plotter Service Tape

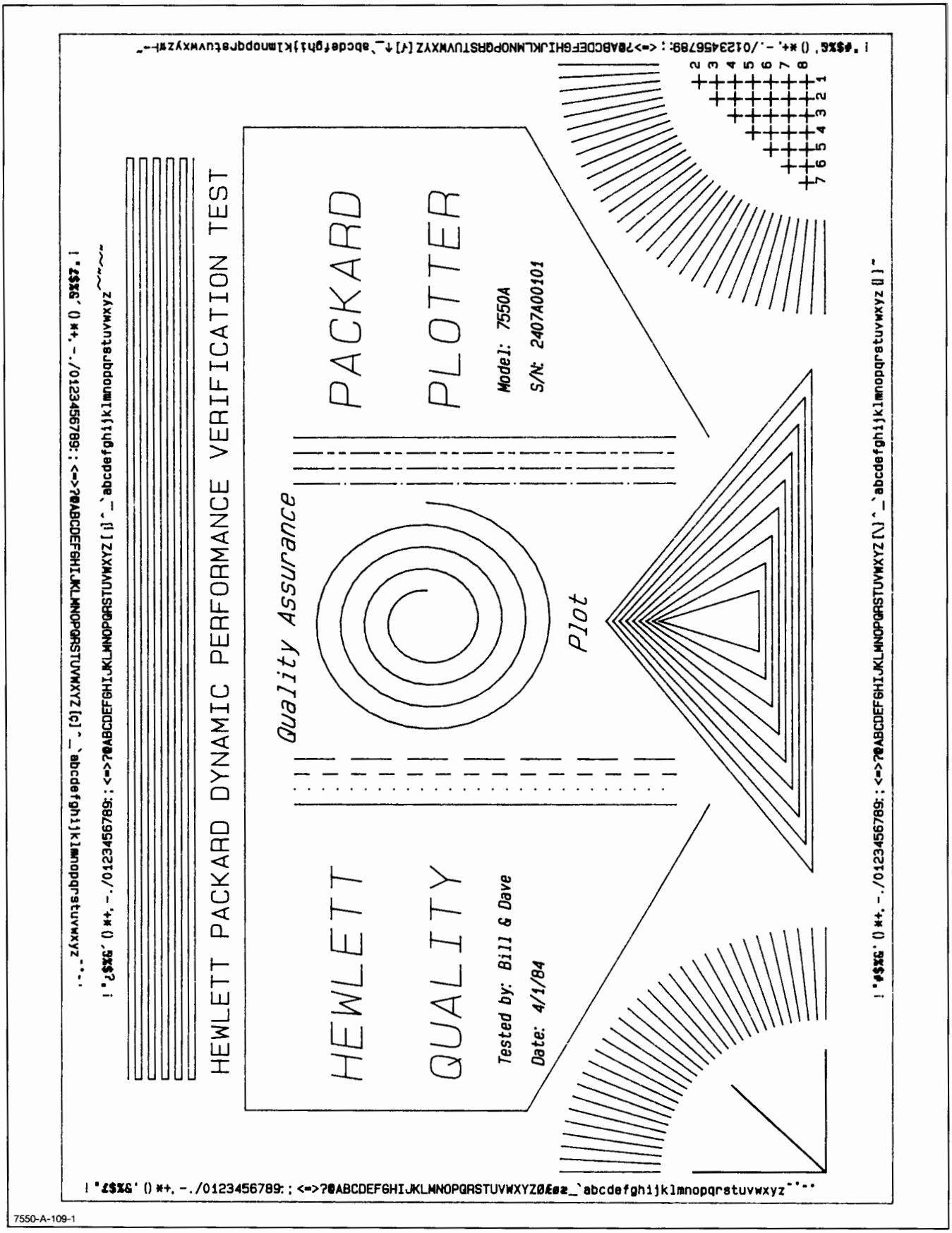

Figure 2-15. HP 7550A Dynamic Performance Plot

pen to a previously plotted point, describing the ability to join new elements to previously plotted ones.

2-72. A listing of the Model 7550A Repeatability Test Program is given in Figure 2-16. Note that the lines with an exclamation point (!) are only commentary and do not impart any action in the program. These lines may be omitted when entering the program into the controller. The Repeatability Plot, a graphic representation of the Repeatability Test Program, is shown in Figure 2-17.

2-73. Since HP-IB addresses are usually greater than 100 (e.g., 705), an address less than 100 (e.g., 10) will cause the program to branch to a subroutine which sets up the RS-232-C Interface. Be sure to input the correct address for the type of interface being used.

2-74. To verify plotter repeatability, proceed as follows:

a. Load a new 0.3 mm pen into stable 1 of the pen carousel and insert the carousel into the plotter.

b. Turn the plotter LINE switch to ON.

c. Load a sheet of B-size (11 × 17 in.) paper onto the platen surface.

d. Using an HP-85A controller connected to the plotter, input the HP 7550A Repeatability Test Program.

e. In performing the Repeatability Test, the plotter initiates the following actions:

1. Advances the paper from front to back at normal velocity.

2. Slowly advances the paper from back to front while emulating the plotting of a sawtooth pattern. Takes approximately 2-1/2 minutes.

3. Reverse direction (front to back) while emulating the plotting of a sawtooth pattern. Takes approximately 2-1/2 minutes.

4. Advances the paper from back to front at normal velocity.

5. Picks designated pen and advances the paper from front to back.

6. Rapidly moves the paper from back to front, approximates the center of the paper, plots a mark (⌐) having a long horizontal segment, moves the paper fully forward, moves the paper from front to back, approximates the center of the paper, plots a short horizontal segment overlapping the long segment, and labels the position as 4. The marking is repeated eight more times, front to back, labeling the positions 3, 2, 1, 0, 1, 2, 3, and 4 for the paper axis respectively.

7. Rapidly moves the pen carriage fully right, moves the pen carriage from right to left, approximates the center of the paper, plots a mark (└) having a long vertical segment, moves the pen carriage fully left, moves the pen carriage from left to right, approximates the center of the paper, plots a mark (┘) having a short vertical segment overlapping the long segment, and labels the position as 4. The marking is repeated eight more times, left to right, labeling the positions 3, 2, 1, 0, 1, 2, 3, and 4 for the pen axis respectively.

f. Remove the Repeatability Plot from the plotter for inspection.

g. Visually, or using an optical comparator for greater accuracy, inspect the paper axis for the numbered position having no, or minimal, offset. Label this numbered position as X. Offset can be checked on the retrace (overlap) of the short horizontal lines over the long horizontal lines at the numbered positions.

h. Inspect the pen axis for the numbered position having no, or minimal, offset. Label this numbered position as Y. Offset can be checked on the retrace (overlap) of the short vertical lines over the long vertical lines at the numbered positions.

i. Using the Pythagorean Theorem (the square root of the sum of the squares), calculate the Repeatability value for the plotter as follows:

X = Numbered position in paper axis having no, or minimal, offset. See step g.

Y = Numbered position in pen axis having no, or minimal, offset. See step h.

R (Repeatability) = $\sqrt{x^2 + y^2}$, where R is measured in 0.001 in. increments.

e.g., if x=2 and y=3, then $R = \sqrt{x^2+y^2} = \sqrt{2^2+3^2} = \sqrt{13} \cong 3.6 \cong 0.0036$ in.

j. A Repeatability value equal to or less than 0.004 in. is within the plotter repeatability specification.

```
10 !
20 !   7550A REPEATABILITY TEST
30 !
40 !         (APRIL 1,1984)
50 !
60 !
70 ! SELECT ADDRESS FOR PLOTTER INTERFACE
80 !
90 CLEAR
100 DISP "ENTER ADDRESS"
110 DISP
120 DISP "   eg. RS-232-C    '10'"
130 DISP "   eg. HP-IB      '705'"
140 DISP
150 INPUT N
160 DISP "ADDRESS IS";N
170 IF N<99 THEN GOSUB 520
180 !
190 ! SET GRIT TRACKS IN PAPER
200 !
210 OUTPUT N USING "#,K" ; "INSP0VS76PD0,0,15970,0"
220 FOR J=1 TO 5
230 OUTPUT N USING "#,K" ; "VS1PR-1597,5323,-1597,-5323"
240 NEXT J
250 FOR J=1 TO 5
260 OUTPUT N USING "#,K" ; "VS1PR1597,5323,1597,-5323"
270 NEXT J
280 OUTPUT N USING "#,K" ; "VS76PA0,0PUSP1"
290 !
300 ! PAPER AXIS TEST
310 !
320 X1=-8891 @ X2=6815 @ I=323
330 FOR J=1 TO 9
340 OUTPUT N USING "#,K" ; "PA15970,3645PR";X1;",0PD-130,0,0,280"
350 OUTPUT N USING "#,K" ; "PUPA0,3645PR";X2;",0PD130,0,0,160PU"
360 OUTPUT N USING "#,K" ; "DI0,1SI.2,.2CP-2.5,-.2LB";VAL$(ABS(J-5));CHR$(3)
370 X1=X1+I @ X2=X2+I+1 @ I=I-1
380 NEXT J
390 !
400 ! PEN AXIS TEST
410 !
420 Y1=-5387 @ Y2=4519 @ I=323
430 FOR J=1 TO 9
440 OUTPUT N USING "#,K" ; "PA9665,10170PR0,";Y1;"PD0,-130,-280,0"
450 OUTPUT N USING "#,K" ; "PUPA9665,0PR0,";Y2;"PD0,130,-160,0PU"
460 OUTPUT N USING "#,K" ; "CP-.3,-2LB";VAL$(ABS(J-5));CHR$(3)
470 Y1=Y1+I @ Y2=Y2+I+1 @ I=I-1
480 NEXT J
490 OUTPUT N USING "#,K" ; "PA0,9999SP0;"
500 END
510 !
520 ! HP 85 RS232C INTERFACE SETUP
530 !
540 CONTROL N,1 ; 16 ! RECEIVED DATA GENERATES INTERRUPT
550 CONTROL N,2 ; 5 !  ACTIVATES DTR & CTS
560 CONTROL N,3 ; 11 ! SET BAUD RATE TO 2400
570 CONTROL N,4 ; 3 !  8 BITS/WORD WITH NO PARITY
580 CONTROL N,5 ; 16 ! ENABLES HARDWIRE HANDSHAKE
590 CONTROL N,16 ; 0 ! NO CHARACTERS SENT AT EOL
600 !
610 ! TURN-ON & CONFIGURATION
620 !
630 OUTPUT N USING "#,K" ; CHR$(27)&".(" !          TURN PLOTTER ON
640 OUTPUT N USING "#,K" ; CHR$(27)&".@;15:" !      SET HARDWARE HANDSHAKE
650 RETURN
 28284
```

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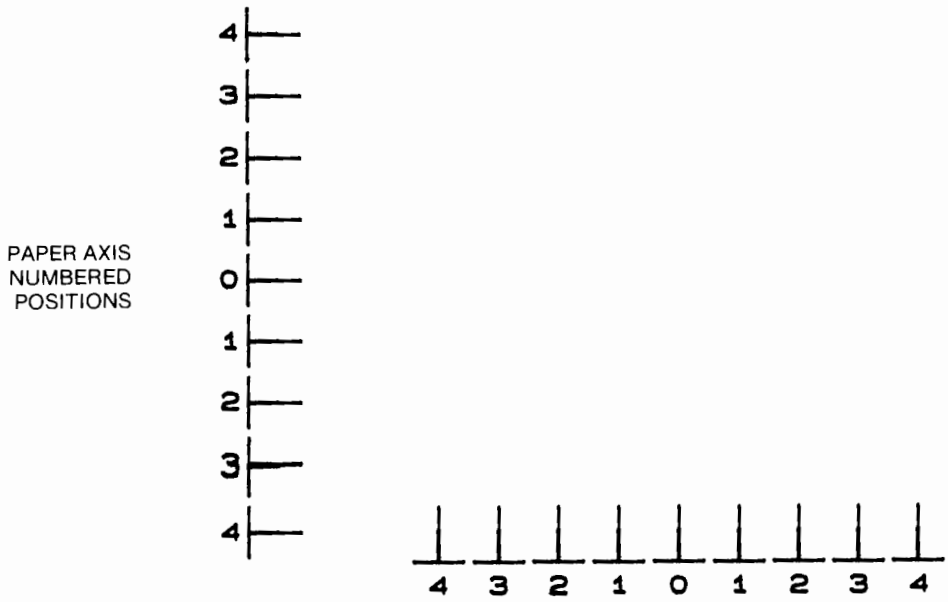
Figure 2-16. Repeatability Test Program



X = NUMBERED POSITION IN PAPER AXIS HAVING NO, OR MINIMAL, OFFSET.

Y = NUMBERED POSITION IN PEN AXIS HAVING NO, OR MINIMAL, OFFSET.

R (REPEATABILITY) = $\sqrt{x^2 + y^2}$, WHERE R IS MEASURED IN 0.001 INCH.

e.g., R = 2 = 0.002 IN.

EXAMPLE USING PLOT GIVEN ABOVE

X = 0
Y = 3
$R = \sqrt{x^2 + y^2} = 3$
R = 0.003 IN.

EXAMPLE HAVING R OUT OF SPECIFICATION

X = 4
Y = 3
$R = \sqrt{x^2 + y^2} = 5$
R = 0.005 IN.

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Figure 2-17. Repeatability Plot

SECTION III

ADJUSTMENTS

3-1. INTRODUCTION

3-2. This section describes procedures and checks used to maintain the Model 7550A Plotter, or to return the plotter to proper operating condition after repairs have been made.

3-3. ELECTRICAL ADJUSTMENTS

3-4. X- AND Y-AXIS MOTOR GAIN CALIBRATION

3-5. This procedure is an internal automatic calibration procedure that measures the performance of the X- and Y-axis drive motors and adjusts the servo gain of each motor to a discreet value. The resultant 'matched' performance of the motors compensates for motors having slightly different magnetic, electrical and mechanical properties.

3-6. X- and Y-axis motor gain calibration is used to obtain maximum line quality in the plotter and should be performed whenever the Main PCA or either of the X-or Y-axis drive motors is replaced.

3-7. To perform the X- and Y-axis motor gain calibration procedure, perform the following steps:

a. Turn the plotter LINE switch to OFF (O).

b. While pressing the front-panel ENTER and Pen Select 4 pushbuttons down, turn the plotter LINE switch to ON (I). Release the pushbuttons.

c. The plotter will move the pen carriage to the left-hand limit of travel and then perform a series of short moves. During these short moves, the performance of each motor is measured. The servo gains are then automatically calibrated to match the motor's performance. The gain calibration constants are then automatically stored in the EAROM, even during subsequent power OFF (O) and ON (I) periods, until changed by performing this procedure again.

d. After successful completion of this procedure, the plotter will automatically enter the initialization sequence and will then be ready for normal operation.

e. If a failure occurs, the gain calibration will not be performed. Refer to the troubleshooting information contained in Section VI of this manual.

SECTION IV

REPLACEABLE PARTS

4-1. INTRODUCTION

4-2. This section contains parts information for the Model 7550A Plotter. Included herein is a listing of assemblies, replaceable parts, and ordering information. Table 4-1 is a list of exchange assemblies, and Table 4-2 lists reference designations and abbreviations used throughout this manual. Tables 4-3 through 4-8 list all replaceable parts in assembly number sequence and/or reference designator order. Table 4-9 contains the names and addresses that correspond to the manufacturer's code numbers.

4-3. EXCHANGE ASSEMBLIES

4-4. Factory rebuilt assemblies that can be exchanged are listed in Table 4-1. Exchange, factory repaired and tested, assemblies are available only on a trade-in basis; therefore, the defective assemblies must be returned for credit.

4-5. REFERENCE DESIGNATIONS AND ABBREVIATIONS

4-6. Table 4-2 lists reference 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.

4-7. REPLACEABLE PARTS LISTS

4-8. The lists of replaceable parts are organized such that printed circuit assemblies (PCAs) and their components are listed in alphanumerical order by reference designation. Mechanical parts are listed in order by number-keyed designations corresponding to the illustrated parts breakdown (IPB) diagrams in this section. The information given for each part consists of the check digit, Hewlett-Packard part number, the quantity used in the plotter, the part description, the manufacturer's code number, and manufacturer's part number. The total quantity for each part is given only once, at the first appearance of the part number in the list.

4-9. PRINTED CIRCUIT ASSEMBLIES

4-10. Parts located on the main printed circuit assembly (PCA A1) are listed in Table 4-3. The components on the PCA are listed in alphanumerical order by reference designation.

4-11. CABLE ASSEMBLIES

4-12. Interconnecting cable assemblies with their respective part numbers are illustrated in Figure 4-1. Use the part number and assembly name when ordering the cable assemblies.

4-13. MECHANICAL ASSEMBLIES

4-14. Mechanical assemblies and frame mounted parts are listed in Tables 4-4 through 4-8 and illustrated in Figures 4-2 through 4-7. Match the appropriate parts list and illustrated parts breakdown diagram for part identification.

4-15. CODE LIST OF MANUFACTURERS

4-16. Table 4-9 lists the five-digit code numbers assigned to the manufacturers of parts in the HP Model 7550A Graphics Plotter. These code numbers appear with the parts in the Replaceable Parts Lists in this section as an aid for ordering replacement parts directly from the manufacturer.

4-17. ORDERING INFORMATION

4-18. To obtain replacement parts or assemblies, address an order or inquiry to the nearest Hewlett-Packard Sales and Support Office. The order should include the part or assembly number, its description and location, and the plotter model and serial number.

4-19. CHECK DIGITS

4-20. A check digit is required to order any parts from Hewlett-Packard. This digit prevents numbers from being transposed on the order, resulting in an incorrect order. If the check digit is not included on the material list, it can be calculated by referring to Table 4-10, Check Digit Calculation, and following the instructions given there.

Table 4-1. Parts List, Exchange Assemblies — Model 7550A

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1	07550-66109	3	1	PCA, MAIN (A1), REBUILT NOTE REBUILT ASSEMBLY PART NUMBERS HAVE A -66XXX SUFFIX. NEW ASSEMBLIES HAVE A -60XXX SUFFIX.	28480	07550-66109

Table 4-2. Reference Designations and Abbreviations

REFERENCE DESIGNATIONS

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

ABBREVIATIONS

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

NOTE

All abbreviations in the parts list will be in uppercase.

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Table 4-2. 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 uppercase.

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}

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Table 4-3. Parts List, Main PCA (A1) — Model 7550A

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1	07550-60109	1	1	MAIN PCA (DATE CODE 2549-11)	28480	07550-60109
A1C1	0160-4832	4	21	CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C2	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C3	0180-3290	8	2	CAPACITOR-FXD 3300UF +-20% 16VDC AL	28480	0180-3290
A1C4	0160-4808	4	14	CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C5	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C6	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C7				NOT ASSIGNED		
A1C8	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C9	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C10	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C11	0160-4835	7	6	CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A1C12	0160-4574	1	9	CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1C13				NOT ASSIGNED		
A1C14	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C15	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C16	0180-3043	9	1	CAPACITOR-FXD 100UF+50-10% 25VDC AL	28480	0180-3043
A1C17	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C18	0180-3290	8		CAPACITOR-FXD 3300UF +-20% 16VDC AL	28480	0180-3290
A1C19				NOT ASSIGNED		
A1C20	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C21	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A1C22	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C23	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C24	0180-3676	4	1	CAPACITOR-FXD 3.3UF 20% AL 50VDC	28480	0180-3676
A1C25	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C26	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C27	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C28	0160-4808	4		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4808
A1C29	0180-0230	0	1	CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0180-0230
A1C30				NOT ASSIGNED		
A1C31	0180-2844	6	1	CAPACITOR-FXD 5300UF+75-10% 12VDC AL	00853	300JL532U012B
A1C32	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C33	0180-0228	6	1	CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A1C34	0160-4574	1		CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1C35	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A1C36	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C37	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C38	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A1C39	0160-2347	2	1	CAPACITOR-FXD 1UF +-10% 200VDC MET-POLYE	28480	0160-2347
A1C40	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C41	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C42	0160-0168	1	1	CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A1C43	0160-0163	6	1	CAPACITOR-FXD .033UF +-10% 200VDC POLYE	28480	0160-0163
A1C44	0160-0301	4	2	CAPACITOR-FXD .012UF +-10% 200VDC POLYE	28480	0160-0301
A1C45	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C46	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A1C47	0160-0301	4		CAPACITOR-FXD .012UF +-10% 200VDC POLYE	28480	0160-0301
A1C48	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C49	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C50	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C51	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C52	0180-2879	7	1	CAPACITOR-FXD 22UF+50-10% 25VDC AL	28480	0180-2879
A1C53	0160-4574	1		CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1C54	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A1C55	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C56	0180-3388	5	1	CAPACITOR-FXD .01F +75 -10% 60VDC AL	28480	0180-3388
A1C57	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C58	0160-4574	1		CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1C59	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C60	0160-4574	1		CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1C61	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C62	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C63	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A1C64	0160-4574	1		CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1C65	0160-4574	1		CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1C66	0160-4574	1		CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1C67	0160-4574	1		CAPACITOR-FXD 1000PF +-10% 100VDC CER	28480	0160-4574
A1CR1	1906-0262	9	2	DIODE RECT VRM-100V MAX IO-3A	28480	1906-0262
A1CR2	1901-0692	9	1	DIODE-PWR RECT 200V 3A 200NS	04713	SR2475
A1CR3	1901-0986	4	4	DIODE-PWR RECT 60V 10A	28480	1901-0986
A1CR4	1901-1065	2	6	DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A1CR5	1901-0987	5	1	DIODE-PWR RECT 100V 8A	28480	1901-0987
A1CR6	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A1CR7	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A1CR8	1901-0986	4		DIODE-PWR RECT 60V 10A	28480	1901-0986
A1CR9	1901-0986	4		DIODE-PWR RECT 60V 10A	28480	1901-0986
A1CR10	1901-0986	4		DIODE-PWR RECT 60V 10A	28480	1901-0986

Table 4-3. Parts List, Main PCA (A1) — Model 7550A (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1CR11	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A1CR12	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A1CR13	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A1CR14	1906-0262	9		DIODE RECT VRM=100V MAX IO=3A	28480	1906-0262
A1CR15	1901-1081	2	4	DIODE-PWR RECT 100V 3A	04713	MR501
A1CR16	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR17	1901-0050	3	7	DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1CR19	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR20	1901-1081	2		DIODE-PWR RECT 100V 3A	04713	MR501
A1CR21	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1CR23	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1CR24	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1CR25	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A1DS1	1990-0962	3	1	LED-INFRARED IF=50MA-MAX BVR=2V	28480	1990-0962
A1E1	07550-40175	9	1	MOUNT, PHOTO SENSOR	28480	07550-40175
A1F1	2110-0633	2	2	FUSE 2.5A 250V TD IEC	28480	2110-0633
A1F2	2110-0633	2		FUSE 2.5A 250V TD IEC	28480	2110-0633
A1J1	1252-0094	8	1	CONNECTOR 25-PIN F D SUBMIN	28480	1252-0094
A1J2	1251-4245	7	2	CONNECTOR 2-PIN M POST TYPE	28480	1251-4245
A1J3	1251-8472	0	1	CONNECTOR 26-PIN M POST TYPE	28480	1251-8472
A1J4	1251-8188	5	2	CONN-POST TYPE .100-PIN-SPCG 4-CONT	28480	1251-8188
A1J5	1252-0205	3	1	CONNECTOR 2-PIN M POST TYPE	28480	1252-0205
A1J6	1200-1095	2	1	SOCKET-STRP 6-CONT SIP DIP-SLDR	28480	1200-1095
A1J7	1251-3276	2	2	CONNECTOR 6-PIN M POST TYPE	28480	1251-3276
A1J8	1251-8794	9	1	CONNECTOR M 25P D-SUBMIN	28480	1251-8794
A1J9	1252-0204	2	1	CONNECTOR 3-PIN M POST TYPE	28480	1252-0204
A1J10	1251-3276	2		CONNECTOR 6-PIN M POST TYPE	28480	1251-3276
A1J11	1251-8170	5	1	CONN-POST TYPE .100-PIN-SPCG 2-CONT	28480	1251-8170
A1J12	1251-8188	5		CONN-POST TYPE .100-PIN-SPCG 4-CONT	28480	1251-8188
A1J13	1251-4245	7		CONNECTOR 2-PIN M POST TYPE	28480	1251-4245
A1J14	1251-7039	3	1	CONNECTOR 2-PIN M POST TYPE	28480	1251-7039
A1J15	1251-4040	0	1	CONNECTOR 24-PIN F MICRO RIBBON	28480	1251-4040
A1L1	9100-1620	5	4	INDUCTOR RF-CH-MLD 15UH 10% .166DX.385LG	28480	9100-1620
A1L2	9100-1620	5		INDUCTOR RF-CH-MLD 15UH 10% .166DX.385LG	28480	9100-1620
A1L3	9100-1620	5		INDUCTOR RF-CH-MLD 15UH 10% .166DX.385LG	28480	9100-1620
A1L4	9100-1620	5		INDUCTOR RF-CH-MLD 15UH 10% .166DX.385LG	28480	9100-1620
A1L5	9100-1788	6	3	CHOKE-WIDE BAND ZMAX=680 OHM@ 180 MHZ	02114	VK200 20/48
A1L6	9100-1788	6		CHOKE-WIDE BAND ZMAX=680 OHM@ 180 MHZ	02114	VK200 20/48
A1L7	9100-1788	6		CHOKE-WIDE BAND ZMAX=680 OHM@ 180 MHZ	02114	VK200 20/48
A1P1	1258-0189	4	1	JUMPER-REMOVABLE FOR 0.025 IN SQUARE	28480	1258-0189
A1Q1	1854-0873	7	4	TRANSISTOR NPN TO-220AB PD=83W	28480	1854-0873
A1Q2	1853-0491	3	4	TRANSISTOR PNP TO-220AB PD=83W	28480	1853-0491
A1Q3	1854-0215	1	1	TRANSISTOR NPN SI PD=350MW FT=300MHZ	04713	2N3904
A1Q4	1854-0873	7		TRANSISTOR NPN TO-220AB PD=83W	28480	1854-0873
A1Q5	1853-0491	3		TRANSISTOR PNP TO-220AB PD=83W	28480	1853-0491
A1Q6	1854-0997	6	1	TRANSISTOR NPN SI PD=1.4W FT=4MHZ	28480	1854-0997
A1Q7	1855-0517	8	1	TRANSISTOR MOSFET P-CHAN E-MODE TO-220	28480	1855-0517
A1Q8	1854-0873	7		TRANSISTOR NPN TO-220AB PD=83W	28480	1854-0873
A1Q9	1853-0491	3		TRANSISTOR PNP TO-220AB PD=83W	28480	1853-0491
A1Q10	1854-0873	7		TRANSISTOR NPN TO-220AB PD=83W	28480	1854-0873
A1Q11	1853-0491	3		TRANSISTOR PNP TO-220AB PD=83W	28480	1853-0491
A1Q12	1853-0530	1	1	TRANSISTOR PNP SI DARL TO-220AB PD=65W	28480	1853-0530
A1Q13	1854-0953	4	1	TRANSISTOR NPN SI DARL TO-220AB PD=65W	28480	1854-0953
A1Q14	1884-0281	4	1	THYRISTOR-SCR 2N6505 TO-220AB VRRM=100	04713	2N6505
A1Q15	1854-0998	7	4	TRANSISTOR NPN SI TO-202AB PD=2.1W	28480	1854-0998
A1Q16	1853-0552	7	4	TRANSISTOR PNP SI TO-92 PD=1W FT=50MHZ	28480	1853-0552
A1Q17	1854-0998	7		TRANSISTOR NPN SI TO-202AB PD=2.1W	28480	1854-0998
A1Q18	1853-0552	7		TRANSISTOR PNP SI TO-92 PD=1W FT=50MHZ	28480	1853-0552
A1Q19	1853-0552	7		TRANSISTOR PNP SI TO-92 PD=1W FT=50MHZ	28480	1853-0552
A1Q20	1854-0998	7		TRANSISTOR NPN SI TO-202AB PD=2.1W	28480	1854-0998
A1Q21	1854-0998	7		TRANSISTOR NPN SI TO-202AB PD=2.1W	28480	1854-0998
A1Q22	1853-0552	7		TRANSISTOR PNP SI TO-92 PD=1W FT=50MHZ	28480	1853-0552
A1Q23	1990-0964	5	1	PHOTOSWITCH IF=50 MA-MAX	28480	1990-0964
A1R1	0757-0290	5	6	RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1R2	0757-0280	3	1	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A1R3	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1R4	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1R5	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1R6	0757-0416	7	1	RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A1R7	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1R8	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A1R9	0699-0756	4	1	RESISTOR 215 2% .25W F TC=0+-100	28480	0699-0756
A1R10	0757-0442	9	1	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F

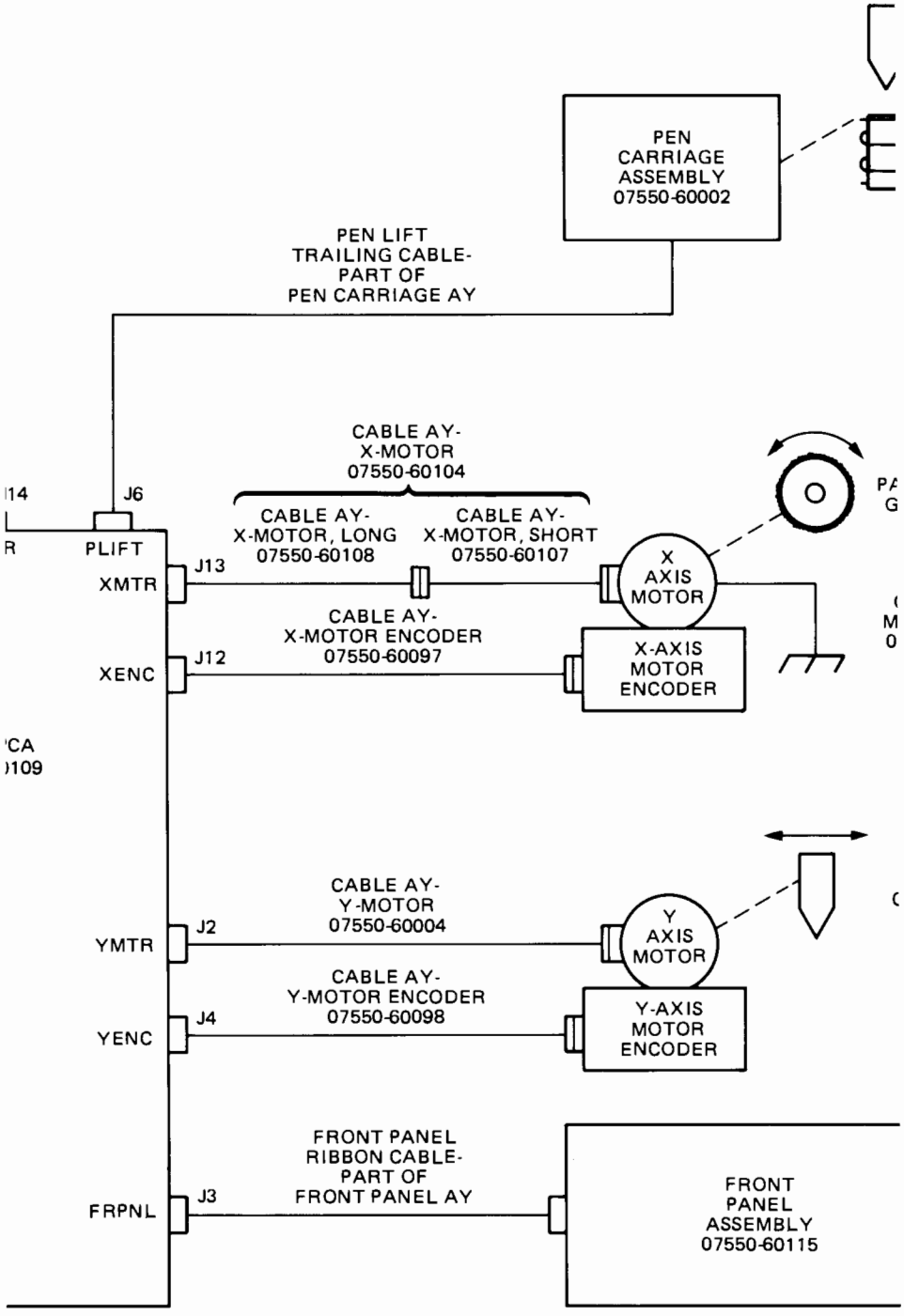
Table 4-3. Parts List, Main PCA (A1) — Model 7550A (Continued)

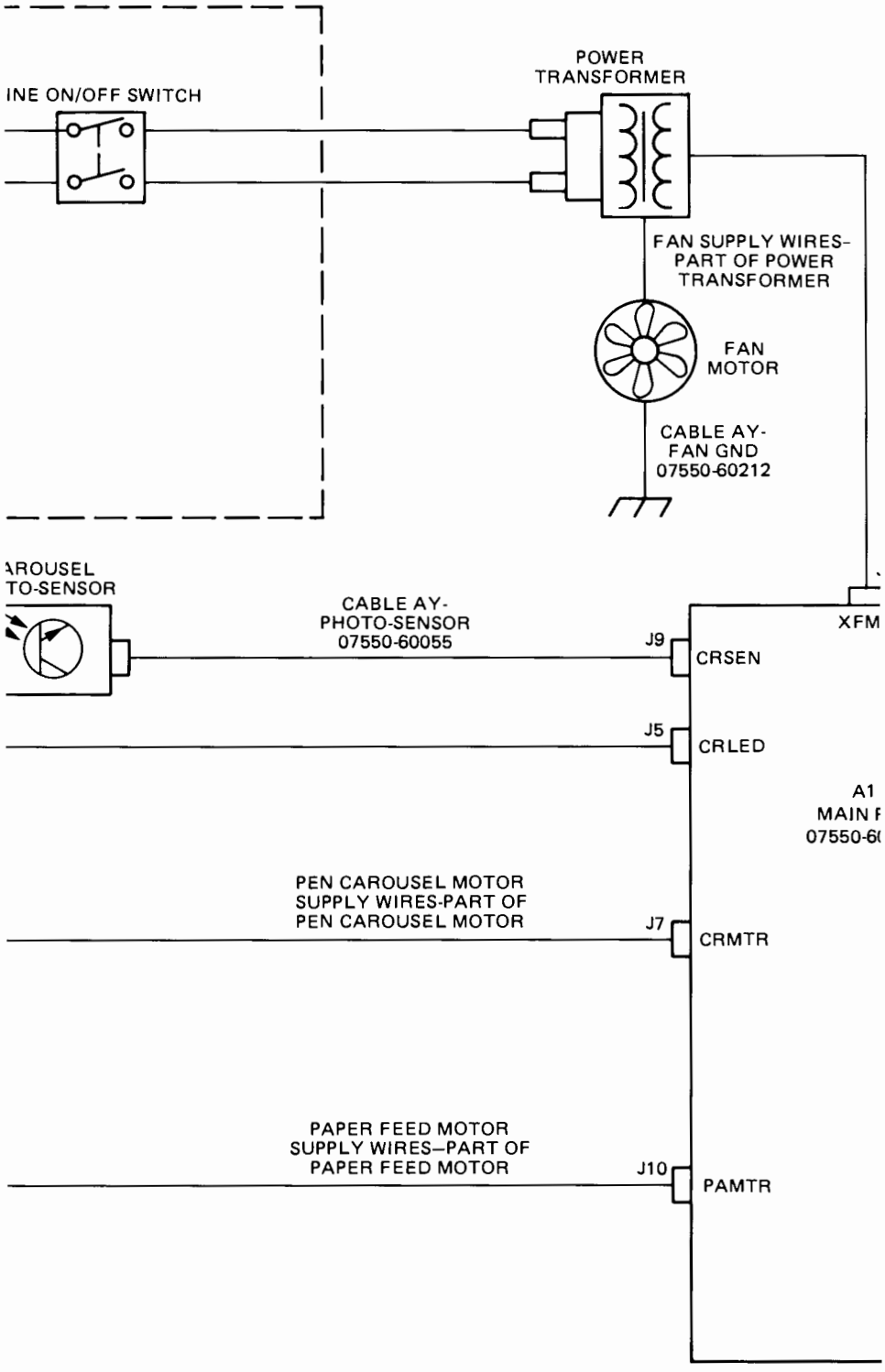
Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1R11	0683-0275	9	4	RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB27G5
A1R12	0683-0275	9		RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB27G5
A1R13	0698-3150	6	1	RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A1R14	0699-0975	9	6	RESISTOR-FXD 10 OHM 2%	28480	0699-0975
A1R15	0699-0975	9		RESISTOR-FXD 10 OHM 2%	28480	0699-0975
A1R16	0757-0394	0	5	RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1R17	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1R18	0698-3447	4	1	RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A1R19	0757-0458	7	1	RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A1R20	0757-0399	5	1	RESISTOR 82.5 1% .125W F TC=0+-100	24546	C4-1/8-T0-82R5-F
A1R21	0698-3428	1	1	RESISTOR-FXD 14.7 OHM 1% .125W F TC=0+-100	24546	C4-1/8-T0-14R7-F
A1R22	0757-0428	1	2	RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A1R23	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1R24	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1R25	0699-0975	9		RESISTOR-FXD 10 OHM 2% .25W F TC=0+-100	28480	0699-0975
A1R26	0699-0975	9		RESISTOR-FXD 10 OHM 2% .25W F TC=0+-100	28480	0699-0975
A1R27	0683-0275	9		RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB27G5
A1R28	0683-0275	9		RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB27G5
A1R29	0698-3155	1	9	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R30	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R31	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A1R32	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R33	0699-0975	9		RESISTOR-FXD 10 OHM 2% .25W F TC=0+-100	28480	0699-0975
A1R34	0757-1094	9	1	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A1R35	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A1R36	0699-0975	9		RESISTOR-FXD 10 OHM 2% .25W F TC=0+-100	28480	0699-0975
A1R37	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R38	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R39	0698-3161	9	2	RESISTOR 38.3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3832-F
A1R40	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R41	0811-2568	0	1	RESISTOR 1 1% 3W PW TC=0+-50	28480	0811-2568
A1R42	0757-0440	7	1	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A1R43	0698-3449	6	1	RESISTOR 28.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2872-F
A1R44	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R45	0683-6815	5	1	RESISTOR 680 5% .25W FC TC=-400/+600	01121	CB6815
A1R46	0757-0470	3	1	RESISTOR 162K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1623-F
A1R47	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R48	0698-3441	8	1	RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A1R49	0757-0123	3	1	RESISTOR 34.8K 1% .125W F TC=0+-100	28480	0757-0123
A1R50	0698-3161	9		RESISTOR 38.3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3832-F
A1R51	0698-3412	3	6	RESISTOR 3.83K 1% .5W F TC=0+-100	28480	0698-3412
A1R52	0699-1290	9	4	RESISTOR 56.2 2% .25W F TC=0+-100	28480	0699-1290
A1R53	0698-3412	3		RESISTOR 3.83K 1% .5W F TC=0+-100	28480	0698-3412
A1R54	0699-1290	9		RESISTOR 56.2 2% .25W F TC=0+-100	28480	0699-1290
A1R55	0698-3412	3		RESISTOR 3.83K 1% .5W F TC=0+-100	28480	0698-3412
A1R56	0699-1290	9		RESISTOR 56.2 2% .25W F TC=0+-100	28480	0699-1290
A1R57	0698-3412	3		RESISTOR 3.83K 1% .5W F TC=0+-100	28480	0698-3412
A1R58	0699-1290	9		RESISTOR 56.2 2% .25W F TC=0+-100	28480	0699-1290
A1R59	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A1R60	0757-0401	0	1	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A1R61	0698-3412	3		RESISTOR 3.83K 1% .5W F TC=0+-100	28480	0698-3412
A1R62	0698-3412	3		RESISTOR 3.83K 1% .5W F TC=0+-100	28480	0698-3412
A1RN1	1810-0279	5	4	NETWORK-RES 10-SIP4.7K OHM X 9	01121	219A472
A1RN2	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	219A472
A1RN3	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	219A472
A1RN4	1810-0655	1	1	NETWORK-RES 9-SIP MULTI-VALUE	28480	1810-0655
A1RN5	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	219A472
A1RN6	1810-0656	2	1	NETWORK-RES 9-SIP MULTI-VALUE	28480	1810-0656
A1T1	9100-4319	5	1	TRANSFORMER FLYBACK CONVERTER;TURNS	28480	9100-4319
A1U1	1820-2703	5	1	IC DRVR TTL DIFF LINE QUAD	28480	1820-2703
A1U2	1820-2594	2	1	IC RCVR TTL LS LINE RCVR QUAD 2-INP	28480	1820-2594
A1U3	1818-3220	8	1	IC NMOS 4096 (4K) EAROM 450-NS 3-S	28480	1818-3220
A1U4	1820-3322	6	2	IC DRVR DTL COMM EIA RS-232C QUAD	28480	1820-3322
A1U5	1820-3321	5	2	IC RCVR DTL COMM EIA RS-232C QUAD	28480	1820-3321
A1U6	1818-3198	9	2	IC CMOS 65536(64K) STAT RAM 150-NS 3 S	28480	1818-3198
A1U7	1820-3489	6	1	IC 75407 8-DIP-P PKG	28480	1820-3489
A1U8	1820-3322	6		IC DRVR DTL COMM EIA RS-232C QUAD	28480	1820-3322
A1U9	1820-3321	5		IC RCVR DTL COMM EIA RS-232C QUAD	28480	1820-3321
A1U10	1826-1117	5	1	IC V RGLTR-SWG 16-DIP-P PKG	28480	1826-1117
A1U11	1820-2274	5	2	IC DRVR TTL QUAD	13606	ULN 2068B
A1U12	07550-18103	6	1	ROM-UPPER LSB	28480	07550-18103
A1U13	1820-0660	7	1	IC BFR TTL NON-INV HEX 1-INP	01295	SN7407N
A1U14	1820 2872	9	1	IC NMOS TRANSMITTER/RECEIVER	28480	1820 2872
A1U15	1820-2274	5		IC DRVR TTL QUAD	13606	ULN-2068B

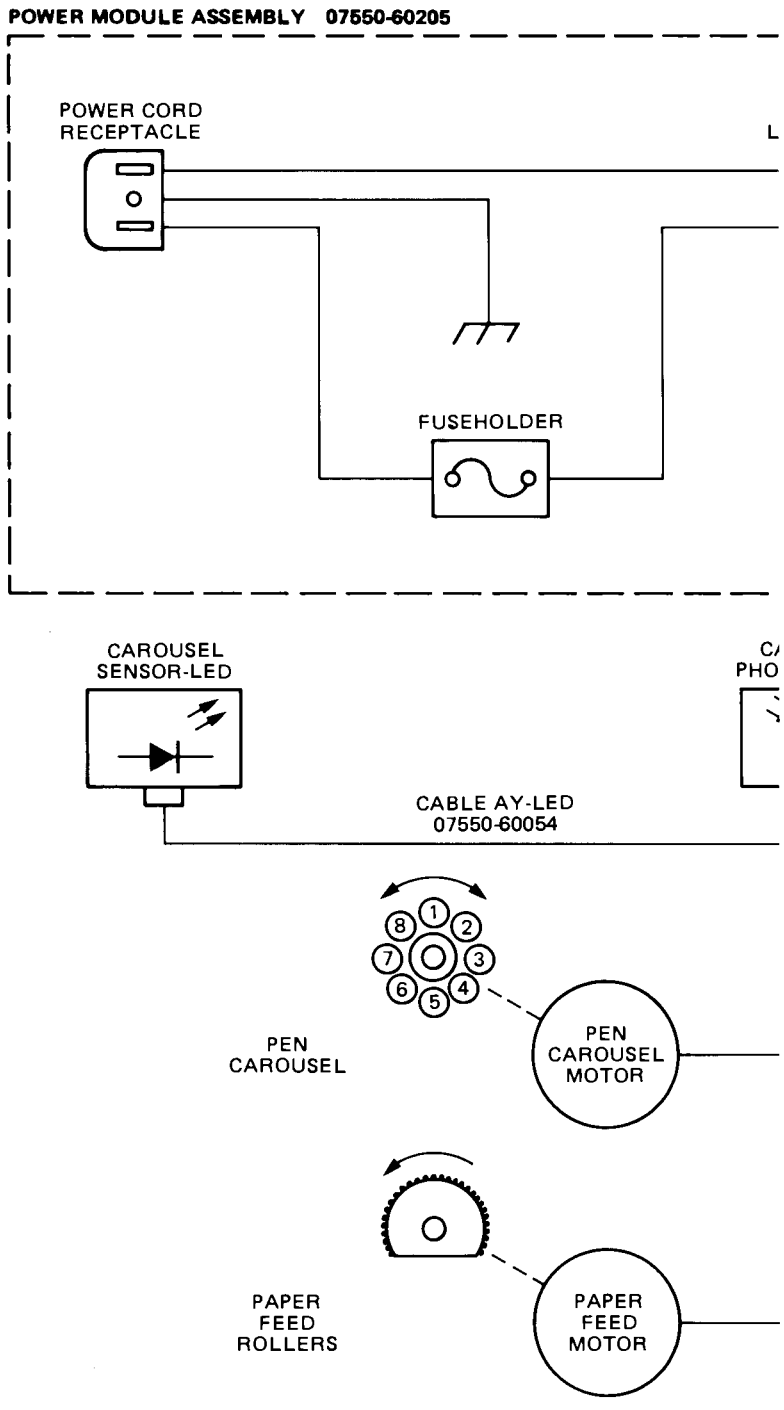
Table 4-3. Parts List, Main PCA (A1) — Model 7550A (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1U16	1820-1730	6	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U17	07550-18121	8	1	ROM-LOWER LSB	28480	07550-18121
A1U18	1820-1245	8	1	IC DCDR TTL LS 2-TO-4-LINE DUAL 2-INP	01295	SN74LS155N
A1U19	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A1U20	1818-3198	9		IC CMOS 65536(64K) STAT RAM 150-NS 3-S	28480	1818-3198
A1U21	1RD5-6101	7	1	IC-STD CELL (SUPPORT IC)	28480	1RD5-6101
A1U22	1818-3452	8	1	ROM-UPPER MSB	28480	1818-3452
A1U23	1826-0138	8	1	IC COMPARATOR GP QUAD 14-DIP-P PKG	01295	LM339N
A1U24	1826-0161	7	1	IC OP AMP GP QUAD 14-DIP-P PKG	04713	MLM324P
A1U25	1820-3346	4	1	IC-16BIT,6MHZ,16M-BYTE-ADDRESS MPU	28480	1820-3346
A1U26	07550-18122	9	1	ROM-LOWER MSB	28480	07550-18122
A1U27	1820-2485	0	1	IC RCVR TTL LS BUS OCTL	01295	SN75160N
A1U28	1820-2549	7	1	IC-8291A P HPIB	28480	1820-2549
A1U29	1RD6-6101	9	1	IC-STDD CELL (SERVO IC)	28480	1RD6-6101
A1U30	1820-2483	8	1	IC RCVR TTL LS BUS OCTL	01295	SN75161N
A1U31	1820-2715	9	2	IC DRVR TTL NAND DUAL 2-INP	01295	SN75447P
A1U32	1820-2715	9		IC DRVR TTL NAND DUAL 2-INP	01295	SN75447P
A1U33	1813-0390	7	1	XTAL-CLOCK-OSCILLATOR 6-MHZ 0.01% TTL	28480	1813-0390
A1VR1	1902-3002	3	1	DIODE-ZNR 2.37V 5% DO-7 PD=.4W TC=-.074%	28480	1902-3002
A1VR2	1902-1249	6	2	DIODE-ZNR 24.9V 5% DO-15 PD=1W TC=+.081%	28480	1902-1249
A1VR3	1902-0652	3	2	DIODE-ZNR 11V 5% PD=1W IR=5UA	28480	1902-0652
A1VR4	1902-0652	3	2	DIODE-ZNR 11V 5% PD=1W IR=5UA	28480	1902-0652
A1VR5	1902-1249	6		DIODE-ZNR 24.9V 5% DO-15 PD=1W TC=+.081%	28480	1902-1249
A1VR6	1902-0049	2	1	DIODE-ZNR 6.19V .4W 5%	28480	1902-0049
A1W1	8159-0005	0	2	LEAD ELECT SLDR-IN	28480	8159-0005
A1W4	8159-0005	0		LEAD ELECT SLDR-IN	28480	8159-0005
A1XF1A	2110-0589	7	4	CLIP FUSEHOLDER 250V	28480	2110-0589
A1XF1B	2110-0589	7		CLIP FUSEHOLDER 250V	28480	2110-0589
A1XF2A	2110-0589	7		CLIP FUSEHOLDER 250V	28480	2110-0589
A1XF2B	2110-0589	7		CLIP FUSEHOLDER 250V	28480	2110-0589
				MISCELLANEOUS		
	0340-1005	9	4	INSULATOR-XSTR POLYI	28480	0340-1005
	0515-0055	8	8	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD	28480	0515-0055
	0515-0104	8	4	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-0104
	0535-0031	2	12	NUT-HEX W/LKWR M3 X 0.5 2.4MM-THK	00000	ORDER BY DESCRIPTION
	3050-0960	1	4	WASHER-SHLDR 3MM 3.1MM-ID 3.55MM-OD	28480	3050-0960
	07550-00100	6	2	HEAT SINK	28480	07550-00100
	07550-00101	7	1	HEAT SINK	28480	07550-00101
	07550-20018	7	2	STANDOFF-HPIB	28480	07550-20018
	07550-20019	1	4	STANDOFF RS-232-C	28480	07550-20019

Figure 4-1. HP Model 7550A Interconnecting Cable Identification Diagram


PEN
CARRIAGE
ASSEMBLY
07550-60002
PEN LIFT
TRAILING CABLE-
PART OF
PEN CARRIAGE AY
CABLE AY-
X-MOTOR
07550-60104
CABLE AY-
X-MOTOR, LONG
07550-60108
CABLE AY-
X-MOTOR, SHORT
07550-60107
J6
PLIFT
J13
XMTR
X
AXIS
MOTOR
CABLE AY-
X-MOTOR ENCODER
07550-60097
J12
XENC
X-AXIS
MOTOR
ENCODER
CABLE AY-
Y-MOTOR
07550-60004
J2
YMTR
Y
AXIS
MOTOR
CABLE AY-
Y-MOTOR ENCODER
07550-60098
J4
YENC
Y-AXIS
MOTOR
ENCODER
FRONT PANEL
RIBBON CABLE-
PART OF
FRONT PANEL AY
J3
FRPNL
FRONT
PANEL
ASSEMBLY
07550-60115


INE ON/OFF SWITCH
POWER
TRANSFORMER
FAN SUPPLY WIRES-
PART OF POWER
TRANSFORMER
FAN
MOTOR
CABLE AY-
FAN GND
07550-60212
AROUSEL
TO-SENSOR
CABLE AY-
PHOTO-SENSOR
07550-60055
J9
CRSEN
XFM
J5
CRLED
A1
MAIN
07550-6
PEN CAROUSEL MOTOR
SUPPLY WIRES-PART OF
PEN CAROUSEL MOTOR
J7
CRMTR
PAPER FEED MOTOR
SUPPLY WIRES–PART OF
PAPER FEED MOTOR
J10
PAMTR


POWER MODULE ASSEMBLY 07550-60205
POWER CORD
RECEPTACLE
L
FUSEHOLDER
CAROUSEL
SENSOR-LED
C/
PHO
CABLE AY-LED
07550-60054
8
1
2
7
3
6
4
5
PEN
CAROUSEL
PEN
CAROUSEL
MOTOR
PAPER
FEED
ROLLERS
PAPER
FEED
MOTOR

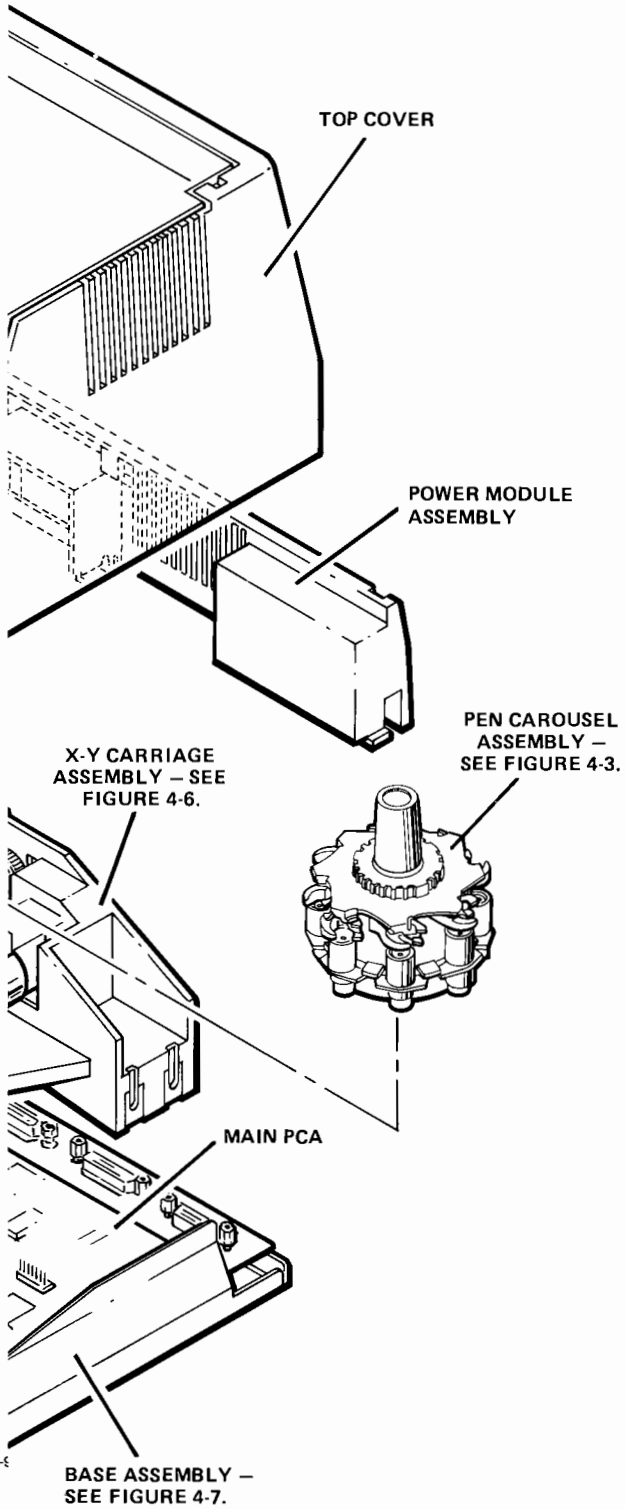
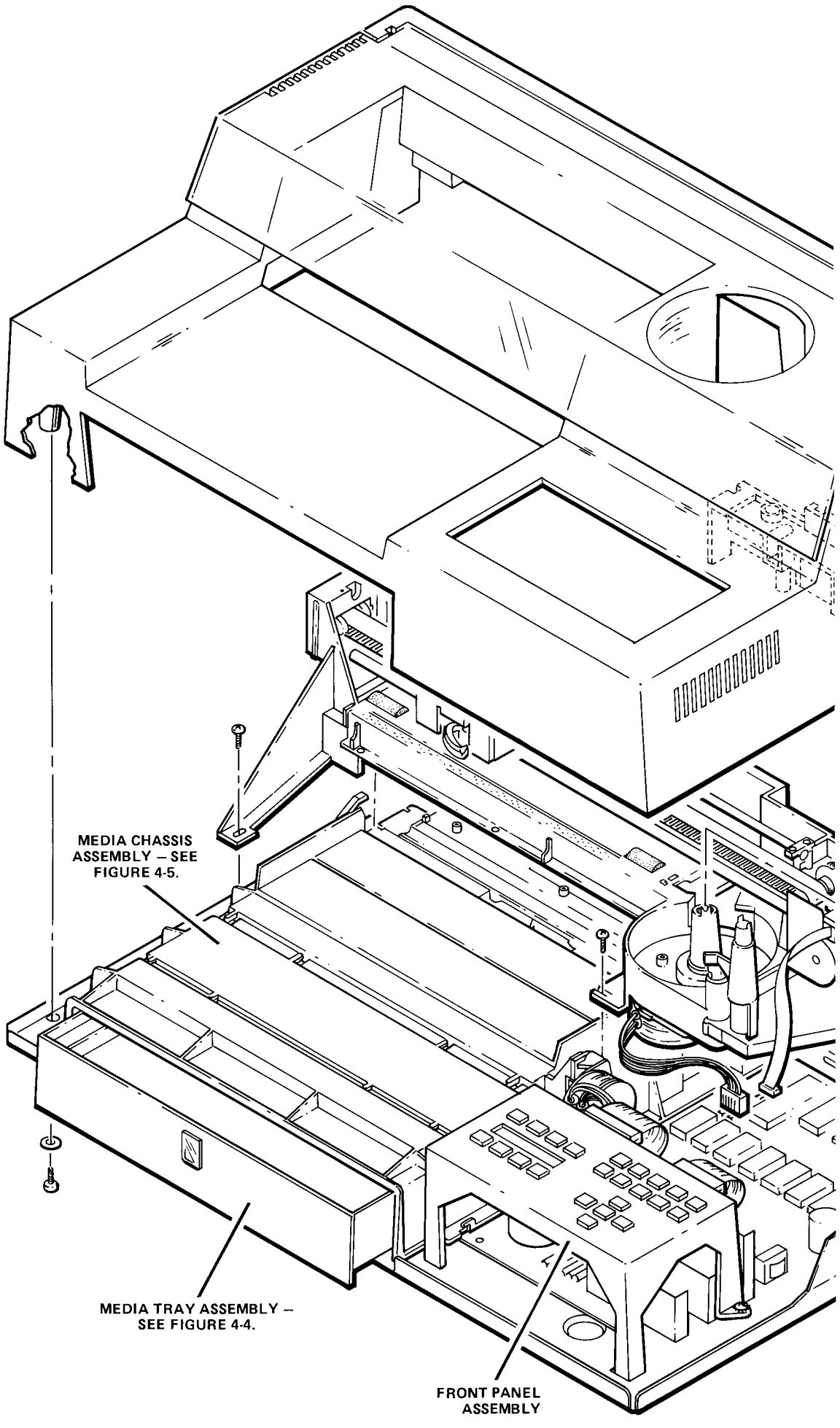
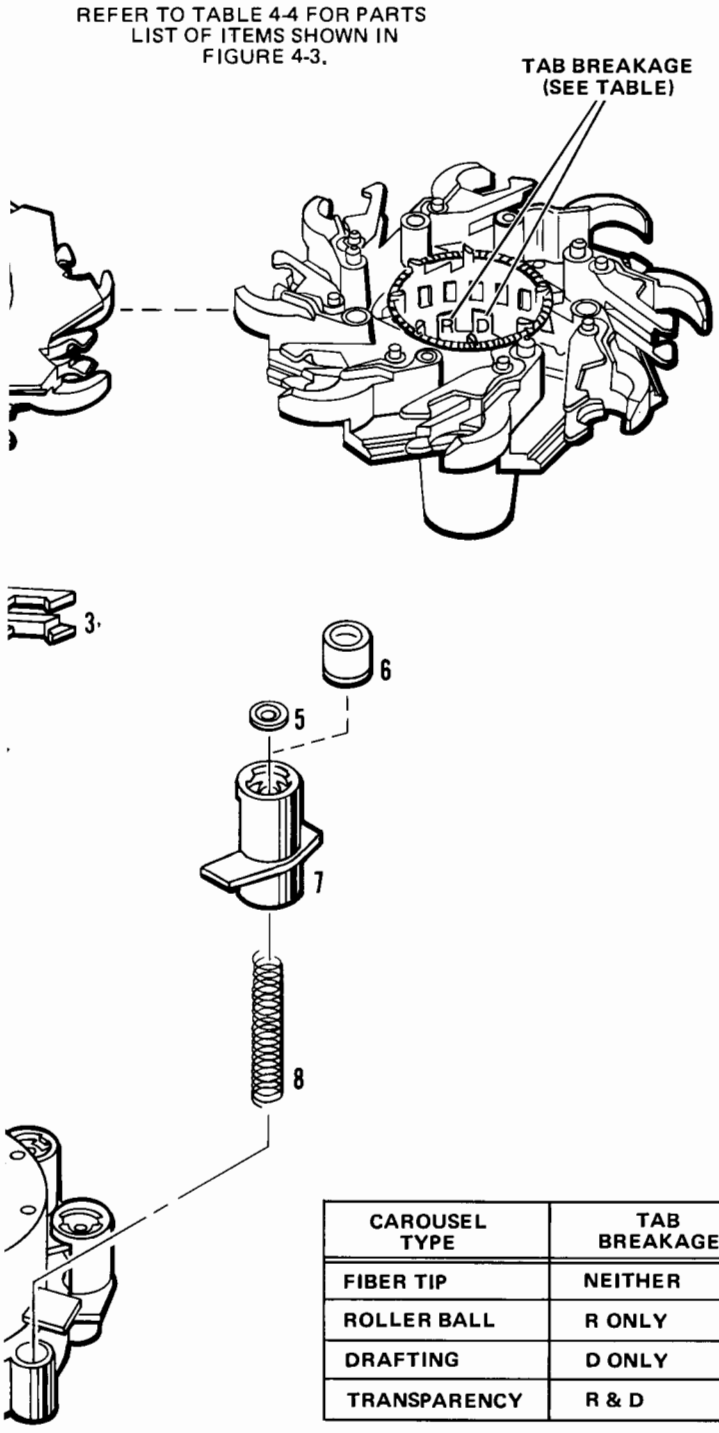


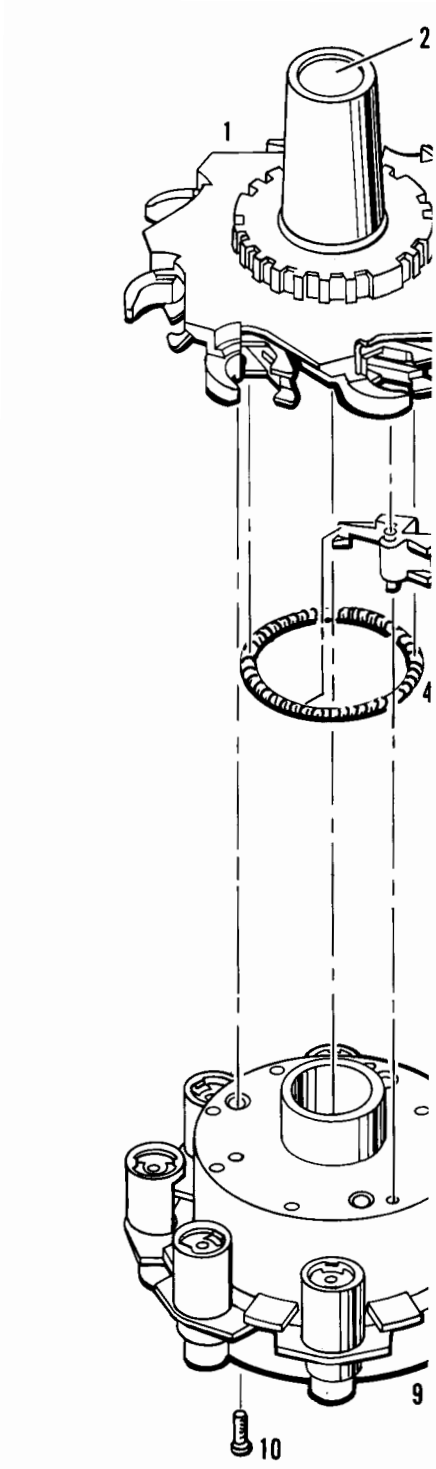
Figure 4-2. HP Model 7550A Assembly Identification Diagram


MEDIA CHASSIS ASSEMBLY – SEE FIGURE 4-5.
MEDIA TRAY ASSEMBLY – SEE FIGURE 4-4.
FRONT PANEL ASSEMBLY



CAROUSEL TYPE	TAB BREAKAGE
FIBER TIP	NEITHER
ROLLER BALL	R ONLY
DRAFTING	D ONLY
TRANSPARENCY	R & D

Figure 4-3. Carousel Assembly, Illustrated Parts Breakdown



7550-A-98-1

Table 4-4. Parts List, Carousel Assembly — Model 7550A

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
1	07550-40051	0	1	CAROUSEL TOP (SEE NOTES)	28480	07550-40051
2	5081-5098	3	1	LABEL, CAROUSEL TYPE-DRAFTING	28480	5081-5098
	5081-5099	8	1	LABEL, CAROUSEL TYPE-FIBER TIP	28480	5081-5099
	5081-5100	8	1	LABEL, CAROUSEL TYPE-ROLLER BALL	28480	5081-5100
	5100-5721	9	1	LABEL, CAROUSEL TYPE-TRANSPARENCY	28480	5100-5721
3	07550-40058	7	8	CAROUSEL PAWL	28400	07550-40050
4	1460-1870	1	1	SPRING, STABLE PAWL RETAINER	28480	1460-1870
5	07550-40066	7	8	SEAL, STABLE (EXCEPT DRAFTING)	28480	07550-40066
6	07550-40065	6	8	BOOT, STABLE (DRAFTING ONLY)	28480	07550-40065
7	07550-40059	8	8	PLUNGER, STABLE	28480	07550-40059
8	1460-2052	3	8	SPRING-CPRSN .3-IN-OD 1.5-IN-OA-LG MUW	28480	1460-2052
9	07550-40055	4	1	CAROUSEL BODY	28480	07550-40055
10	0624-0314	3	2	SCREW-TPG 4-20 .375-IN-LG PAN-HD-POZI	28480	0624-0314
				NOTES CAROUSEL TOP CONFIGURATION DEPENDENT ON TAB BREAKAGE. SEE TABLE IN FIGURE 4-3.		
				COMPLETE CAROUSEL ASSEMBLIES		
	07550-60050	1	1	PEN CAROUSEL ASSEMBLY-TRANSPARENCY PEN	28480	07550-60050
	07550-60051	2	1	PEN CAROUSEL ASSEMBLY-FIBER TIP PEN	28480	07550-60051
	07550-60052	3	1	PEN CAROUSEL ASSEMBLY-ROLLER BALL PEN	28480	07550-60052
	07550-60053	4	1	PEN CAROUSEL ASSEMBLY-DRAFTING PEN	28480	07550-60053

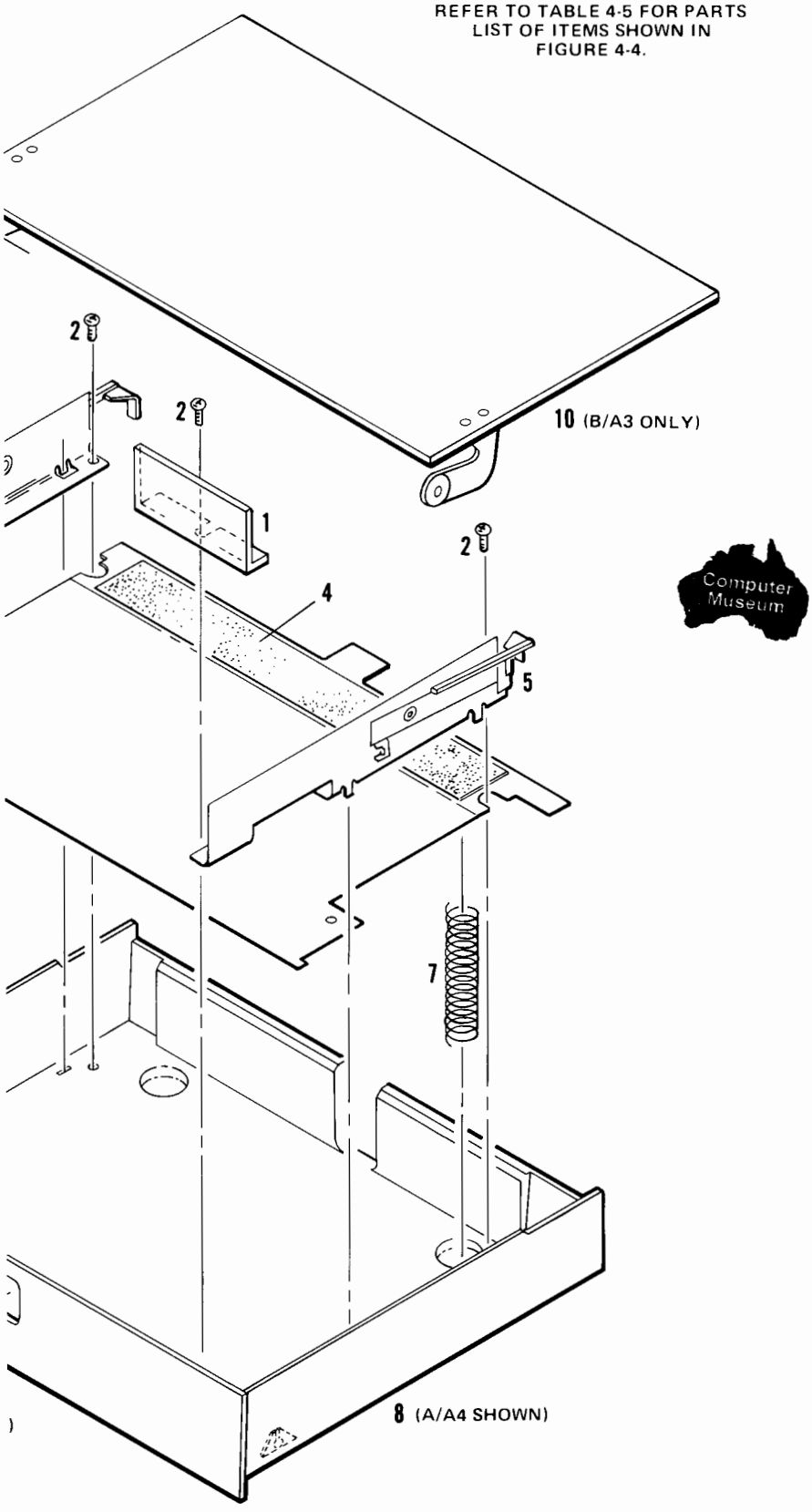
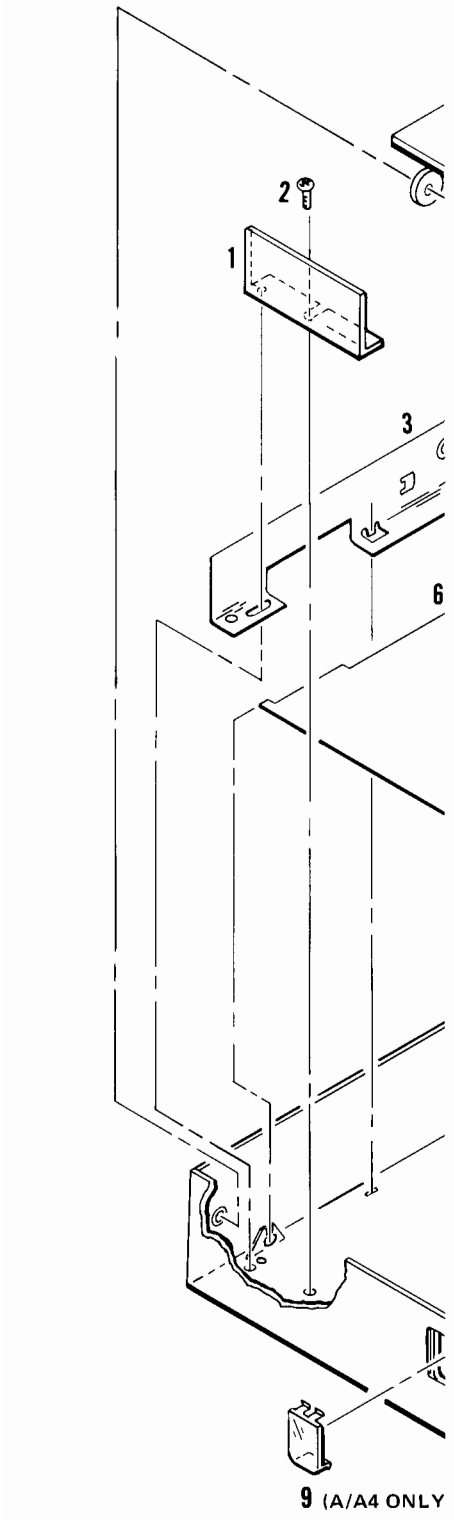


Figure 4-4. Media Tray Assembly, Illustrated Parts Breakdown



7550-A-96-1

Table 4-5. Parts List, Media Tray Assembly — Model 7550A

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
1	07550-40153	3	2	BACKSTOP, MEDIA (SNUBBER)	28480	07550-40153
2	0624-0324	5	3	SCREW-TPG 4-20 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
3	07550-60155	7	1	MEDIA GUIDE, LEFT	28480	07550-60155
4	07550-00161	9	1	FRICTION PAD, PRESSURE PLATE	28480	07550-00161
5	07550-60156	8	1	MEDIA GUIDE, RIGHT	28480	07550-60156
6	07550-00151	7	1	PRESSURE PLATE, MEDIA TRAY	28480	07550-00151
7	1460-2064	7	2	SPRING, COMPRESSION-PRESSURE PLATE	28480	1460-2064
8	07550-40151	1	1	MEDIA TRAY (A/A4) - SEE NOTES	28480	07550-40151
	07550-40152	2	1	MEDIA TRAY (B/A3) - SEE NOTES	28480	07550-40152
9	07550-40177	1	1	LENS-TRAY (A/A4 ONLY)	28480	07550-40177
10	07550-40164	6	1	COVER-TRAY (B/A3) ONLY)	28480	07550-40164
				NOTES *QTY 4 IN A/A4, QTYL IN B/A3 MEDIA TRAY CONFIGURATION DEPENDENT ON PLACEMENT OF MEDIA GUIDES AND BACKSTOPS.		
				COMPLETE MEDIA TRAY ASSEMBLIES		
	07550-60152	4	1	MEDIA TRAY ASSEMBLY, A	28480	07550-60152
	07550-60158	0	1	MEDIA TRAY ASSEMBLY, A4	28480	07550-60158
	07550-60153	5	1	MEDIA TRAY ASSEMBLY, B	28480	07550-60153
	07550-60159	1	1	MEDIA TRAY ASSEMBLY, A3	28480	07550-60159

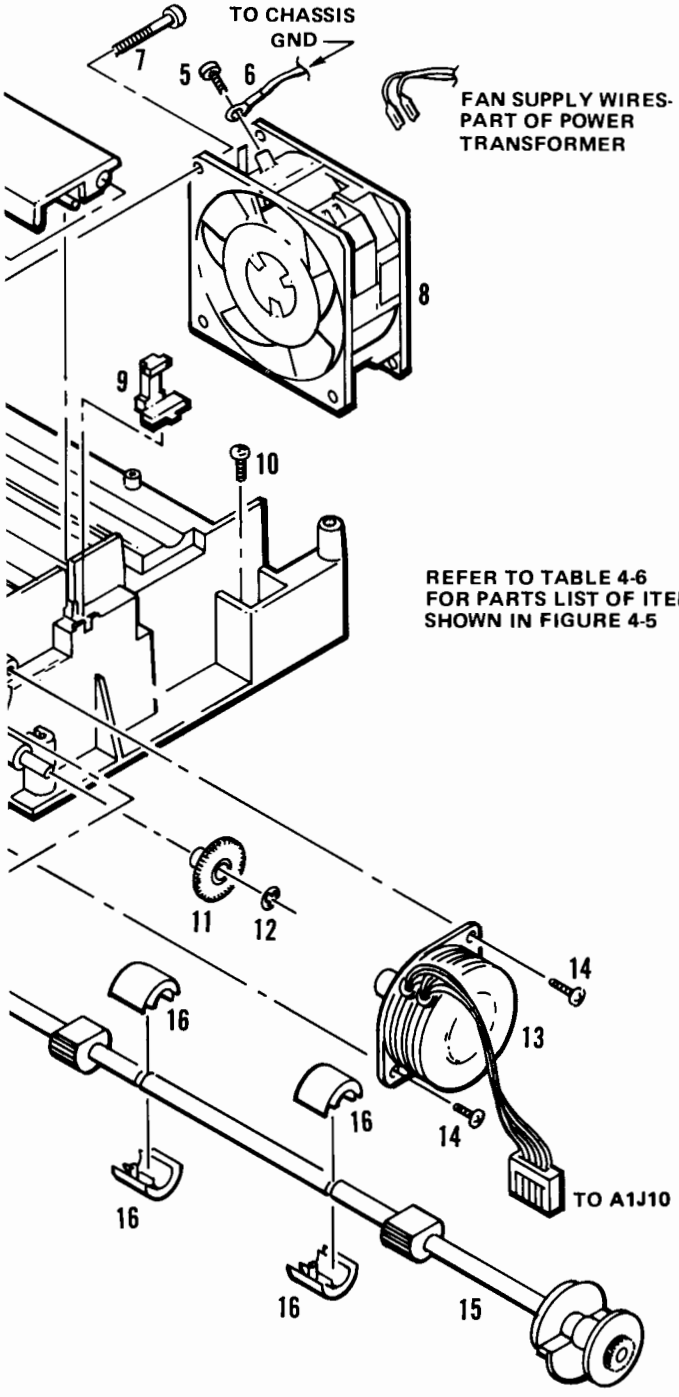


Figure 4-5. Media Chassis Assembly, Illustrated Parts Breakdown

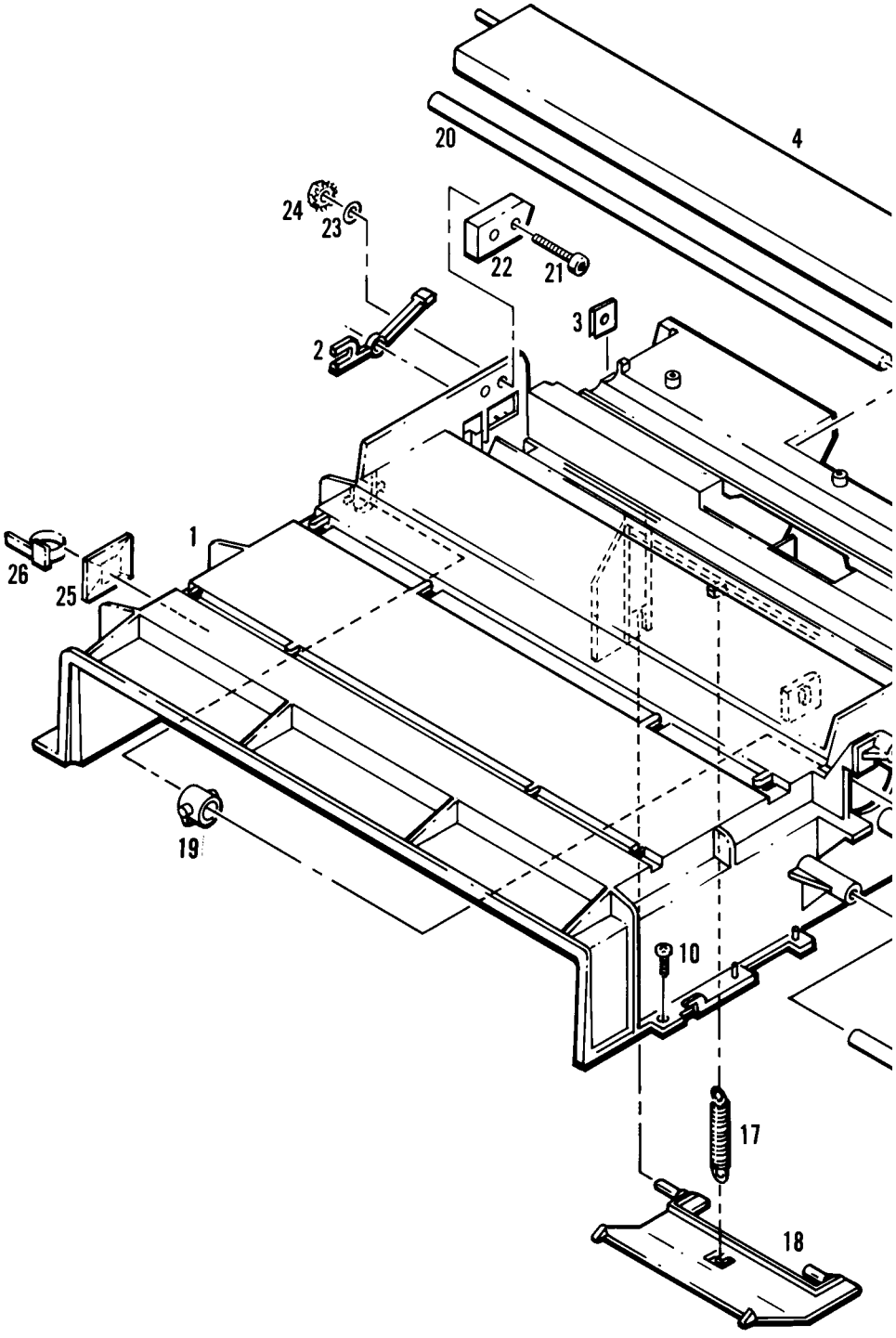

20
4
24
23
22
21
3
2
1
26
25
19
10
17
18

Table 4-6. Parts List, Media Chassis Assembly — Model 7550A

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
1	07550-40203	4	1	CHASSIS, MEDIA	28480	07550-40203
2	07550-40172	6	1	LEVER, DEFLECTOR	28480	07550-40172
3	0590-1471	2	4	NUT-SHMET-U-TP 8-32-THD .017-IN-THK	28480	0590-1471
4	07550-40162	4	1	DEFLECTOR	28480	07550-40162
5	0624-0215	3	1	SCREW-TPG 8-32 .25-IN-LG PAN-HD-POZI STL	28480	0624-0215
6	07550-60212	7	1	CABLE AY, FAN GND	28480	07550-60212
7	0624-0400	8	3	SCREW-TPG 6-19 0.5-IN-LG PAN-HD-POZI STL	28480	0624-0400
8	3160-0288	9	1	FAN-TBAX 60-CFM 115V 50/60-HZ 1.5KV-DIEL	28480	3160-0288
9	07550-40178	2	1	CLIP, DEFLECTOR	28480	07550-40178
10	0515-0414	3	5	SCREW-MACH M4 X 0.7 10MM-LG PAN-HD	28480	0515-0414
11	07550-40173	7	1	GEAR, PAPER FEED ENCODER	28480	07550-40173
12	0510-0083	2	1	RETAINER-RING E-R EXT .25-IN-DIA STL	28480	0510-0083
13	3140-0700	8	2	MOTOR-STEPPER, CAROUSEL	28480	3140-0700
14	0624-0657	7	2	SCREW 6-19X .500-IN-LG PLASTITE	28480	0624-0657
15	07550-60162	6	1	DRIVESHAFT AY-PAPER FEED(INCLUDES ITEM16	28480	07550-60162
16	07550-40174	8	4	IDLER, PAPER FEED DRIVESHAFT	28480	07550-40174
17	1460-2065	8	1	SPRING, EXTENSION-PAPER TRAY CATCH	28480	1460-2065
18	07550-40154	4	1	CATCH-PAPER TRAY	28480	07550-40154
19	07550-40168	0	1	BUSHING-LEFT, PAPER FEED DRIVESHAFT	28480	07550-40168
20	07550-40163	5	1	ROLLER-DEFLECTOR	28480	07550-40163
21	0570-0657	2	2	SCREW,SKT HD CAP 6-32 .625-IN-LG	00000	ORDER BY DESCRIPTION
22	07550-40179	3	1	GUIDE-PAPER	28480	07550-40179
23	3050-0228	4	2	WASHER,FLAT MTLC #6 .156-IN-ID	00000	ORDER BY DESCRIPTION
24	0590-0381	1	2	NUT-HEX W/LKWR 6-32-THD .12-IN-THK	00000	ORDER BY DESCRIPTION
25	1400-0584	6	1	MOUNT-CABLE TIE .122-DIA .75 WD	28480	1400-0584
26	1406-0264	1	1	CABLE TIE	28480	1406-0264

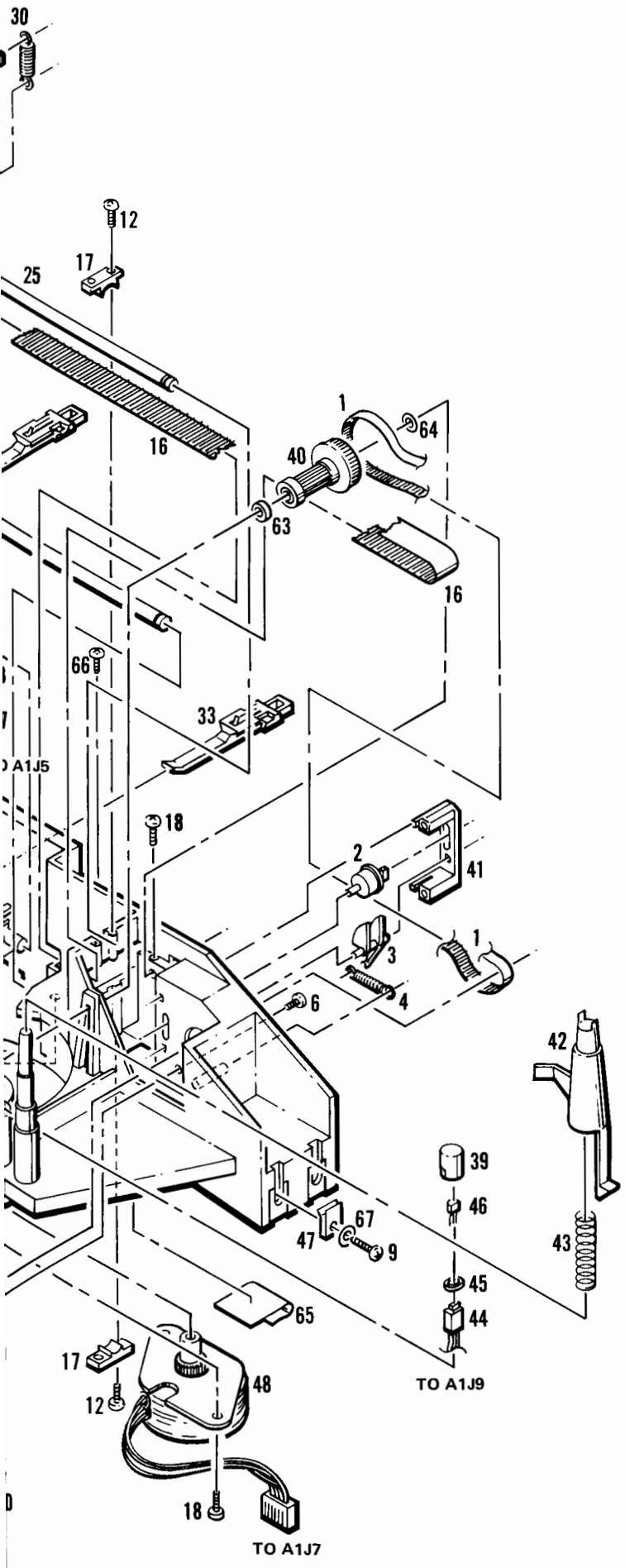
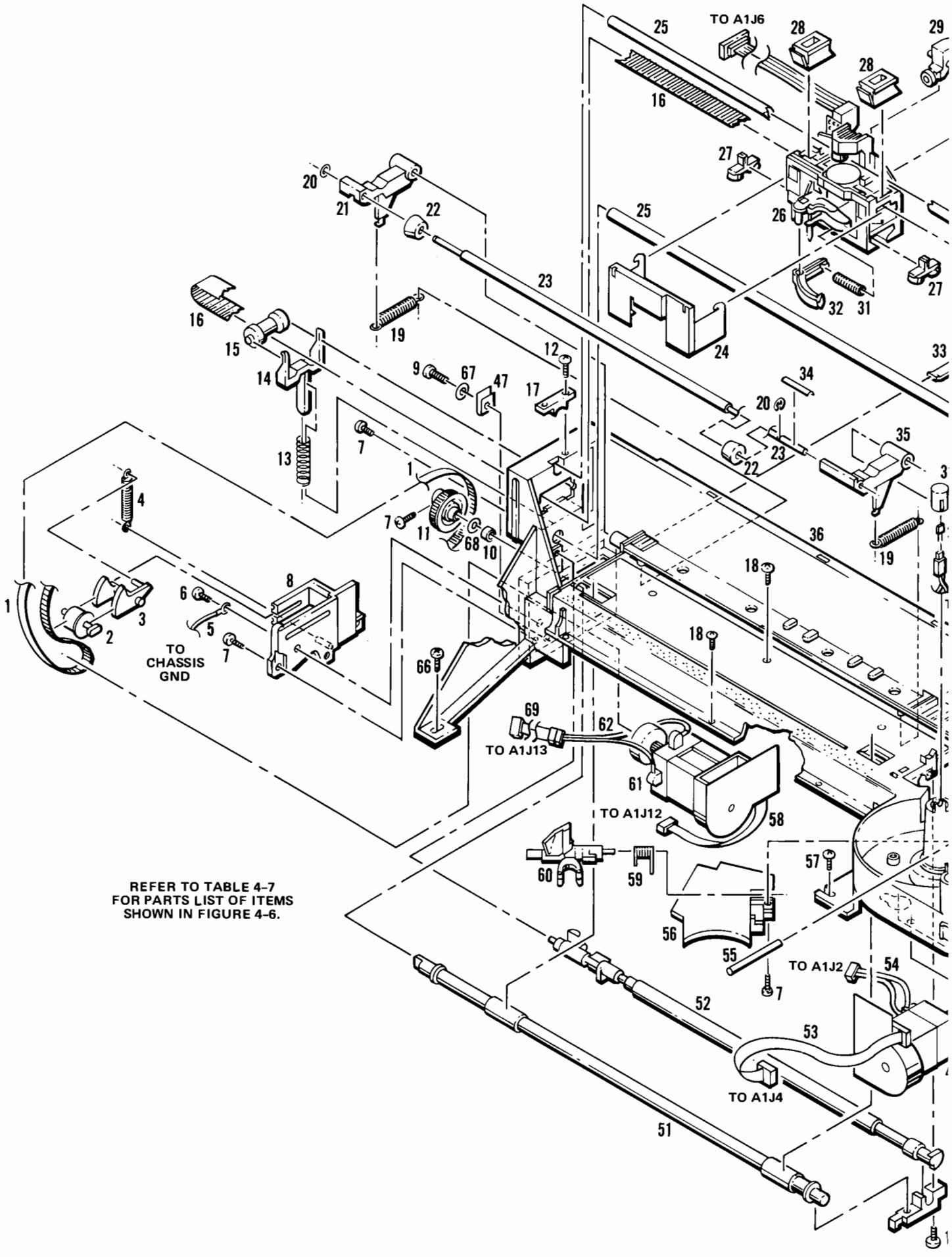


Figure 4-6. X,Y Carriage Assembly, Illustrated Parts Breakdown



REFER TO TABLE 4-7
FOR PARTS LIST OF ITEMS
SHOWN IN FIGURE 4-6.

7550-C-46-1B

Table 4-7. Parts List, X,Y Carriage Assembly — Model 7550A

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
1	1500-0666	7	2	DRIVE BELT SMALL (X AND Y MOTOR)	28480	1500-0666
2	07550-60106	8	2	IDLER, SMALL (X AND Y DRIVE BELTS)	28480	07550-60106
3	07550-40104	4	2	TENSIONER, CAM (X AND Y DRIVE BELTS)	28480	07550-40104
4	1460-2061	4	2	SPRING-EXT .187-IN-OD MUW ZN	28480	1460-2061
5	07550-60105	7	1	CABLE AY-MOTOR GND. (X-AXIS)	28480	07550-60105
6	0515-0104	8	4	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	28480	0515-0104
7	0624-0324	5	4	SCREW-TPG 4-20 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
8	07550-40109	9	1	MOUNTING PLATE, X-MOTOR	28480	07550-40109
9	0515-0459	6	4	SCREW-MACH M4 X 0.7 12MM-LG PAN-HD	28480	0515-0459
10	1410-1212	0	1	BEARING-RDL BA .3125-IN-ID .5-IN-OD	28480	1410-1212
11	07550-40106	6	1	PULLEY, X-MOTOR DRIVE	28480	07550-40106
12	0624-0664	6	6	SCREW-TPG 4-20 .437-IN-LG PAN-HD-POZI	28480	0624-0664
13	1460-2050	1	1	SPRING, COMP .372-IN-OD 1.275-IN-OA-LG	28480	1460-2050
14	07550-40005	4	1	TENSIONER, Y-BELT	28480	07550-40005
15	07550-60005	6	1	IDLER AY, LG. Y-BELT	28480	07550-60005
16	1500-0662	3	1	BELT-GEAR .72-WD .045-THK 472-T .08-P	28480	1500-0662
17	07550-40009	8	3	CLAMP, SLIDER ROD	28480	07550-40009
18	0624-0314	3	10	SCREW-TPG 4-20 .375-IN-LG PAN-HD-POZI	28480	0624-0314
19	1460-2060	3	2	SPRING-EXT .187-IN-OD MUW ZN	28480	1460-2060
20	0510-0015	0	2	RETAINER-RING E-R EXT .125-IN-DIA STL	28480	0510-0015
21	07550-40128	2	1	ARM, PINCH WHEEL-LEFT	28480	07550-40128
22	07550-20127	9	1	PINCH WHEEL	28480	07550-20127
23	07550-20128	0	1	SHAFT, PINCH WHEEL	28480	07550-20128
24	07550-40012	3	1	COVER, PEN CARRIAGE ASSEMBLY	28480	07550-40012
25	07550-20001	8	1	ROD, SLIDER-Y	28480	07550-20001
26	07550-60002	3	1	PEN CARRIAGE ASSEMBLY-INCLUDES ITEMS 27 THROUGH 32 AND TRAILING CABLE.	28480	07550-60002
27	07550-60010	3	2	BEARING HOLDER ASSEMBLY	28480	07550-60010
28	07550-40011	2	2	CLAMP, BELT-PEN CARRIAGE	28480	07550-40011
29	07550-60008	9	1	SWING ARM ASSEMBLY	28480	07550-60008
30	1460-2051	2	1	SPRING, EXTENSION .24-IN-OD SST-302	28480	1460-2051
31	1460-2055	6	1	SPRING-CPRSN .184-IN-OD .866-IN-OA-LG	28480	1460-2055
32	07550-40027	0	1	PEN PAWL	28480	07550-40027
33	07550-40110	2	1	GUIDE, CLIP-MEDIA	28480	07550-40110
34	07550-40131	7	1	SPACER, PINCHWHEEL	28480	07550-40131
35	07550-40129	3	1	ARM, PINCHWHEEL-RIGHT	28480	07550-40129
36	07550-40204	5	1	CHASSIS, X-Y CARRIAGE ASSEMBLY	28480	07550-40204
37	07550-60054	5	1	CABLE ASSEMBLY, LED	28480	07550-60054
38	1990-0961	2	1	LED-INFRARED IF=50MA-MAX BVR=2V	28480	1990-0961
39	07550-40063	4	2	COVER, PHOTO-SENSOR	28480	07550-40063
40	07550-60006	7	1	PULLEY ASSEMBLY-Y DRIVE	28480	07550-60006
41	07550-40105	5	1	BRACKET, IDLER-Y MOTOR	28480	07550-40105
42	07550-40218	1	1	SHUTTER, CARRIAGE COVER	28480	07550-40218
43	1460-2081	8	1	SPRING-CPRSN .372-IN-OD 1.275-IN-OA-LG	28480	1460-2081
44	07550-60055	6	1	CABLE ASSEMBLY, PHOTO-SENSOR	28480	07550-60055
45	07550-40067	8	1	SPACER, PHOTO-SENSOR	28480	07550-40067
46	1990-0965	6	1	PHOTOSWITCH IF=50MA-MAX	28480	1990-0965
47	0535-0084	5	4	NUT-SHMET-U-TP M4X0.7 .43MM-THK	28480	0535-0084
48	3140-0700	8		MOTOR-STEPPER, CAROUSEL	28480	3140-0700
49	07550-60001	2	1	MOTOR/ENCODER ASSEMBLY-Y DRIVE	28480	07550-60001
50	07550-40108	8	1	CLAMP, GRITWHEEL SHAFT	28480	07550-40108
51	07550-60101	3	1	GRIT WHEEL SHAFT ASSEMBLY	28480	07550-60101
52	07550-40130	6	1	CAM SHAFT-PINCH WHEEL	28480	07550-40130
53	07550-60098	7	1	CABLE ASSEMBLY, Y MOTOR ENCODER	28480	07550-60098
54	07550-60004	5	1	CABLE ASSEMBLY, Y MOTOR SUPPLY	28480	07550-60004
55	07550-20003	4	1	SHAFT, Y DRIVE PULLEY	28480	07550-20003
56	07550-40064	5	1	PLATE, MOUNTING BRACKET-PEN CAPPER	28480	07550-40064
57	0515-1273	4	1	SCREW-MACH M4 X 0.7 35MM-LG PAN-HD	28480	0515-1273
58	07550-60097	6	1	CABLE ASSEMBLY, X MOTOR ENCODER	28480	07550-60097
59	1460-2062	5	1	SPRING-TRSN 9.5-MM-OD 12-MM-OA-LG SST	28480	1460-2062
60	07550-40060	1	1	CAM, PEN CAPPER MECHANISM	28480	07550-40060
61	07550-60103	5	1	MOTOR/ENCODER ASSEMBLY-X DRIVE	28480	07550-60103
62	07550-60107	9	1	CABLE ASSEMBLY, X MOTOR SUPPLY,SHORT	28480	07550-60107
63	07550-20009	6	1	SPACER-Y DRIVE PULLEY	28480	07550-20009
64	3050-1072	8	1	WASHER,FLAT #10 .195-IN-ID	00000	ORDER BY DESCRIPTION
65	1400-0611	0	1	CLAMP-CABLE,FLEX	28480	1400-0611
66	0515-0414	3	2	SCREW-MACH M4X0.7 10MM-LG	28480	0515-0414
67	3050-0893	9	4	WASHER FL MTLC 4.0MM 4.4MM-ID	28480	3050-0893
68	07550-20010	9	1	SPACER-X DRIVE PULLEY	28480	07550-20010
69	07550-60108	0	1	CABLE ASSEMBLY,X-MOTOR SUPPLY,LONG	28480	07550-60108

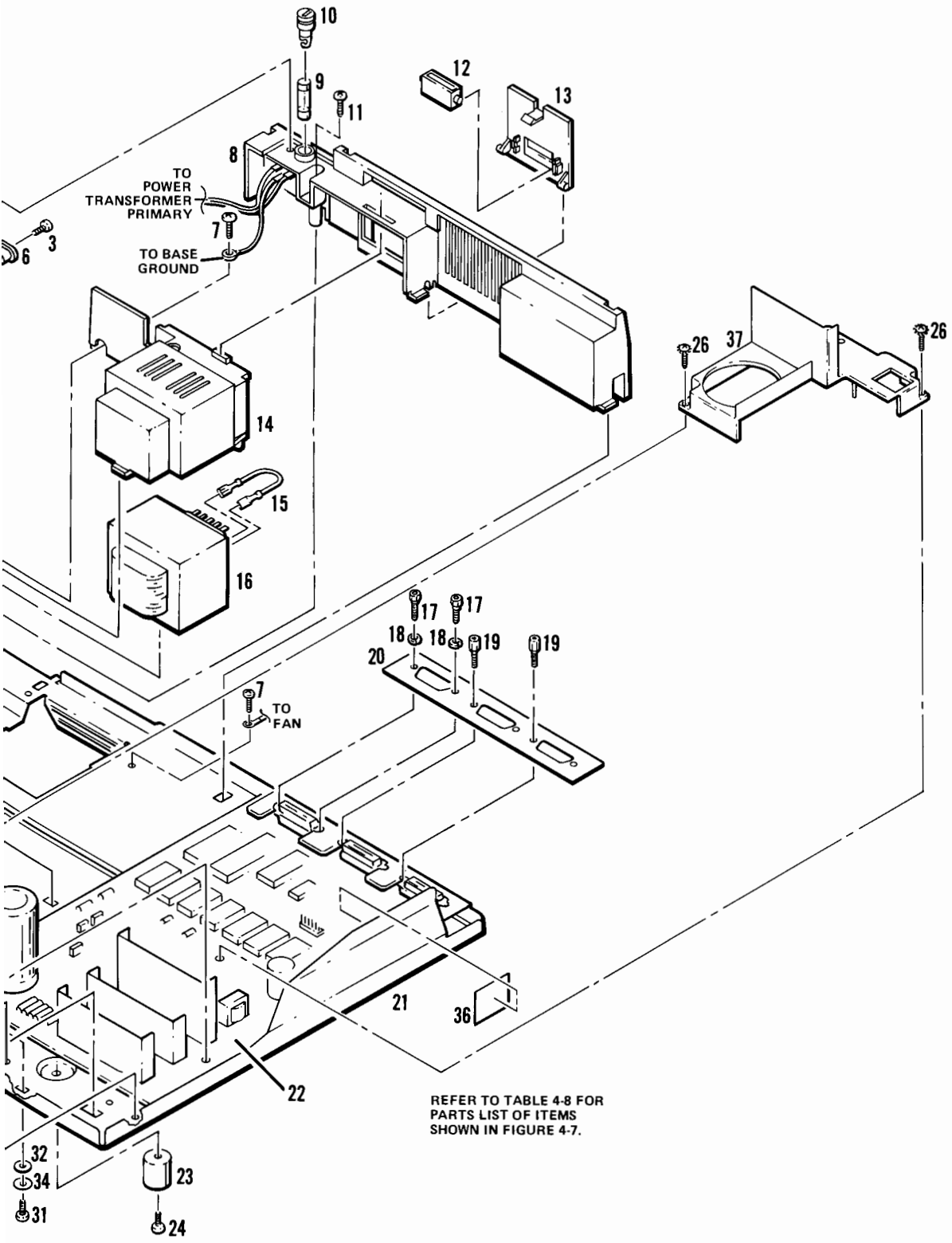
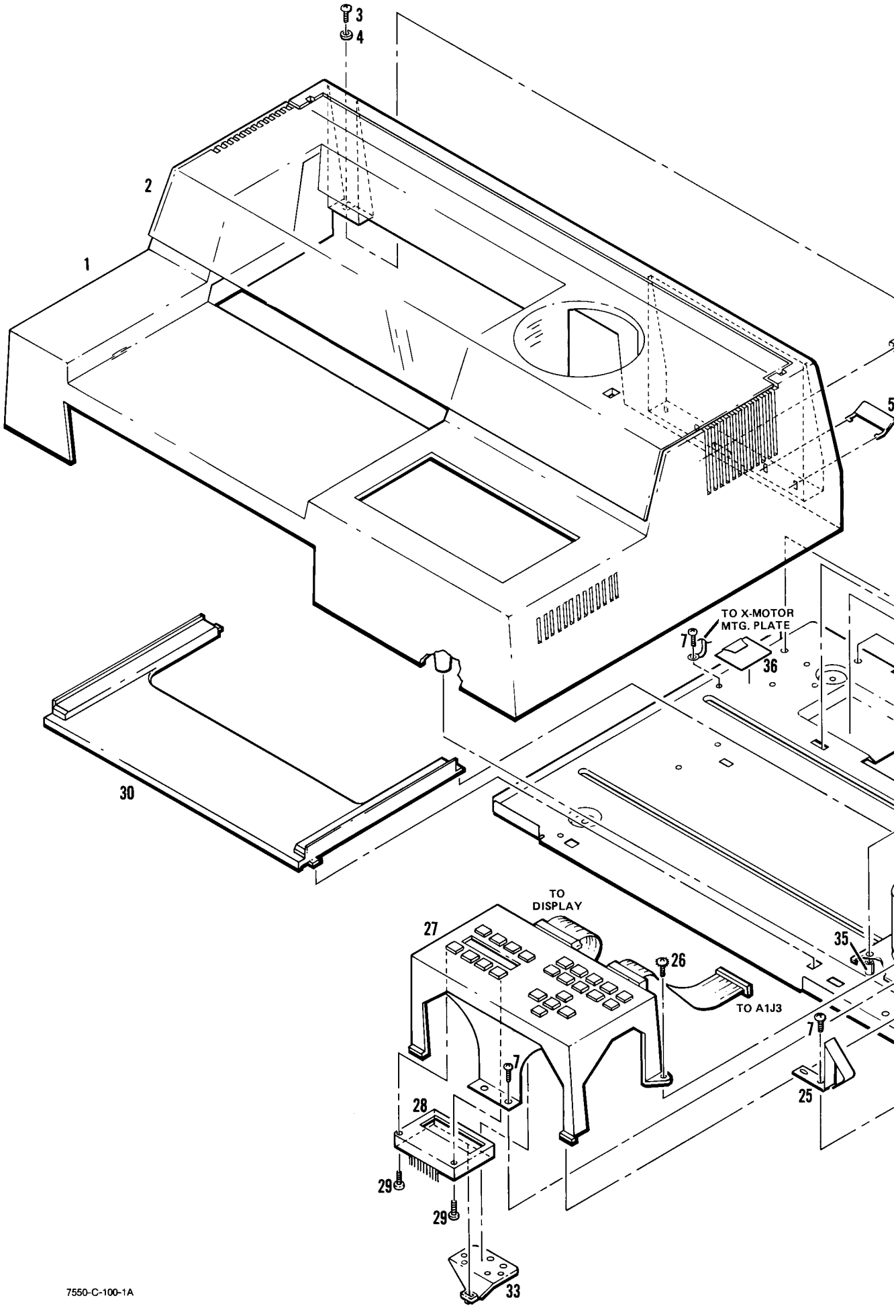


Figure 4-7. Top Cover, Base, and Power Module Assemblies, Illustrated Parts Breakdown


3
4
2
1
5
TO X-MOTOR
MTG. PLATE
7
36
30
TO
DISPLAY
27
35
26
TO A1J3
7
7
25
28
29
29
33

7550-C-100-1A

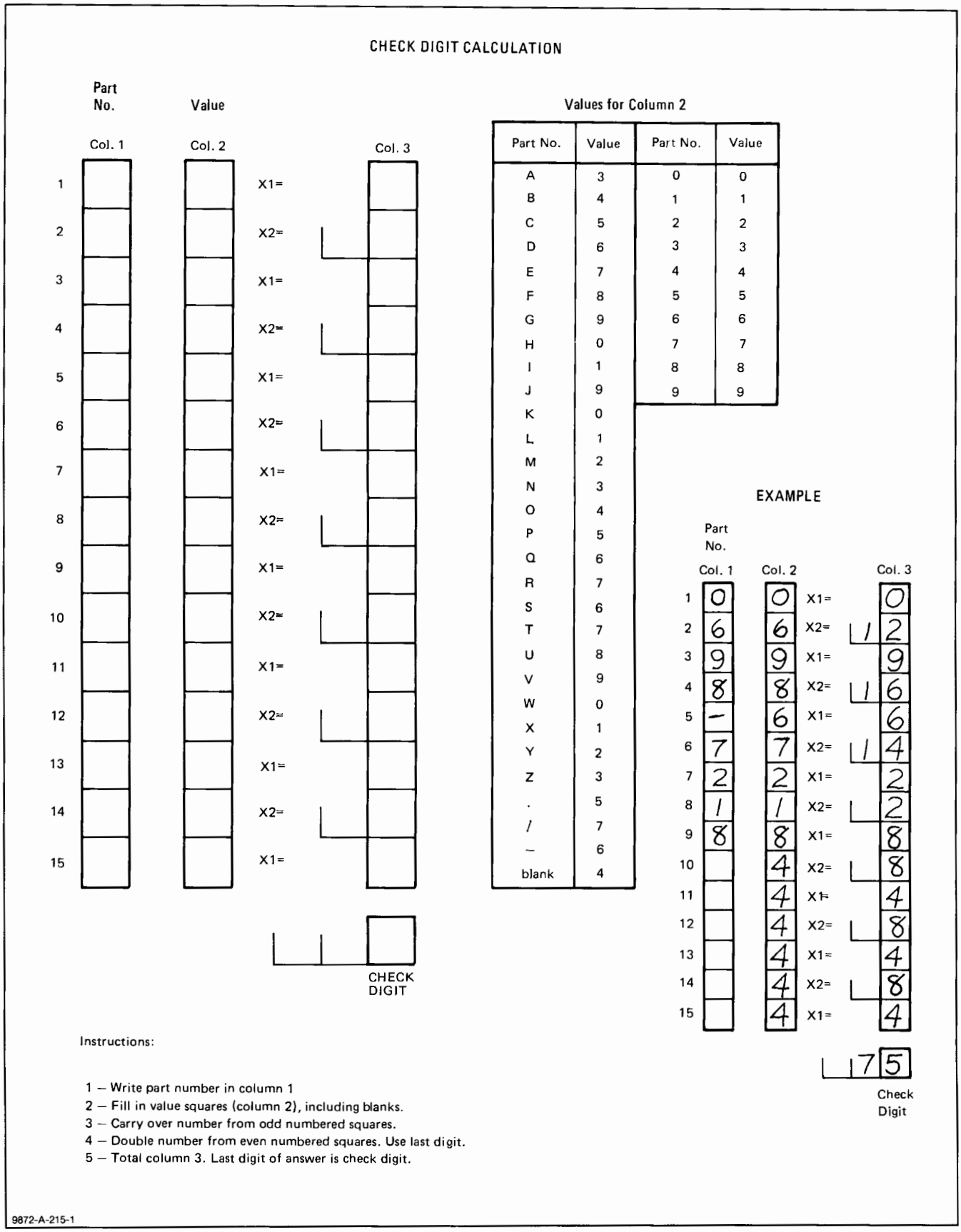
Table 4-8. Parts List, Top Cover, Base, and Power Module Assemblies — Model 7550A

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
1	07550-40201	2	1	COVER-TOP	28480	07550-40201
2	07550-40221	6	1	COVER-CARRIAGE (WINDOW)	28480	07550-40221
3	0515-0397	1	2	SCREW-MACH M4 X 0.7 16MM-LG	28480	0515-0397
4	07470-20012	4	1	STAND OFF-SHOULDER TYPE, COUNTERSUNK	28480	07470-20012
5	07550-40219	2	3	COVER, I/O CONNECTOR	28480	07550-40219
6	07550-40222	7	1	HOLD DOWN-TOP COVER	28480	07550-40222
7	0515-0413	2	7	SCREW-MACH M4 X 0.7 6MM-LG PAN-HD	28480	0515-0413
8	07550-60205	8	1	POWER MODULE ASSEMBLY	28480	07550-60205
9	2110-0304	4	1	FUSE 1.5A 250V TD 1.25X.25 UL	28480	2110-0304
	2110-0495	4	1	FUSE 1.6A 250V IEC	28480	2110-0495
	2110-0020	1	1	FUSE .8A 250V TD 1.25X.25 UL	75915	313.800
	2110-0496	5	1	FUSE .8A 250V IEC	28480	2110-0496
10	2110-0565	9	1	FUSEHOLDER CAP 12A MAX FOR UL	28480	2110-0565
	2110-0567	1	1	FUSEHOLDER CAP 12A MAX FOR UL	28480	2110-0567
11	0515-1273	4	1	SCREW-MACH M4 X 0.7 35MM-LG PAN-HD	28480	0515-1273
12	07550-40209	0	1	BLACK-VOLTAGE LABEL (POWER DISPLAY)	28480	07550-40209
13	07550-40211	4	1	DOOR-VOLTAGE SELECT	28480	07550-40211
14	07550-40213	6	1	HOUSING, TRANSFORMER	28480	07550-40213
15	0360-2073	5	1	JUMPER-TRANSFORMER	28480	0360-2073
16	9100-4315	1	1	TRANSFORMER POWER 100/120/220/240V	28480	9100-4315
17	0380-0644	4	2	STANDOFF-HEX .327-IN-LG 6-32THD	00000	ORDER BY DESCRIPTION
18	2190-0577	1	2	WASHER-LK HLCL NO. 10 .194-IN-ID	28480	2190-0577
19	1251-7828	8	4	STANDOFF-LOCK AMPHENOL 17 CONN	28480	1251-7828
20	07550-00203	0	1	PLATE-COVER, I/O LABEL	28480	07550-00203
21	07550-60211	6	1	BASE ASSEMBLY	28480	07550-60211
22	07550-60109	1	1	PCA, MAIN (A1)	28480	07550-60109
23	07550-40180	6	4	FOOT	28480	07550-40180
24	0361-1142	9	4	RIVET-SEMITUB OVM .188DIA .375LG	28480	0361-1142
25	07550-00206	3	1	CONTACT-ESD	28480	07550-00206
26	0515-0780	6	5	SCREW MACHINE ASSEMBLY M4 X 0.7 10MM-LG	28480	0515-0780
27	07550-60115	9	1	FRONT PANEL ASSEMBLY	28480	07550-60115
28	1990-0963	4	1	DISPLAY-AN-DOT MAT 32-CHAR	28480	1990-0963
29	0624-0390	5	2	SCREW-TPG 2-28 .625-IN-LG PAN-HD-POZI	28480	0624-0390
30	07550-40176	0	1	RAIL-TRAY	28480	07550-40176
31	0515-0053	6	2	SCREW-MACH M4 X 0.7 10MM-LG PAN-HD	28480	0515-0053
32	3050-1179	6	2	WASHER, FLAT #8 .170-IN-ID .625-IN-OD	28480	3050-1179
33	07550-40206	7	1	HOLDER,LCD	28480	07550-40206
34	2190-0087	8	2	WASHER-LK HLCL #8 .168-IN-ID	28480	2190-0087
35	07550-20202	1	5	STANDOFF-PCA	28480	07550-20202
36	1400-0510	8	2	CLAMP-CABLE .15-DIA .62-WD NYL	28480	1400-0510
37	07550-40200	5	1	COVER-PCA,MAIN	28480	07550-40200

Table 4-9. Code List of Manufacturers

MFR. NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
00000	Any Satisfactory Supplier		
00853	Sangamo Elec. Company, S. Carolina Division	Pickens, SC	29671
01121	Allen-Bradley Company	Milwaukee, WI	53204
01295	Texas Instruments, Inc., Semiconductor Component Div.	Dallas, TX	75222
02114	Ferroxcube Corporation	Saugerties, NY	12477
03508	GE Company, Semiconductor Products Department	Auburn, NY	13201
04713	Motorola Semiconductor Products	Phoenix, AZ	85008
13606	Sprague Electric Company, Semiconductor Division	Concord, NH	03301
14936	General Instrument Corp., Semicon. Products Group	Hicksville, NY	11802
19701	Mepco/Electra Corporation	Mineral Wells, TX	76067
24546	Corning Glass Works (Bradford)	Bradford, PA	16701
28480	Hewlett-Packard Company, Corporate Headquarters	Palo Alto, CA	94304
56289	Sprague Electric Company	North Adams, MA	01247
75915	Littlefuse, Inc.	Des Plaines, IL	60016

Table 4-10. Check Digit Calculation



SECTION V

PRODUCT HISTORY

5-1. INTRODUCTION

5-2. This section describes the differences between earlier versions of the HP 7550 and the latest version documented in this manual. The earlier versions are identified by their serial number prefix which is lower than the serial number prefix on the title page of this manual. Printed circuit assembly (PCA) levels are identified by their date codes. For ease of reference, this section is divided into two major topics; History of Assemblies by Serial Number Prefix and History of Printed Circuit Assemblies (PCAs).

5-3. HISTORY OF ASSEMBLIES BY SERIAL NUMBER PREFIX

5-4. Table 5-1 is a quick-reference table that lists, by serial number prefix, the assemblies that differ from those documented in this manual. Also referenced are Item Numbers under which these differences are described within this section. Table 5-2 lists the assemblies that are described under each Item.

5-5. Knowing the serial number prefix 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 Serial Number Prefix

S/N PREFIX	ASSEMBLIES	ITEM
2407A	A1 Main PCA	See PCA History
	*Media Chassis Assembly	3
	*X-Y Carriage Assembly	4, 9
	*Top Cover Assembly	5
2444A	A1 Main PCA	See PCA History
	*X-Y Carriage Assembly	9

NOTE

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

Table 5-2. Item Description

ITEM	ASSEMBLIES
3	Media Chassis Assembly
4	X-Y Carriage Assembly
5	Top Cover Assembly
9	X-Y Carriage Assembly

5-6. HISTORY OF PRINTED CIRCUIT ASSEMBLIES (PCAs)

5-7. 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 of the same part number, a new part number is assigned to the revised PCA.

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 of the PCA. The first two digits represent the last two digits of the current year and are derived by subtracting 60 from the current year. The next two digits are the number of the week in that year. Any digits following a hyphen in the date code represent the division that manufactured the PCA; i.e., 2501-11 = first week in 1985 and manufactured at division 11.

5-8. 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. PCA Date Codes

PRINTED CIRCUIT ASSEMBLY (PCA)	DATE CODE	REV	ITEM(S)
A1 Main PCA (07550-60100)	2404-11	A	1, 2, 6, 8, 10
A1 Main PCA (07550-60100)	2444-11	A	2
A1 Main PCA (07550-60100)	2501-11	A	6
A1 Main PCA (07550-60109)	2520-11	A	7, 8, 10
A1 Main PCA (07550-60109)	2540-11	A	8, 10
A1 Main PCA (07550-60109)	2544-11	B	10

ITEM 1

Date code 2404-11: This is the date code on the Main PCA installed in the plotter at the time of product introduction. Except for the parts listed in this item and any parts listed in pertinent higher numbered items, Main PCAs having a date code of 2404-11 have the same components as the Main PCA listed in Section IV.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
A1U17	07550-18101	4	1	ROM — LOWER LSB (Rev. A)	28480	07550-18101
A1U26	07550-18102	5	1	ROM — LOWER MSB (Rev. A)	28480	07550-18102

ITEM 2

Date code 2444-11: Except for the parts listed in this item and any parts listed in pertinent higher numbered items, Main PCAs having a date code of 2444-11 have the same components as the Main PCA listed in Section IV.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
A1C24	0180-2879	7	1	CAP-FXD, 22UF +50 -10% 25VDC AL	28480	0180-2879

ITEM 3

Except for the following differences, the Media Chassis Assembly is the same as the assembly documented in Section IV of this manual.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
14	0624-0606	6	1	SCREW, 6-19 × .375-IN-LG PLASTITE	28480	0624-0606

ITEM 4

Except for the following differences, the X-Y Carriage Assembly is the same as the assembly documented in Section IV of this manual.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
10	1410-0618	8	1	BEARING, RDL BA .312-IN-ID .5-IN-OD	28480	1410-0618
12	0624-0333	6	1	SCREW, TPG. 4-20 .25-IN-LG PAN-HD	28480	0624-0333
20	0510-0166	2	2	RETAINER, RING E-R EXT .156-IN-DIA	28480	0510-0166
62	07550-60104	6	1	CABLE ASSEMBLY, X-MOTOR SUPPLY	28480	07550-60104
63				NOT ASSIGNED		
64				NOT ASSIGNED		
69				NOT ASSIGNED		

ITEM 5

Except for the following differences, the Top Case Assembly is the same as the assembly documented in Section IV of this manual.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
31	0515-0106	8	2	SCREW, MACH M4 × 0.7 8MM-LG PAN-HD	28480	0515-0106
34				NOT ASSIGNED		

ITEM 6

Date code 2501-11: Except for the parts listed in this item and any parts listed in pertinent higher numbered items, Main PCAs having a date code of 2501-11 have the same components as the Main PCA listed in Section IV.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
A1U17	07550-18101	4	1	ROM-LOWER LSB	28480	07550-18101
A1U26	07550-18102	5	1	ROM-LOWER MSB	28480	07550-18102

ITEM 7

Date code 2520-11: This data code was implemented with the part number change of the Main PCA from 07550-60100 to 07550-60109. Except for the parts listed in this item and any parts listed in pertinent higher numbered items, Main PCAs having a date code of 2520-11 have the same components as the Main PCA listed in Section IV.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
A1CR2	1901-0691	8	1	DIODE-PWR RECT 100V 3A 200NS	03508	A115A

ITEM 8

Date code 2540-11: Except for the parts listed in this item and any parts listed in pertinent higher numbered items, Main PCAs having a date code of 2540-11 have the same components as the Main PCA listed in Section IV.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
A1XU12	1200-0567	1	4	SOCKET IC 28-PIN	28480	1200-0567
A1XU17	1200-0567	1		SOCKET IC 28-PIN	28480	1200-0567
A1XU22	1200-0567	1		SOCKET IC 28-PIN	28480	1200-0567
A1XU26	1200-0567	1		SOCKET IC 28-PIN	28480	1200-0567

ITEM 9

Except for the following differences, the X-Y Carriage Assembly is the same as the assembly documented in Section IV of this manual.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
12	0624-0635	1	6	SCREW-TPG. 4-20 × .437-IN-LG PAN-HD	28480	0624-0635
68	1251-8701	8	1	HOUSING, TRAILING CABLE	28480	1251-8701

ITEM 10

Date code 2544-11: Except for the parts listed in this item and any parts listed in pertinent higher numbered items, Main PCAs having a date code of 2544-11 have the same components as the Main PCA listed in Section IV.

REF DES	HP PART NUMBER	C D	QTY	DESCRIPTION	MFR CODE	MFR PART NUMBER
A1U17	07550-18111	6	1	ROM-LOWER LSB	28480	07550-18111
A1U26	07550-18112	7	1	ROM-LOWER MSB	28480	07550-18112

SECTION VI

SERVICE

6-1. INTRODUCTION

6-2. This section contains both a simplified and a functional theory of operation, troubleshooting procedures, component location diagrams, schematics, and general service information for the Model 7550A Plotter as follows:

Safety Considerations

Simplified Theory of Operation

Functional Theory of Operation

Troubleshooting

Cleaning

Recommended Test Equipment and Tools

Repair

Logic Symbology and Schematic Symbols

Service Sheets

6-3. The functional block diagram, component location figures, and schematic diagrams, are shown on the Service Sheets in this section. The Service Sheets are identified as follows:

Service Sheet	Title
1	Model 7550A Functional Block Diagram
2	Front Panel Assembly and Input/Output Circuits
3	Power Supply, Power-Up, and Voltage Sensing Circuits
4	HP-IB/RS-232-C Interface Circuits
5	Processor and Memory Circuits
6	Carousel Motor and Paper Feed Motor — Sensing and Drive Circuits
7	X- and Y-Motor Drive Circuits
8	Penlift Drive Circuit

6-4. SAFETY CONSIDERATIONS

6-5. The Model 7550A Graphics Plotter has been designed in accordance with accepted safety standards. Safety Symbols used with Hewlett-Packard instruments are illustrated on page vii. of the front matter in this manual. These symbols should be reviewed before service work is performed. Servicing should be performed only by qualified service personnel.

6-6. SIMPLIFIED THEORY OF OPERATION

6-7. This simplified theory of operation is provided as an introduction to the plotter system at a simplified block diagram level. See Figure 6-1.

6-8. The front-panel assembly provides a means of manually entering X- and Y-position data, pen control and selection, and media load control data to the plotter circuitry for processing. Alphanumeric displays of the front-panel functions and plotter activities are available on the front-panel assembly.

6-9. Interfacing between the front-panel circuits and the plotter bus is provided by the Support IC. Front-panel signals are interpreted by the Support IC for input to the plotter microprocessor.

6-10. The GP-IB and DART Interface circuits perform data transfer, interfacing, and any necessary data conversions for internal plotter use.

6-11. Data transfer is controlled by the microprocessor which generates the appropriate timing signals to properly sequence the processing of data and instructions. Power-up failure and interrupt detection circuits provide a means of plotter operation intervention.

6-12. The Read-Only Memory (ROM) and Electrically Alterable Read-Only Memory (EAROM) store the system executable instructions and data constants which the microprocessor accesses and interprets. The Random-Access Memory (RAM) is used for temporary storage of microprocessor calculations and input/output data. The processor/memory is used to translate the input graphic language to the plotter internal control language.

6-13. The Servo IC transfers position encoded information from the X- and Y-motor/encoders and the pen coil encoder onto the data bus for microprocessor comparison to commanded positions. The microprocessor then returns updated error signals to the Servo IC which modulates the pulse width of the X- and Y-motors and pen coil drive signals.

6-14. Power drivers in the penlift and motor drive circuits provide amplification for the signals that drive the X- and Y-motors and the penlift coil. Data on the plotter bus is used to step the paper feed and pen carousel drive motors.

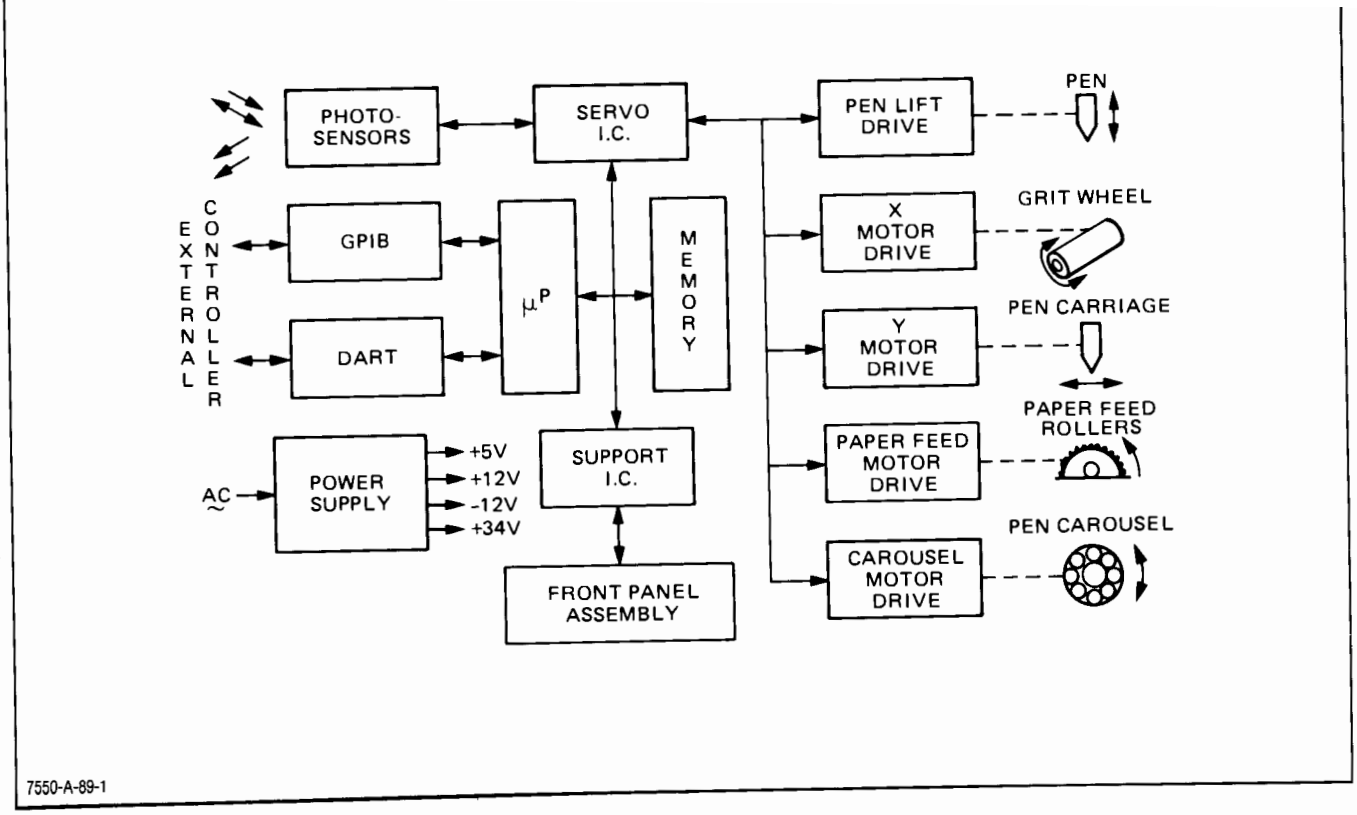


Figure 6-1. Model 7550A Simplified Block Diagram

6-15. A photosensor utilizing a phototransistor assembly detects carousel presence, carousel type, carriage cover interrupt, and pen presence during plotter initialization. A second photosensor is used to position the media feed rollers for AUTO FEED loading.

6-16. The power supply circuitry converts the line input ac voltage in a switching regulator to the required dc voltages to drive the motors and plotter electronics.

6-17. FUNCTIONAL THEORY OF OPERATION

6-18. The functional theory of operation is a block diagram description (see Service Sheet 1) which presents an overview of the Model 7550A Graphics Plotter operation. A detailed description of each of the major blocks is given with reference to the corresponding Service Sheet. Simplified diagrams of major blocks are included to facilitate understanding of the detailed description.

6-19. The Support IC U21 and the Servo IC U29 are custom VLSI ICs. Each IC performs numerous functions which impact different areas on the service sheets. Functions performed by the Support IC include baud rate generation, interrupt acknowledgement, wait state generation, and power supply voltage monitoring. Functions performed by the Servo IC include pulse modulation for the X- and Y-axis drive motors, penlift coil, photosensor enabling, and encoder feedback.

6-20. Pin assignments for the Support IC U21 and the Servo IC U29 are given in Figure 6-2.

6-21. FRONT PANEL INPUT/OUTPUT CIRCUITS

6-22. A twenty-three pushbutton switch matrix on the front panel allows the operator to manually enter pen position data, pen selection and pen control data, media load information, plotter limits, and interface parameters. Four function keys, whose immediate functions are displayed in the display module on the front panel, allow the operator to set various plotter parameters and invoke the internal diagnostic routines.

6-23. The LCD (Liquid Crystal Display) module on the front-panel assembly provides a 32-character, 2 rows of 16 characters each, alphanumeric display of the plotter functions and activities as accessed through the front-panel pushbuttons.

6-24. The front panel, through microprocessor control, displays messages for controlling the plotter. Every display has a ranking and the front panel has a functional hierarchy which is illustrated in Section II of this manual. Error displays have top ranking and will override other displays should an error or malfunction occur.

6-25. Signals from the front-panel switch matrix are input to the Support IC on the Main PCA for interfacing onto the data bus for processing. See Service Sheet 2. A signal from the Support IC enables the display module, and display data received from the microprocessor and stored in the keyboard latch register is input to the front panel display. Buffering of output signals to the switch matrix is also provided. A simplified block diagram of

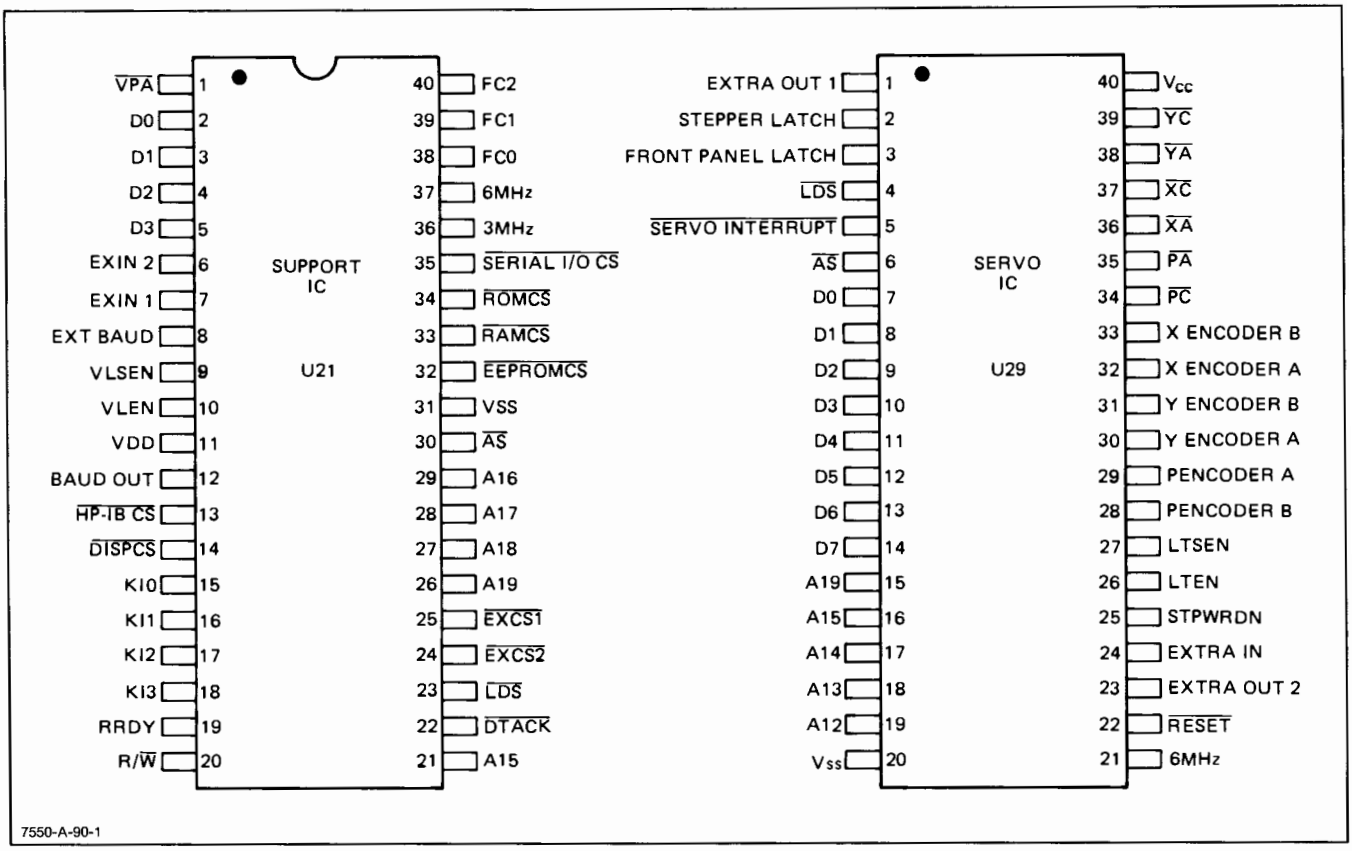


Figure 6-2. Support and Servo IC Pin Assignments

the front-panel and input/output circuits is shown in Figure 6-3.

6-26. Pressing any of the front-panel pushbuttons causes the corresponding matrix line to go low. This low is input to the Support IC U21 on the Main PCA and the information put on the data bus for processing. Bypass capacitors C7, C9, and C10 in the keyboard input lines provide electrostatic discharge protection for the signals. Resistor network RN3 keeps the lines pulled high when not activated.

6-27. The microprocessor receives the keyboard information from the Support IC U21, on data bus lines 8, 9, 10, and 11. Front-panel status on the data bus is interpreted and processed by the microprocessor. Data from the microprocessor is used to drive the alphanumeric liquid crystal display module. Information displayed by the module is used for plotter status and troubleshooting purposes. U16 and U13 provide latching and buffering for the switch matrix lines.

6-28. POWER SUPPLY, POWER-UP AND VOLTAGE SENSING CIRCUITS

6-29. Line voltage to the power supply is input through the ac input circuitry comprised of the power cord receptable, the line fuse/fuseholder, the LINE ON/OFF switch, and the power transformer. Voltage developed in the power transformer secondary is converted in the power supply to drive the plotter electronics. Taps in the primary of the power transformer provide the voltage to the vacuum fan. The vacuum fan draws the medium down on the platen to eliminate pen drag on the medium.

6-30. Voltages of +5 V, +12 V, −12 V, and +34 V are produced in the power supply circuits to drive the motors and plotter electronics. See Service Sheet 3. The power supply is a switching type dc supply incorporating a pulse-width modulator. Signals from a voltage-sensing network are used by the microprocessor to monitor the unregulated +34 V supply. The +34 V supply provides power to the X- and Y-motor drive circuits. Microprocessor control over the period of the pulses sent to the X- and Y-motor drive circuits compensates for any variations in the +34 V supply.

6-31. +5 V is developed in the switching regulator of the power supply and is provided with overvoltage protection. The +5 V provides the power to the plotter digital electronics. A +5 V reference voltage from the regulator is used by the power-on circuit to generate signals when power is first applied to the plotter. These signals are used to set the plotter circuits to a known quiescent condition. A simplified block diagram of the power supply circuitry is shown in Figure 6-4.

6-32. The +12 V regulated supply is developed through transformer coupling of the regulated +5 V and the +7 V developed across the transformer. It is used to power the phototransistors, carousel motor, paper feed motor, and penlift drive circuits. The −12 V supply is similarly developed and is used to power the serial interface line drivers and the penlift drive circuit. CR2 and CR4 provide half-wave rectification for the ±12 V supplies.

6-33. Power supply voltage monitoring is performed by a voltage-sensing pulse-width modulator circuit in the Support IC which generates a fixed frequency signal whose pulse-width is microprocessor controlled. These output pulses, VLEN, are filtered in the voltage-sensing circuit comparator and compared with the unregulated +34 V power supply voltage. The comparator then generates a series of output pulses, VLSEN, whose period is dependent upon the result of the comparison. The microprocessor samples the pulses to compute a compensation signal for any voltage variation. This compensation signal is used to control the X- and Y-motor servo circuits by controlling the period of the servo output pulses, thus compensating for any amplitude changes of those pulses. A simplified block diagram of the voltage monitoring circuit is shown in Figure 6-5.

6-34. The ac power source is switched into the primary windings of the power transformer through the LINE ON/OFF switch and the internal line fuse. The output lines to the transformer can be configured for either 100 V, 120 V, 220 V, or 240 Vac by connection to external spade lugs on the transformer, which are tied internally to the taps in the primary windings. One of the primary windings provides nominal 120 Vac for the vacuum fan regardless of input voltage range selection.

6-35. The power transformer T1 provides the proper stepped down voltage to the full wave rectifier diodes CR15, CR16, CR19, and CR20 on the main PCA. Radio frequency interference (RFI) filtering is provided by C39 and C43 in the ac filtering network.

6-36. A +34 V unregulated supply is developed by the full wave rectifier diodes. The +34 V supply is filtered by C56 and protected by fuse F1.

6-37. Switching type circuitry is used to develop a +5 V supply from the unregulated +34 V line. The +34 V is applied through F2 to both the control circuit U10 and the +5 V switching circuitry. U10 is a pulse-width modulation (PWM) control circuit containing an on-chip 5-volt reference supply (Vref), error amplifier, current limit

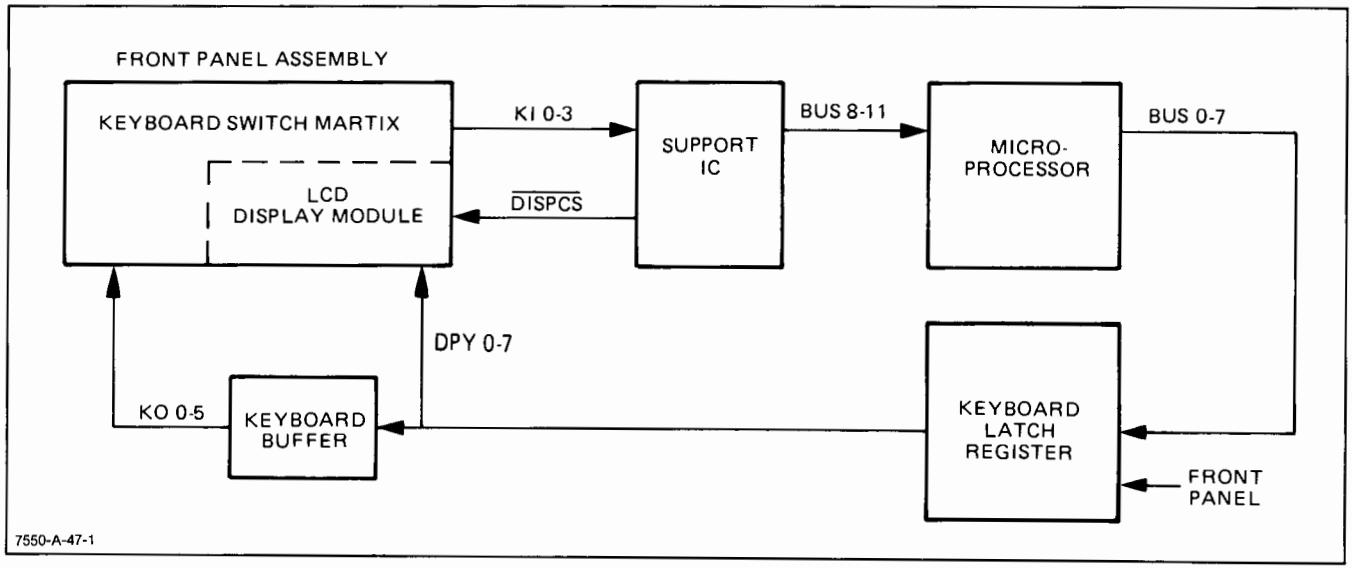


Figure 6-3. Front Panel Input/Output Circuit, Simplified Block Diagram

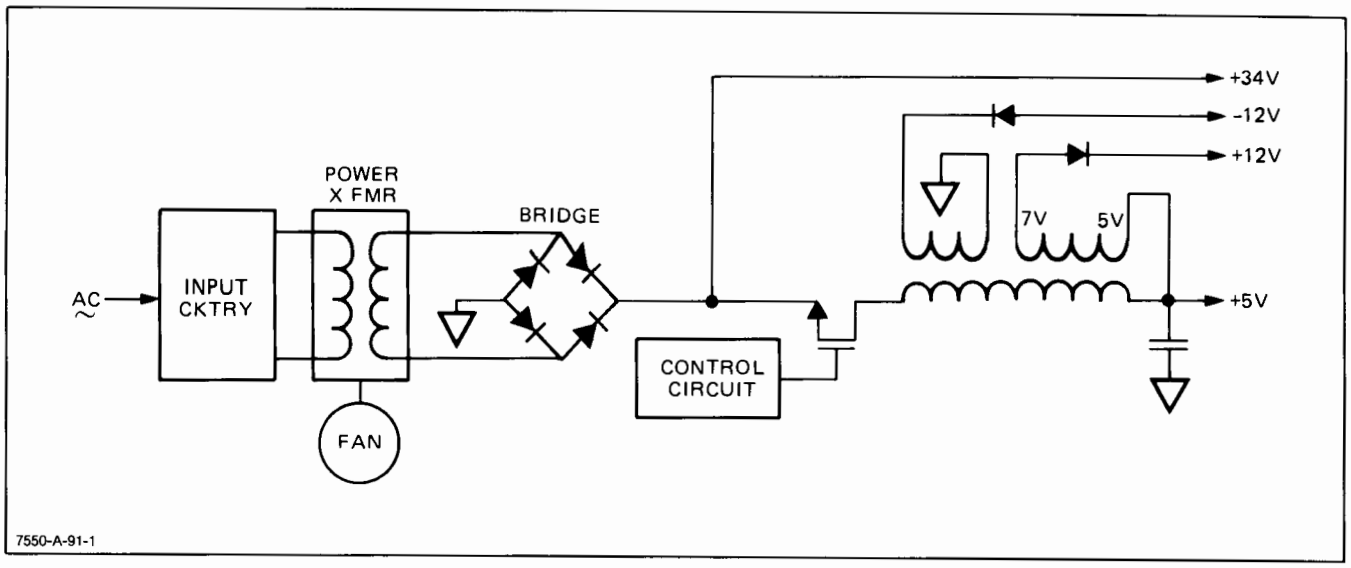


Figure 6-4. Power Supply, Simplified Block Diagram

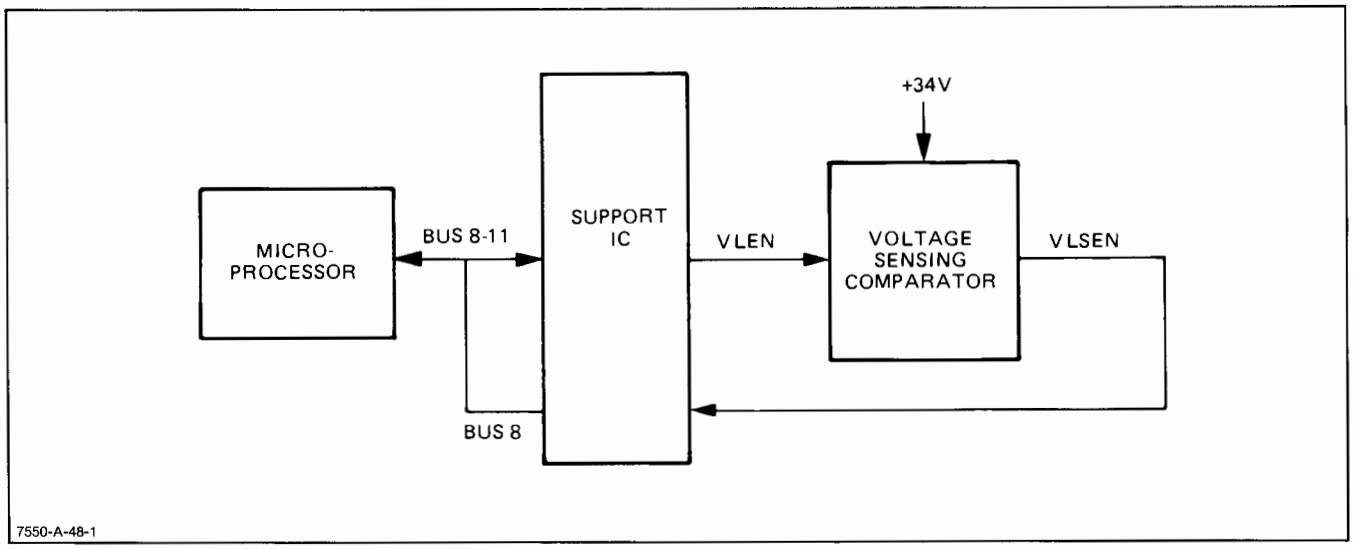


Figure 6-5. Voltage Monitoring Circuit, Simplified Block Diagram

amplifier, oscillator, PWM comparator, pulse steering flip-flop, and push-pull output control.

6-38. The +34 V is input through the zener diodes VR3 and VR4 and referenced at approximately +11 V. This voltage provides the current drive input for the internal reference supply at U10 pin 12. Stabilization is provided by C29. The output of the internal reference supply on pin 14 is a stabilized reference voltage for the switching circuit. Pin 7 provides the circuit common to the stabilized reference supply. Feedback information from the +5 V switching supply is input to pin 1 of U10 for the error amplifier. The error amplifier detects the +5 V on pin 1, through a filter comprised of R31 and C32. The error amplifier input on pin 2 detects the Vref signal through R22 and dynamic feedback through R19 and C21. Error amplifier inputs are combined in the pulse-width modulator comparator. The output of the PWM comparator is used to control the stabilized reference voltage.

6-39. R13 determines the constant current that charges the timing capacitor C17 for the internal oscillator set control inputs on pins 5 and 6. The input at pin 4 is used to control the dead time comparator. The current limiting amplifier in U10 is not used, therefore it is biased OFF by connecting the noninverting input on pin 16 to circuit common and the inverting input on pin 15 to Vref. Also, one of the two internal output transistors is not used and its collector and emitter, pins 8 and 9, are not connected.

6-40. With the output control pin 13 of U10 tied to Vref, the pulse steering flip-flop is enabled and the two internal output transistors are driven on alternate cycles of the sawtooth oscillator. Since only one output transistor is used, the output is limited to a 50% duty cycle. Pin 11 is connected to the collector of the transistor used while pin 10 is connected to the emitter.

6-41. The PWM output of U10 is translated to the gate of field effect transistor Q7 through Q6. This is accomplished by referencing the base of Q6 to the +5 Vref and then using the PWM output transistor to ground the bottom of R20. Thus, when ON, approximately 4 volts is forced across R20 resulting in an emitter current of approximately 50 mA on Q6. This emitter current appears as collector current through R9 and develops approximately 10 volts to turn ON Q7. When the PWM is OFF, Q6 is OFF, and the charge on the gate capacitance of Q7 is discharged through R9.

6-42. When Q7 is ON, CR5 is reverse biased and current flows into T1 making pin 1 positive relative to pin 2, pin 5 positive relative to pin 6, and pin 3 positive relative to pin 4. Diodes CR2 and CR4 are thus reverse biased.

6-43. When Q7 is OFF, the current into T1 starts to decrease causing the polarity in the three windings to reverse. This reversing polarity causes diodes CR2, CR4, and CR5 to conduct.

6-44. The known constant voltage across the primary of T1, due to the +5 V output and −0.7 V threshold of CR5, results in known voltages across the secondaries of T1. Diodes CR2 and CR4 conduct these voltages to C3 and C18 to sustain the quasi-regulated +12 V and −12 V. An L-C low pass filter to smooth the +5 V voltage is provided by the inductance in the primary of T1 and capacitor C31.

6-45. A +5 V overload protection circuit provides protection to the load should an overvoltage condition occur. If the +5 V output exceeds the reference voltage set by VR6, current starts conducting through VR6 thereby triggering SCR Q14. When SCR Q14 conducts, it clamps the +5 V output to common and protects the load. The time constant of R35 and C38 prevents shutdown due to spurious excursions.

6-46. HP-IB/RS-232-C INTERFACE CIRCUITS

6-47. The Model 7550A HP-IB/RS-232-C Interface provides both an asynchronous serial I/O interface conforming to EIA Standard RS-232-C and CCITT V.24, and a 16-line interface bus, utilizing the Hewlett-Packard Interface Bus (HP-IB) method of interfacing HP controllers, conforming to IEEE Standard 488-1978. The Main

6-48. Transfer of control data and information between the HP-IB external controller and the HP-IB General Purpose Interface Bus (GP-IB) Talker/Listener is performed by two bidirectional bus transceivers. The Talker/Listener sets up the data transfer circuits when addressed and provides the interface to the plotter bus. See Service Sheet 4. The HP-IB address is front-panel selectable and stored in memory. HP-IB addresses range from 0 to 30 and Listen Only. The factory default address is 5. If set to Listen Only, the plotter cannot be addressed to talk.

6-49. The bus transceivers U27 and U30 are enabled when power is applied to the plotter and directed to transmit or receive in response to the HP-IB commands by the talker/listener U28. The TR1 output of the talker/listener directs the bus transceivers into either the transmit or receive mode. All handshake requirements for the HP-IB are automatically handled by the talker/listener. When the plotter power is OFF, all inputs and outputs are high impedance and the plotter does not interfere with other HP-IB operations.

6-50. When the ATN input is low, the talker/listener compares data on the HP-IB Data Input/Output (DIO) lines to the address set through the front panel and responds when addressed by the HP-IB system controller to either talk or listen.

6-51. The talker/listener chip select (HP-IB CS) is active when address bits A16, A17, and A19 from the microprocessor are low. When the talker/listener is enabled and its WRITE (WR) input is low, data can be written by the microprocessor into the talker/listener and when the READ (RD) input is low, data can be read by the microprocessor from the talker/listener. The follows:

a. Functions implemented to IEEE standard 488-1978, Appendix C.

1.	Source Handshake	SH1
2.	Acceptor Handshake	AH1
3.	Talker	T6
4.	Listener	L3
5.	Service Request	SR1
6.	Parallel Poll	PP0, PP1, PP2
7.	Device Clear	DC1
8.	No Remote Local	RLO
9.	No Device Trigger	DTO
10.	No Controller	CO

b. Device Clear causes the plotter to:

1. Complete any vector currently in process.
2. Complete an up vector if queued.
3. Convert a down vector to an up vector and complete.
4. Disable "TALK."

c. Parallel Poll response is assigned by the HP-IB address or the REMOTE configuration function. If the address is L0, the parallel poll response is PP0. LISTEN address 0 through 7 assigns Data Input/Output (DIO) lines 8 through 1, respectively, using PP2. All other listen addresses use response PP1.

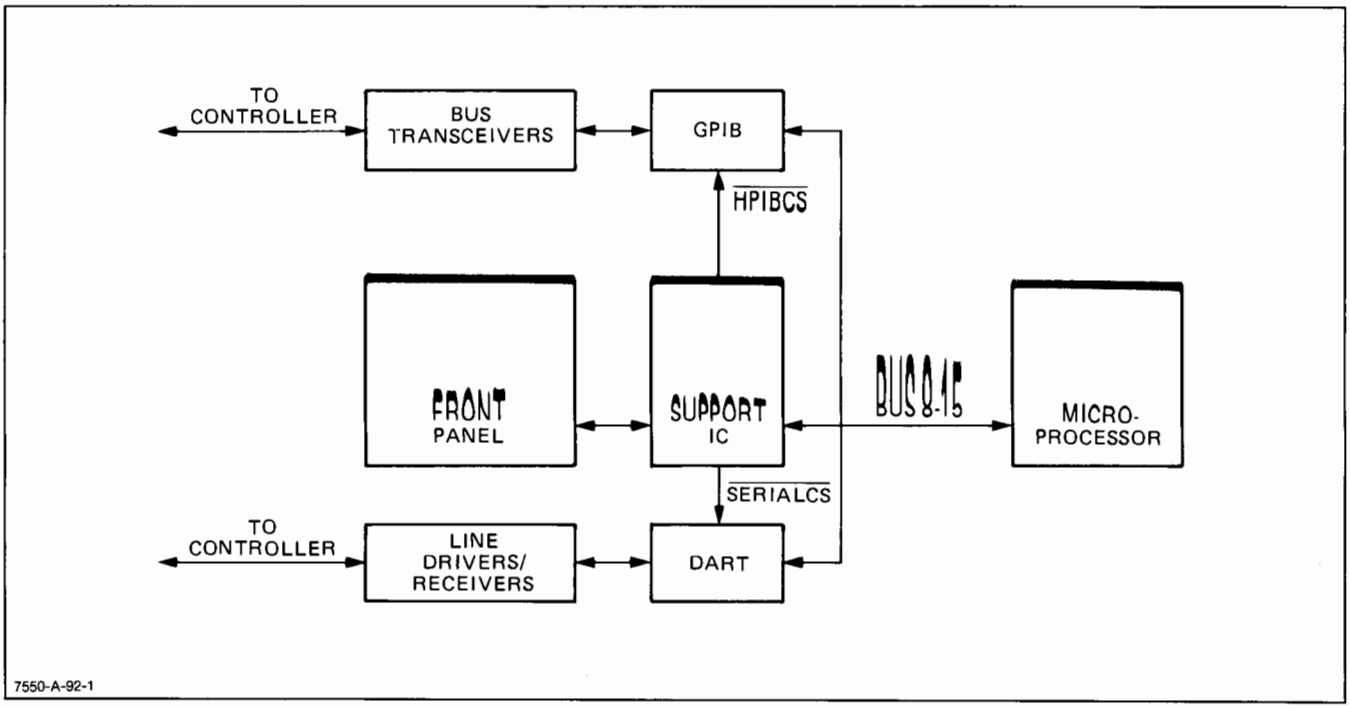


Figure 6-6. Interface Circuits, Simplified Block Diagram

6-53. BUS LINE IDENTIFICATION. A 16-line bus is used to carry data and control information between the plotter and the HP-IB external controller. The bus line is divided into three sets of signal lines as follows:

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

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

c. Interface management — 5 signal lines.

6-54. The data bus carries 8-bit data or control words in bit parallel, byte serial form. These words are transmitted bidirectionally and asynchronously. 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 bus.

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

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

6-55. The five interface management lines are used to provide an orderly flow of information across the interface bus and are identified as follows:

a. ATTENTION (ATN) — Used to identify the information on the data bus. The information is either a Command, Data, or Parallel Poll Response.

b. SERVICE REQUEST (SRQ) — Used to indicate that the plotter needs attention.

c. INTERFACE CLEAR (IFC) — Used to place the plotter in a known quiescent state.

d. REMOTE ENABLE (REN) — Used to enable instruments to go into remote control.

e. END or IDENTIFICATION (EOI) — Used to indicate the end of a multiple byte transfer sequence, or in conjunction with ATN, to execute a parallel polling sequence.

6-56. SIGNAL FUNCTIONS. Positive true logic is used within the plotter circuitry. Negative true logic is used on the HP-IB lines. A capital letter N in front of a mnemonic shows an inversion for that line.

6-57. LISTEN HANDSHAKE. When the plotter is ready to receive a byte on the data bus, it sets NDAC true and NRFD false. When the plotter sets the above two signals it starts the "handshake" sequence:

a. Plotter indicates that it is ready to accept data by setting NRFD false and NDAC true.

b. After NRFD has gone true, the controller places a byte on the eight data lines and sets the DAV line true.

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

d. After the NDAC line has gone false, the controller sets DAV false and takes the data off the lines. When DAV goes false, the plotter sets NDAC back to true and processes the data.

e. When the plotter is ready to accept another byte of data, it sets NRFD false and the sequence is ready to repeat from step a.

6-58. TALK HANDSHAKE. Data is transferred from the plotter to the controller using an interlocked handshake sequence similar to the acceptor handshake previously described. Refer to the Handshake Timing diagram, Figure 6-7. The same three bus lines DATA VALID (DAV), NOT READY FOR DATA (NRFD) and NOT DATA ACCEPTED (NDAC) are used as follows:

a. The plotter, having been addressed as a talker, causes the processor to generate a new byte available (nba) signal which sets the talk logic gates and latches to set the DAV message to false.

b. The controller, which is now the listener, makes the NRFD line false and NDAC true signifying its readiness to accept the message byte.

c. The plotter sends the DAV message true indicating that it has put a valid message byte on the bus.

d. The controller acknowledges that DAV is true, accepts the message byte, and sets the NDAC line false.

e. When the plotter is ready to send another byte, it sets NRFD true and the sequence is ready to repeat from step a.

6-59. SERVICE REQUEST. The SERVICE REQUEST (SRQ) allows the plotter to request service from its controller. A service request is initiated when the plotter processor generates a request for service (rsv) which causes the HP-IB service request logic circuit to set the SRQ line true. This true SRQ state indicates over the interface that the plotter is requesting service.

6-60. The controller, upon detecting a service request, may conduct either a serial or parallel poll of all the devices on the bus that may have requested service. To initiate the serial poll, the controller transmits the universal command "SPE" (SERIAL POLL ENABLE), it then sequentially commands each device on the HP-IB to talk.

6-61. The SERIAL POLL ENABLE (SPE) command sets the serial poll mode state flip-flop when the controller sets the plotter as a talker. The plotter requests service by sending the status byte (DIO1-DIO7) with DIO8 always =0. The controller looks at DIO7 to determine if the plotter was the device that set the SRQ line. The controller has the option of determining when or if a

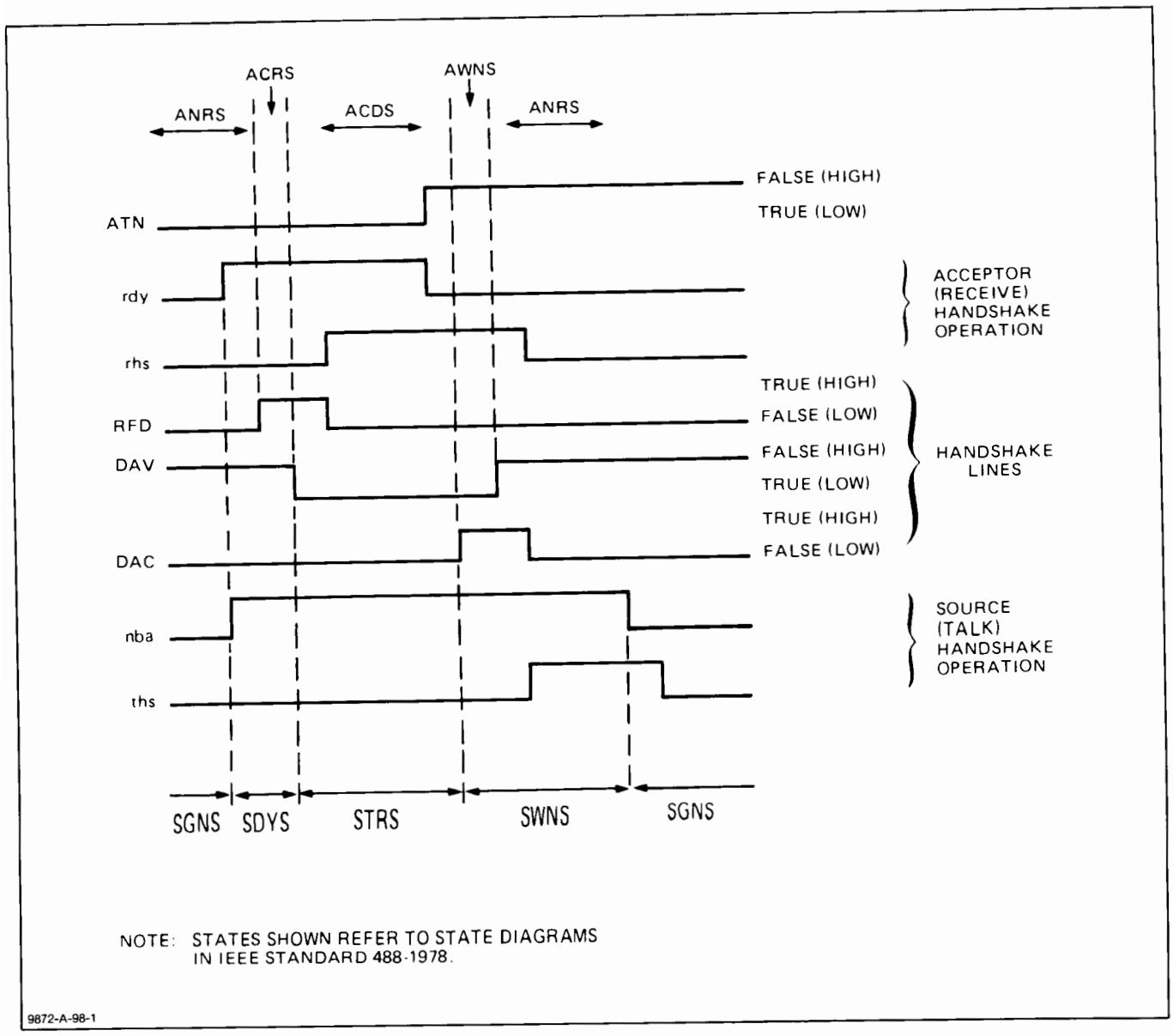


Figure 6-7. HP-IB Data Transfer Handshake Timing

service request will be serviced and takes appropriate action. The use of the service request and the serial poll depends entirely on the makeup of each system and the devices involved.

6-62. PARALLEL POLL MODE. Parallel polling permits the status of up to eight devices on the HP-IB to be checked simultaneously. The operator assigns each device a data line (DIO1 through DIO8) which the device sets low during the parallel poll routine if it requires service. More devices can be handled, if desired, by sharing the use of each DIO line.

6-63. DEVICE CLEAR (DCL) AND SELECTED DEVICE CLEAR (SDC). The controller can set all devices on the HP-IB system to a predefined or initialized state by sending the universal command DEVICE CLEAR (DCL). The controller can also set "selected devices only" on the HP-IB system to a predefined state by sending a SELECTED DEVICE CLEAR (SDC) command. Upon receiving either an SDC or a DCL command, the plotter decodes data lines DIO1-DIO7 and sets the respective SDC or DCL gates. The output of the enabled gate sets a DCL latch which requests the microprocessor to go to an initialized state. The microprocessor receives this request during its READ INTERFACE BUS (RDIB) cycle and determines when it will grant the request. The microprocessor next causes the HP-IB control gate to output a clear acknowledge (cla) pulse to reset the data clear latch when the next WRITE INTERFACE BUS (WRIB) occurs.

6-64. Line drivers and receivers in the RS-232-C circuitry provide the transfer of data and instructions between the RS-232-C external controllers and the DART (Dual Asynchronous Receiver/Transmitter). The DART converts the incoming serial data into parallel data for internal plotter use and converts the outgoing data from parallel to serial data. See Service Sheet 4. The Model 7550A serial interface has been modified for EIA RS-422-A compatibility. Ten mutually exclusive serial I/O configurations are available in the Model

7550A. Serial baud rate and handshaking configurations are front-panel selectable and stored in memory.

6-65. Serial baud rate and handshaking configuration settings selected through the front panel are interfaced with the microprocessor bus by the Support IC. Internal synchronous counters in the Support IC are used to develop the baud rate frequencies from the input clock frequency. A 4-bit select code from the microprocessor is internally latched and used to select the baud rate. Figure 6-8 is a simplified block diagram of the baud rate generator circuit. Table 6-1 lists the baud rates and actual frequencies for the select codes.

6-66. Serial mode and parity status are input through the front panel along with the handshake configurations. A diagram showing the front-panel access to the interface functions is given in Section II of this manual. Specific information on the handshake definitions and configurations, as well as mode and parity settings, is contained in the HP Model 7550A Interfacing and Programming Manual.

6-67. Since signals and data within the plotter are positive-true TTL levels, inverting line drivers U1, U4, and U8 and receivers U2, U5, and U9 are used in the RS-232-C input and output circuits to convert the logic and voltage levels. Table 6-2 shows the levels required for RS-232-C systems. The received serial data and signals are input to the DART through line receivers. Conversely, the serial string data from the DART is driven to the I/O connectors by the line drivers.

Table 6-1. Baud Rate Frequencies

SELECT CODE D C B A	BAUD RATE	FREQUENCY 16× Baud Rate ±0.2%
0 0 0 0	External Baud	—
0 0 0 1	75	1.20 kHz
0 0 1 0	110	1.76 kHz
0 0 1 1	150	2.40 kHz
0 1 0 0	200	3.20 kHz
0 1 0 1	300	4.80 kHz
0 1 1 0	600	9.60 kHz
0 1 1 1	1200	19.20 kHz
1 0 0 0	2400	38.40 kHz
1 0 0 1	4800	76.80 kHz
1 0 1 0	9600	153.60 kHz

6-68. The Dual Asynchronous Receiver Transmitter (DART) U14 is a dual channel serial to parallel, parallel to serial converter/controller used in the asynchronous mode. In addition, the DART also provides modem control for both channels. The DART converts the incoming serial data into parallel data for use by the plotter micro-

Table 6-2. RS-232-C Signal Levels

	DATA CIRCUITS		CONTROL CIRCUITS	
	Mark	Space	Off	On
Binary State	1	0	1	0
Voltage Range	−3 V to −25 V	+3 V to +25 V	−3 V to −25 V	+3 V to +25 V

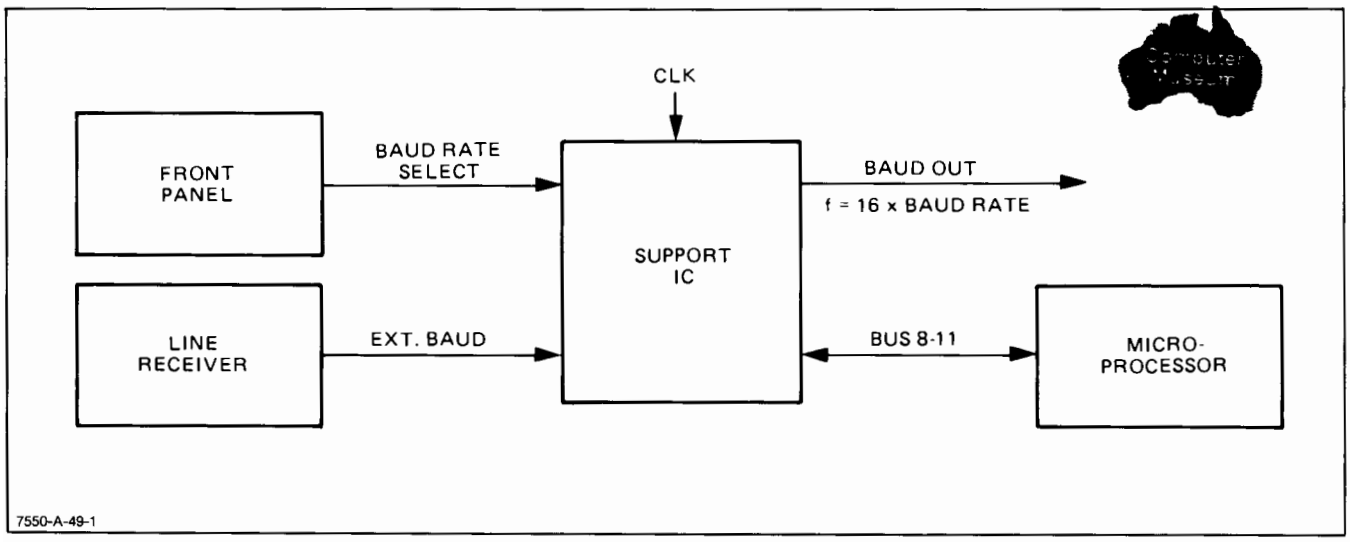


Figure 6-8. Baud Rate Generator Circuit, Simplified Block Diagram

processor and converts the outgoing data from parallel to serial string for the external controller.

6-69. Address bit A1 supplies the CHANNEL $\overline{A}$ OR B SELECT (B/$\overline{A}$) input to pin 34 of U14 and defines which channel is accessed during a data transfer between the microprocessor and the DART. A high on address A1 selects channel B while a low on A1 selects channel A.

6-70. Address bits A15, A17, and A19 are used to supply the CHIP ENABLE ($\overline{CE}$) input for the DART. When enabled, the DART accepts data or commands from the microprocessor during a WRITE cycle or transmits data to the microprocessor during a READ cycle.

6-71. The CONTROL OR $\overline{DATA}$ SELECT (C/$\overline{D}$) input specifies whether the type of information being transferred between the DART and the microprocessor is control or data information. A high on address bit A2 instructs the C/$\overline{D}$ input to select control type information transfer and a low on A2 specifies data type information transfer.

6-72. When the address bit A19 goes low and the READ/$\overline{WRITE}$ (R/$\overline{W}$) signal goes high, the $\overline{READ}$ CYCLE STATUS ($\overline{RD}$) input pin 32 of U14 acknowledges that a READ operation is in progress.

6-73. The INTERRUPT ENABLE IN (IEI) and $\overline{MACHINE\ CYCLE\ ONE}$ ($\overline{M1}$) inputs to the DART are tied high to indicate that no other devices of higher priority are being serviced by the microprocessor interrupt routine.

6-74. A low on the INTERRUPT 1 (INT1) line from the DART interrupt logic signals the microprocessor to branch to a plotter interrupt service routine.

6-75. The TRANSMITTER AND RECEIVER CLOCK inputs, ($\overline{RXCA}$, $\overline{TXCA}$, and $\overline{RXTXCB}$) of the DART are tied to the output frequency of the baud rate generator in the Support IC, U21.

6-76. RS-232-C WIRES/SIGNALS. A list of the EIA RS-232-C/CCITT V.24 signals used in the HP Model 7550A is given in Table 6-3.

6-77. MICROPROCESSOR AND MEMORY CIRCUITS

6-78. Data and instructions received through the interface or front-panel input/output circuits are input on the data bus for microprocessor interpretation. A 16-bit microprocessor, U25, is used in the plotter to convert the incoming graphic instructions into the plotter internal control instructions. The microprocessor input and output signals can be functionally organized into the groups shown in Figure 6-9. The microprocessor input/output signals and their definitions are given in Table 6-4. Figure 6-10 is the pin assignment for the microprocessor.

6-79. The address bus is a 23-bit unidirectional, 3-state bus providing the signal path for bus address operation during all cycles except interrupt cycles. During interrupt acknowledge cycles, address lines A1, A2, and A3 provide interrupt level service information while address lines A4 through A23 are set to a logic high.

Table 6-3. EIA RS-232-C/CCITT V.24 WIRES/SIGNALS

WIRE/SIGNAL NAME	MNEMONIC	
	RS-232-C	CCITT V.24
Protective Ground	AA	101
Signal Common	AB	102
Transmitted Data	BA	103
Received Data	BB	104
Request to Send	CA	105
Clear to Send	CB	106
Data Set Ready	CC	107
Data Terminal Ready	CD	108.2
Received Line Signal Detector	CF	109
Data Signal Rate Selector	CH	111
Receiver Signal Element Timing	DD	115

6-80. The data bus is a 16-bit, bidirectional, 3-state bus providing the communication path for data between the Interface, Memory, Support IC, Servo IC, and microprocessor circuits. Data can be transferred on the bus in either word or byte length. The direction of data flow on the bus is controlled by the READ/$\overline{WRITE}$ function of the microprocessor.

6-81. Asynchronous data transfers are handled using the Address Strobe ($\overline{AS}$), Read/Write (R/$\overline{W}$), $\overline{Upper\ and\ Lower\ Data\ Strobes}$ ($\overline{UDS}$, $\overline{LDS}$), and Data Transfer Acknowledge ($\overline{DTACK}$) control signals. These asynchronous bus control signals indicate the presence of a valid address, define the data transfer cycle, and control the data on the data bus.

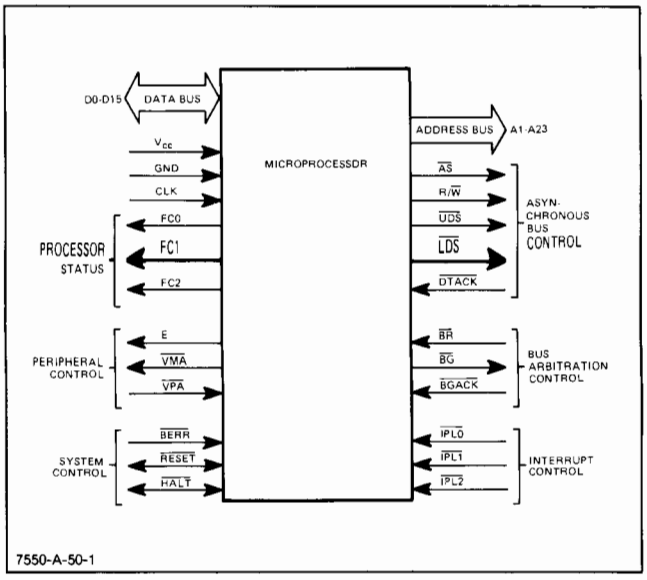


Figure 6-9. Microprocessor Signal Groups

Table 6-4. Microprocessor Signal Summary

SIGNAL NAME	MNEMONIC	INPUT/OUTPUT	ACTIVE STATE	PIN NUMBER
Address Bus	A1-A23	output	high	29-48, 50-52
Data Bus	D0-D15	input/output	high	1-5, 54-64
Address Strobe	$\overline{AS}$	output	low	6
Read/Write	R/$\overline{W}$	output	read-high write-low	9
Upper and Lower Data Strobes	$\overline{UDS}$,$\overline{LDS}$	output	low	7,8
Data Transfer Acknowledge	$\overline{DTACK}$	input	low	10
Bus Request	$\overline{BR}$	input	low	13
Bus Grant	$\overline{BG}$	output	low	11
Bus Grant Acknowledge	$\overline{BGACK}$	input	low	12
Interrupt Priority Level	$\overline{IPL0}$, $\overline{IPL1}$, $\overline{IPL2}$	input	low	23-25
Bus Error	$\overline{BERR}$	input	low	22
Reset	$\overline{RESET}$	input/output	low	18
Halt	$\overline{HALT}$	input/output	low	17
Enable	E	output	high	20
Valid Memory Address	$\overline{VMA}$	output	low	19
Valid Peripheral Address	$\overline{VPA}$	input	low	21
Function Code Output	FC0, FC1, FC2	output	high	26-28
Clock	CLK	input	high	15
Power Input	Vcc	input	—	14, 49
Ground	GND	input	—	16, 53

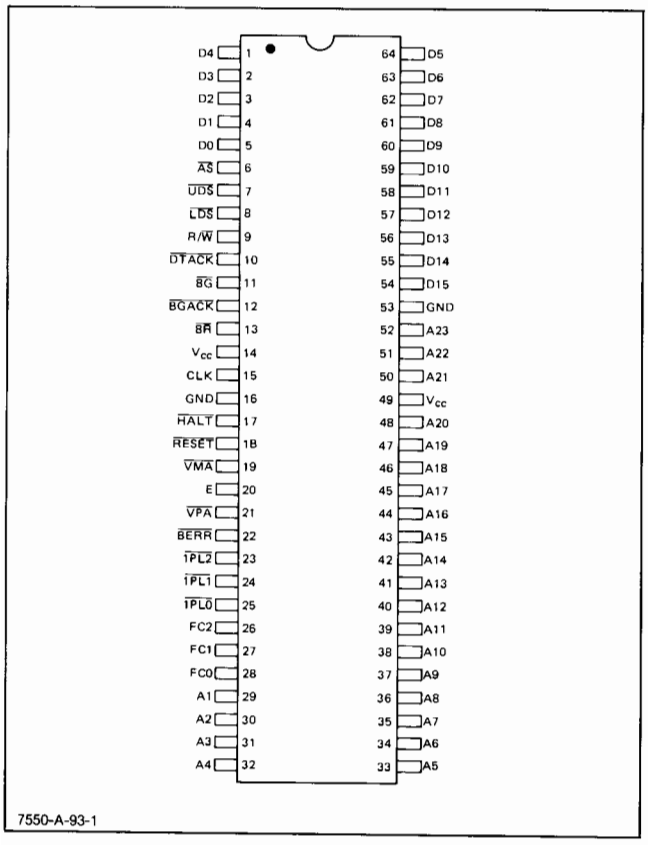


Figure 6-10. Microprocessor Pin Assignment

6-82. A Data Transfer Acknowledge ($\overline{DTACK}$) input to the microprocessor allows control of data transfer during READ or WRITE cycles. Setting the $\overline{DTACK}$ line active indicates the completion of data transfer and the cycle can be terminated. $\overline{DTACK}$ can be used to put the microprocessor into a wait state. Setting $\overline{DTACK}$ high will cause the microprocessor to wait when more time is required for the data transfer process. The cycle will terminate only when an active $\overline{DTACK}$ signal is recognized. The wait state generator in the Support IC can force $\overline{DTACK}$ high through decoding the address space of slow memory or peripheral devices on address lines A18 and A19. A simplified block diagram of the wait state generator circuit is shown in Figure 6-11.

6-83. Bus control signals Bus Request ($\overline{BR}$) and Bus Grant Acknowledge ($\overline{BGACK}$) normally form a bus arbitration circuit used to determine which device will control the bus. These lines are not used and therefore tied high to prevent them from becoming active (low). Bus Grant ($\overline{BG}$) is not used.

6-84. Seven levels of interrupt priorities are provided. An interrupt request to the microprocessor is made by encoding the interrupt request level onto the interrupt request lines. Interrupt control signals $\overline{IPL0}$, $\overline{IPL1}$, and $\overline{IPL2}$ indicate the encoded priority level of the requesting device. Level zero (0) indicates no interrupt request while level seven (7) is the highest priority interrupt. The least significant bit in the code is assigned to $\overline{IPL0}$ and the most significant bit to $\overline{IPL2}$. $\overline{HP\text{-}IB\ INT}$ is the input signal to $\overline{IPL0}$ and $\overline{SERIAL\ INT}$ is the input signal to $\overline{IPL1}$. These signals from the GP-IB and DART data

communication circuits are used to inform the microprocessor of pending interrupt service requirements. The SERVO INT signal input to IPL2 is used to determine the sample rate of the data control system for the servo motors.

6-85. HALT and RESET signals provide the microprocessor system control. An active (low) RESET signal causes the microprocessor to initiate a system initialization sequence in response to an external RESET signal from the plotter power-on circuit. An active (low) HALT signal will cause the microprocessor to suspend plotter operation at completion of the current bus cycle. BUS ERROR (BERR) is tied high to keep it inactive. BERR is normally used to indicate bus errors to the microprocessor.

6-86. Peripheral control signal Valid Peripheral Address (VPA) is used to specify synchronous data transfer and indicate that the microprocessor should use autovectoring for an interrupt. Enable (E) and Valid Memory Address (VMA) peripheral control signals are not used. During an interrupt acknowledge cycle, a VPA signal from the Support IC is used to implement an autovectoring interrupt causing the microprocessor to fetch an internally generated vector to locate the interrupt service routine. Microprocessor interrupt acknowledge is indicated when the function code outputs FC0-FC2 are all active (high) along with an active AS (Address Strobe) signal. Figure 6-12 is a simplified block diagram of the interrupt acknowledge circuit.

6-87. Function code outputs (FC0, FC1, and FC2) indicate the microprocessor state status and the cycle type currently being executed. The function code output information is valid whenever the Address Strobe (AS) is active (low). The function codes are also used for an interrupt acknowledge.

6-88. An external 6 MHz clock circuit provides the input frequency for the microprocessor internal clock. The microprocessor generates the timing signals to properly synchronize plotter operations. The microprocessor timing control diagram is shown in Figure 6-13.

6-89. The microprocessor uses algorithms stored in memory to translate the input graphics instructions to internal control instructions. Eighty K-bytes of Read-Only Memory (U12, U17, U22, and U26) store the system executable instructions and data constants. Sixteen K-bytes of Random-Access memory (U6 and U20) temporarily store microprocessor calculations and data. ROM configuration jumper capability is provided for possible future expansion to 128K bytes of ROM. The EEPROM (U3) is used to store both plotter and user-definable parameters including mechanical and selected I/O constants.

6-90. Signals from the microprocessor are decoded and used to enable the RAM. The RAM, when selected and enabled, will either READ or WRITE information on the data bus to or from memory locations selected by information on the address bus. Data stored in ROM is put on the data bus when selected and enabled by signals from the microprocessor. ROM storage is also addressed by information on the address bus. See Service Sheet 5.

6-91. CAROUSEL MOTOR AND PAPER FEED MOTOR — SENSING AND DRIVE CIRCUITS

6-92. When first powered ON, the plotter performs an initialization sequence. During this initialization sequence, the pen carousel is rotated to determine the carousel type and establish default pen speed and force parameters. Carousel type is sensed by a photosensor pair (DS1, Q1) whose photobeam is interrupted by identification slots in the carousel body. An enabling signal (LTEN) from the Servo IC (U29) is used by the carousel light enable driver U7 to activate the carousel LED. Light beams passing through the carousel are sensed (LTSEN) by the carousel photosensor and input to the Servo IC for interpretation. The Servo IC then enables the stepper latch register U19 and allows microprocessor-generated carousel motor pulses on the data bus to pass through to the carousel motor switch U11 and control

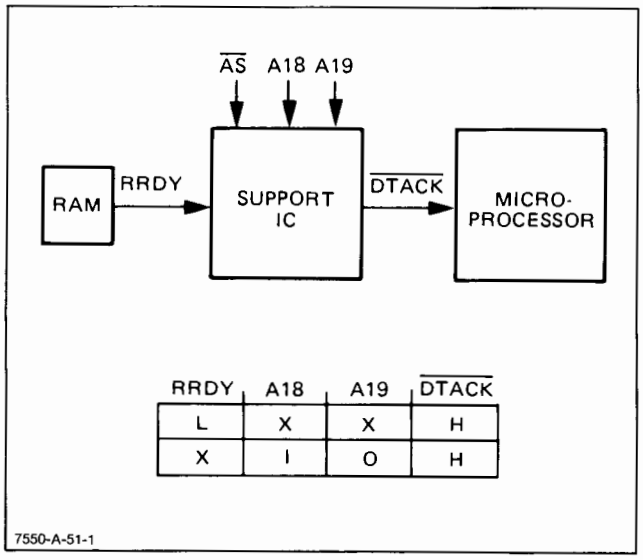


Figure 6-11. Wait State Generator Circuit, Simplified Block Diagram

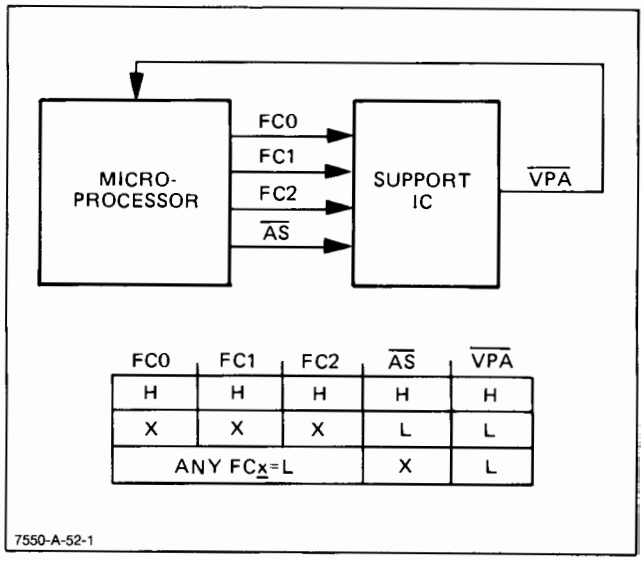


Figure 6-12. Interrupt Acknowledge Circuit, Simplified Block Diagram

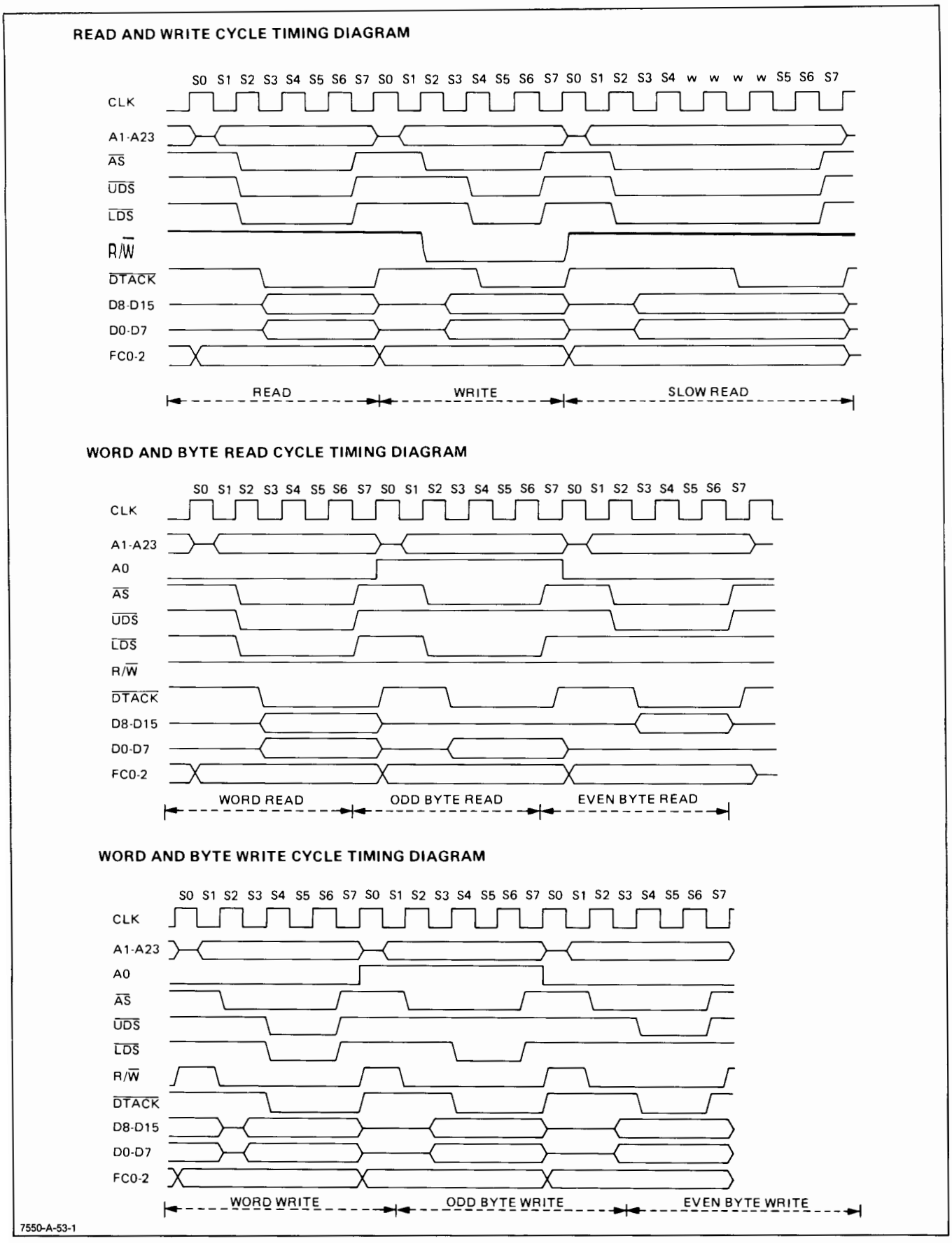


Figure 6-13. Timing Control Diagram (Sheet 1 of 2)

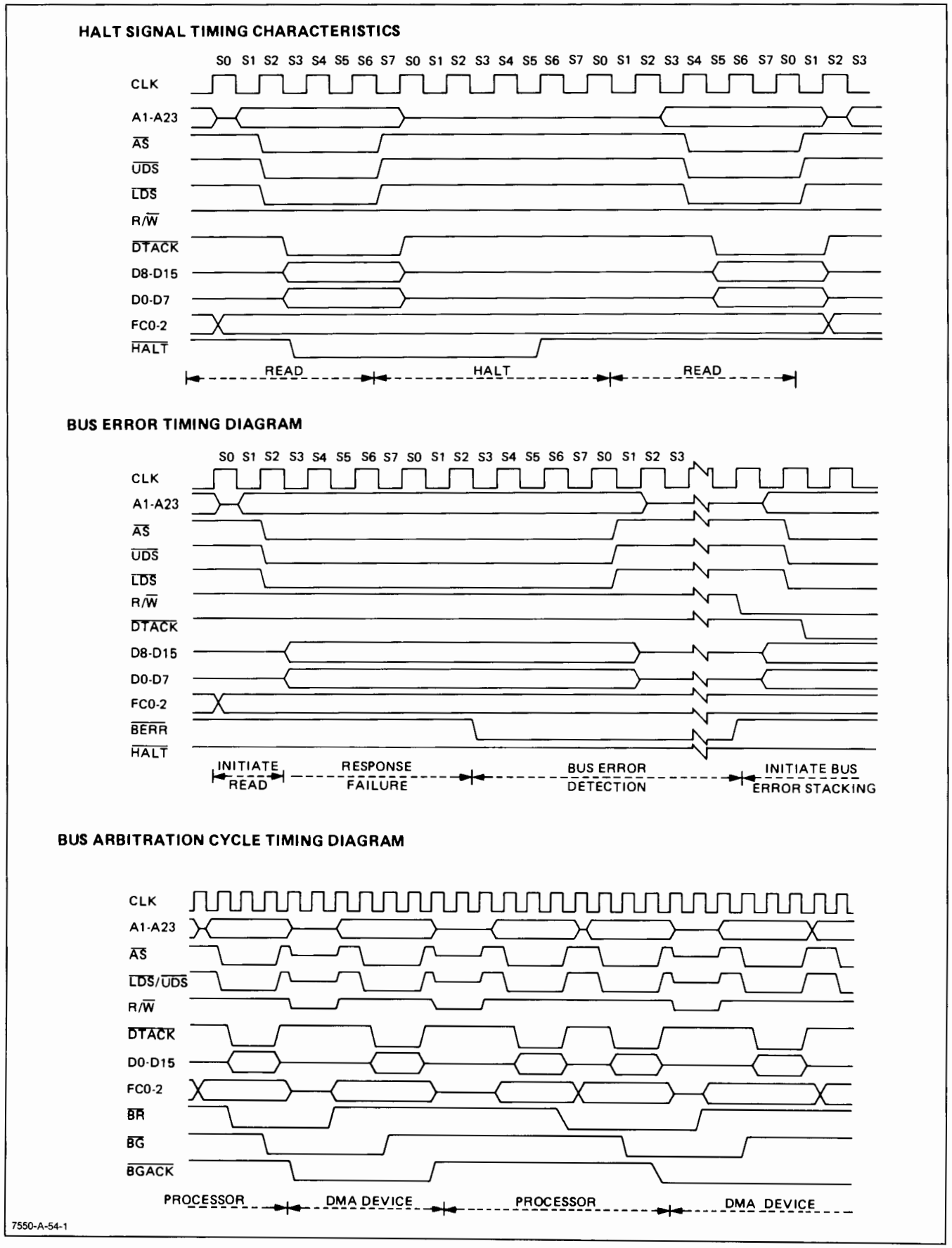


Figure 6-13. Timing Control Diagram (Sheet 2 of 2)

the pen carousel drive motor. See Service Sheet 6. Each pulse from the microprocessor causes the carousel motor to rotate one step. During each revolution, light sensed by the photosensor through the carousel identification slits creates a 576-bit memory map of the sensed photobeams. This memory map is unique to each type of carousel and is used by the microprocessor to identify the carousel type and establish the appropriate pen speed and pen force default values.

6-93. A photosensor assembly (DS1, Q23) is used to properly time the paper feed mechanics for an AUTO-FEED operation. When the timing mark in the paper feed encoder gear allows the photobeam to pass through it, the photosensor inputs the sensed signal (EXIN) to the Servo IC for interpretation. The Servo IC then enables the stepper latch register U19 and allows microprocessor generated paper feed data pulses on the bus lines to pass through the paper feed motor switches, U15, and control the paper feed drive motor. See Service Sheet 6. Each data pulse from the microprocessor causes the paper feed motor to move one step with 576 steps required for a full revolution.

6-94. Raising the carriage cover allows a spring-loaded mechanical shutter to block the carousel photobeam. This photobeam interrupt is sensed by the microprocessor which then issues signals to halt the plotter operation. The front-panel display will indicate LOWER COVER PRESS ENTER until the cover is lowered and the microprocessor resumes plotter operation.

6-95. X- (MEDIA TRANSPORT) AND Y- (PEN CARRIAGE) MOTOR DRIVE CIRCUITS

6-96. The microprocessor controls the X- and Y-Axis motor positions through a sampled data control system running at a fixed sample rate. Both X- and Y-Axis are driven by dc motors with 500-line optical encoders mounted on the motor shafts. The motors drive through approximately a 3:1 speed reduction. During each plotter cycle, the microprocessor compares the X- and Y-motor positions requested with their present position data and generates numbers which represent the differences from the comparisons. These difference numbers are input to the respective axis pulse-width modulator (PWM) circuits in the Servo IC U29. See Figure 6-14 for a simplified block diagram of the motor servo circuits.

6-97. Output pulses (XA, XC, YA, and YC) from the pulse-width modulator circuits in the Servo IC are input to the respective X- and Y-Axis motor drive circuits for amplification to drive the motors. See Service Sheet 7. The pulse duty cycle determines the amount of drive energy applied to the motor. The drivers also use the pulses to determine the direction of rotation. As the X- and Y-drive motors rotate, their respective encoders generate a series of quadrature pulses which are input to the Servo IC for decoding by the X- and Y-position decoder registers.

6-98. When the microprocessor receives a servo motor position request, it reads an 8-bit number representing the present servo motor position from the respective servo decoder register in the Servo IC.

6-99. The microprocessor modifies the Servo IC X- and Y-axis PWM output pulses by monitoring the unregulated +34 V power supply voltage. Any variations in the +34 V supply are detected by the voltage sensing network whose signals are used by the microprocessor to modify the period and/or width of the pulses sent to the X- and Y- motor drive circuits.

6-100. The X- and Y-period gain circuit in the Servo IC sets the period of the PWM output pulses controlled by the data on the data bus lines from the microprocessor. This data represents the period gain necessary under operating conditions when power supply voltage is normal. A decrease in the +34 V power supply voltage will decrease the numerical data value. The smaller the value the more frequent the output pulses $\overline{XA}$, $\overline{XC}$, $\overline{YA}$, or $\overline{YC}$ will be from the PWM.

6-101. The X- and Y-servo difference numbers represent the result of the comparison between the requested motor positions and the present motor positions. If the servo difference number increases, so will the width of the negative output pulses $\overline{XA}$, $\overline{XC}$, $\overline{YA}$, or $\overline{YC}$. If the difference number is zero, no output pulses will occur and the signal lines will be at approximately +5 V. A number greater than zero causes output pulses to appear on the $\overline{XA}$ or $\overline{YA}$ lines accordingly. A number of less than zero will cause output pulses to appear on the $\overline{XC}$ or $\overline{YC}$ lines accordingly.

6-102. PENLIFT DRIVE CIRCUIT

6-103. Using a sampled data control system during alternate servo interrupt cycles, the microprocessor compares the penlift position requested with the present pen position data and generates a number which represents the difference from the comparison. This difference number is input to the penlift pulse-width modulator (PWM) circuit in the Servo IC U29. See Figure 6-15 for a simplified block diagram of the penlift drive circuit.

6-104. Output pulses ($\overline{PA}$, $\overline{PC}$) from the pulse-width modulator circuit in the Servo IC are input to the penlift drive circuits for amplification to drive the penlift solenoid. See Service Sheet 8. The penlift solenoid raises and lowers the pen. Pen height information is maintained by an optical encoder in the penlift assembly. As the pen solenoid raises and lowers the pen, the pen encoder generates a series of quadrature pulses which are input to the Servo IC for decoding by the penlift position decoder register.

6-105. When the microprocessor receives a penlift position request, it reads an 8-bit number representing the present penlift position from the penlift decoder register in the Servo IC.

6-106. The penlift difference number calculated by the microprocessor controls the width of the penlift PWM pulses. As the penlift difference number increases, so does the width of the negative output pulses $\overline{PA}$ and $\overline{PC}$. A zero value for the difference number will occur only when the pen solenoid is fully in the "up" position.

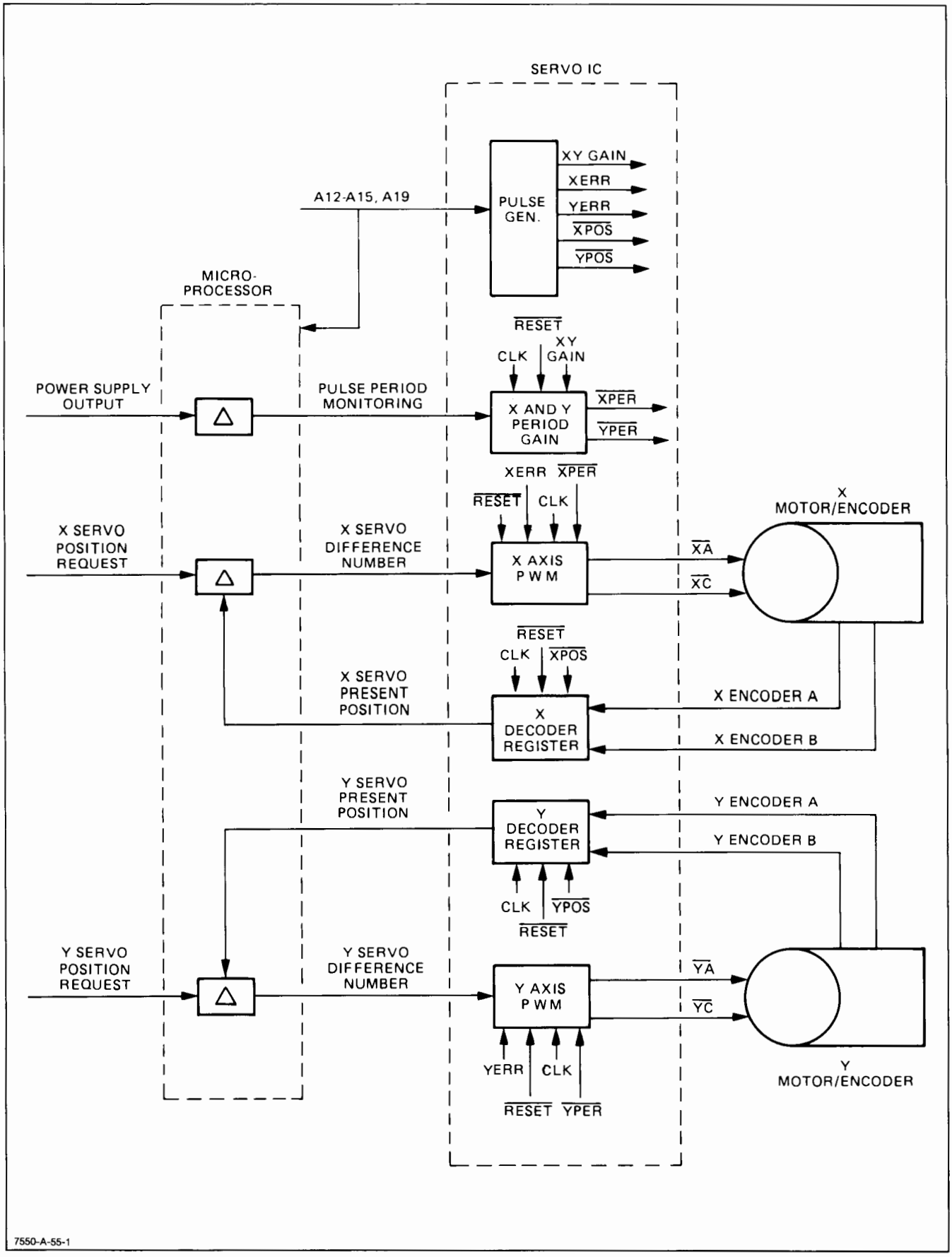


Figure 6-14. Servo Circuits, Simplified Block Diagram

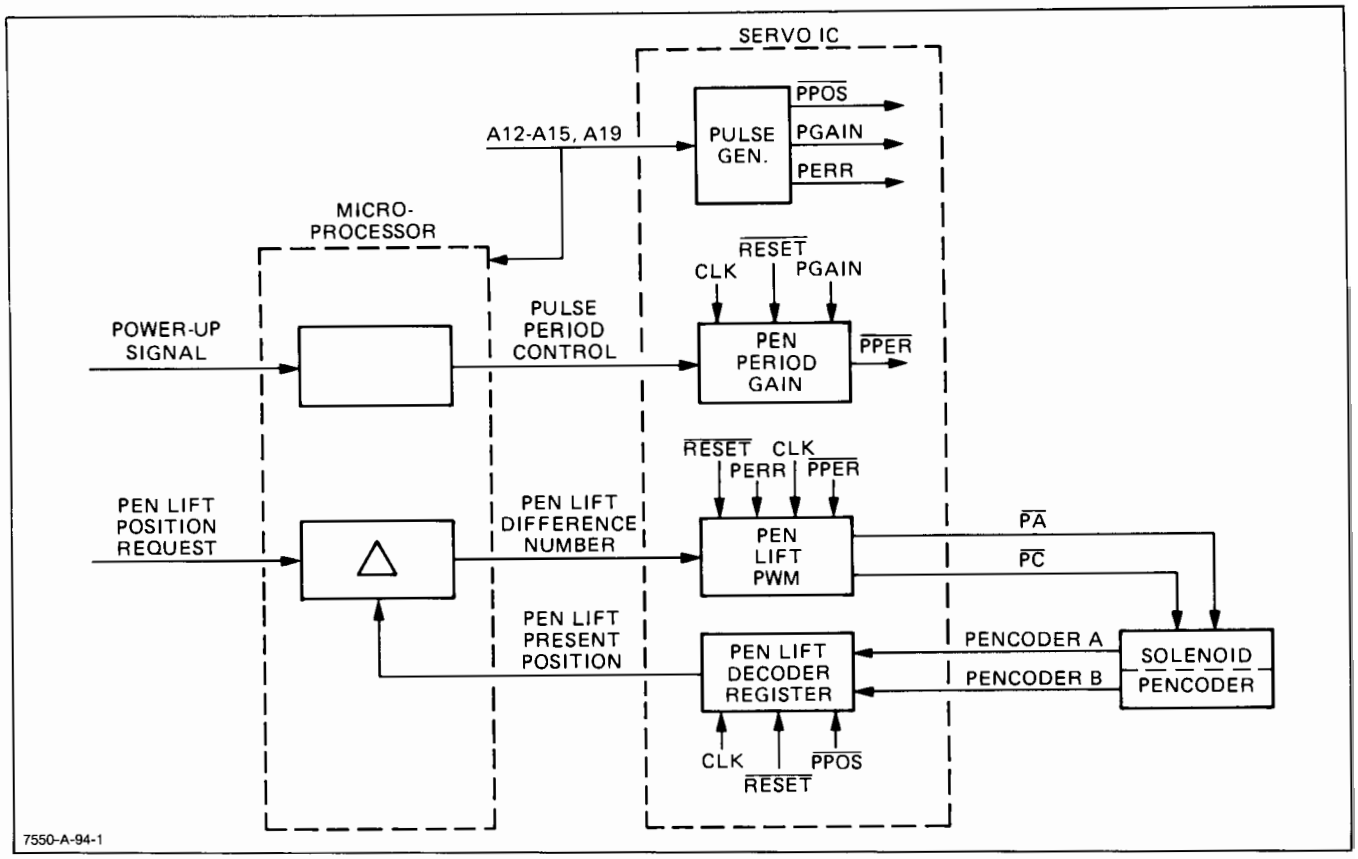


Figure 6-15. Penlift Drive, Simplified Block Diagram

6-107. TROUBLESHOOTING

6-108. The HP Model 7550A has an internal diagnostic routine that is performed upon every power-up sequence and comprehensive built-in Performance Tests that can be used as aids in troublshooting.

6-109. For ease of reference, error codes, error messages, plotter malfunction symptoms, and probable locations and solutions of the malfunctions are categorized into the following groups:

Programming Error Codes and Messages

Writing and Plot Quality Difficulties

Performance Test Failures

Plotter Hardware Failures

6-110. PROGRAMMING ERROR CODES AND MESSAGES

6-111. Program command or parameter errors detected by the plotter will cause the plotter to generate an error code and message which will be displayed in the plotter front panel. A list of the error codes and messages is given in Table 6-5. For further information on programming error definitions and solutions, refer to the HP Model 7550A Interfacing and Programming Manual.

Table 6-5. Programming Error Codes and Messages

ERROR CODE	ERROR MESSAGE
ERROR 1	COMMAND NOT RECOGNIZED
ERROR 2	WRONG NUMBER OF PARAMETERS
ERROR 3	BAD PARAMETER
ERROR 5	UNKNOWN CHARACTER SET
ERROR 6	POSITION OVERFLOW
ERROR 7	BUFFER OVERFLOW
ERROR 10	INVALID I/O OUTPUT REQUEST
ERROR 11	INVALID BYTE FOLLOWING ESC.
ERROR 12	INVALID BYTE IN I/O CONTROL
ERROR 13	OUT OF RANGE I/O PARAMETER
ERROR 14	TOO MANY I/O PARAMETERS
ERROR 15	ERROR IN I/O TRANSMISSION
ERROR 16	I/O BUFFER OVERFLOW
ERROR 17	TRANSMIT UNDERRUN
ERROR 18	I/O ERROR INDETERMINATE

6-112. WRITING AND PLOT QUALITY DIFFICULTIES

6-113. There are many factors that directly affect the quality of the plot being generated. The type, condition, and quality of the pens, ink, and media used as well as the temperature, relative humidity, and cleanliness of the plotting environment are all prime factors involved with plot quality. Pen speed and pen force values selected will also affect plot quality. Table 6-6 provides a list of symptoms and solutions for difficulties affecting plot and writing quality. A more comprehensive list of plot quality symptoms and solutions as well as information for selecting ideal pen speed and force values, type of pens and media, etc., is provided in the HP Model 7550A Operation and Interconnection Manual.

6-114. PERFORMANCE TEST FAILURES

6-115. The plotter Performance Tests (see Section II) can be used as aids in isolating a failure to a defective assembly or component. The service sheets in this section can also be used to help isolate failures on the Main Printed Circuit Assembly. Refer to Table 6-7 for troubleshooting information on Peformance Test failures.

Table 6-6. Writing and Plot Quality Difficulties

SYMPTOMS	SOLUTIONS
Pen does not write	Pen tip dried out — prime pen tip by manually writing until ink flows. Refill ink reservoir (drafting pens). Pen out of ink — replace pen.
Beginning of line does not show	Pen tip partially dried out — prime pen tip or replace pen.
Pen skips or drags	Pen tip worn or damaged — replace pen. Pen speed or force incorrect for type of pen — select proper value. Plotting medium surface is watermarked, oily, bubbled, wrong weight, or thickness — replace medium. Penlift mechanism sticky or pen height incorrect — repair plotter.
Line width not uniform or too narrow/wide	Pen tip worn or damaged — replace pen. Pen speed too fast — select lower speed value. Wrong pen tip width — select correct width.
Ink blobs or flows unevenly	Pen force too high — select lower force value. Wrong pen/media combination — select correct type pen for media used. Pen tip dirty — clean pen tip.
Wiggly lines	Pen tip worn or damaged — replace pen. Media surface dirty or bubbled — replace media. Pen holder mechanism damaged — repair plotter.
Plot misregistration or drift	Plotter subjected to hard vibration or jarred — eliminate interference. Dirty grit wheels or pinch wheels — clean as recommended. Medium unstable due to climatic or environmental change — stabilize environment if possible. Unsuitable media — use only media as recommended by Hewlett-Packard.

Table 6-7. Performance Test Failures

TEST	DISPLAY	RESULTS
RWM/ROM Test	10000000	Test in progress.
	00000000	Test complete.
	00001000	Error in RWM LSB
	00001010	Error in RWM MSB
	00001100	Error in ROM lower LSB
	00001101	Error in ROM lower MSB
	00001110	Error in ROM upper LSB
	00001111	Error in ROM upper MSB
		In case of multiple component errors, the lower number error is displayed.
SENSOR AND MOTOR TEST		
Media Feed Sensor	0	Photobeam sensed.
	1	Photobeam not sensed.
	constant 1, never 0	Failure to sense photobeam through timing slot — defective photosensor or associated circuitry.
Carousel Sensor	0	Photobeam sensed after LED enabled.
	1	Photobeam not sensed after LED enabled.
	2	Photobeam sensed before LED enabled — defective sensor or associated circuitry.
Power Supply and X,Y Gain	5	Typical value displayed.
Penlift Encoder	Constant	Penlift at rest.
	Fluctuates	Penlift activated.
		Failure of display change when penlift mechanism is activated — defective pencoder or associated circuitry.
X-Axis Encoder	Constant	X-Motor/Encoder at rest.
	Fluctuates	X-Motor/Encoder activated.
		Failure of display change when X-Motor/Encoder activated — defective X-Motor/Encoder Assembly or associated circuitry.
Y-Axis Encoder	Constant	Y-Motor/Encoder at rest.
	Fluctuates	Y-Motor/Encoder activated.
		Failure of display change when Y-Motor/Encoder activated — defective Y-Motor/Encoder Assembly or associated circuitry.
Front Panel Switches	00000000	No pushbutton activated. See hex code display for Front Panel Switch Bit Map portion of the Sensor and Motor Test. A display other than indicated due to defective front-panel switch matrix or associated circuitry.
X- and Y-Axis Servos	Blank	Indicates good servo circuits.
	X or Y	X or Y indicates a servo shutdown in the axis shown. Servo shutdown algorithm momentarily deactivated.
I/O Self-Test		A failure in any portion of the I/O Self-Test will be displayed in the display module. Refer to the associated circuitry for the test area failure.
HP-IB Echo Test		A short or open in the data or control lines will disrupt the binary sequence of 1's and 0's at the defective line.
EAROM	10000000	Test in progress.
	00000000	Test complete.
	00010000	Error in EAROM validity code.

6-116. PLOTTER HARDWARE FAILURES

6-117. During the initialization sequence, when the plotter is first powered up, a basic internal diagnostic check of the plotter electronics is performed. If a malfunction is detected, the initialization sequence will stop and an error message will be displayed in the display module on the front-panel assembly. Detection of a malfunction during normal plotter operation will also suspend the operation and generate an error message in the display module. A list of malfunction symptoms, error messages, probable malfunction locations and corrective action is given in Table 6-8.

Table 6-8. Plotter Hardware Failures

SYMPTOMS/ ERROR MESSAGES	POSSIBLE CAUSES	CORRECTIVE ACTIONS	REFERENCES
Plotter inoperative. Fan not running.	1. Open ac line fuse. 2. Open power cord or connection. 3. Open power transformer primary lead/s or connection. 4. Open or shorted power transformer primary windings.	1. Replace line fuse. 2. Replace power cord or repair connection. 3. Repair lead/s or connections. 4. Replace transformer.	See Service Sheet 3.
Plotter inoperative. Fan running.	1. Open +12 V or +34 V power supply fuse. 2. Defective power supply circuit. 3. Open power transformer secondary. 4. Open power transformer secondary lead/s or connections.	1. Replace fuse 2. Replace bad component, repair open, or clear short. (Isolate power supply using +5 V jumper W1 and check resistance of power supply load to COM and other supplies before switch-on.) 3. Replace transformer. 4. Replace transformer or repair lead/s or connections.	See Service Sheet 3.
No display.	1. Defective cable connection at the display module or defective front panel cable connection at the Main PCA. 2. Loss of +5 V. 3. Defective display module. 4. Defective front panel I/O circuitry on Main PCA.	1. Repair connection. 2. Replace fuse or repair +5 V circuitry. 3. Replace display module. 4. Replace or repair PCA.	See Service Sheets 2 and 3.
Display indicates an X- or Y-Axis failure.	1. +34 V power supply failure (fuse or circuitry). 2. Defective connection at motor or Main PCA. 3. Defective connection at encoder or Main PCA. 4. Defective servo circuit on Main PCA. 5. Defective X- or Y-motor/encoder assembly. 6. Loose or broken belt, pulley, idler, spring, etc.	1. Replace fuse or repair circuit. 2. Repair connection. 3. Repair connection. 4. Replace or repair PCA. 5. Replace motor/encoder assembly. 6. Repair or replace mechanical part.	See Service Sheets 3 and 7 plus the Sensor and Motor Test

Table 6-8. Plotter Hardware Failures (Continued)

SYMPTOMS/ ERROR MESSAGES	POSSIBLE CAUSES	CORRECTIVE ACTIONS	REFERENCES
With power ON and display constant — LOWER COVER, PRESS ENTER. Does not react to input. Carousel does not move.	1. Defective Carousel photosensor LED. 2. Open cable or connectors. 3. Defective sensor circuit on Main PCA.	1. Replace LED or transistor as necessary. 2. Repair open. 3. Repair or replace Main PCA.	See Service Sheet 6.
With power ON and display constant, LOWER COVER, PRESS ENTER Does not react to input. Carousel rotates either fully or partially.	1. Pen carousel not properly installed. 2. Pen/s not properly seated in in stable.	1. Install carousel. 2. Reload pen stable/s.	
With power ON, the display appears and reacts to input, but carousel does not rotate.	1. Open carousel motor cable connection on Main PCA. 2. Defective carousel stepper motor. 3. Defective carousel circuitry on Main PCA.	1. Repair connection. 2. Replace motor. 3. Repair or replace Main PCA.	See Service Sheet 6.
Paper load failure. Display constant — PAPER LOAD FAILED. Does not clear after replacing paper.	1. Open paper feed motor cable connection at the Main PCA. 2. Defective paper feed stepper motor. 3. Defective paper feed sensor/s (AUTOFEED). 4. Defective paper feed circuitry on Main PCA. 5. Improper timing orientation of paper feed gears. 6. Defective paper feed wheels on shaft. 7. Bad pen carriage trailing cable connection. 8. Defective pen carriage assembly. 9. Weak paper tray compression spring/s. 10. Worn pinch wheel/s. 11. Worn grit wheel/s. 12. Right-hand pinch wheel not properly aligned for paper being used. 13. Pinch wheel shaft lobes worn or broken. 14. Loose pinch wheel arm spring.	1. Repair connection. 2. Replace motor. 3. Replace sensor/s. 4. Repair or replace Main PCA. 5. Retime gears. 6. Replace paper feed shaft assembly. 7. Repair connection. 8. Repair or replace assembly. 9. Replace spring/s. 10. Replace worn pinch wheel/s. 11. Replace grit wheel shaft assembly. 12. Reposition right-hand pinch wheel. 13. Replace pinch wheel shaft assembly. 14. Connect or replace spring.	See Service Sheet 6.

Table 6-8. Plotter Hardware Failures (Continued)

SYMPTOMS/ ERROR MESSAGES	POSSIBLE CAUSES	CORRECTIVE ACTIONS	REFERENCES
Pen pick not working correctly. Display constant — PEN PUT FAILED (Plotter will display PEN PUT FAILED if attempting to install pen from pen holder into an occupied pen stable in the carousel.)	1. Pen/s not properly loaded into stable/s. 2. Carousel not properly installed. 3. Pen capping mechanism jammed or defective. 4. Pen holder in pen carriage assembly defective. 5. Pen holder pawl broken. 6. Pen holder pawl spring weak or broken. 7. Carousel pen stable spring/s stuck, stable will not release pen/s. 8. Defective pen carousel 9. Carousel sensor circuitry on Main PCA defective.	1. Reload pens. 2. Reinstall carousel. 3. Clear or replace mechanism. 4. Replace pen carriage assembly. 5. Replace pen pawl. 6. Replace spring. 7. Free up pen stable spring/s or replace carousel. 8. Replace carousel. 9. Repair or replace Main PCA.	See Service Sheet 6.
No Pen Up/Down	1. Defective pen carriage assembly. 2. Open pen carriage assembly cable or connection on Main PCA. 3. Defective penlift circuit on Main PCA.	1. Replace pen carriage assembly. 2. Repair connection or replace pen carriage assembly. 3. Repair or replace Main PCA.	See Sensor and Motor Test in Section II and Service Sheet 8

6-118. CLEANING

6-119. GENERAL CLEANING

6-120. 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:

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 it may create a shock hazard.

a. Blow away dust accumulation with compressed air if available.

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.

c. Wipe accumulated paper dust from the rubber pinch wheels. Do not use the grit wheel brush to clean the pinch wheels.

NOTE

Do not use abrasive cleansers on the plastic carriage cover. The cover should be cleaned with a mild solution of soap and water and wiped dry with a soft lint-free cloth to prevent scratching.

6-121. GRIT WHEEL CLEANING

6-122. Use only the brush provided with your plotter to clean the grit wheels. Cleaning the micro-grip drive grit wheel is limited to the removal of dust from between the particles of grit to ensure that media engagement is not impaired. Dust is removed as follows:

a. Disconnect power from the plotter.

b. Raise the carriage cover to gain access to the grit wheels.

CAUTION

Using any brush other than the one supplied with the plotter may damage the grit on the grit wheels.

c. Manually rotate the grit wheels and brush dust from grit surface using the brush supplied with the plotter.

6-123. RECOMMENDED TEST EQUIPMENT AND TOOLS

6-124. Test equipment required to maintain the plotter is listed in the Recommended Test Equipment table in Section I of this manual. Substitute equipment must meet or exceed the specifications of the equipment recommended.

6-125. REPAIR

6-126. The removal and replacement procedures in this section are given to facilitate plotter repair. After diagnosing the defective part(s), refer to the appropriate repair procedure and follow the steps provided. For ease of plotter repair, a disassembly matrix is provided in Table 6-9. The matrix indicates which assemblies must be removed, and the order in which they must be removed, to access the assembly to be repaired or replaced.

WARNING

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

Most repair procedures described in this section are performed with protective covers removed. If the plotter is not disconnected from the power source, voltage available at many points can, if contacted, result in personal injury.

Avoid contact with moving media. Long hair or ties and other clothing can get caught on the surface of the media and become entangled in the plotter mechanics resulting in personal injury. Lacerations can also occur due to contact with the edges of the moving media. Do NOT allow hair or clothing to contact the plotter mechanics while servicing the plotter or personal injury and damage to the plotter may result.

6-127. OPENING UP THE PLOTTER.

6-128. To access the interior of the plotter, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the Paper Tray.

c. Raise the Carriage Cover and remove the Pen Carousel.

d. Remove any media from the plotting area.

e. Refer to Figure 6-16 and remove the four top cover mounting screws shown at the following locations:

1 located on base bottom near front right-hand foot.
1 located on base bottom near front left-hand foot.
1 located on back adjacent to the fuseholder.
1 located on back just below interface connectors.

f. Lift the top cover off of the plotter.

6-129. CAROUSEL SENSORS REMOVAL

6-130. To remove the carousel photosensors, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. To access the carousel photodiode, carefully pull the photodiode cover straight up off of the carousel base spindle. See Figure 6-17. Note the position of the node on the photodiode for reassembly and carefully pull the photodiode from its connector.

d. To access the carousel phototransistor, carefully pull the phototransistor cover straight up off of the carousel base tower. See Figure 6-17. Note the position of the flat side of the phototransistor for reassembly and carefully pull the phototransistor from its connector.

e. To remove the associated photodevice connector and wires, disconnect the device wire connector from the Main PCA and carefully pull the device connector and wires through the carousel base.

6-131. FRONT PANEL ASSEMBLY REMOVAL

6-132. To remove the front-panel assembly or the display module, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

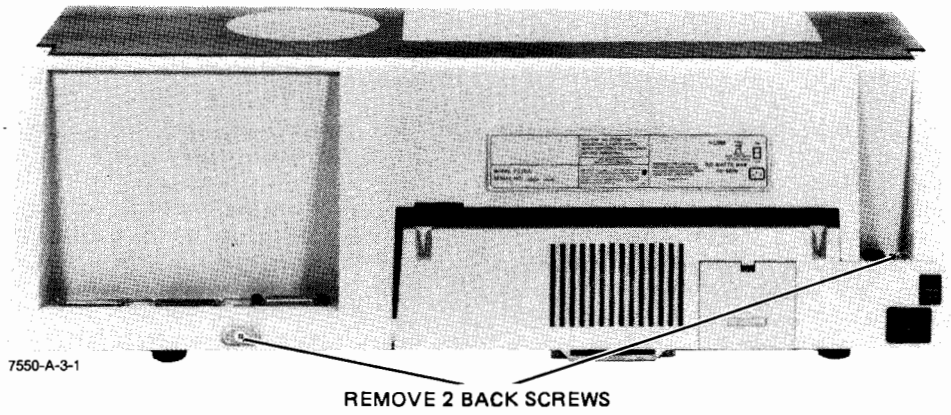
c. Disconnect the front-panel assembly ribbon cable from the Main PCA. Note the polarity of the cable for reassembly.

d. Remove the front-panel mounting screw located in the back right-hand leg of the front-panel assembly. See Figure 6-18.

e. Tilt the back side of the front-panel assembly slightly forward and lift the assembly from the plotter.

f. To remove the display module, disconnect the ribbon cable from the display module connector and remove the two display module mounting screws.

g. To install the front-panel assembly, make sure that the two tabs in the front legs of the assembly go into the slots in the base and the peg on the left rear leg goes into the small hole in the base.



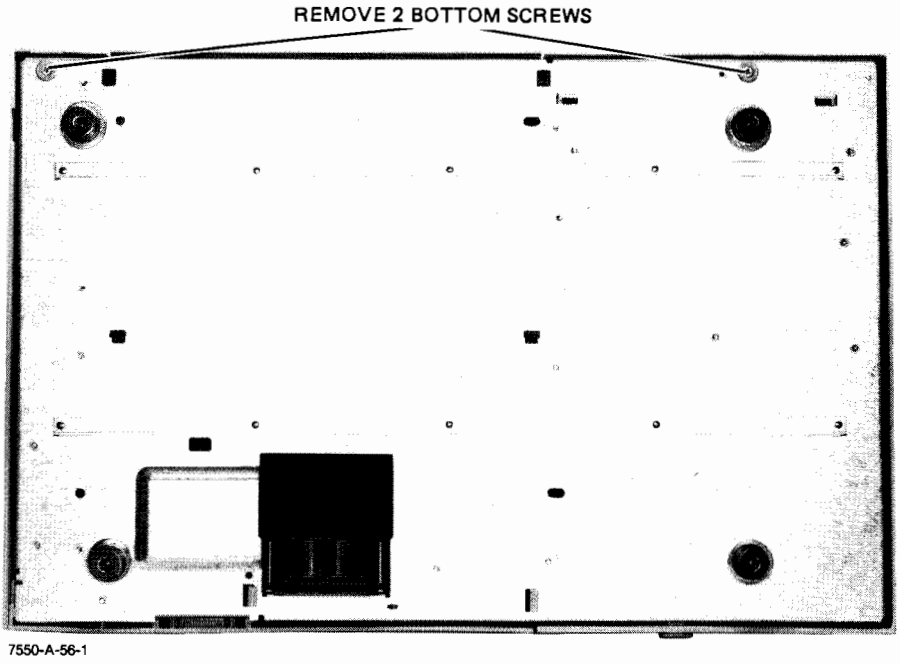
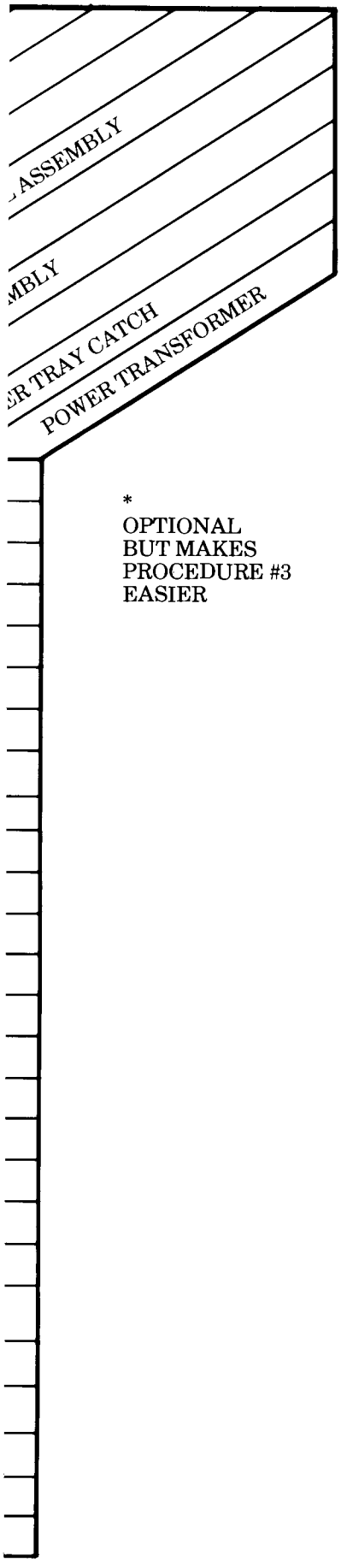


Figure 6-16. Opening up the Plotter

Table 6-9. Disassembly Matrix



*
OPTIONAL
BUT MAKES
PROCEDURE #3
EASIER

7550-C-110-1

\VE BELT	BELT	(MEDIA) MOTOR/ENCODER	PAPER FEED MOTOR	PAPER FEED GEARS AND IDLER	PINCH WHEEL AND PINCH WHEEL AXLE	PINCH WHEEL ARM	X,Y CARRIAGE ASSEMBLY	CAROUSEL MOTOR	PEN CAPPING MECHANISM	PINCH WHEEL SHAFT AND GRIT WHEEI	POWER MODULE ASSEMBLY	MEDIA CHASSIS ASSE	FAN	PAPI
4														
	2													
		3	2 *											
			2											
			2	3										
			2		3									
			2			3								
			2				3							
			2					3						
			2					3	4					
			2					3		4				
			2				4	3			5			

l
res

P THE PLOTTER	ROUSEL SENSORS	FRONT PANEL ASSEMBLY	MAIN PCA	Y-DRIVE MOTOR/ENCODER	Y-MOTOR IDLER GEAR	Y-DRIVE BELT & PULLEY GEAR	PEN CARRIAGE ASSEMBLY AND PEN CARRIAGE DR	PEN CARRIAGE BEARING HOLDERS	PEN PAWL	X-MOTOR IDLER GEAR	X-MOTOR DRIVE	X-DRIVE
2												
2	3											
		2										
			2									
			2	3								
					2							
					2	3						
					2		3					
								2				
								2	3			
								2	3	4		
2												3
2												3

Follow these
service manua
removal procedu

To Remove		OPENING U / CA	
TOP COVER	1		
CAROUSEL SENSORS	1	2	
FRONT PANEL ASSEMBLY	1		
MAIN PCA	1		
Y-DRIVE MOTOR/ENCODER	1		
Y-MOTOR IDLER GEAR	1		
Y-DRIVE BELT & PULLEY GEAR	1		
PEN CARRIAGE ASSEMBLY AND PEN CARRIAGE DRIVE BELT	1		
PEN CARRIAGE BEARING HOLDERS	1		
PEN PAWL	1		
X-MOTOR IDLER GEAR	1		
X-MOTOR DRIVE BELT	1		
X-DRIVE (MEDIA) MOTOR/ENCODER	1		
PAPER FEED MOTOR	1		
PAPER FEED GEARS AND IDLER	1		
PINCH WHEEL AND PINCH WHEEL AXLE	1		
PINCH WHEEL ARM	1		
X,Y CARRIAGE ASSEMBLY	1		
CAROUSEL MOTOR	1		
PEN CAPPING MECHANISM	1		
PINCH WHEEL SHAFT AND GRIT WHEEL ASSEMBLY	1		
POWER MODULE ASSEMBLY	1		
MEDIA CHASSIS ASSEMBLY	1		
FAN	1		
PAPER TRAY CATCH	1		
POWER TRANSFORMER	1		

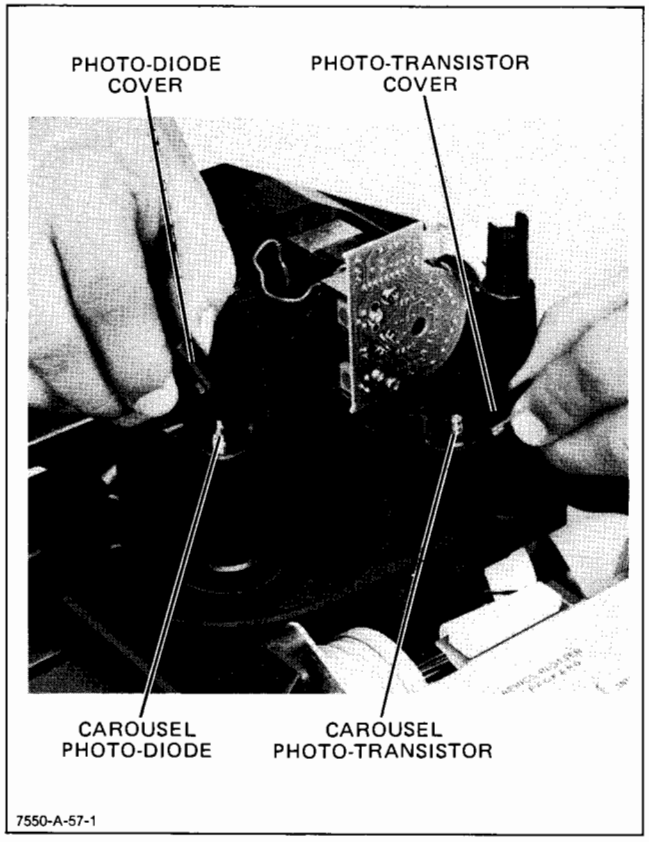


Figure 6-17. Carousel Sensors Removal

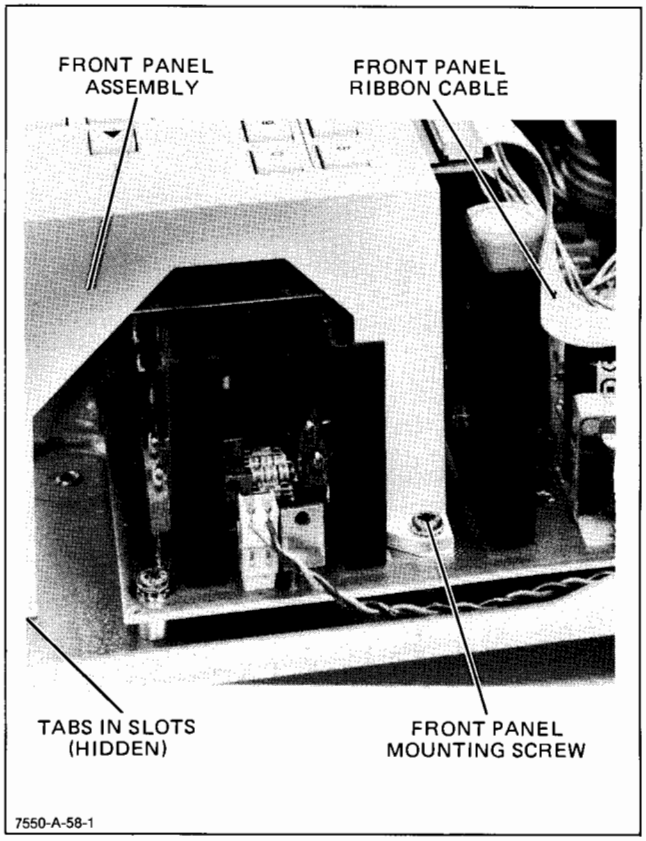


Figure 6-18. Front-Panel Assembly Removal

6-133. MAIN PCA REMOVAL

CAUTION

The Main PCA circuits in the plotter may be damaged by electrostatic discharge (ESD) from a hand or tool when the PCA is removed or replaced. To prevent possible ESD damage, ground the hand while working with the Main PCA. Conductive wristbands (HP P/N 00970-67900) are available for this purpose. Also, momentarily ground all tools to remove any static charges before using them on the PCA.

6-134. To remove the Main PCA, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Remove the front-panel assembly. If necessary, refer to the front-panel assembly removal procedure given in this section.

d. Remove the six interface connector mounting screws and the connector cover plate from the back of the Main PCA.

e. Disconnect all cable assemblies from their connectors on the Main PCA. Note the position and the polarity of the cable assemblies for reassembly. If necessary, refer to the Interconnecting Cable Identification Diagram in Section IV.

f. Refer to Figure 6-19 and remove the four Main PCA mounting screws shown at the following locations:

1 located at the center of the Main PCA next to the carousel base.
1 located at the center of the right-hand edge of the Main PCA next to the transformer.
1 located at the front right-hand corner of the Main PCA.
1 located at the front left-hand corner of the Main PCA.

g. Carefully slide the Main PCA out toward you. Avoid damaging the paper feed sensors with the paper feed encoder gear located above the center of the left-hand edge of the Main PCA.

h. Upon completion of the repair, perform the X- and Y-Motor Gain Calibration procedure described in Section III of this manual.

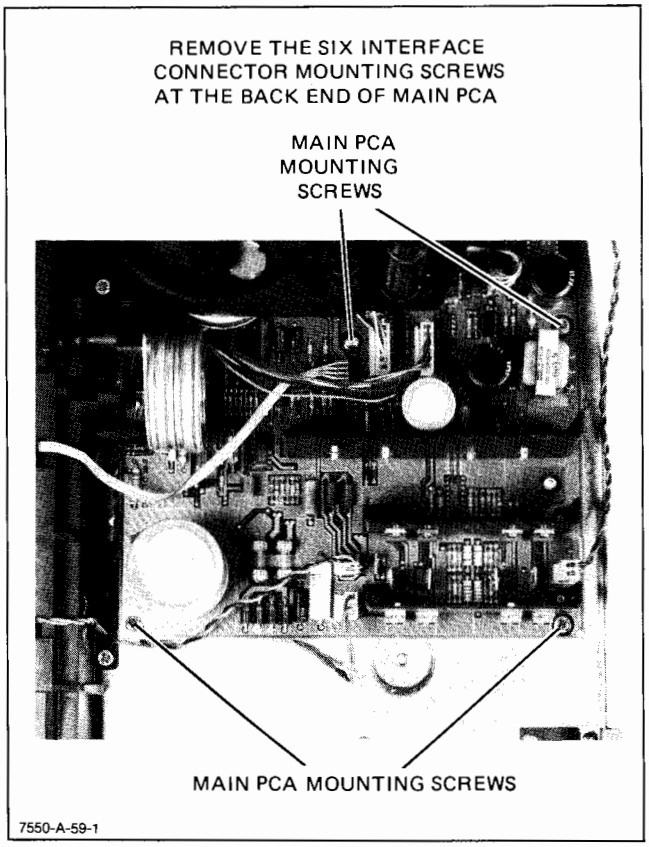


Figure 6-19. Main PCA Removal

6-135. Y-DRIVE (PEN CARRIAGE) MOTOR/ ENCODER REMOVAL

6-136. To remove the Y-drive motor/encoder assembly, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Disconnect the Y-encoder ribbon cable and Y-motor supply wires from the Y-motor/encoder assembly. See Figure 6-20, Detail A. Note the polarity of the wires for reassembly.

d. Release the Y-idler gear tension spring from the standoff located on the back side of the X,Y carriage assembly. See Figure 6-20, Detail B.

e. Slide the Y-drive belt off of the Y-motor gear.

f. Remove the two Y-motor/encoder assembly mounting screws to release the assembly.

g. Upon completion of the repair, perform the X- and Y-Motor Gain Calibration procedure described in Section III of this manual.

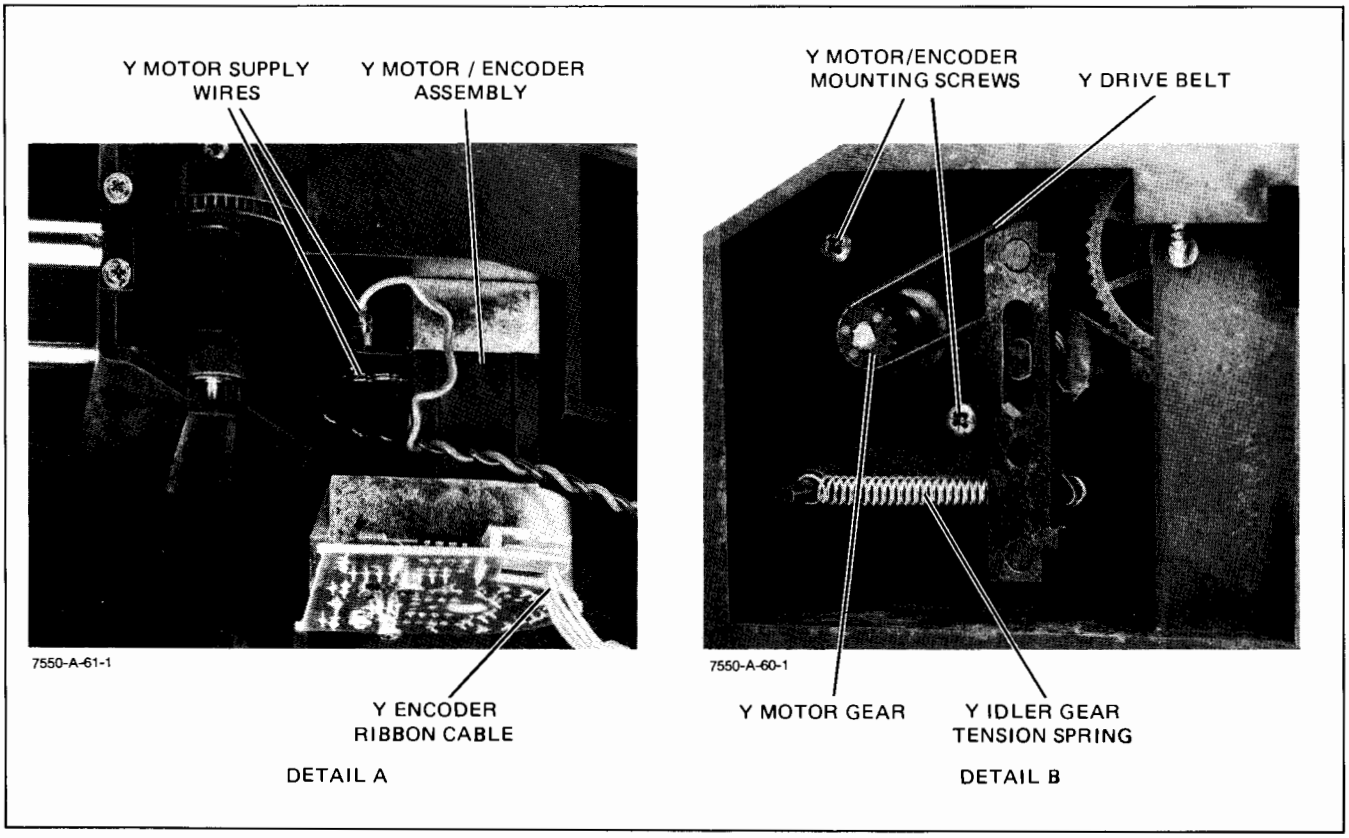


Figure 6-20. Y-Drive (Pen Carriage) Motor/Encoder Removal

6-137. Y-MOTOR IDLER GEAR REMOVAL

6-138. To remove the Y-motor idler gear, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Release the Y-idler gear tension spring from the standoff located on the back side of the X,Y carriage assembly. See Figure 6-21.

d. Slide the Y-motor drive belt off of the Y-motor gear.

e. To remove the Y-idler gear, apply even pressure at the top and bottom of the idler gear bracket and carefully pull the Y-idler gear bracket off of the standoffs. Note the positioning of the idler gear and cam for easier reassembly.

6-139. Y-DRIVE BELT AND PULLEY GEAR REMOVAL

6-140. To remove the Y-drive belt or pulley gear, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Release the Y-idler gear tension spring from the standoff located on the back side of the X,Y carriage assembly. See Figure 6-21.

d. Apply even pressure at the top and bottom of the Y-idler gear bracket and carefully pull the bracket with the idler gear off of the standoffs. Note the positioning of the idler gear and cam for easier reassembly. See Figure 6-21.

e. Slide the Y-drive belt off of the Y-motor gear.

f. Carefully remove the pen carriage drive belt tensioner with the large compression spring located above the X-drive belt idler. **Firmly** grasp the tensioner extension with needlenose pliers and slowly pull outwards until the compression spring clears the X,Y carriage assembly. Lift the tensioner out and upward until it is clear of the X,Y carriage assembly. See Figure 6-22, Detail A.

g. Slide the pen carriage belt idler toward the pen carriage to relieve the belt tension and provide the required slack to remove the Y-drive pulley gear.

h. Loosen the Y-drive pulley gear retaining screw. See Figure 6-22, Detail B.

i. Push or pull the Y-drive pulley gear axle out of the X,Y carriage assembly to release the Y-pulley gear and Y-drive belt. See Figure 6-22, Detail B.

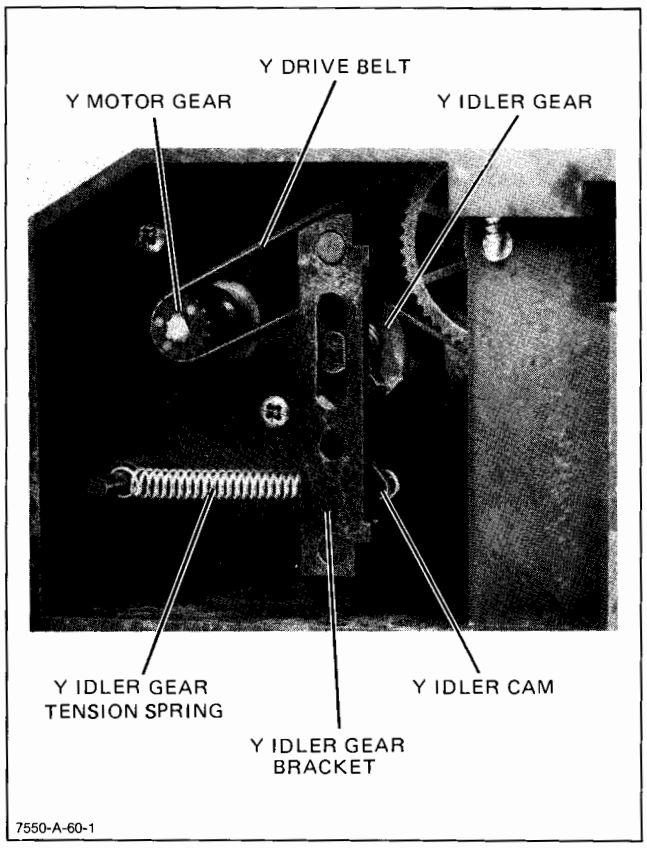


Figure 6-21. Y-Motor Idler Gear Removal

j. Lift the Y-drive pulley gear up to release the Y-drive belt.

k. When installing the Y-pulley gear axle, make sure that the axle is pushed completely in so as to engage both sides of the X,Y carriage assembly. Tighten the Y-drive pulley gear retaining screw.

l. When installing the pen carriage belt tensioner, make sure that the hooked ends of the tensioner engage the pen carriage belt idler so as to apply upward and outward pressure when the compression spring is inserted.

m. To insert the pen carriage belt tensioner compression spring, slide the prongs of needlenose pliers up along the tensioner extension to compress the spring. Push the tensioner and spring **fully** into position before releasing the pliers.

6-141. PEN CARRIAGE ASSEMBLY AND PEN CARRIAGE DRIVE BELT REMOVAL

6-142. To remove the pen carriage or pen carriage drive belt, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

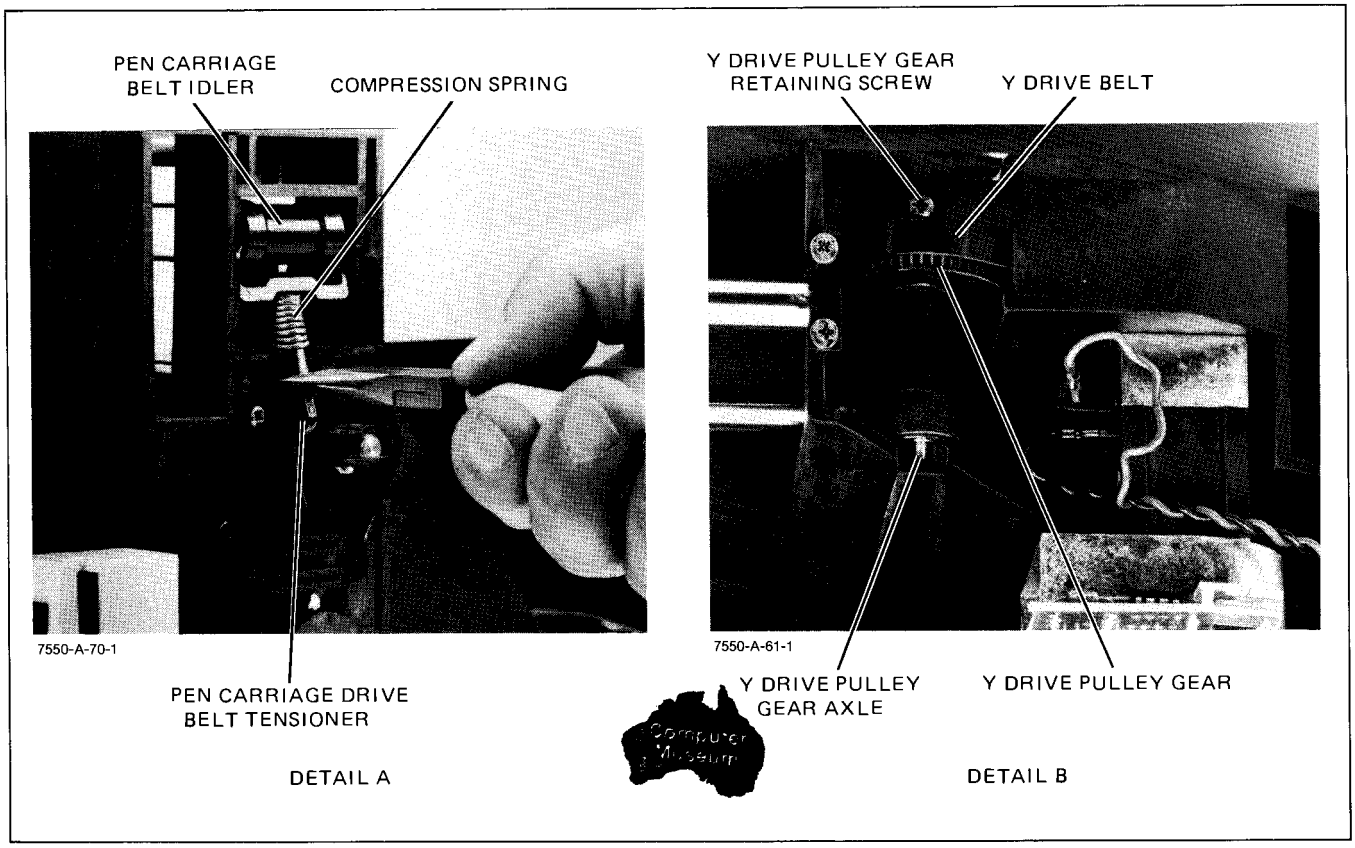


Figure 6-22. Y-Drive Belt and Pulley Gear Removal

c. Carefully remove the pen carriage drive belt tensioner with large compression spring located above the X-drive belt idler. **Firmly** grasp the tensioner extension with needlenose pliers and slowly pull the extension outwards until the compression spring clears the X,Y carriage assembly. Lift the tensioner out and upwards until it clears the X,Y carriage assembly. See Figure 6-22, Detail A.

d. Slide the pen carriage belt idler toward the pen carriage to relieve the belt tension.

e. Release the extension spring from the swing arm located at the top of the pen carriage assembly. See Figure 6-23, Detail A.

f. Rotate the swing arm up and forward until it releases from the pen carriage assembly.

g. Lift the pen carriage assembly off of the top slider rod and pivot it forward to clear the slider rods. Exercise care not to damage the flex trailing cable. See Figure 6-23, Detail B.

h. To remove the pen carriage drive belt, carefully pry the two belt clamps out of the pen carriage assembly. The clamps have front tabs which must be compressed to release the clamps. Insert a small common screwdriver into the recess at the back of the clamps and apply pressure forward and upward to release the clamps. See Figure 6-23, Detail C.

i. Slide the pen carriage drive belt out of the pen carriage assembly through the slots on the sides of the pen carriage assembly.

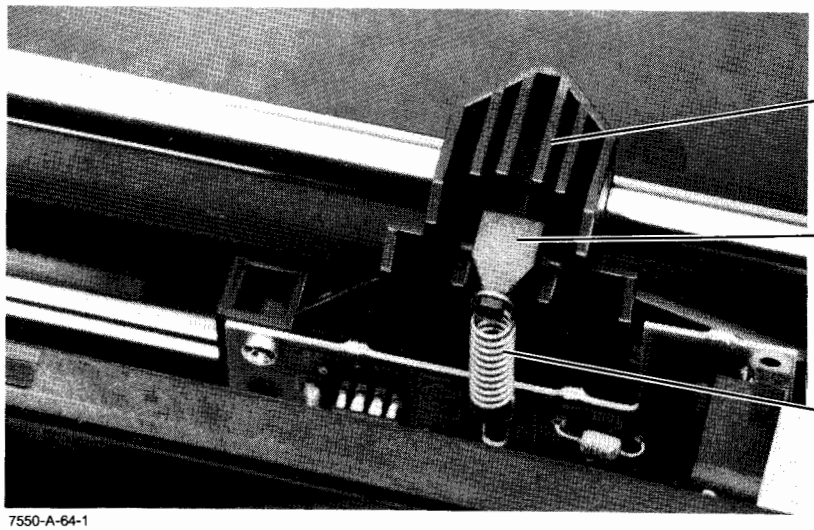
j. To remove the pen carriage assembly, release the flex trailing cable from the Main PCA and clamping tabs in the X,Y carriage assembly. Note the polarity of the cable for reassembly.

k. When installing the pen carriage assembly, make sure that the flex trailing cable is installed so as to allow full free travel of the pen carriage assembly across the slider rods.

l. When installing the pen carriage drive belt, make sure that the belt enters through the slots in the sides of the pen carriage assembly and is fully seated into the clamping recesses. Make sure the belt grooves are facing up in the recesses and there are no twists in the drive belt. Insert the belt clamps in back end first and then push down on the front end. Push the belt clamps in until fully seated and the tabs lock in place.

m. When reassembling the pen carriage belt tensioner, make sure that the hooked ends of the tensioner engage the pen carriage belt idler so as to apply upward and outward pressure when the compression spring is installed.

n. To insert the pen carriage belt tensioner compression spring, slide the prongs of needlenose pliers up along the tensioner extension to compress the spring. Push tensioner and spring **fully** into position before releasing the pliers.



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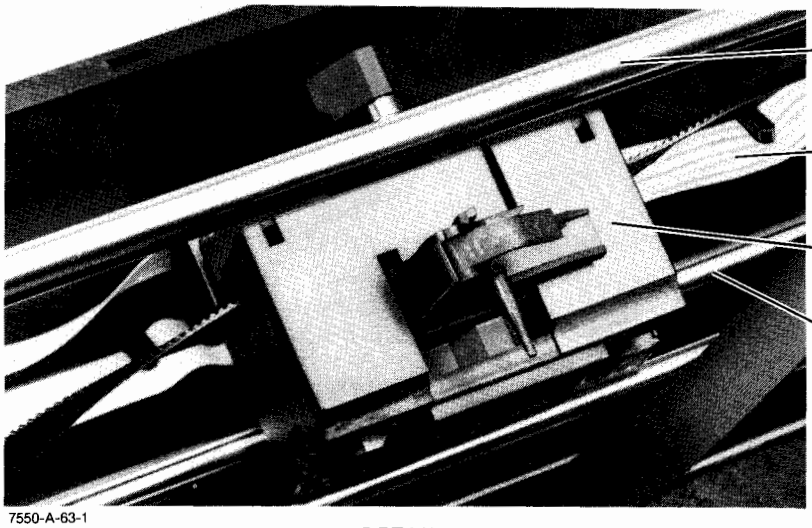
DETAIL A



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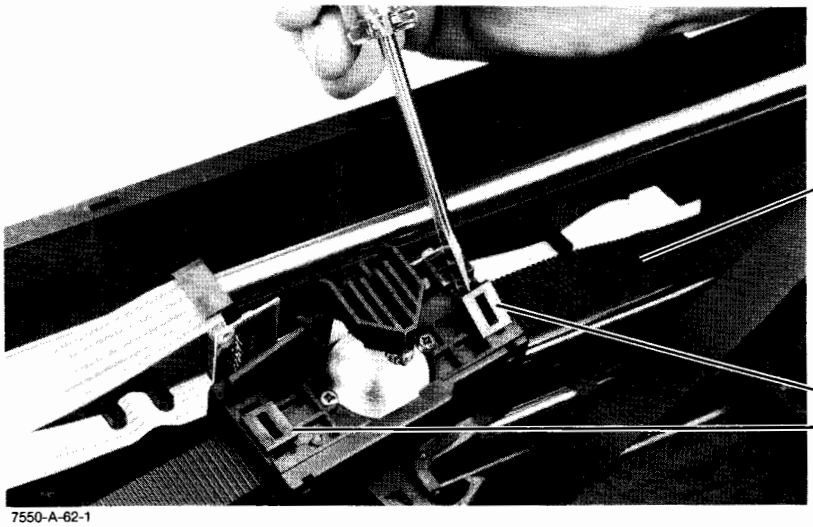
DETAIL B



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DETAIL C

Figure 6-23. Pen Carriage Assembly and Pen Carriage Drive Belt Removal

6-143. PEN CARRIAGE BEARING HOLDERS REMOVAL

6-144. To remove the pen carriage bearing holders, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Release the pen carriage assembly from the X,Y carriage assembly. If necessary, refer to the pen carriage assembly and pen carriage drive belt removal procedure given in this section.

NOTE

The swing arm and bearing holders are the only replaceable bearing units in the pen carriage assembly. All other bearings require changing of the pen carriage assembly.

d. Remove the pen carriage cover. Carefully pry the sides of the cover away from the pen carriage assembly and slide the cover upward to remove. Push the pen holder down if necessary. See Figure 6-24, Detail A.

e. Carefully pry or pull the bearing holders from the pen carriage. See Figure 6-24, Detail B.

6-145. PEN PAWL REMOVAL

6-146. To remove the pen pawl, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Release the pen carriage assembly from the X,Y carriage assembly. If necessary, refer to the pen carriage assembly and pen carriage drive belt removal procedure given in this section.

d. Invert the pen carriage assembly to access the pen pawl.

e. Carefully remove the pen pawl compression spring from the pen holder. See Figure 6-25.

f. Rotate the pen pawl fully counterclockwise (CCW) as viewed from the bottom until it is aligned with the access slot in the pen holder.

g. Carefully pry or pull the pen pawl from the pen holder.

h. When installing the pen pawl, make sure that it is fully inserted into the pen holder and the compression spring is seated on the standoff in the pen holder.

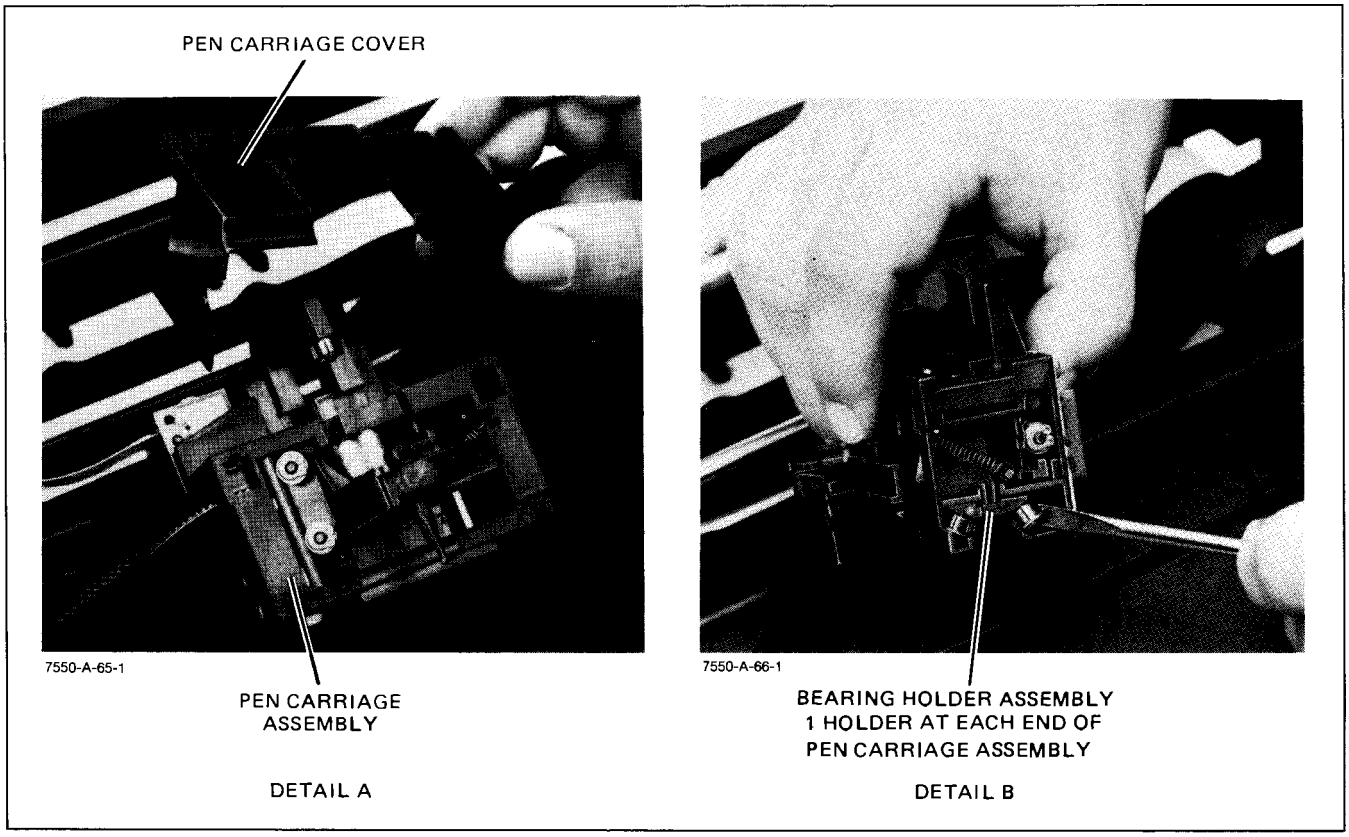


Figure 6-24. Pen Carriage Bearing Holder Removal

6-147. X-MOTOR IDLER GEAR REMOVAL

6-148. To remove the X-motor idler gear, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Release the X-idler gear extension spring from the standoff on the X,Y carriage assembly. See Figure 6-26.

d. Slide the X-drive belt off of the grit wheel pulley gear.

e. To remove the X-idler gear, slide the Idler to the right end of the slot and pull to remove. The idler cam is removed in the same manner. Note the positioning of the idler gear and cam for reassembly.

6-149. X-MOTOR DRIVE BELT REMOVAL

6-150. To remove the X-motor drive belt, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Release the X-idler gear extension spring from the standoff on the X,Y carriage assembly. See Figure 6-27.

d. Slide the X-drive belt off of the grit wheel pulley gear.

e. Carefully pull the X-drive belt from the X-motor drive gear. If necessary, slightly elevate the X-idler gear cam to remove the belt.

6-151. X-DRIVE (MEDIA TRANSPORT) MOTOR/ ENCODER REMOVAL

6-152. To remove the X-drive motor/encoder assembly, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Release the X-idler gear extension spring from the standoff on the X,Y carriage assembly. See Figure 6-27.

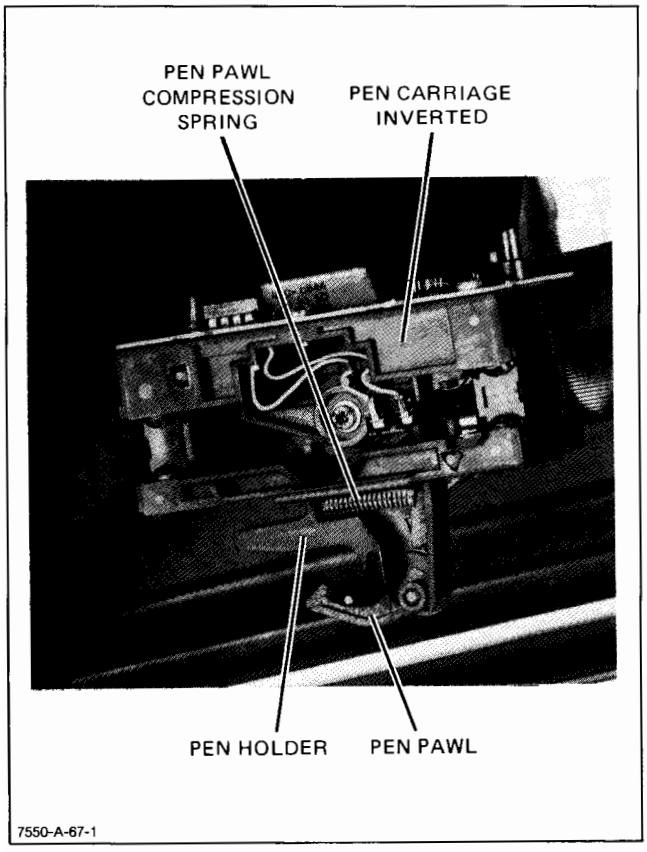


Figure 6-25. Pen Pawl Removal

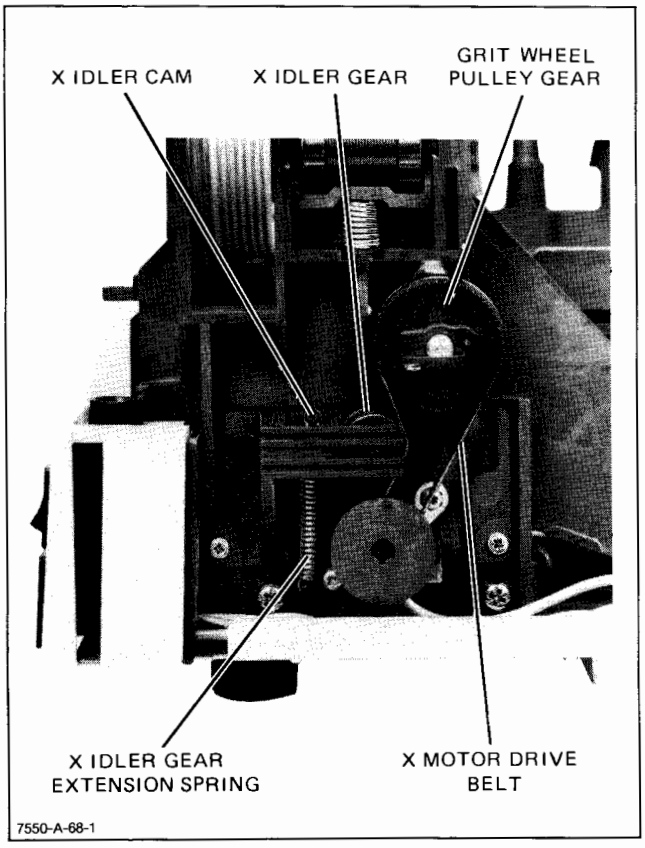


Figure 6-26. X-Motor Idler Gear Removal

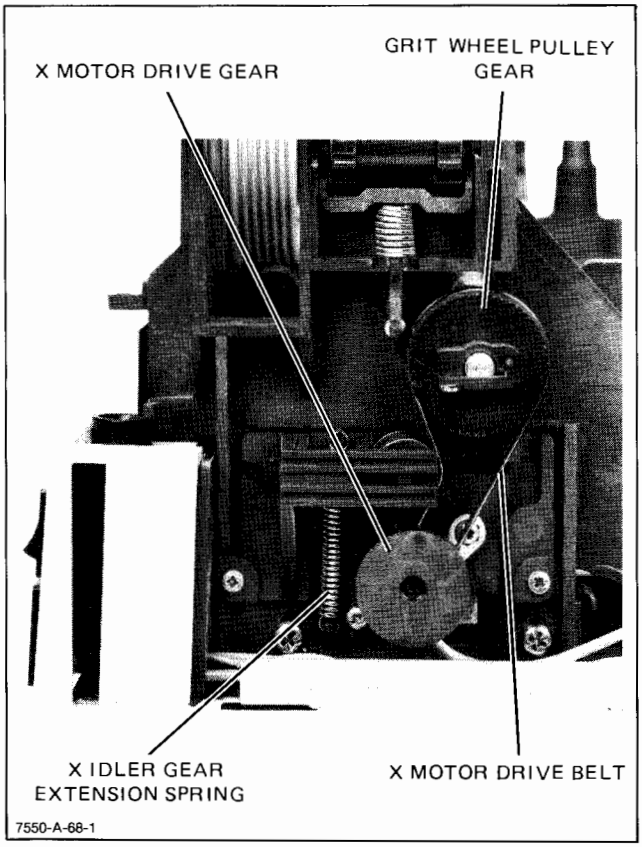


Figure 6-27. X-Motor Drive Belt Removal

d. Slide the X-drive belt off of the grit wheel pulley gear. Remove the grit wheel pulley gear.

e. Slide the X-idler gear to the right end of the slot and pull to remove. Remove the X-idler cam in the same manner.

f. Remove the two screws that mount the X-motor plate to the X,Y carriage assembly. See Figure 6-28, Detail A.

g. Remove the two X-motor plate mounting screws and remove the plate. See Figure 6-28, Detail A.

h. Pull the X-motor/encoder out until the X-encoder PCA contacts the pinch wheel extension spring. Lift the spring up until the X-encoder PCA clears the spring and pull the X-motor/encoder out as far as possible.

i. Carefully lift the X-motor/encoder up and rotate it to clear the X,Y carriage assembly.

j. Disconnect the X-encoder ribbon cable and the X-motor supply wires from the X-motor/encoder assembly. Note the polarity of the wires for reassembly. See Figure 6-28, Detail B.

k. Upon completion of the repair, perform the X- and Y-Motor Gain Calibration procedure described in Section III of this manual.

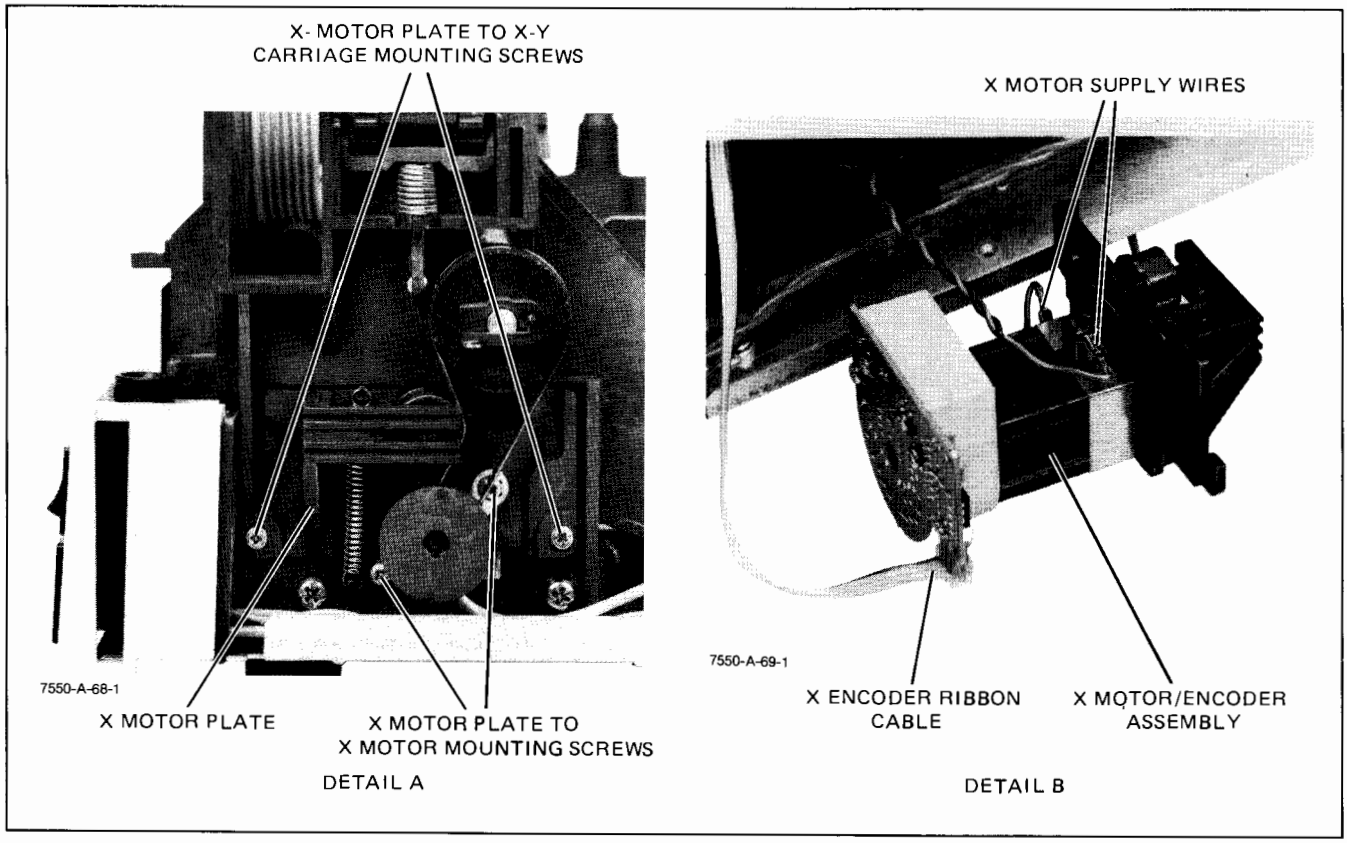


Figure 6-28. X-Drive (Media) Motor/Encoder Removal

6-153. PAPER FEED MOTOR REMOVAL

6-154. To remove the paper feed motor, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Remove the front-panel assembly. If necessary, refer to the front-panel assembly removal procedure given in this section.

d. Disconnect the paper feed motor wire connector from the Main PCA. Note the polarity of the wire connector for reassembly.

e. Remove the two paper feed motor mounting screws to release the motor. See Figure 6-29. If necessary, release the Main PCA and slide it forward to access the lower paper feed motor mounting screw.

6-155. PAPER FEED GEARS AND IDLER REMOVAL

6-156. To remove the paper feed gears or idlers, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

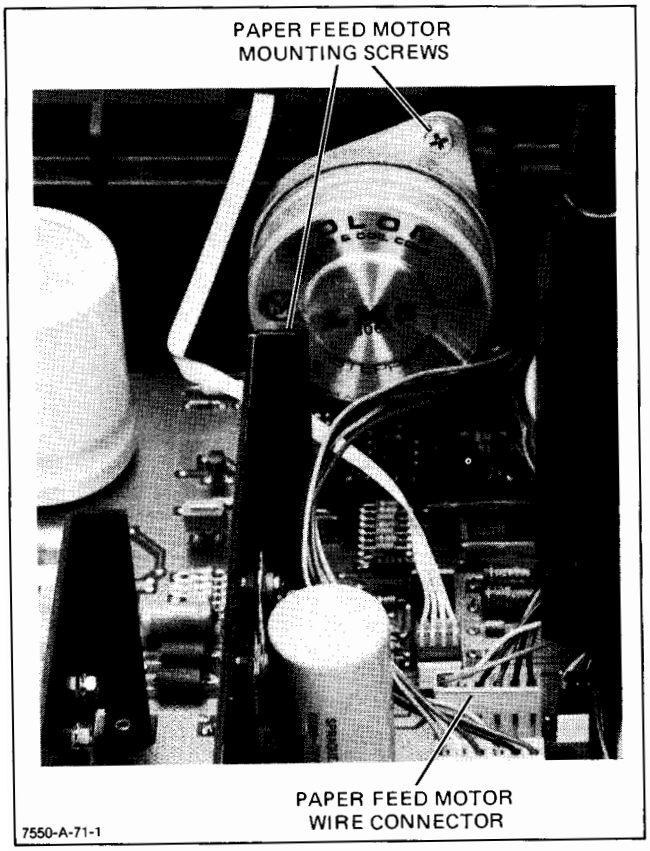


Figure 6-29. Paper Feed Motor Removal

c. Remove the front-panel assembly. If necessary, refer to the front-panel assembly removal procedure given in this section.

d. Remove the four Main PCA mounting screws and the six interface connector mounting screws to release the Main PCA.

e. Slide the Main PCA forward until the paper sensor holder clears the paper feed gears.

f. Remove the paper feed motor mounting screws and remove the motor. See Figure 6-29.

g. Remove the paper feed encoder gear retaining clip and slide the gear off of the standoff. Note the positioning of the paper feed encoder gear timing mark in relation to the paper feed gear timing mark for reassembly. See Figure 6-30, Detail A.

NOTE

The timing marks on the gears should point toward each other. When the paper feed gear timing mark is pointing down at approximately the six o'clock position, the flat portion of the paper drive wheels should also be facing down. The paper drive wheels are visible through the paper tray opening in the media chassis assembly. The paper feed gear is part of the paper feed shaft assembly and should not be removed as an individual item.

h. To remove the paper feed idlers or paper feed shaft assembly, slide the shaft assembly out of the media chassis assembly.

i. The paper feed idlers are snap-fit together. Carefully pry the idlers apart to remove. Note the position of the idlers on the slots on the paper feed shaft. See Figure 6-30, detail B.

NOTE

The paper drive wheels are part of the paper feed shaft assembly and should not be removed as individual items.

6-157. PINCH WHEEL AND PINCH WHEEL AXLE REMOVAL

6-158. To remove the pinch wheels and pinch wheel axle, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Manually move the pen carriage assembly fully left so as to raise the pinch wheels off of the grit wheels.

d. Remove the left-hand pinch wheel arm retaining clip. See Figure 6-31, Detail A.

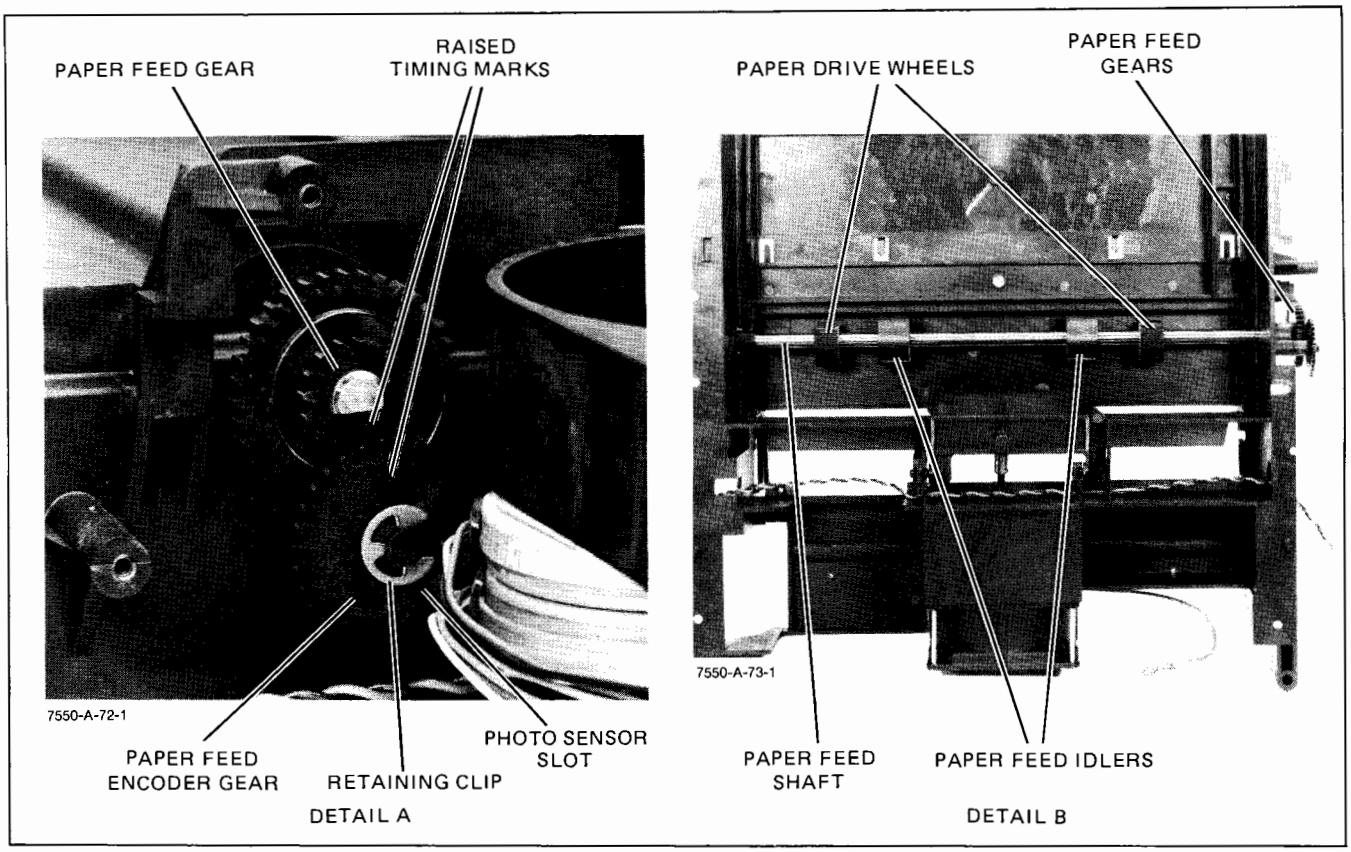


Figure 6-30. Paper Feed Gears and Idlers Removal

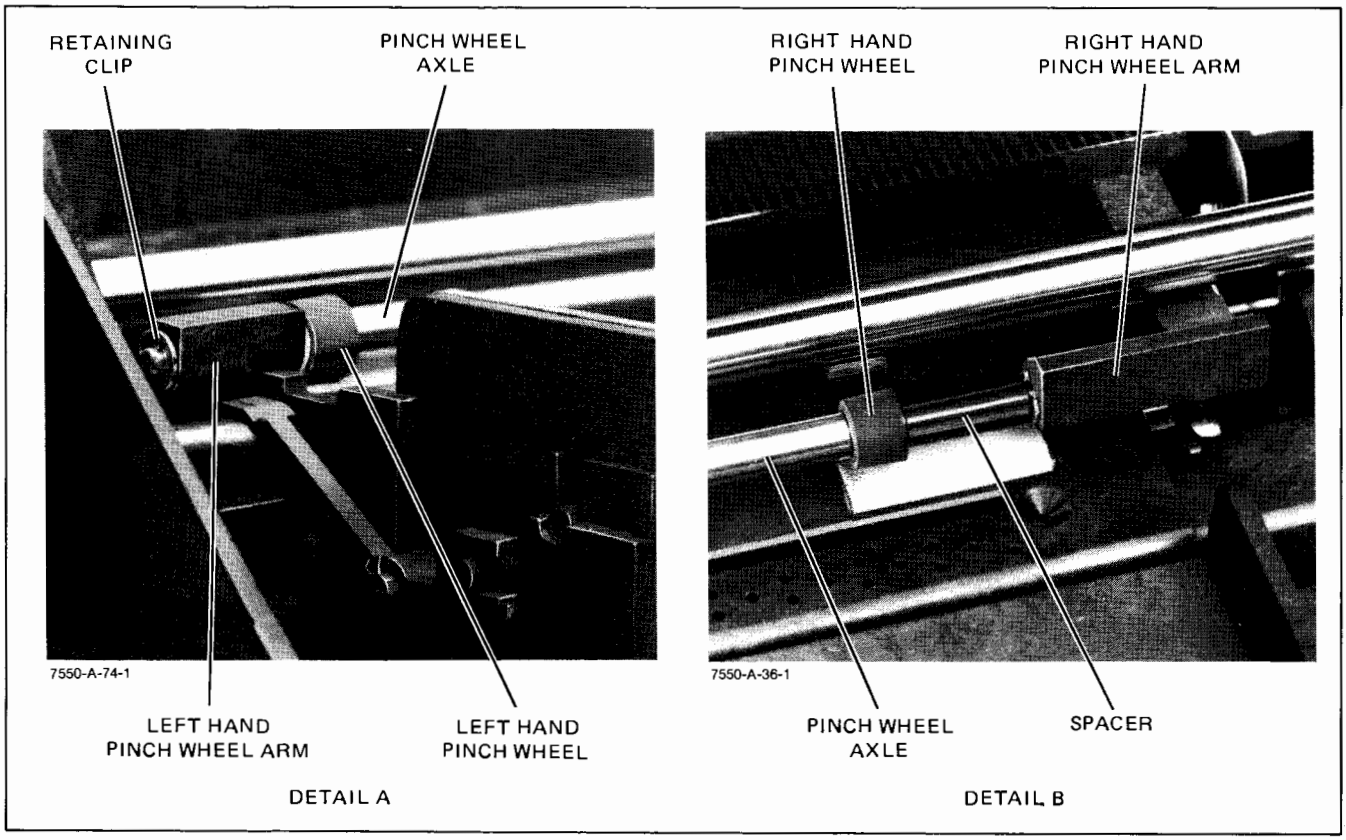


Figure 6-31. Pinch Wheel and Pinch Wheel Axle Removal

e. Slide the pinch wheel arms toward the sides of the plotter until the pinch wheel axle disengages one of the arms. Do not allow the pinch wheel arms to slide off of their standoffs or the pinch wheel arm extension springs could pull the arms under the X,Y carriage assembly.

f. Remove the pinch wheel axle from the pinch wheel arms.

g. Slide the pinch wheels off of the pinch wheel axle. Note that the small diameter ends of the pinch wheels face toward each other. Also note the placement of the spacer to the right-hand pinch wheel for proper media size configuration. See Figure 6-31, Detail B.

6-159. PINCH WHEEL ARM REMOVAL

6-160. To remove the pinch wheel arms, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Remove the left-hand pinch wheel arm retaining clip. See Figure 6-31.

d. Release the pinch wheel arm extension springs accessible from the back of the X,Y carriage assembly. Note where the springs attach for reassembly. See Figure 6-32. The X,Y carriage assembly may be removed for easier access if desired. Refer to the X,Y carriage assembly removal procedure given in this section.

e. Slide the pinch wheel arms off of their standoffs on the X,Y carriage assembly. The pen carriage trailing cable may be moved for better access of the right-hand pinch wheel arm.

NOTE

Removing the pinch wheel arms will release the pinch wheel axle assembly. Exercise care not to damage the pinch wheels or grit wheels while removing the pinch wheel arms.

6-161. X,Y CARRIAGE ASSEMBLY REMOVAL

6-162. To remove the X,Y carriage assembly, perform the following steps.

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary refer to the procedure on Opening up the Plotter given in this section.

c. Disconnect the grounding wire located below the X-drive belt from the X,Y carriage assembly.

d. Disconnect the carousel motor and photosensor wire connectors from the Main PCA.

e. Disconnect the Y-motor/encoder assembly wires and ribbon cable from the Y-motor/encoder assembly. Note the polarity of the wires for reassembly.

f. Disconnect the pen carriage trailing cable from the Main PCA. Note the polarity of the cable for reassembly.

g. Remove the deflector retaining clip located at the right end of the deflector. See Figure 6-33, Detail A. Carefully pry the bottom outside edge of the clip upward while pressing the bottom inside of the clip outward.

h. Reach through the paper tray opening and push up on the deflector to release it from the media chassis assembly. Lift the deflector from the media chassis assembly. Avoid damaging the

(Continued on page 6-39)

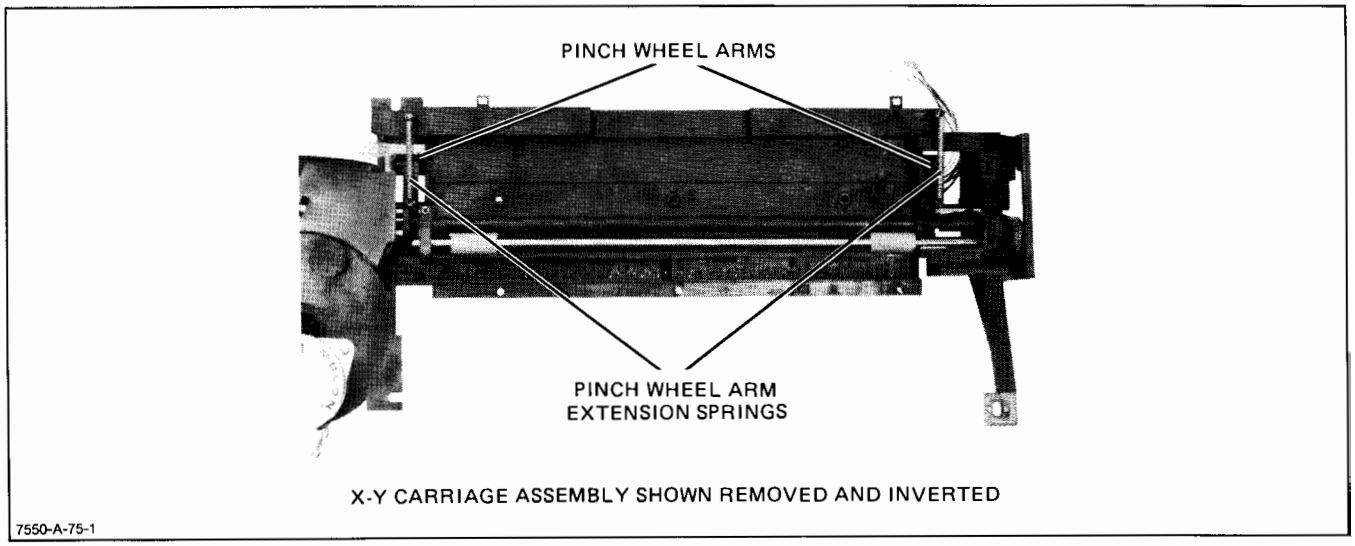
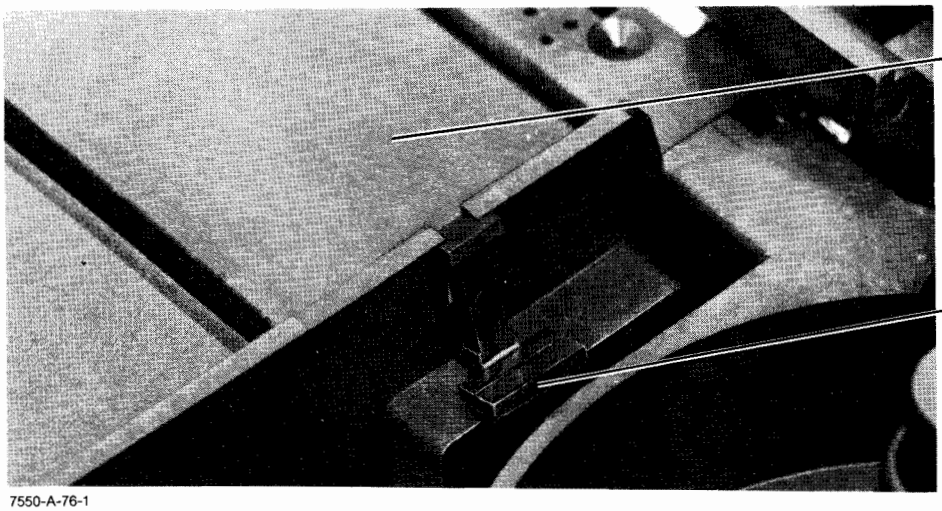
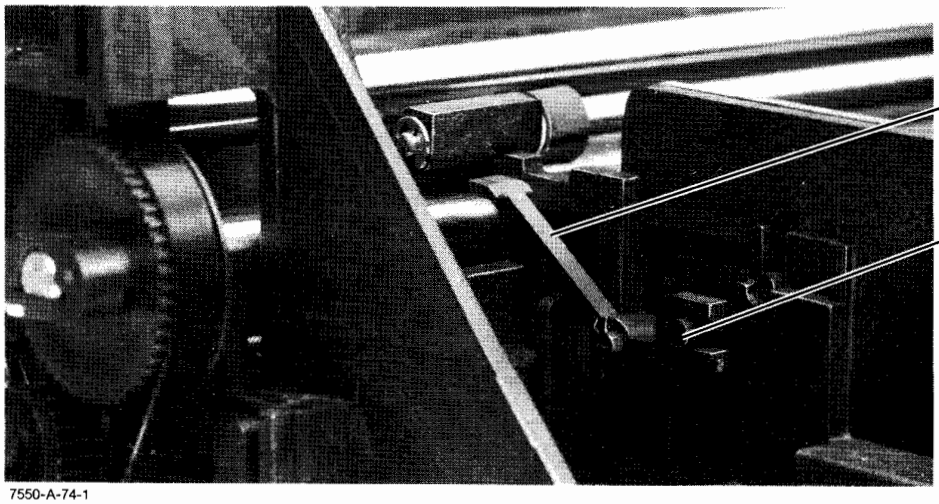


Figure 6-32. Pinch Wheel Arm Removal



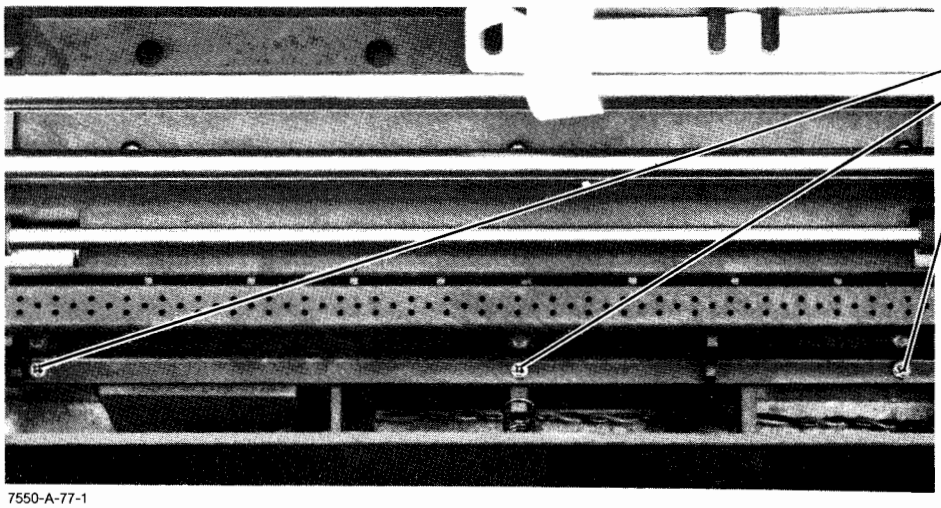
7550-A-76-1

DETAIL A



7550-A-74-1

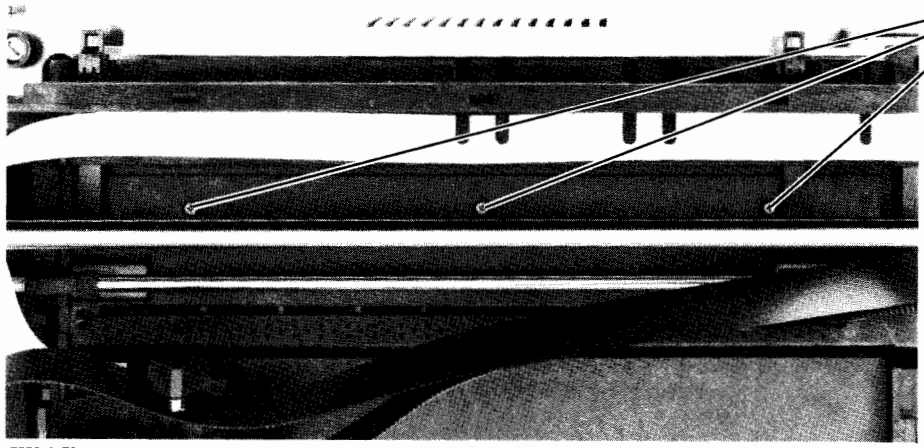
DETAIL B



7550-A-77-1

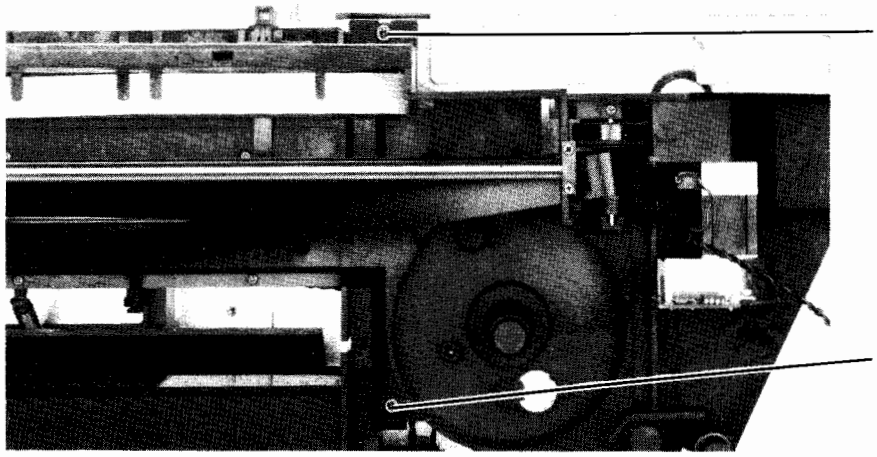
DETAIL C

Figure 6-33. X,Y Carriage Assembly Removal (Sheet 1 of 2)



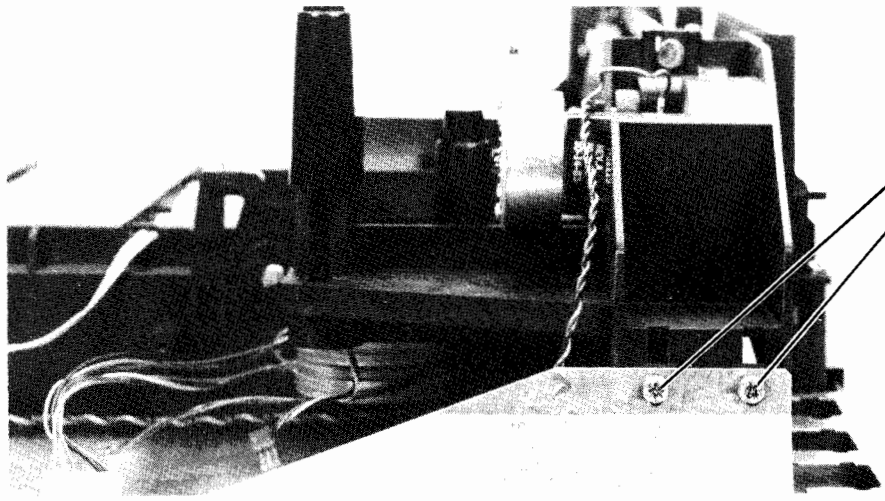
7550-A-78-1

DETAIL D



7550-A-79-1

DETAIL E



7550-A-80-1

DETAIL F

Figure 6-33. X,Y Carriage Assembly Removal (Sheet 2 of 2)

lever located at the left end of the extension on the deflector. See Figure 6-33, Detail B.

i. Remove the three X,Y carriage assembly mounting screws visible in the recess normally covered by the deflector. See Figure 6-33, Detail C.

j. Remove the three X,Y carriage assembly mounting screws located just back of the lower slider rod. See Figure 6-33, Detail D.

k. Remove the five X,Y carriage assembly mounting screws adjacent to the media chassis assembly; one located on the left-hand side at the end of the X,Y carriage assembly extension, two beneath the X-motor assembly, and two located on the right-hand side near the carousel base. See Figure 6-33, Detail E.

l. Remove the two X,Y carriage assembly mounting screws located on the far right end of the X,Y carriage assembly. See Figure 6-33, Detail F.

m. Carefully lift the X,Y carriage assembly up and disconnect the wires and ribbon cable from the X-motor/encoder assembly. Note the polarity of the wires for reassembly.

n. When installing the X,Y carriage assembly, avoid pinching the cable and wires. Also avoid damaging the deflector lever. Tighten the center carriage assembly mounting screw first, then the outer screws.

o. When installing the deflector, make sure that the long extension on the left end of the deflector engages the fork of the deflector lever and the deflector is fully seated into the media chassis assembly. Tighten the center deflector mounting screw first, then the outer screws.

6-163. CAROUSEL MOTOR REMOVAL

6-164. To remove the carousel motor, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Remove the X,Y carriage assembly. If necessary, refer to the X,Y carriage assembly removal procedure given in this section.

d. Invert the X,Y carriage assembly to access the carousel motor mounting screws. Avoid damaging the Y-encoder PCA or the carousel photosensor covers.

e. Remove the two carousel motor mounting screws. See Figure 6-34.

f. Carefully remove the carousel motor so as to avoid damaging the carousel motor drive gear.

6-165. PEN CAPPING MECHANISM REMOVAL

6-166. To remove the pen capping mechanism, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Remove the X,Y carriage assembly. If necessary, refer to the X,Y carriage assembly removal procedure given in this section.

d. Invert the X,Y carriage assembly to access the pen capping mechanism mounting screw. See Figure 6-35, Detail A.

e. Remove the pen capping mechanism mounting screw. Note that the pen capping mechanism is under spring tension. Carefully remove the mechanism. Holding the capper against the capper plate will prevent the parts from separating while removing the mechanism.

f. When installing the pen capping mechanism, make sure that the tension spring is fully seated in the groove of the pen capper plate and beneath the tab on the capper. The spring should be seated around the extension on the capper and around the extension on the capper plate. See Figure 6-35, Detail B. Hold the capper against the capper plate while installing the mechanism. Insert the mounting screw.

g. Manually check the operation of the pen capping mechanism before plotter reassembly.

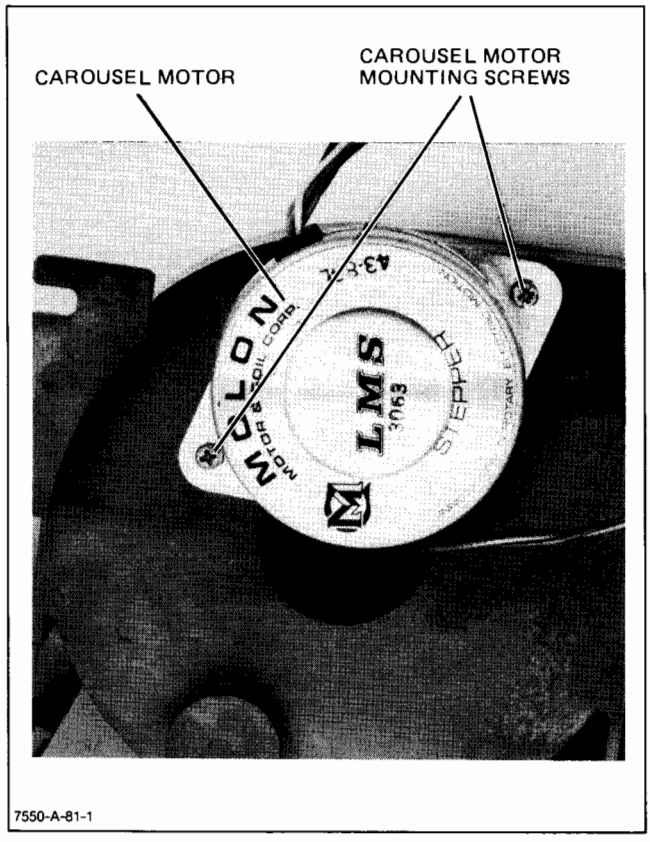


Figure 6-34. Carousel Motor Removal

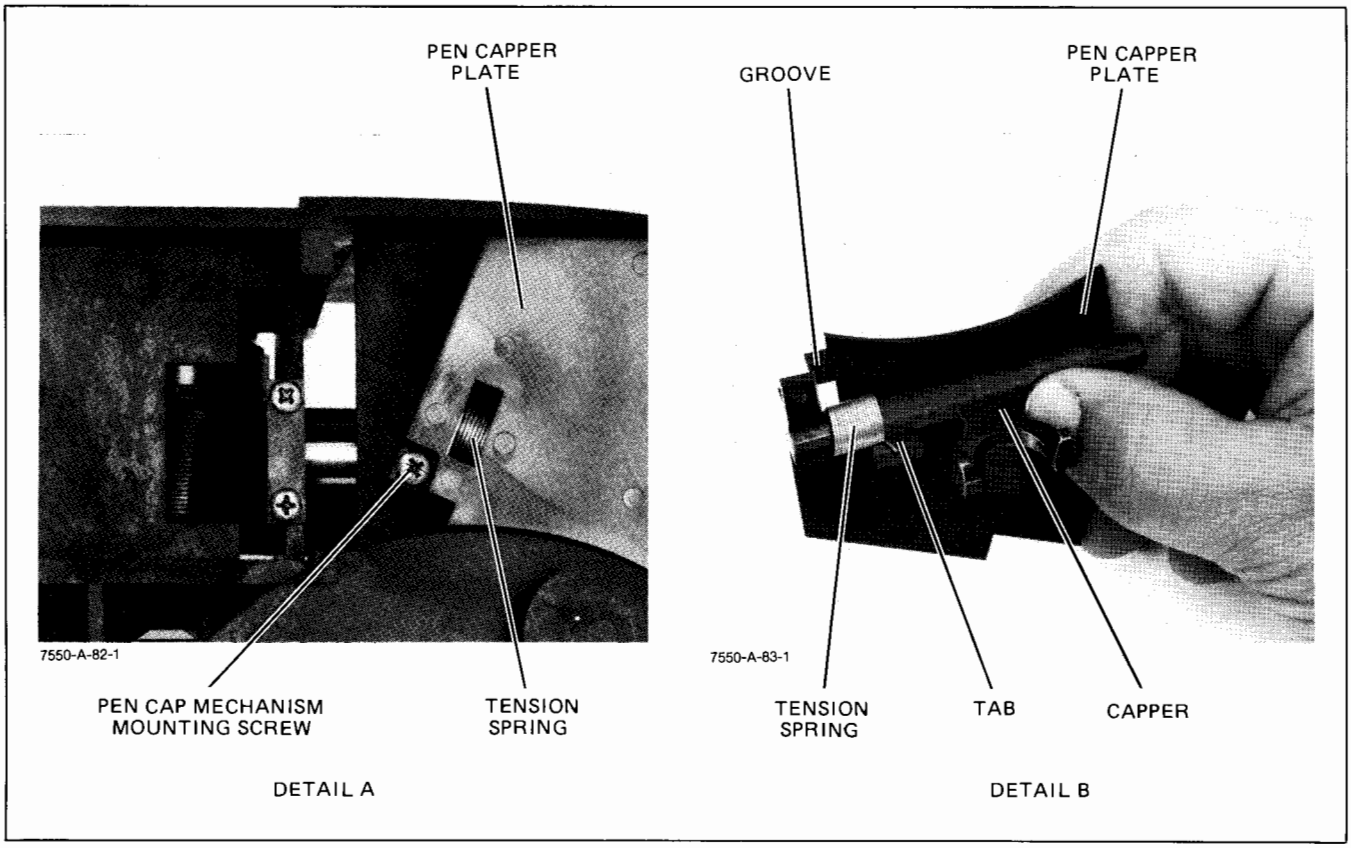


Figure 6-35. Pen Capping Mechanism Removal

6-167. PINCH WHEEL SHAFT AND GRIT WHEEL ASSEMBLY REMOVAL

6-168. To remove the pinch wheel shaft or grit wheel assembly, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Remove the X,Y carriage assembly. If necessary, refer to the X,Y carriage assembly removal procedure given in this section.

d. Invert the X,Y carriage assembly to access the grit wheel assembly.

e. Carefully release the pinch wheel arm extension springs from the standoffs on the X,Y carriage assembly. See Figure 6-36, Detail A.

f. Remove the pinch wheel shaft/grit wheel assembly clamp retaining screw and remove the clamp. See Figure 6-36, Detail A.

g. Lift the pinch wheel shaft up and out of the X,Y carriage assembly. Note the positions of the pinch wheel shaft lobes for reassembly. Avoid damaging the grit wheels.

h. When installing the pinch wheel shaft, make sure that the peg on the right end of the shaft is fully seated into the hole in the side of the X,Y carriage assembly.

i. Release the X-drive belt from the grit wheel pulley gear. See Figure 6-36, Detail B.

j. Loosen the grit wheel pulley gear clamping screw and remove the gear from the grit wheel shaft. See Figure 6-36, Detail B.

k. Raise the end of the grit wheel assembly closest to the carousel base up while pushing down on the opposite end of the shaft. The grit wheel assembly should slide out of the recess in the side of the X,Y carriage assembly.

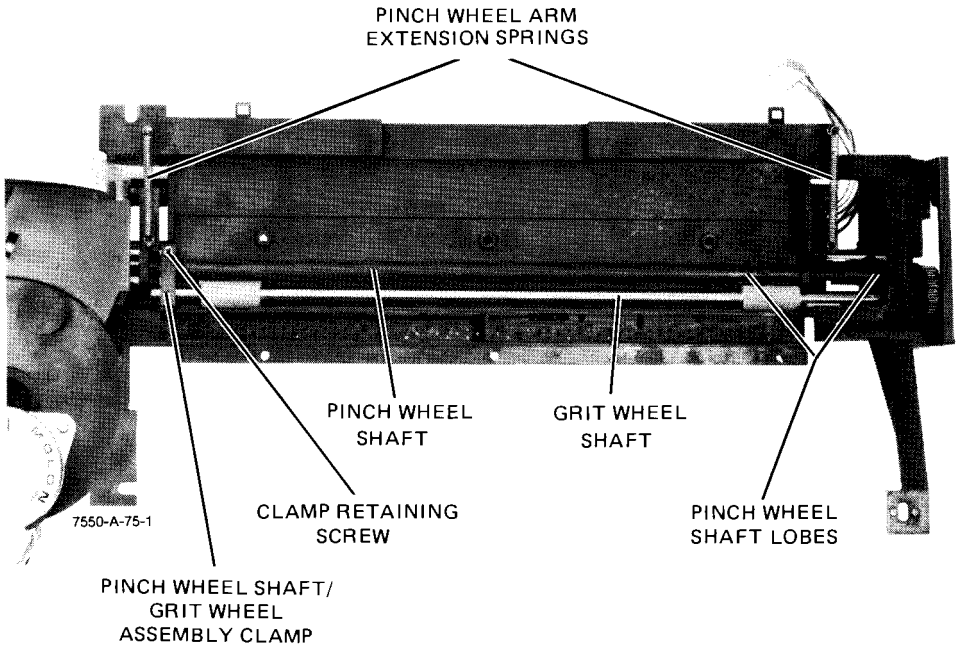
l. Carefully pull the grit wheel assembly from the X,Y carriage assembly. If necessary, loosen or remove the X-motor/encoder assembly.

m. When installing the grit wheel assembly, make sure that the flat notch on the grit wheel shaft is toward the X-motor end of the X,Y carriage assembly.

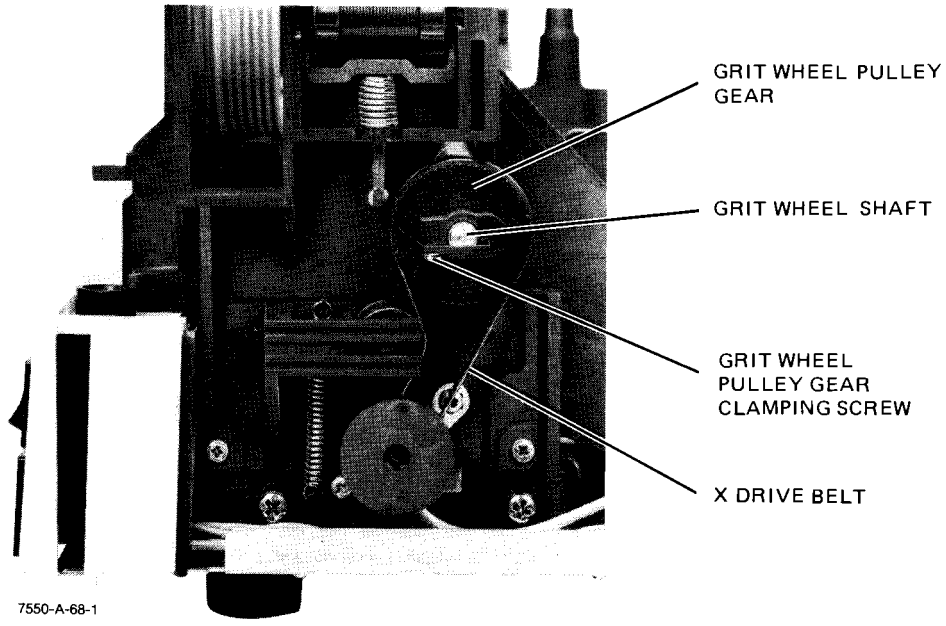
6-169. POWER MODULE ASSEMBLY REMOVAL

6-170. To remove the power module assembly, perform following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.



DETAIL A



DETAIL B

Figure 6-36. Pinch Wheel Shaft and Grit Wheel Assembly Removal

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Remove the X,Y carriage assembly. If necessary, refer to the X,Y carriage assembly removal procedure given in this section.

d. Remove the power module mounting screw located adjacent to the fuseholder. See Figure 6-37.

e. Carefully slide the power module assembly to the right and lift the assembly from the plotter.

f. When installing the power module assembly, make sure that the slot in the assembly engages the tab on the power transformer cover and the tabs on the assembly engage the slots in the base assembly. Avoid pinching or damaging the input circuitry wires.

6-171. MEDIA CHASSIS ASSEMBLY REMOVAL

6-172. To remove the media chassis assembly, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Remove the X,Y carriage assembly. If necessary, refer to the X,Y carriage assembly removal procedure given in this section.

d. Release the power transformer primary wires and the X-encoder ribbon cable from the channels on the top of the media chassis assembly. See Figure 6-38.

e. Disconnect the fan ground wire and supply wires from the fan. See Figure 6-38.

f. Disconnect the paper feed motor wire connector from the Main PCA. Note the polarity of the wire connector for reassembly.

g. Remove the five media chassis assembly mounting screws to release the assembly. See Figure 6-38.

h. Lift the media chassis assembly up to remove. Avoid damaging the paper feed sensors.

6-173. FAN REMOVAL

6-174. To remove the fan, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Remove the X,Y carriage assembly. If necessary, refer to the X,Y carriage assembly removal procedure given in this section.

d. Remove the media chassis assembly. If necessary, refer to the media chassis assembly removal procedure given in this section.

e. Remove the three fan mounting screws to release the fan. See Figure 6-39.

6-175. PAPER TRAY CATCH REMOVAL

6-176. To remove the paper tray catch, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

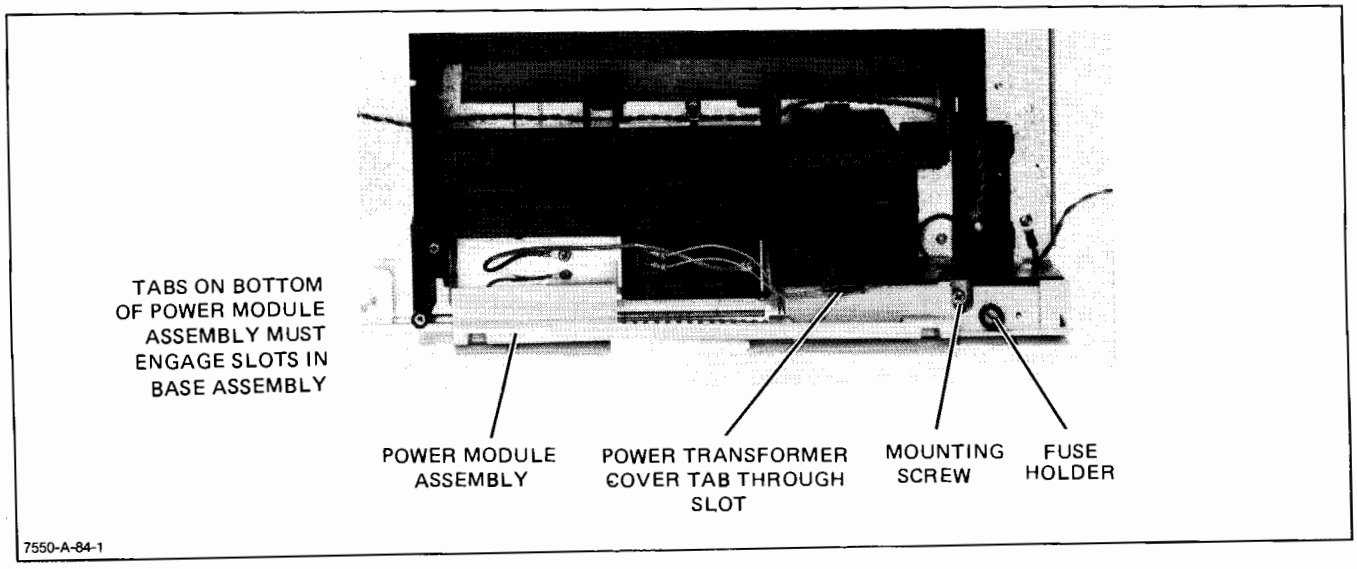


Figure 6-37. Power Module Assembly Removal

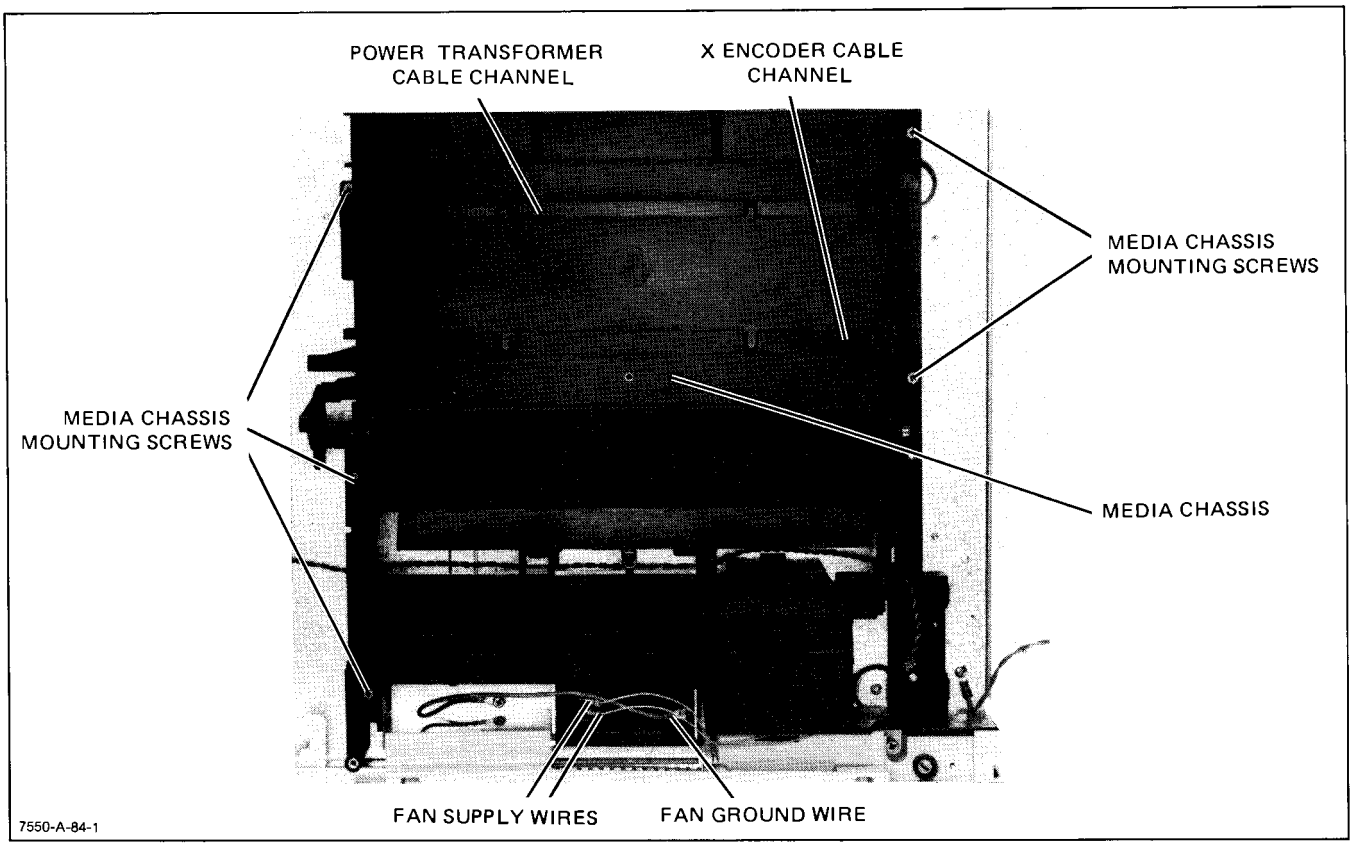


Figure 6-38. Media Chassis Removal

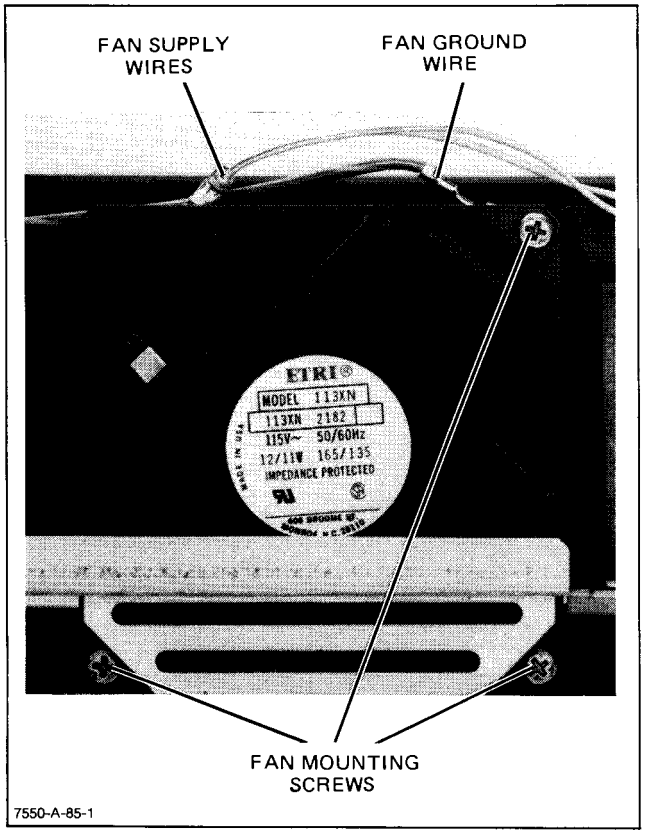


Figure 6-39. Fan Removal

c. Remove the X,Y carriage assembly. If necessary, refer to the X,Y carriage assembly removal procedure given in this section.

d. Remove the media chassis assembly. If necessary, refer to the media chassis assembly removal procedure given in this section.

e. Carefully release the paper tray catch tension spring. See Figure 6-40, Detail A.

f. Invert the media chassis assembly to access the paper tray catch.

g. Raise the paper tray catch up to clear the notch in the media chassis assembly and slide the catch out to remove. See Figure 6-40, Detail B.

6-177. POWER TRANSFORMER REMOVAL

6-178. To remove the power transformer, perform the following steps:

a. Turn the plotter LINE switch to OFF and disconnect the ac power cord.

b. Remove the top cover. If necessary, refer to the procedure on Opening up the Plotter given in this section.

c. Remove the X,Y carriage assembly. If necessary, refer to the X,Y carriage assembly removal procedure given in this section.

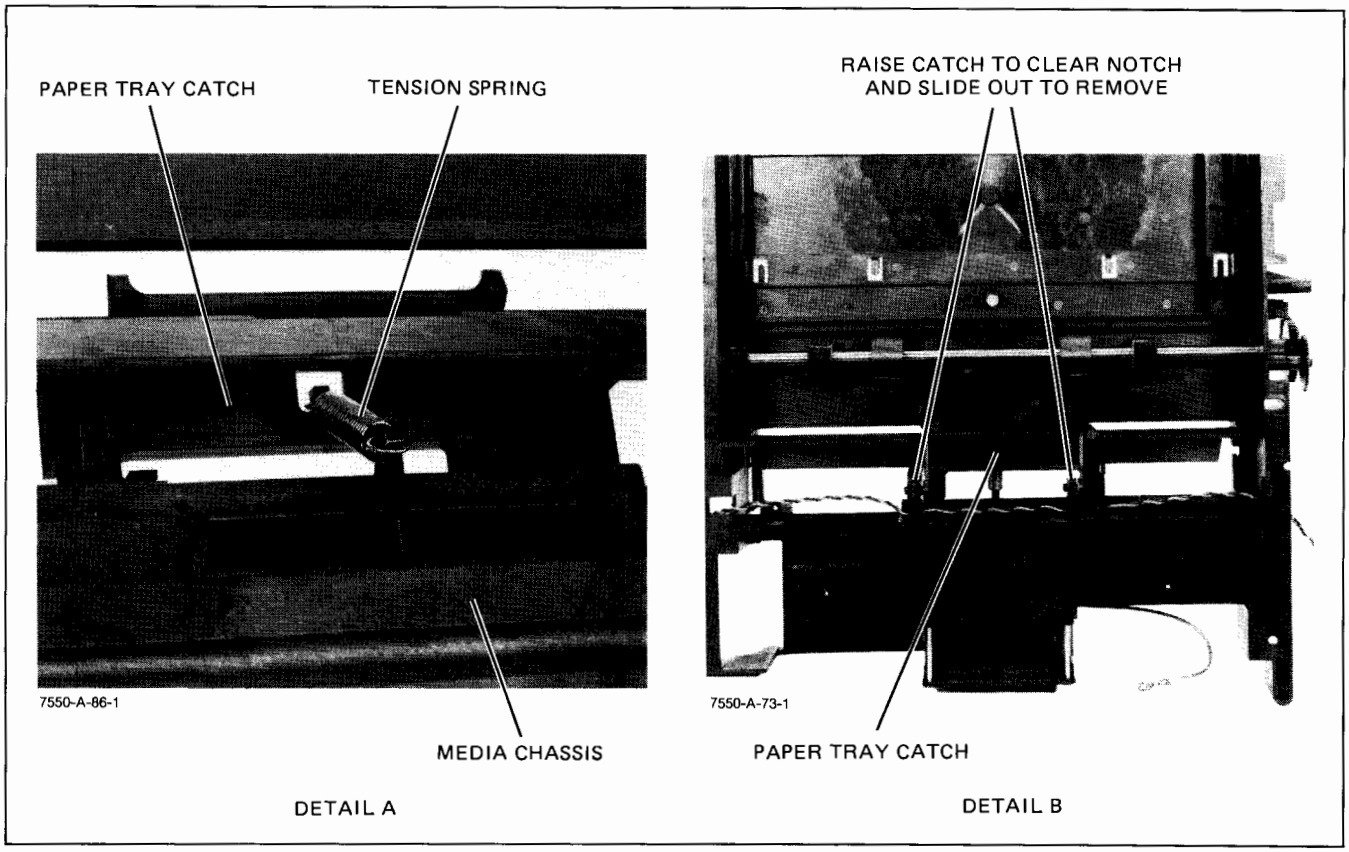


Figure 6-40. Paper Tray Catch Removal

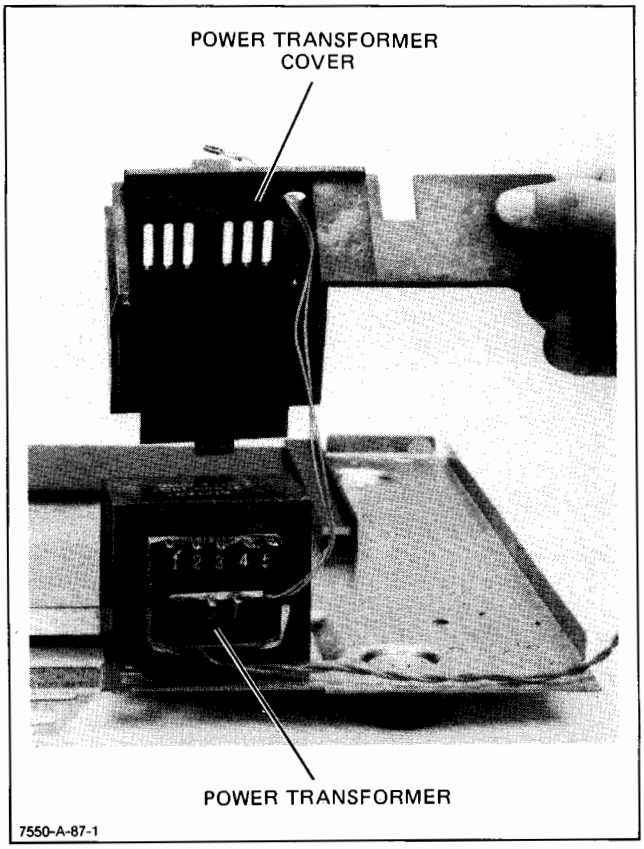


Figure 6-41. Power Transformer Removal

d. Remove the media chassis assembly. If necessary, refer to the media chassis assembly removal procedure given in this section.

e. Remove the power module assembly. If necessary, refer to the power module assembly removal procedure given in this section.

f. Disconnect the power transformer primary leads. Note the line input voltage and the primary lead hookup for reassembly. Refer to the power supply schematic given in this section for primary hookup.

g. Raise the front of the power transformer cover and slide it toward you until the tab on the back of the cover clears the slot in the base assembly. Lift the cover to access the power transformer. See Figure 6-41.

h. Lift the power transformer to remove.

6-179. LOGIC SYMBOLOGY AND SCHEMATIC SYMBOLS

6-180. The ANSI Y32.14 logic symbols used in the Model 7550A service sheet schematics are shown and explained in Figure 6-42. Schematic diagram symbols used in the service sheets are shown in Figure 6-43.

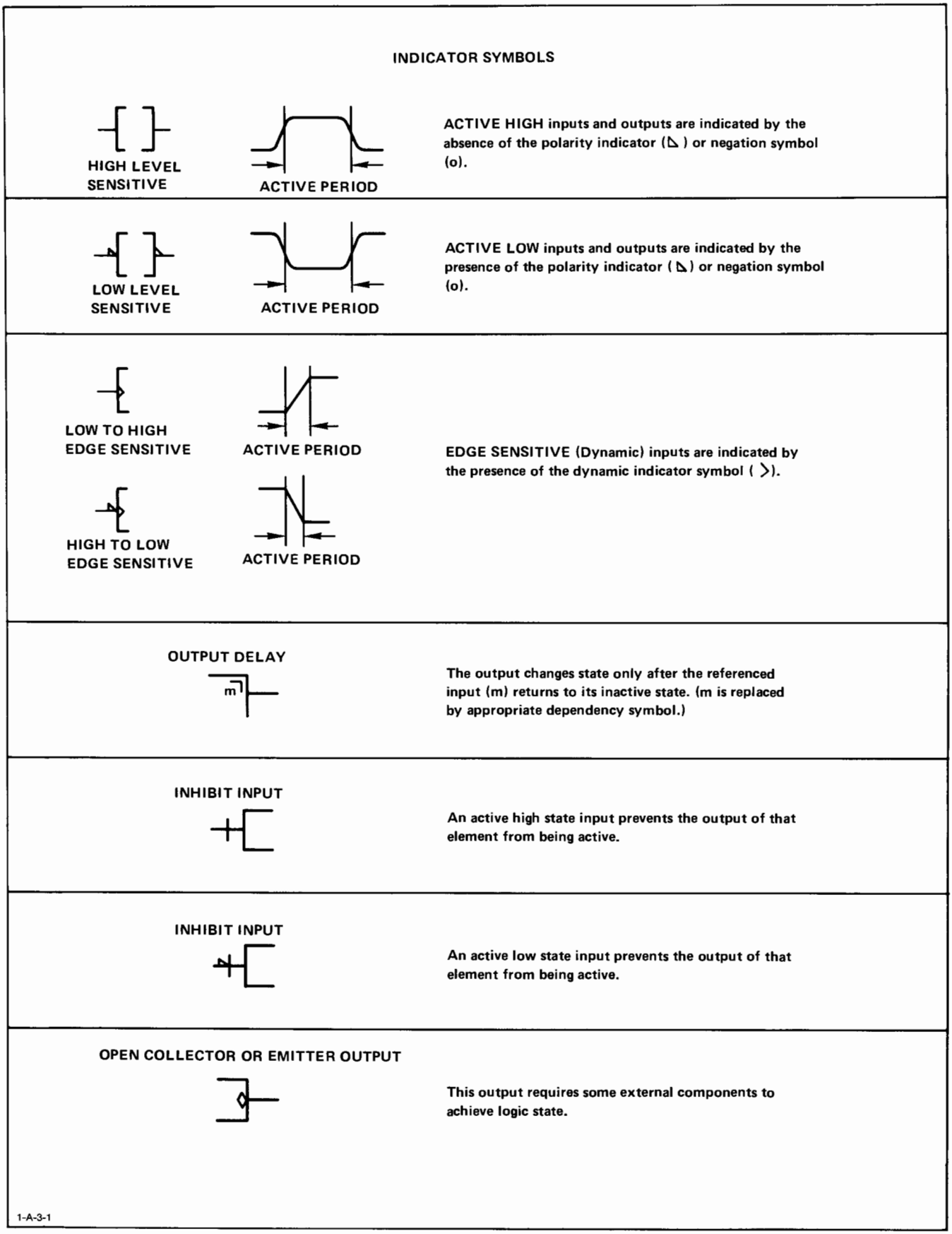


Figure 6-42. ANSI Y32.14 Logic Symbols (Sheet 1 of 7)

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

G1
G2
$X_{1,2}$

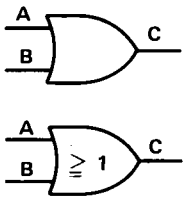
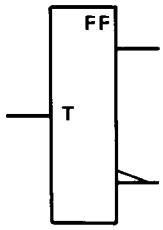
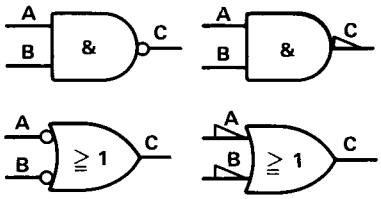
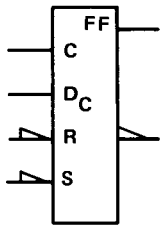
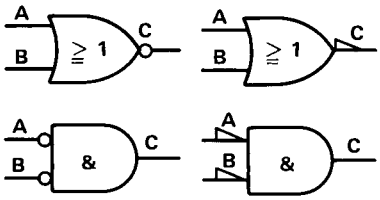
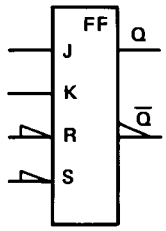
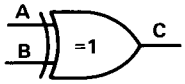
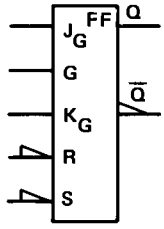
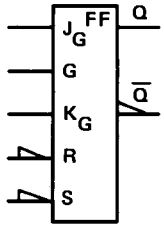
If the input or output is affected by more than one gate or control input, then the identifying numbers of each gate or control input will appear in the prefix or subscript, separated by commas. In this example "X" is controlled by "G1" and "G2".

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^{FF}, 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 6-42. ANSI Y32.14 Logic Symbols (Sheet 2 of 7)

INDICATOR SYMBOLS (Continued)

OR		A B C: L L L; H H H; L H H; H L H	T 	Toggles with every clock pulse
NAND		A B C: L L H; H H L; L H H; H L H	D 	Data output follows data input. Input is gated by C.
NOR		A B C: L L H; H H L; L H L; H L L	J-K 	J K Q Q̄: L L N/C N/C; L H L H; H L H L; H H toggles
XOR		A B C: L L L; H H L; L H H; H L H		
BUF-FER		A B: 1 1; 0 0	J-K (gated) 	J and K inputs are gated by G.
INVERT-ER		A B: 1 0; 0 1		
			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)

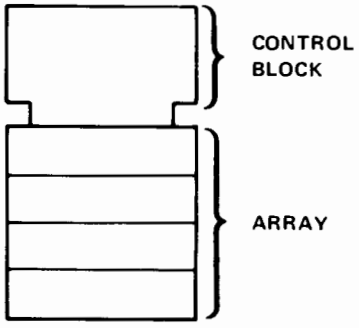
R Reset input — when active causes the flip-flop to reset (Asynchronous)

N/C No Change

1-A-5-1

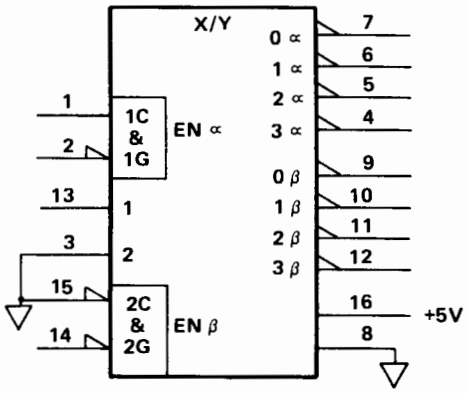
Figure 6-42. ANSI Y32.14 Logic Symbols (Sheet 3 of 7)

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.



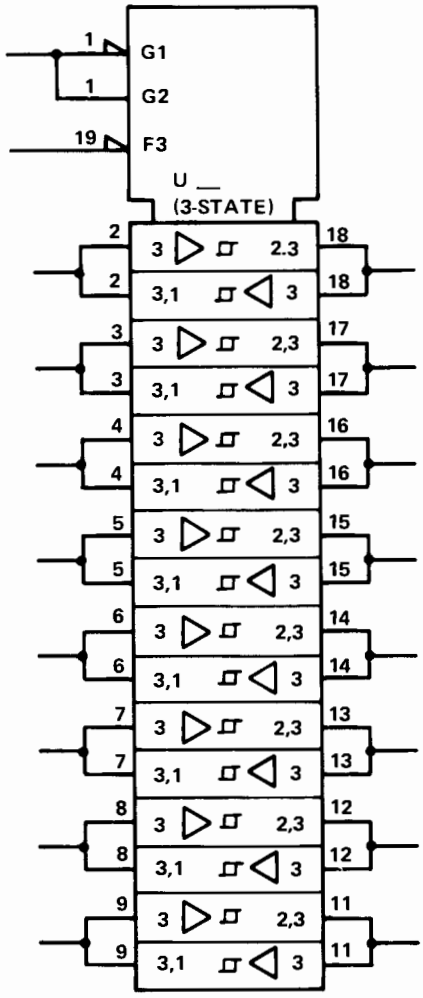
DECODER

The output is controlled by individual strobes that permit activating or inhibiting each of the 4-bit sections as desired. A strobe at input 1G will allow data to be input at 1C. Inputs 1 and 2 select the proper outputs 0 ∝ through 3 ∝.

A strobe at input 2G will allow data to be input at 2C. Inputs 1 and 2 select the proper outputs 0B through 3B.

1-A-31-1

Figure 6-42. ANSI Y32.14 Logic Symbols (Sheet 4 of 7)



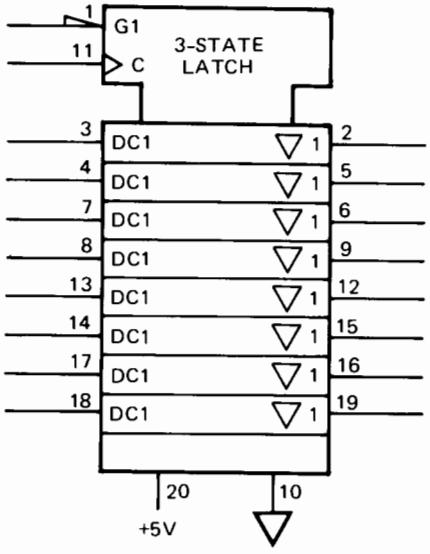
OCTAL BUS TRANSCEIVER with identical input/output lines

Pin 1 is the transmit/receive enable. A low at G1 enables the left to right flow of information, while a high at G2 will enable the right to left flow. F3 is the three state enable. A low at Pin 19 is required to enable the chip.

Each pin of the array is shown twice, once as a receiver and again as a transmitter, with the numbers of the enabling inputs of the control block given at each pin. The triangle indicates each section as a buffer, while the hysteresis symbol shows noise immunity.

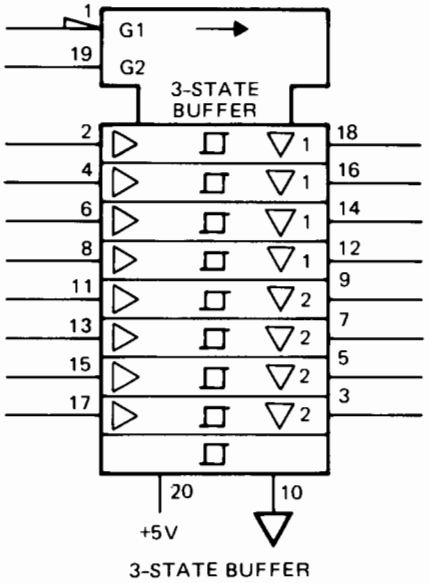
17603-A-29-1

Figure 6-42. ANSI Y32.14 Logic Symbols (Sheet 5 of 7)



3-STATE LATCH

Low input G1 enables clock input C to transfer D inputs to the outputs at the low to high transition of C. A high level at G1 sets all outputs to high impedance.

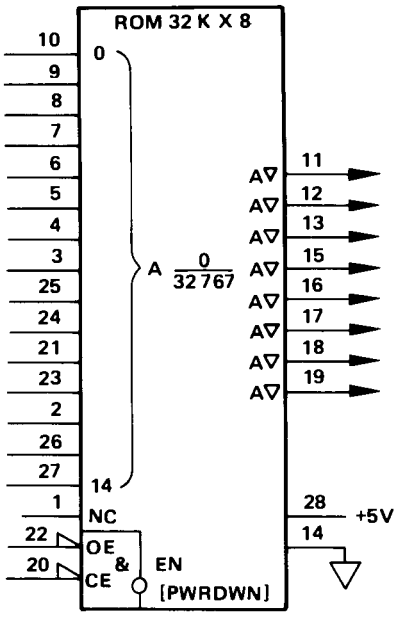


3-STATE BUFFER

Outputs at pins 12, 14, 16, and 18 are enabled when gate G1 is low, and are high impedance when G1 is high. Outputs at pins 3, 5, 7, and 9 are enabled when G2 is high, and are high impedance when G2 is low. Hysteresis in each buffer improves noise immunity.

1-A-32-1

Figure 6-42. ANSI Y32.14 Logic Symbols (Sheet 6 of 7)



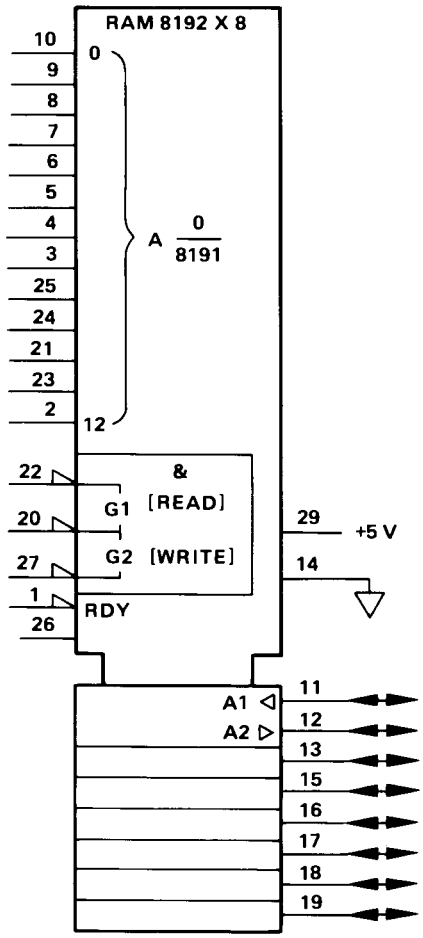
ROM

Read Only Memory with 32 768 addresses. Address selection is determined by the bit address inputs on the left side of the control block.

The CE input is used for device selection. A LOW on the CE input will power up memory for an active cycle.

The OE input is the 3-state enable line. A LOW on this line will enable the outputs.

(A) on the outputs indicates the dependency upon the memory location addressed.



RAM (with identical input/output pins)

Random Access Memory with access to 8192 locations. Address selection is determined by the address input codes in the upper left corner of the control block. These lines are weighted to correspond to the possible address (A0-8191).

G1 is the read enable. G2 is the write enable. A low at pin 20 will enable the read and write functions. A low on pins 22 or 27 will select the read or write function accordingly.

The input lines are identical and are noted in the lower right portion of the Symbol. A1 indicates that information will be read from the chip when G1 is low at the memory location addressed (A).

A2 indicates that information will be written into the chip when G2 is low at the memory location addressed (A).

1-A-33-1

Figure 6-42. ANSI Y32.14 Logic Symbols (Sheet 7 of 7)

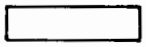
SCHEMATIC DIAGRAM NOTES

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

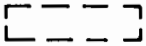
Indicates a NOTE on the schematic diagram.

Tool-aided adjustment.

Manual control.



Encloses a front-panel or circuit assembly silkscreened designator.



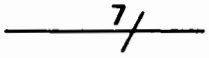
Encloses a rear-panel silkscreened designator.

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).

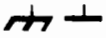
Numbered Test point. Measurement aid (metal post, circuit pad, etc.) provided.

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.

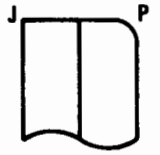
Common connections. All like-designated points are connected. When accompanied by a letter, indicates the type common (i.e., A = Analog, D = Digital, F = Floating).

1-A-1-1

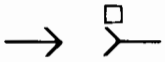
Figure 6-43. Schematic Diagram Symbols (Sheet 1 of 2)

SCHEMATIC DIAGRAM NOTES (Continued)

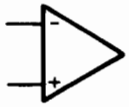
Light Emitting Diode (LED).



Cable and circuit assembly connectors.



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.

Identifies service sheet for quick reference.

9872-A-117-1

Figure 6-43. Schematic Diagram Symbols (Sheet 2 of 2)

6-181. SERVICE SHEETS

6-182. Foldout service sheets are provided in this section. The service sheets contain component location diagrams and schematics for the printed circuit assemblies (PCAs) and sensors used in the Model 7550A.

6-183. Service Sheet 1: Figure 6-44 provides the complete component identification diagram for the Main PCA. Figure 6-45 is an overall functional block diagram illustrating major signal flow and circuit dependency of the plotter.

6-184. Service Sheet 2: The component location diagram for the front panel input/output circuitry is given in Figure 6-46. The schematic diagram for this circuitry is given in Figure 6-47.

6-185. Service Sheet 3: Figure 6-48 contains the component location diagram for the power supply, power up, and voltage sensing circuits. The corresponding circuit schematic diagram is contained in Figure 6-49.

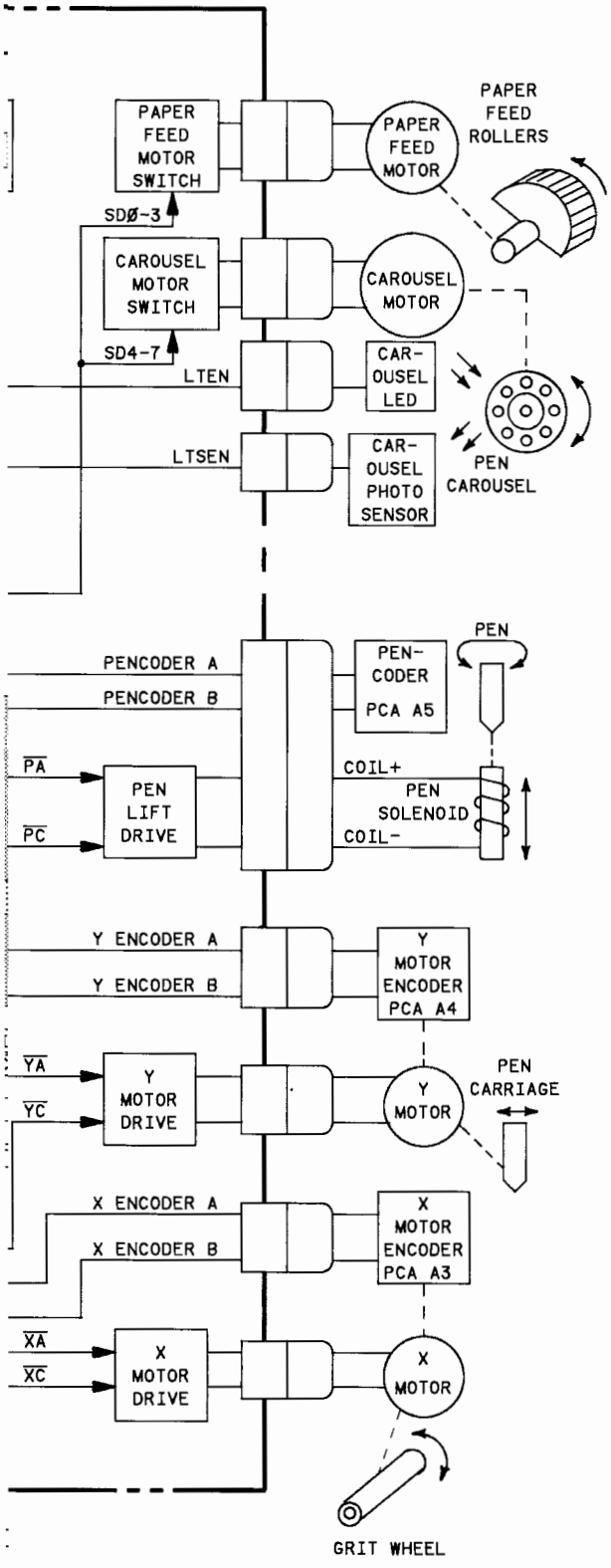
6-186. Service Sheet 4: The HP-IB/RS-232-C interface circuitry component location diagram is shown in Figure 6-50. Figure 6-51 provides the schematic diagram for the interface circuits.

6-187. Service Sheet 5: The component locations for the microprocessor and memory circuits are given in Figure 6-52. The corresponding schematic diagram is given in Figure 6-53.

6-188. Service Sheet 6: Figure 6-54 contains the component location diagram for the carousel and paper feed motor sensing and drive circuits. Figure 6-55 provides the schematic for these circuits.

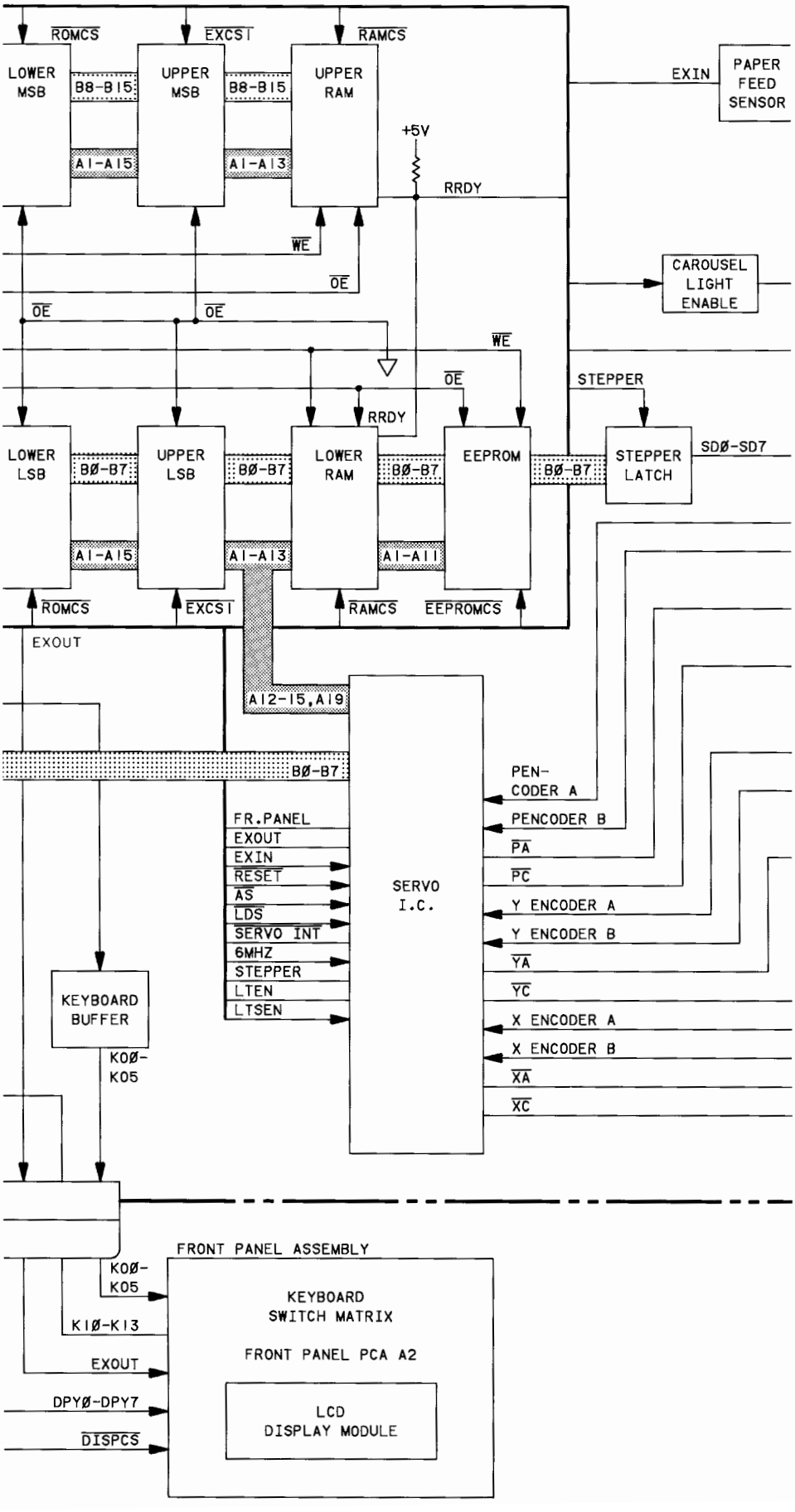
6-189. Service Sheet 7: The X- and Y-motor drive circuit component locations are shown in Figure 6-56. The corresponding schematic diagram for the X- and Y-motor drive circuits is given in Figure 6-57.

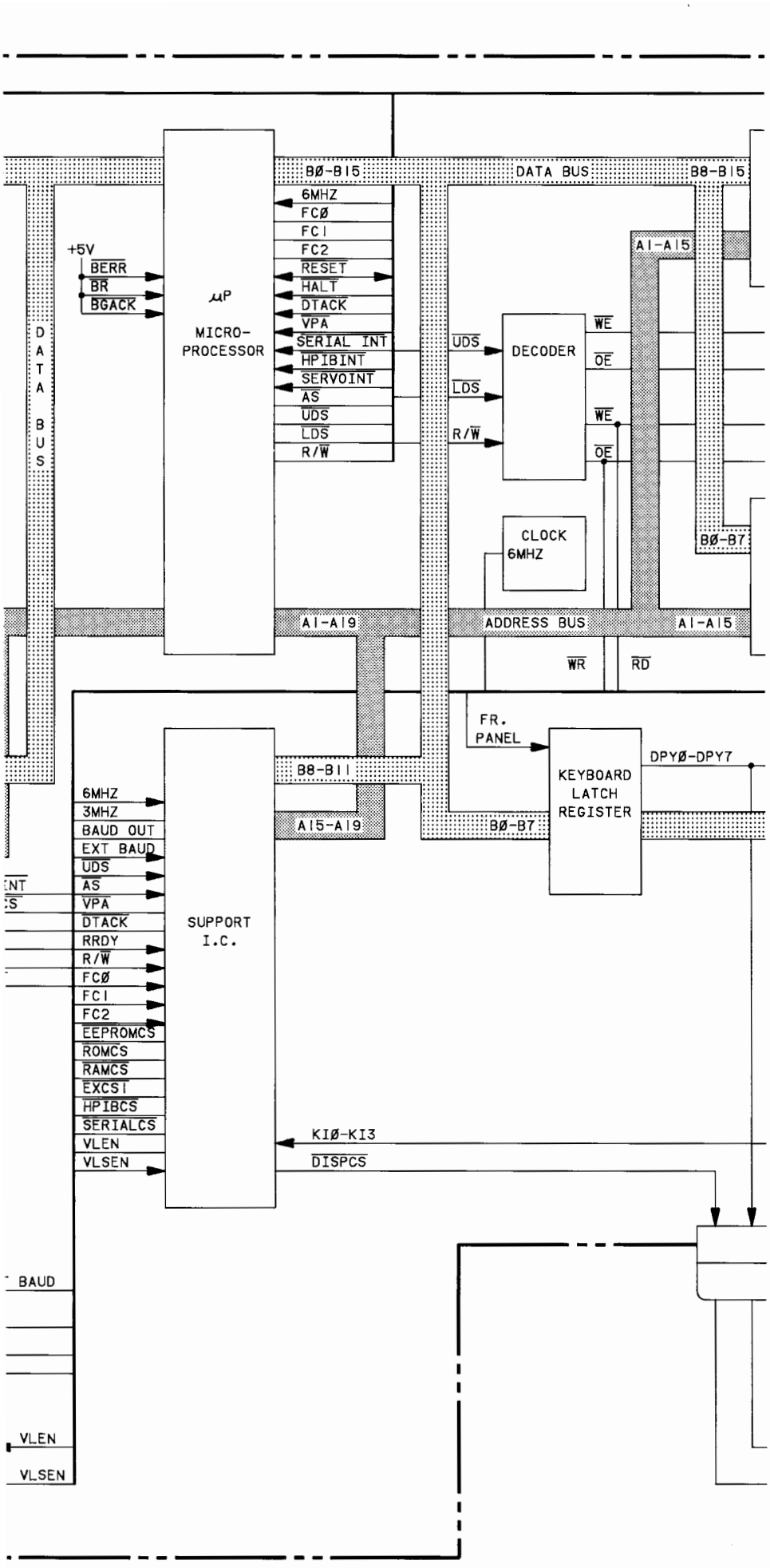
6-190. Service Sheet 8: A diagram showing the component locations for the penlift drive circuitry is given in Figure 6-58. Figure 6-59 provides the penlift circuit schematic diagram.

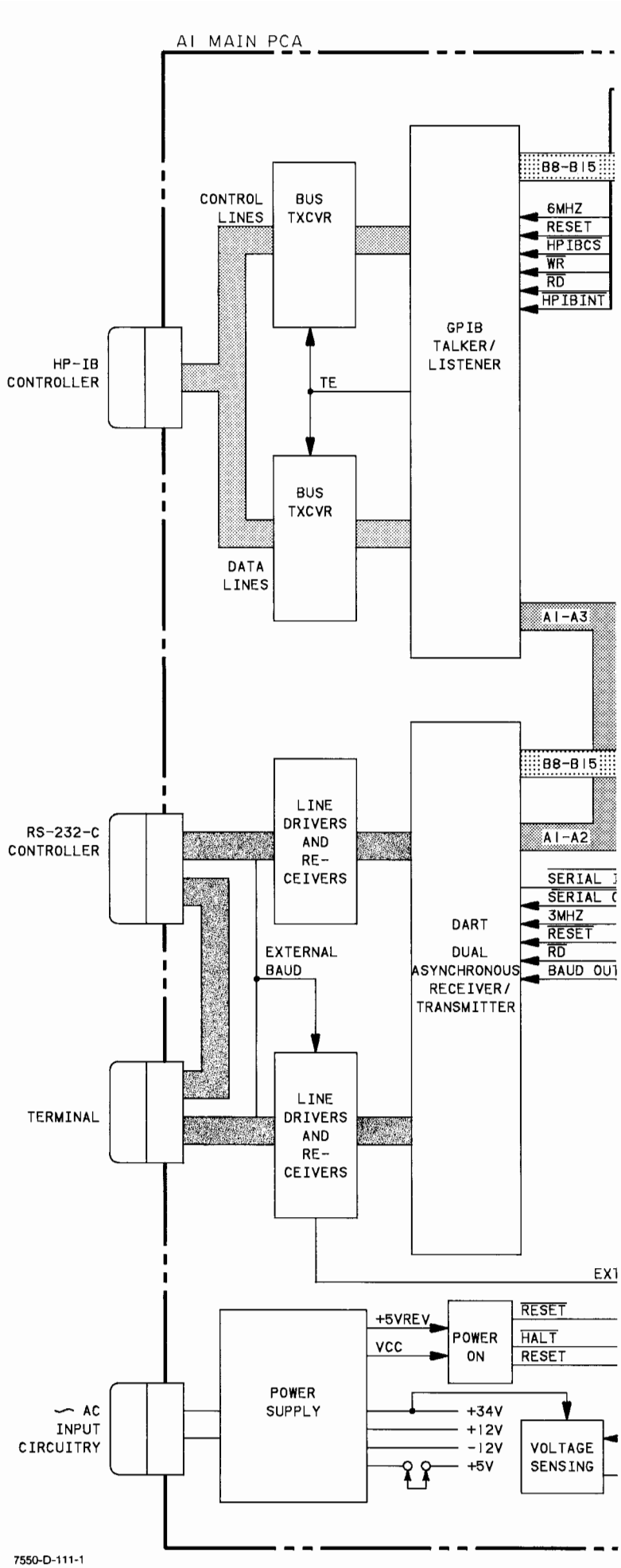


SERVICE SHEET

Figure 6-45. Model 7550A
Functional Block Diagram


ROMCS
EXCST
RAMCS
LOWER MSB
B8-B15
UPPER MSB
B8-B15
UPPER RAM
EXIN
PAPER FEED SENSOR
+5V
A1-A15
A1-A13
RRDY
WE
OE
CAROUSEL LIGHT ENABLE
STEPPER
LOWER LSB
B0-B7
UPPER LSB
LOWER RAM
EEPROM
STEPPER LATCH
SD0-SD7
A1-A11
EEPROMCS
EXCS1
EXOUT
A12-15,A19
PEN-CODER A
PENCODER B
PA
PC
Y ENCODER A
Y ENCODER B
YA
YC
X ENCODER A
X ENCODER B
XA
XC
FR.PANEL
RESET
AS
LDS
SERVO INT
6MHZ
LTEN
LTSEN
SERVO I.C.
KEYBOARD BUFFER
K00-K05
FRONT PANEL ASSEMBLY
K10-K13
KEYBOARD SWITCH MATRIX
FRONT PANEL PCA A2
DPY0-DPY7
LCD DISPLAY MODULE
DISPCS


B0-B15
DATA BUS
B8-B15
6MHZ
FC0
FC1
FC2
RESET
HALT
DTACK
VPA
SERIAL INT
HPIBINT
SERVOINT
AS
UDS
LDS
R/W
+5V
BERR
BR
BGACK
μP
MICRO-
PROCESSOR
DATA BUS
A1-A15
UDS
LDS
R/W
DECODER
WE
OE
WE
OE
CLOCK
6MHZ
B0-B7
A1-A19
ADDRESS BUS
A1-A15
WR
RD
FR.
PANEL
KEYBOARD
LATCH
REGISTER
DPY0-DPY7
B8-B11
A15-A19
B0-B7
6MHZ
3MHZ
BAUD OUT
EXT BAUD
UDS
AS
VPA
DTACK
RRDY
R/W
FC0
FC1
FC2
EEPROMCS
ROMCS
RAMCS
EXCS1
HPIBCS
SERIALCS
VLEN
VLSEN
SUPPORT
I.C.
KI0-KI3
DISPCS
BAUD
VLEN
VLSEN


A1 MAIN PCA
CONTROL LINES
BUS TXCVR
B8-B15
6MHZ
RESET
HPIBCS
WR
RD
HPIBINT
GPIB TALKER/ LISTENER
HP-IB CONTROLLER
TE
BUS TXCVR
DATA LINES
A1-A3
B8-B15
LINE DRIVERS AND RE-CEIVERS
RS-232-C CONTROLLER
A1-A2
SERIAL
SERIAL
3MHZ
RESET
RD
BAUD OUT
DART DUAL ASYNCHRONOUS RECEIVER/ TRANSMITTER
EXTERNAL BAUD
LINE DRIVERS AND RE-CEIVERS
TERMINAL
EXT
+5VREV
VCC
POWER ON
RESET
HALT
RESET
POWER SUPPLY
+34V
+12V
-12V
+5V
VOLTAGE SENSING
~ AC INPUT CIRCUITRY
7550-D-111-1

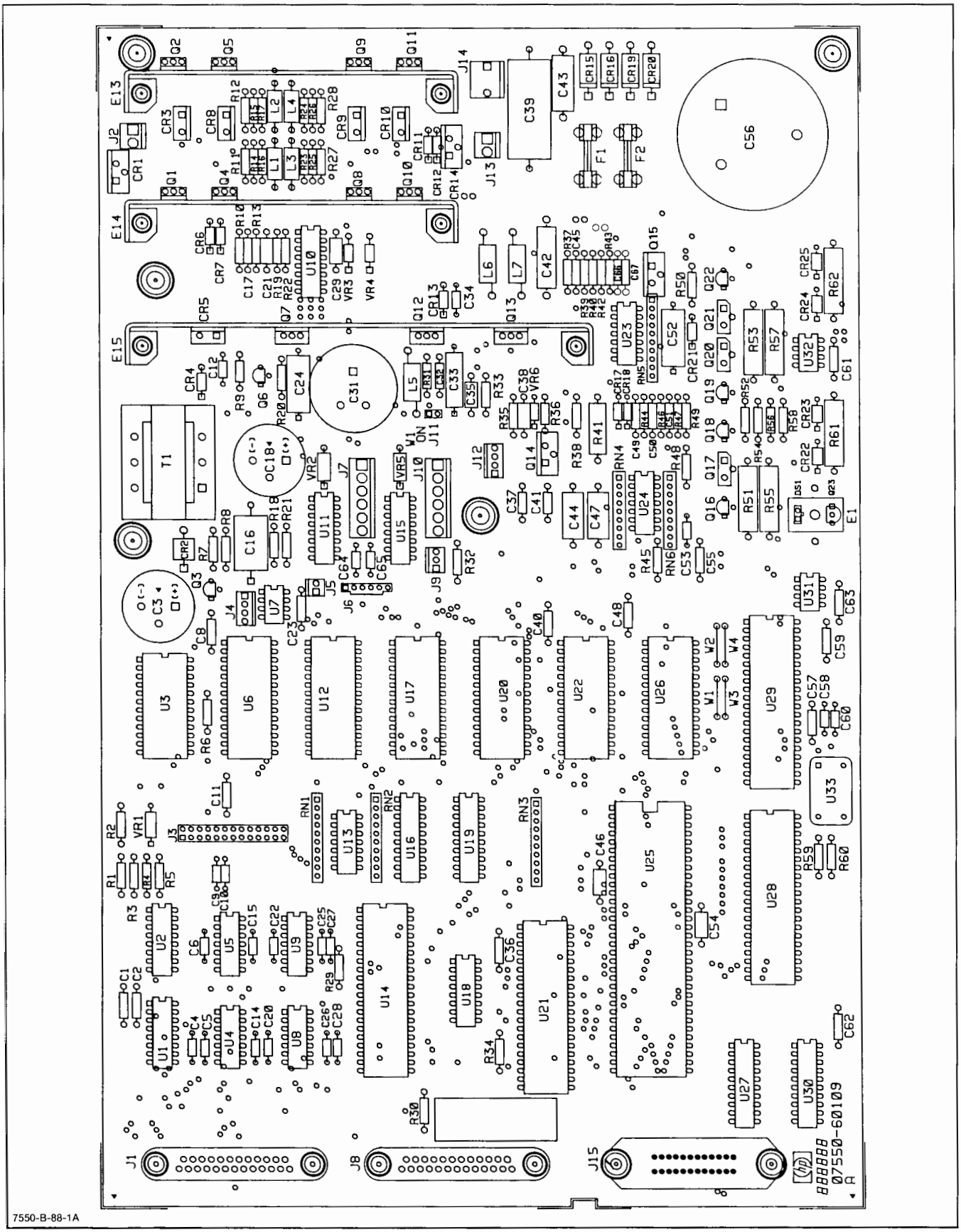
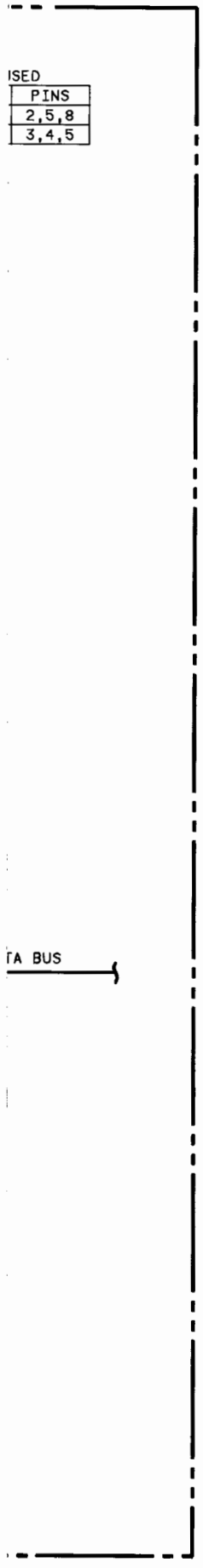


Figure 6-44. Main PCA A1, Component Identification Diagram



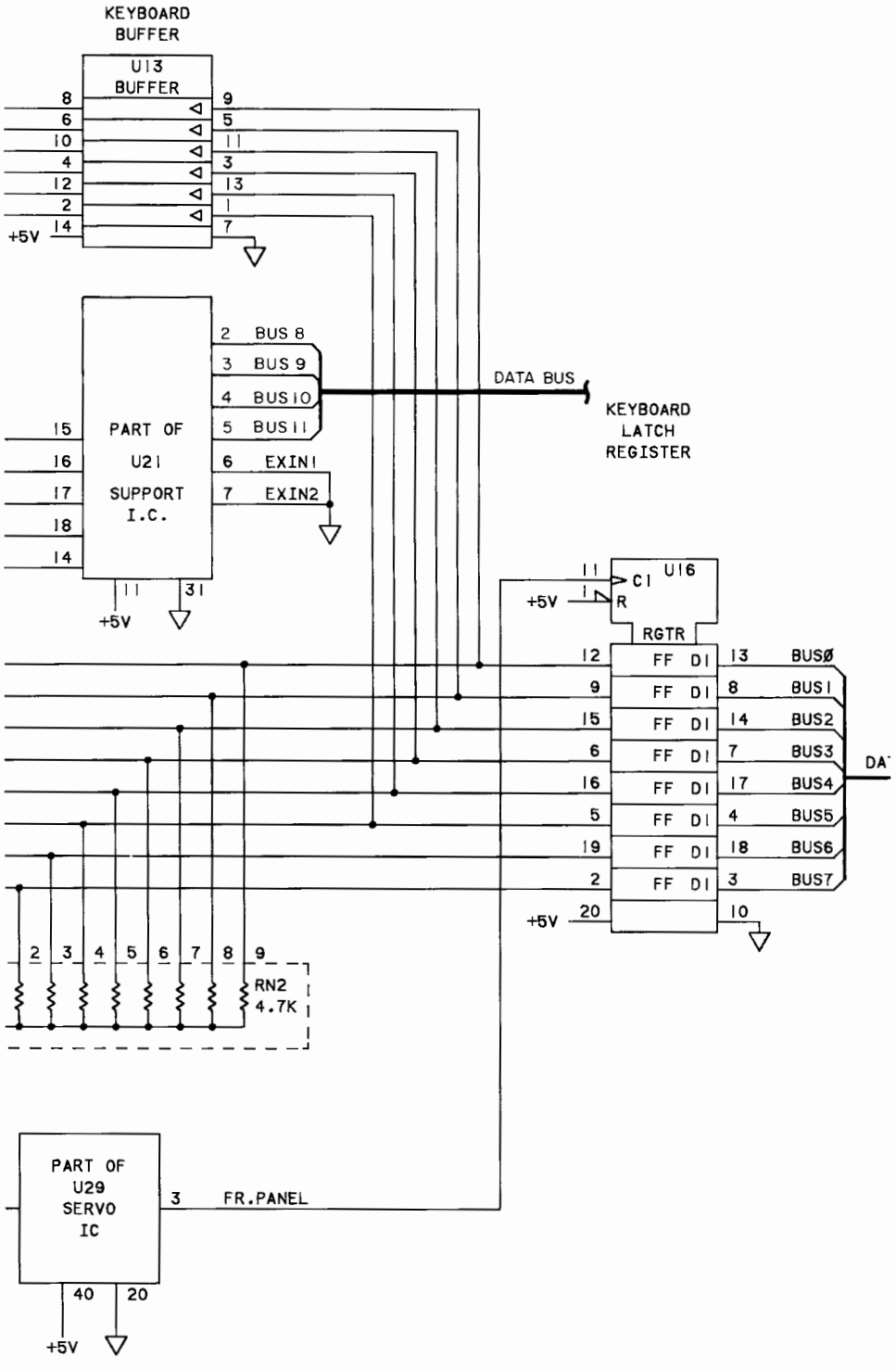
2

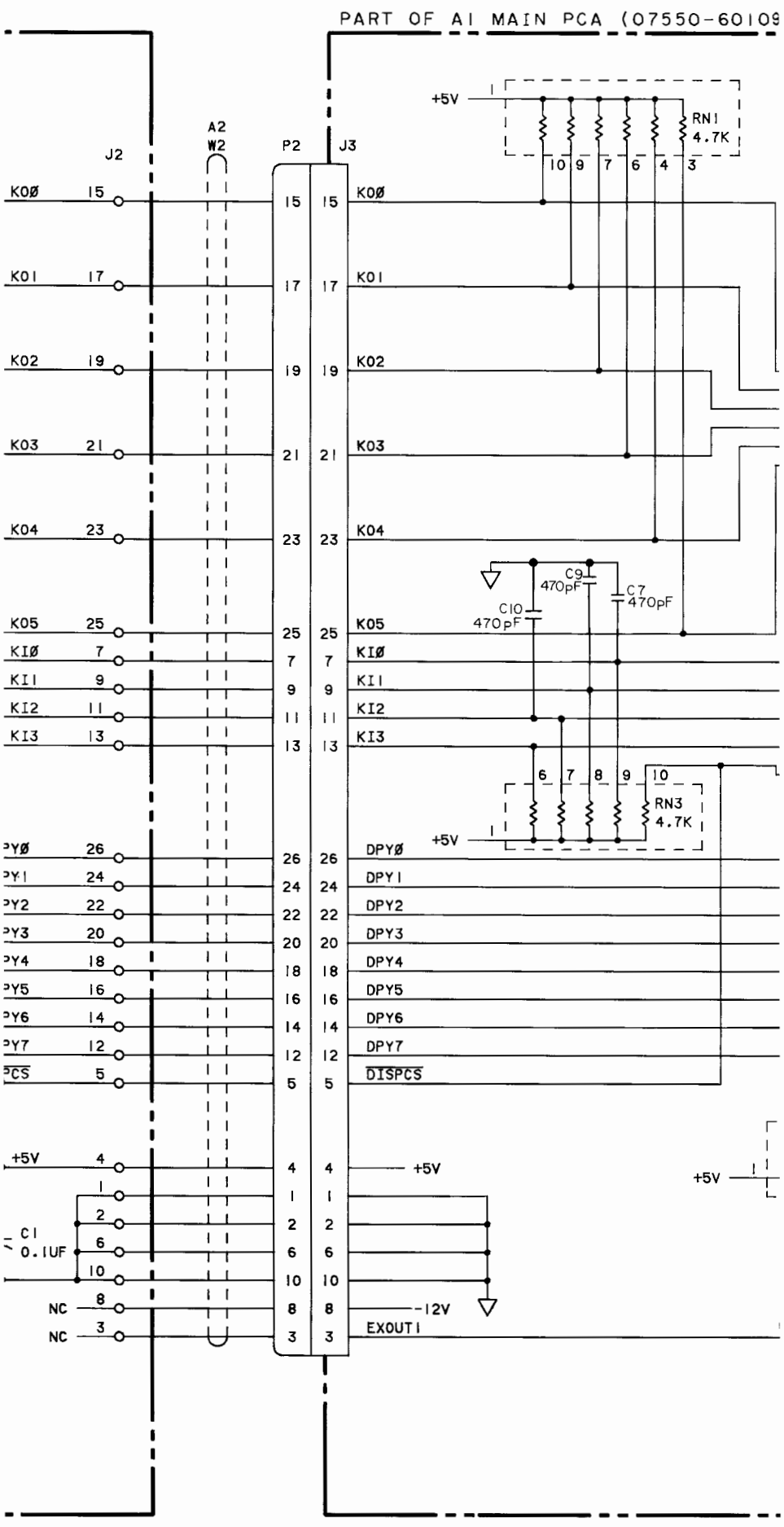
SERVICE SHEET

Figure 6-47. Front Panel Assembly and Input/Output Circuits, Schematic Diagram

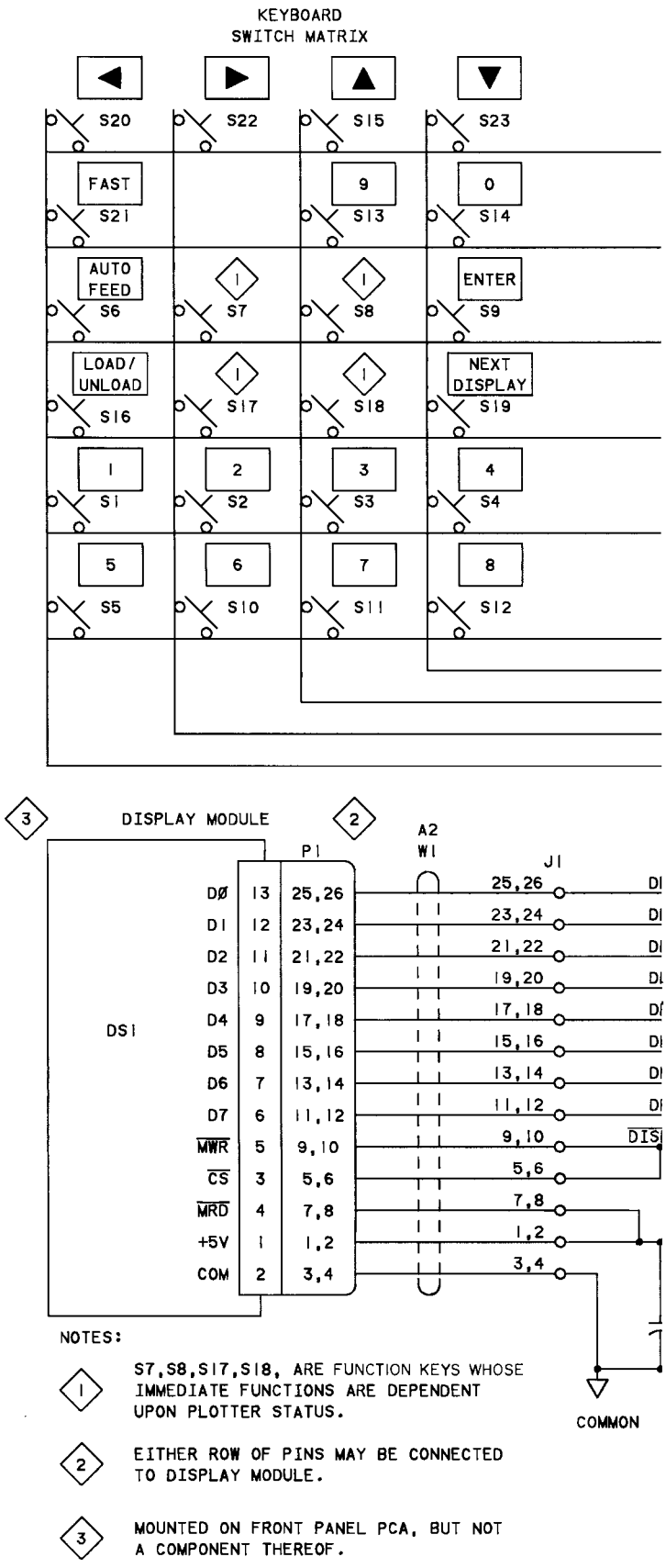
NOTES:

REF. DES.	NOT L
RN1	
RN3	




PART OF A1 MAIN PCA (07550-60109
J2
A2
W2
P2
J3
+5V
RN1
4.7K
10 9 7 6 4 3
K0Ø 15
K01 17
K02 19
K03 21
K04 23
K05 25
KIØ 7
KI1 9
KI2 11
KI3 13
C9
470pF
C7
470pF
C10
470pF
6 7 8 9 10
RN3
4.7K
DPYØ 26
DPY1 24
DPY2 22
DPY3 20
DPY4 18
DPY5 16
DPY6 14
DPY7 12
DISPCS 5
+5V 4
C1
0.1UF
NC 8
NC 3
-12V
EXOUT1

A2 FRONT PANEL PCA (07550-60115)



NOTES:

1. S7,S8,S17,S18, ARE FUNCTION KEYS WHOSE IMMEDIATE FUNCTIONS ARE DEPENDENT UPON PLOTTER STATUS.
2. EITHER ROW OF PINS MAY BE CONNECTED TO DISPLAY MODULE.
3. MOUNTED ON FRONT PANEL PCA, BUT NOT A COMPONENT THEREOF.

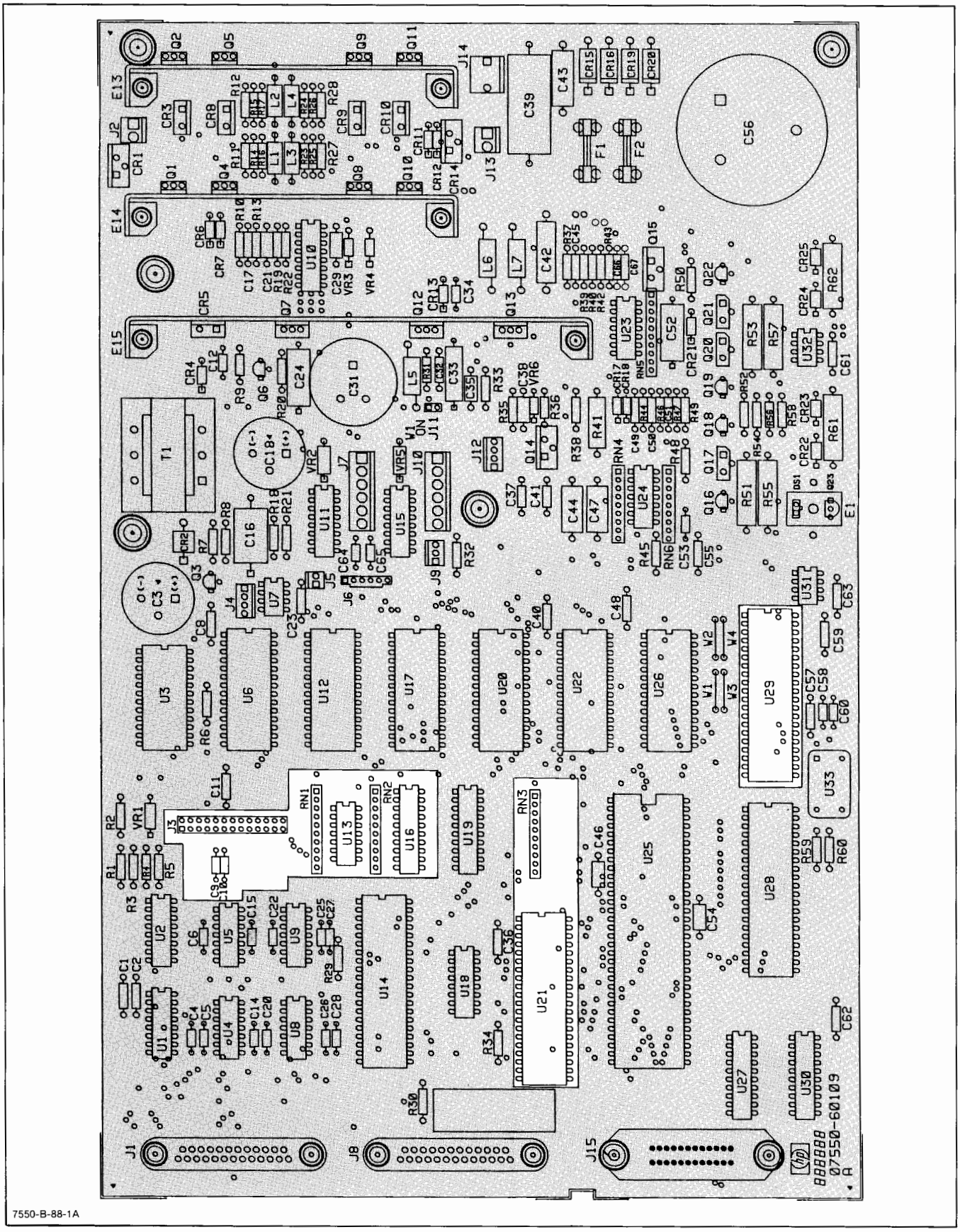
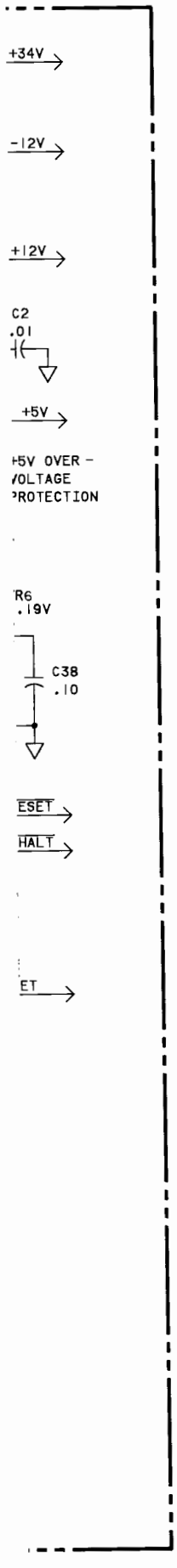


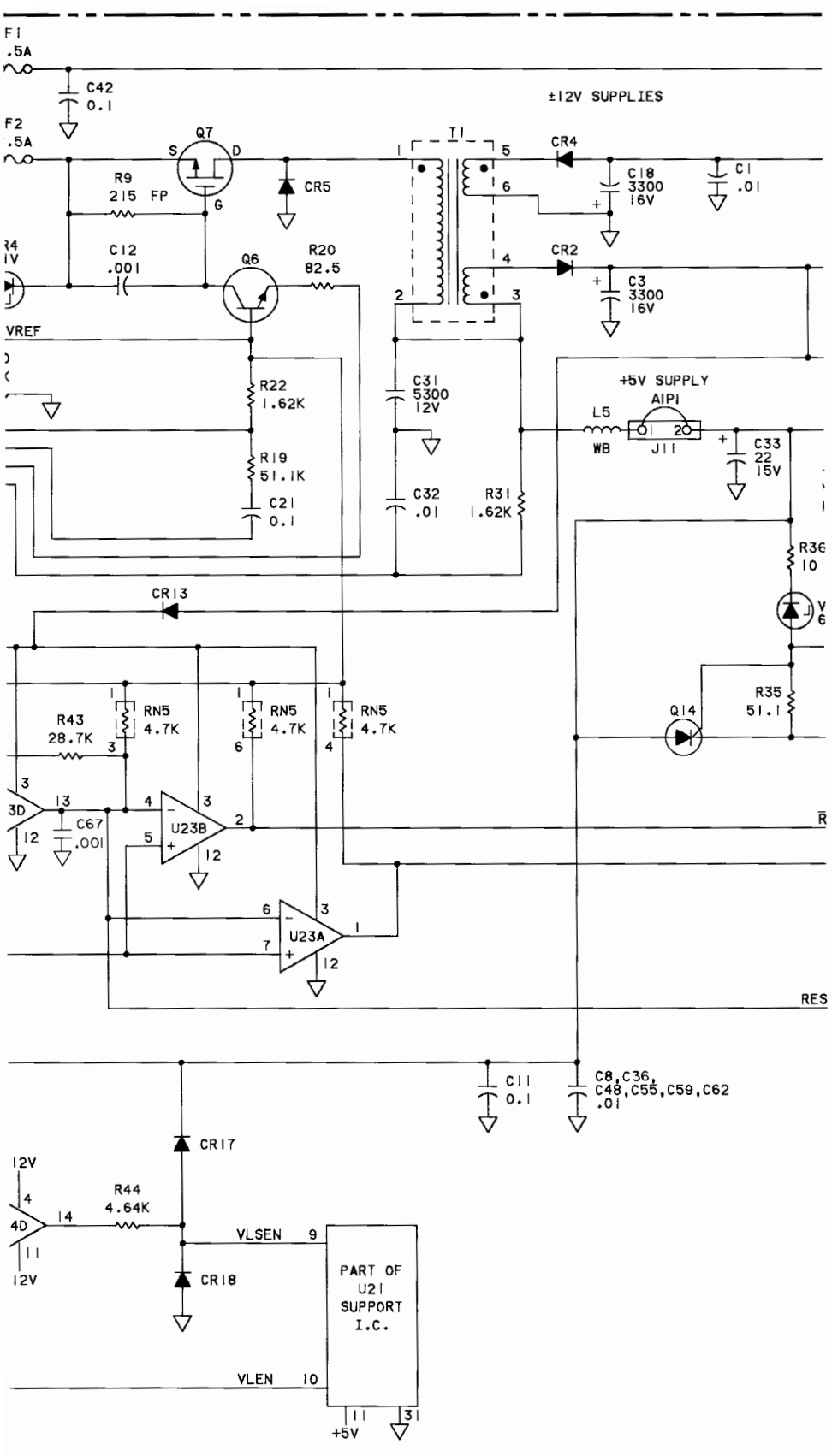
Figure 6-46. Front Panel Assembly and Input/Output Circuits, Component Location Diagram

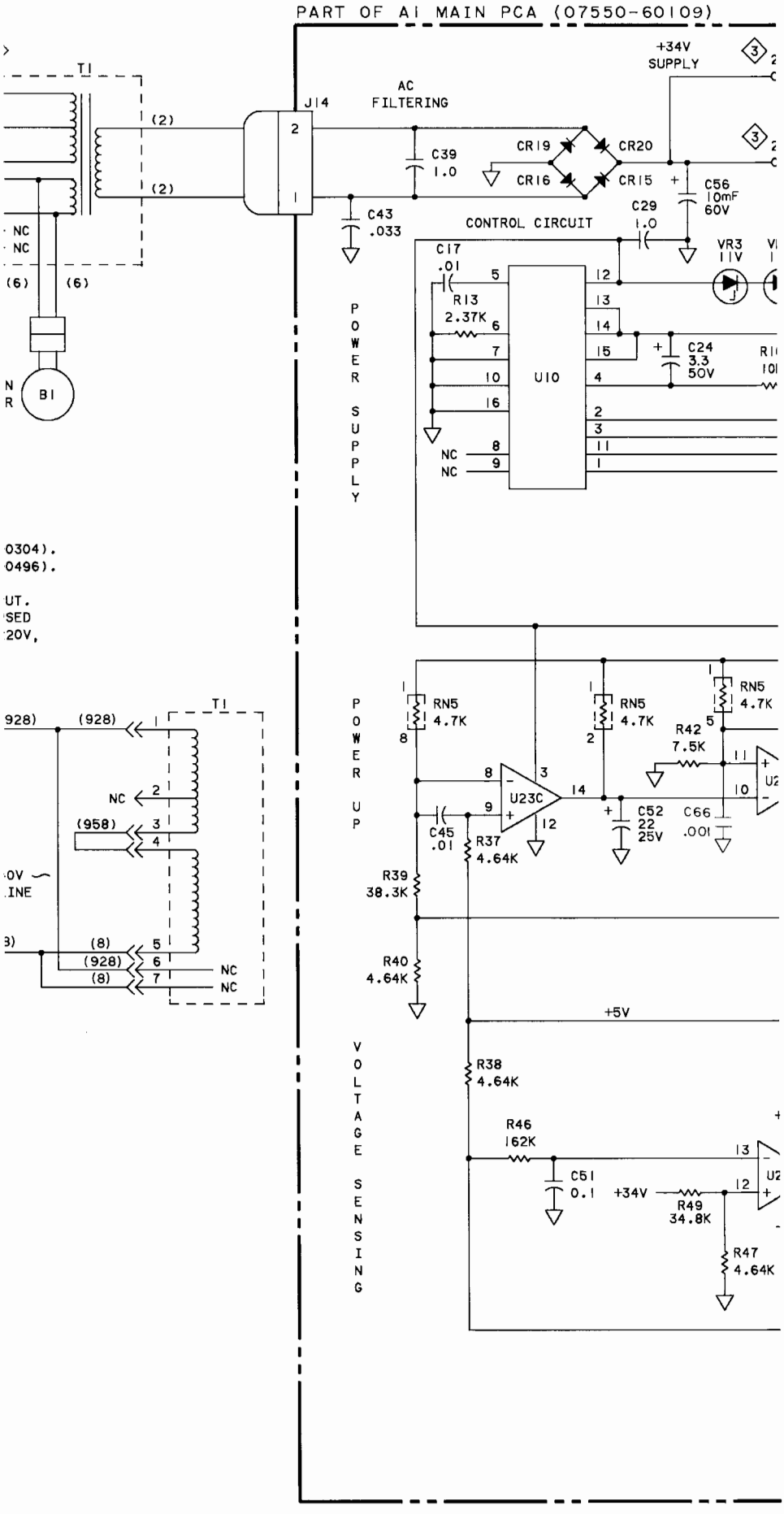


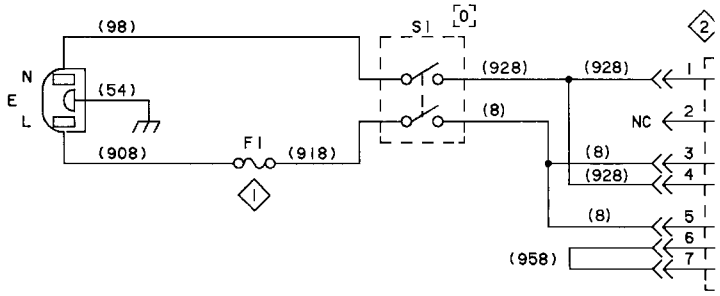
3

SERVICE SHEET

Figure 6-49. Power Supply, Power-Up and Voltage Sensing Circuits, Schematic Diagram


F1
.5A
C42
0.1
±12V SUPPLIES
F2
.5A
Q7
S
D
G
T1
CR4
R9
215 FP
CR5
C18
3300
16V
C1
.01
C12
.001
Q6
R20
82.5
CR2
C3
3300
16V
VREF
R22
1.62K
C31
5300
12V
+5V SUPPLY
AIPI
L5
WB
J11
C33
22
15V
R19
51.1K
C21
0.1
C32
.01
R31
1.62K
R36
10
CR13
RN5
4.7K
R43
28.7K
Q14
R35
51.1
C67
.001
U23B
U23A
RES
C11
0.1
C8,C36,
C48,C55,C59,C62
.01
CR17
R44
4.64K
VLSEN
CR18
PART OF
U21
SUPPORT
I.C.
VLEN
+5V


PART OF A1 MAIN PCA (07550-60109)
T1
(2)
(2)
NC
NC
(6)
(6)
B1
J14
AC
FILTERING
C39
1.0
C43
.033
CR19
CR20
CR16
CR15
+34V
SUPPLY
C56
10mF
60V
C29
1.0
CONTROL CIRCUIT
C17
.01
R13
2.37K
U10
C24
3.3
50V
VR3
11V
POWER SUPPLY
0304).
0496).
UT.
SED
20V,
T1
928)
(928)
NC
(958)
0V
INE
3)
(8)
(928)
(8)
NC
NC
RN5
4.7K
RN5
4.7K
RN5
4.7K
R42
7.5K
U23C
C45
.01
R37
4.64K
C52
22
25V
C66
.001
R39
38.3K
R40
4.64K
POWER UP
+5V
R38
4.64K
R46
162K
C51
0.1
+34V
R49
34.8K
R47
4.64K
VOLTAGE SENSING

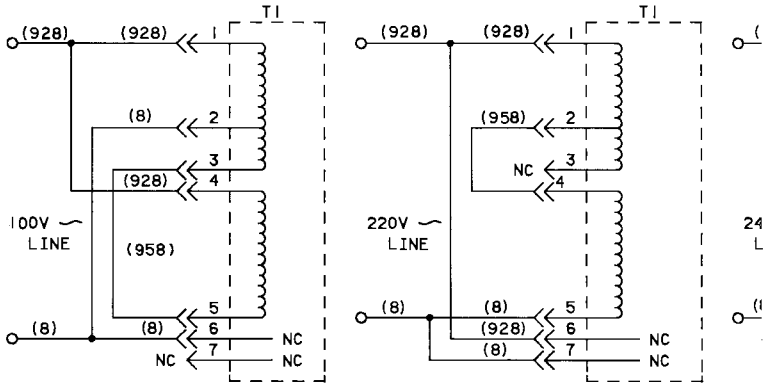


FA
MOTC

NOTES:

1. FOR 100V/120V OPERATION, USE 1.5A/250V FUSE (HP P/N 2110-
   FOR 220V/240V OPERATION, USE 0.8A/250V FUSE (HP P/N 2110-

2. TRANSFORMER PRIMARY CONNECTIONS SHOWN FOR 120VAC LINE INP
   PINS 6 AND 7 ARE NON-FUNCTIONAL PARKING POSITIONS FOR UNU
   PRIMARY LEADS. JUMPER (958) IS SUPPLIED FOR USE IN 100V,2
   OR 240V OPERATION AS SHOWN.



3. USE 2.5A/250V FUSE (HP P/N 2110-0633).

NOT USED

REF DESIG	PINS
RN5	7,9,10

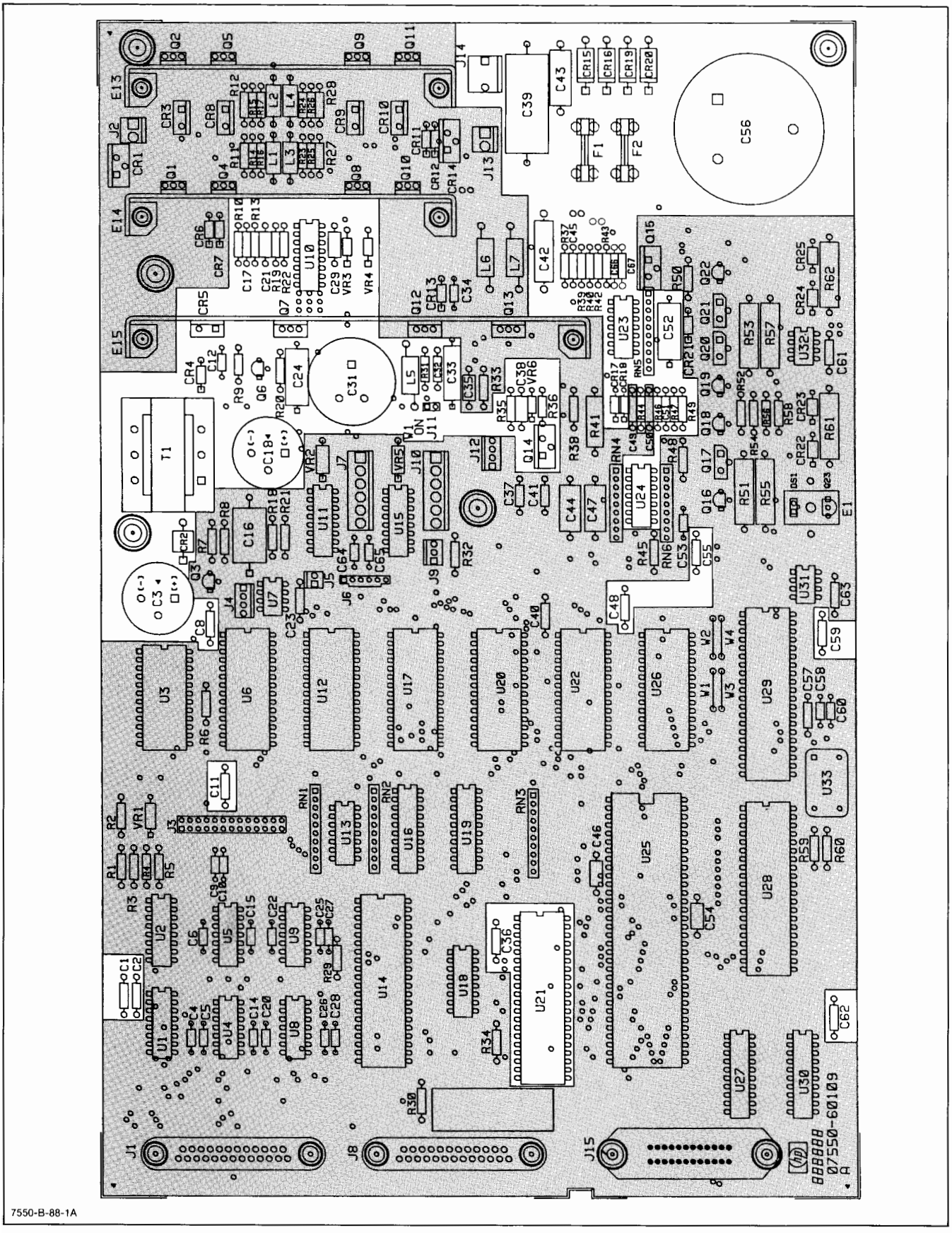


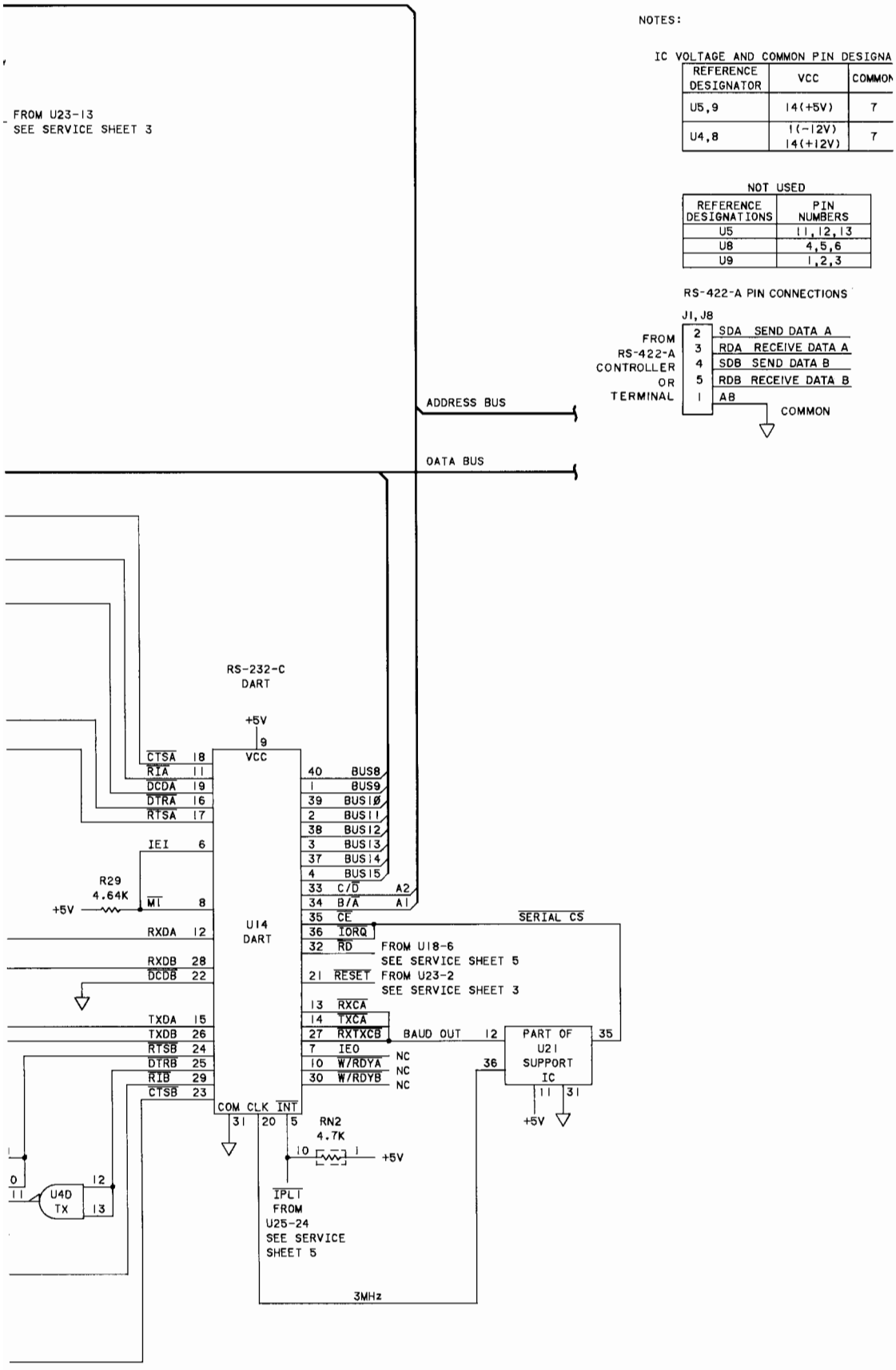
Figure 6-48. Power Supply, Power-Up and Voltage Sensing Circuits, Component Location Diagram

TIONS

4

SERVICE SHEET

Figure 6-51. HP-IB/RS-232-C Interface Circuits, Schematic Diagram



NOTES:

IC VOLTAGE AND COMMON PIN DESIGNA

REFERENCE DESIGNATOR	VCC	COMMON
U5,9	14(+5V)	7
U4,8	1(-12V) 14(+12V)	7

NOT USED

REFERENCE DESIGNATIONS	PIN NUMBERS
U5	11,12,13
U8	4,5,6
U9	1,2,3

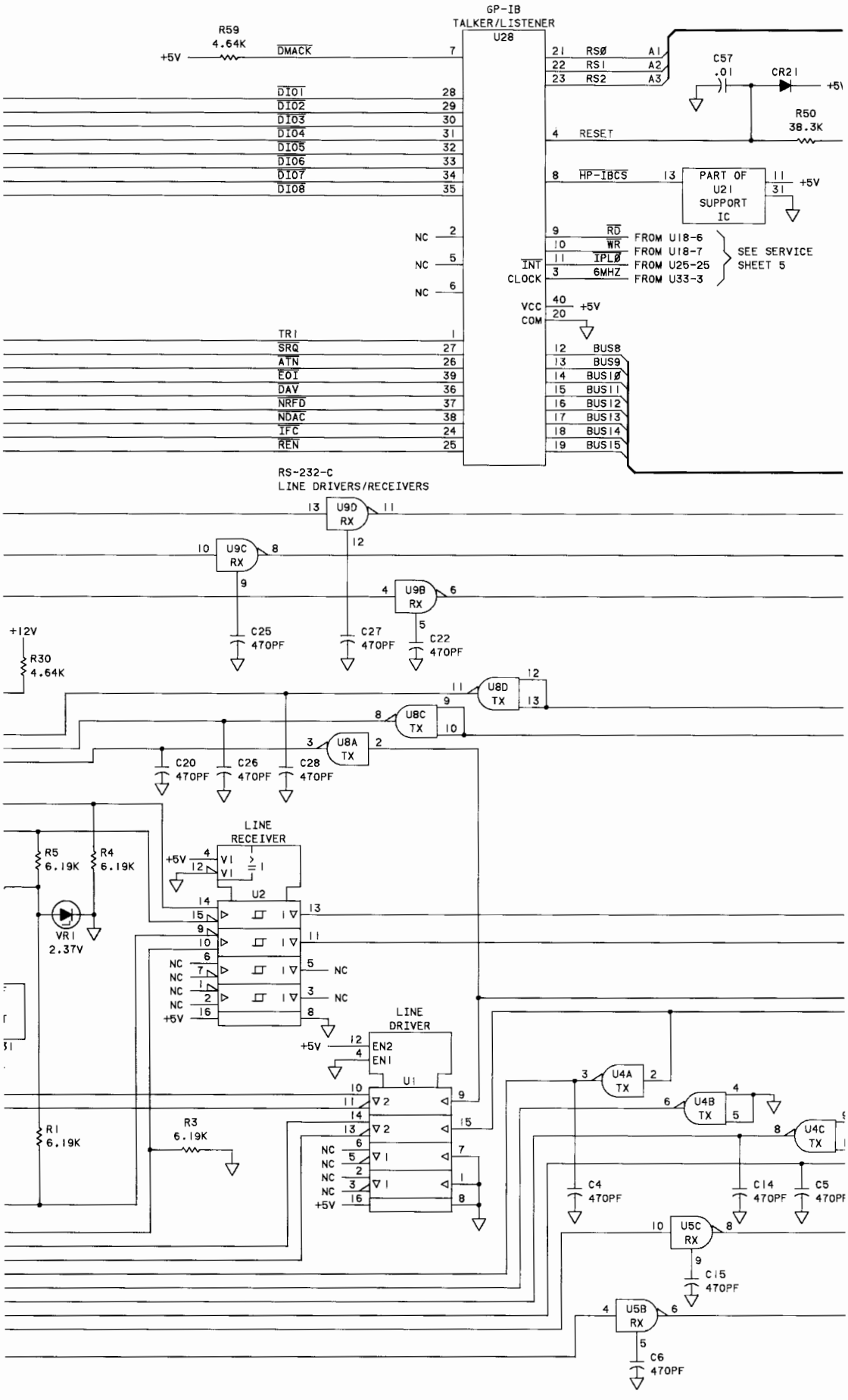
RS-422-A PIN CONNECTIONS

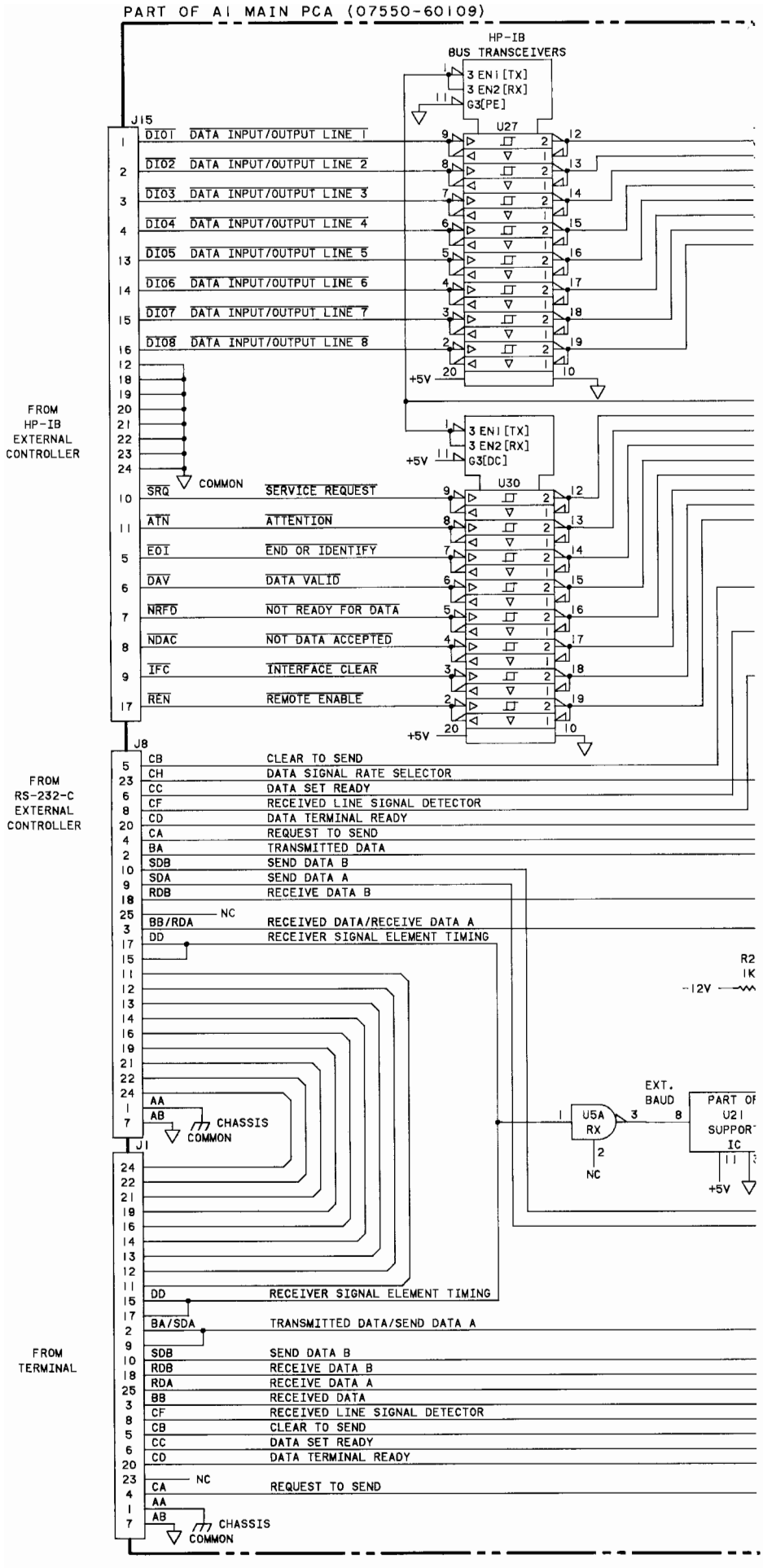
J1, J8

FROM RS-422-A CONTROLLER OR TERMINAL

2	SDA SEND DATA A
3	RDA RECEIVE DATA A
4	SDB SEND DATA B
5	RDB RECEIVE DATA B
1	AB

COMMON


GP-IB
TALKER/LISTENER
U28
R59
4.64K
+5V
DMACK
DIO1
DIO2
DIO3
DIO4
DIO5
DIO6
DIO7
DIO8
TR1
SRQ
ATN
EOI
DAV
NRFD
NDAC
IFC
REN
RS0
RS1
RS2
RESET
HP-IBCS
PART OF U21 SUPPORT IC
RD
WR
IPL0
6MHZ
INT
CLOCK
VCC
COM
BUS8
BUS9
BUS10
BUS11
BUS12
BUS13
BUS14
BUS15
C57
.01
CR21
R50
38.3K
FROM U18-6
FROM U18-7
FROM U25-25
FROM U33-3
SEE SERVICE SHEET 5
RS-232-C
LINE DRIVERS/RECEIVERS
U9D RX
U9C RX
U9B RX
U8D TX
U8C TX
U8A TX
C25 470PF
C27 470PF
C22 470PF
C20 470PF
C26 470PF
C28 470PF
+12V
R30
4.64K
LINE RECEIVER
U2
R5
6.19K
R4
6.19K
VR1
2.37V
R1
6.19K
R3
6.19K
LINE DRIVER
U1
U4A TX
U4B TX
U4C TX
U5C RX
U5B RX
C4 470PF
C14 470PF
C5 470PF
C15 470PF
C6 470PF


PART OF A1 MAIN PCA (07550-60109)
HP-IB
BUS TRANSCEIVERS
3 EN1 [TX]
3 EN2 [RX]
G3[PE]
U27
J15
DIO1 DATA INPUT/OUTPUT LINE 1
DIO2 DATA INPUT/OUTPUT LINE 2
DIO3 DATA INPUT/OUTPUT LINE 3
DIO4 DATA INPUT/OUTPUT LINE 4
DIO5 DATA INPUT/OUTPUT LINE 5
DIO6 DATA INPUT/OUTPUT LINE 6
DIO7 DATA INPUT/OUTPUT LINE 7
DIO8 DATA INPUT/OUTPUT LINE 8
+5V
FROM HP-IB EXTERNAL CONTROLLER
COMMON
3 EN1 [TX]
3 EN2 [RX]
G3[DC]
U30
SRQ SERVICE REQUEST
ATN ATTENTION
EOI END OR IDENTIFY
DAV DATA VALID
NRFD NOT READY FOR DATA
NDAC NOT DATA ACCEPTED
IFC INTERFACE CLEAR
REN REMOTE ENABLE
J8
FROM RS-232-C EXTERNAL CONTROLLER
CB CLEAR TO SEND
CH DATA SIGNAL RATE SELECTOR
CC DATA SET READY
CF RECEIVED LINE SIGNAL DETECTOR
CD DATA TERMINAL READY
CA REQUEST TO SEND
BA TRANSMITTED DATA
SDB SEND DATA B
SDA SEND DATA A
RDB RECEIVE DATA B
NC
BB/RDA RECEIVED DATA/RECEIVE DATA A
DD RECEIVER SIGNAL ELEMENT TIMING
R2
1K
-12V
AA
AB
CHASSIS
COMMON
EXT. BAUD
U5A
RX
NC
PART OF
U21
SUPPORT
IC
+5V
J1
DD RECEIVER SIGNAL ELEMENT TIMING
BA/SDA TRANSMITTED DATA/SEND DATA A
FROM TERMINAL
SDB SEND DATA B
RDB RECEIVE DATA B
RDA RECEIVE DATA A
BB RECEIVED DATA
CF RECEIVED LINE SIGNAL DETECTOR
CB CLEAR TO SEND
CC DATA SET READY
CD DATA TERMINAL READY
NC
CA REQUEST TO SEND
AA
AB
CHASSIS
COMMON

7550-J-114-1B

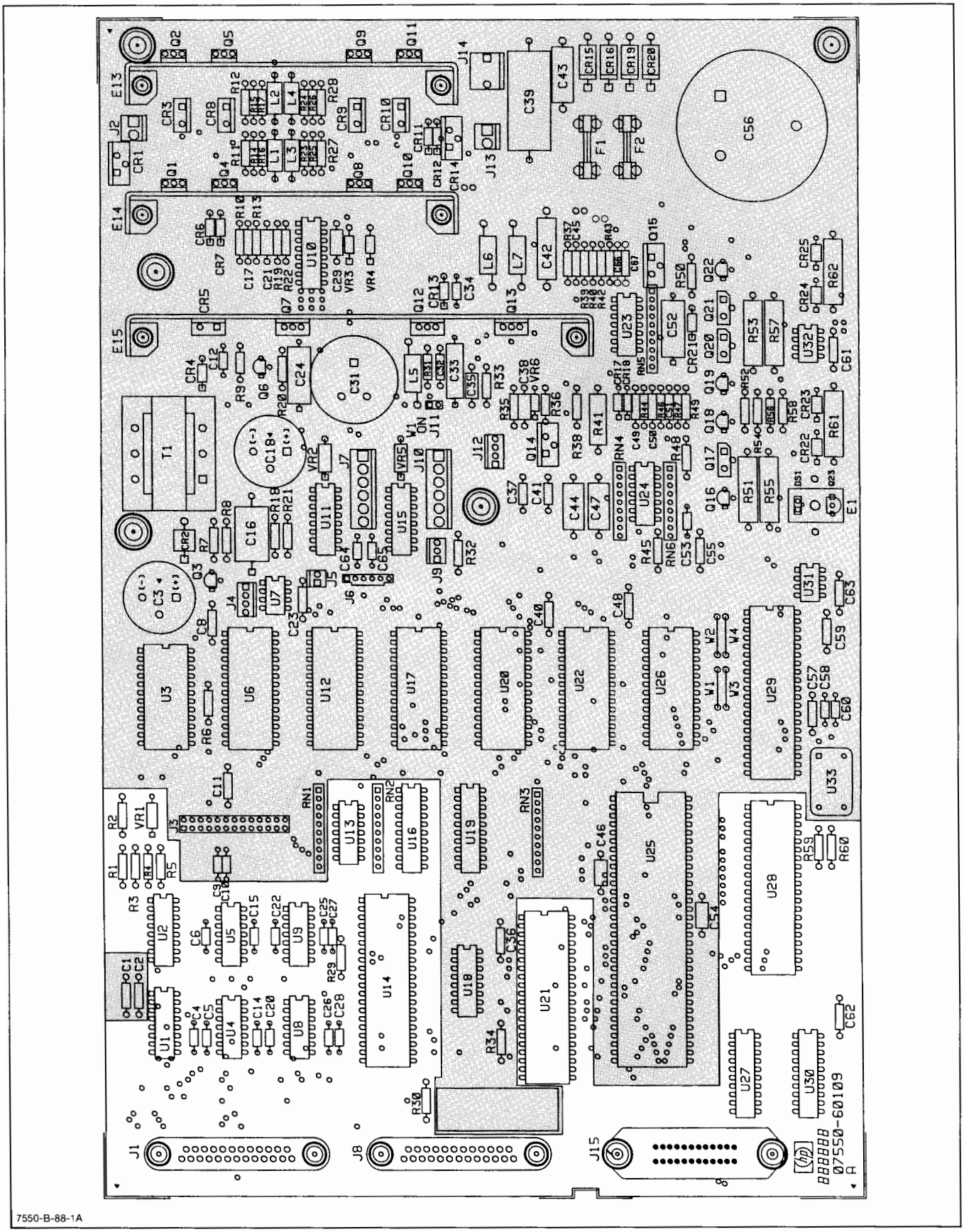
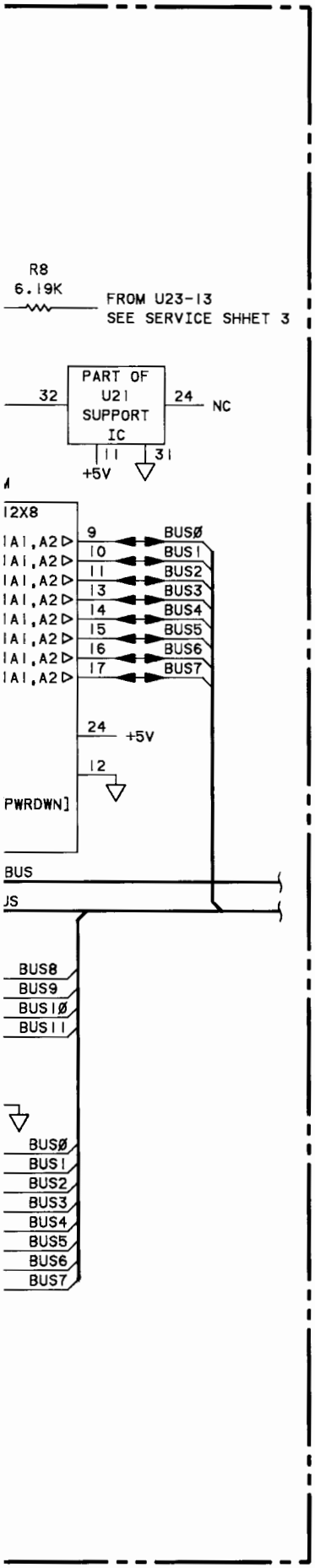


Figure 6-50. HP-IB/RS-232-C Interface Circuits, Component Location Diagram



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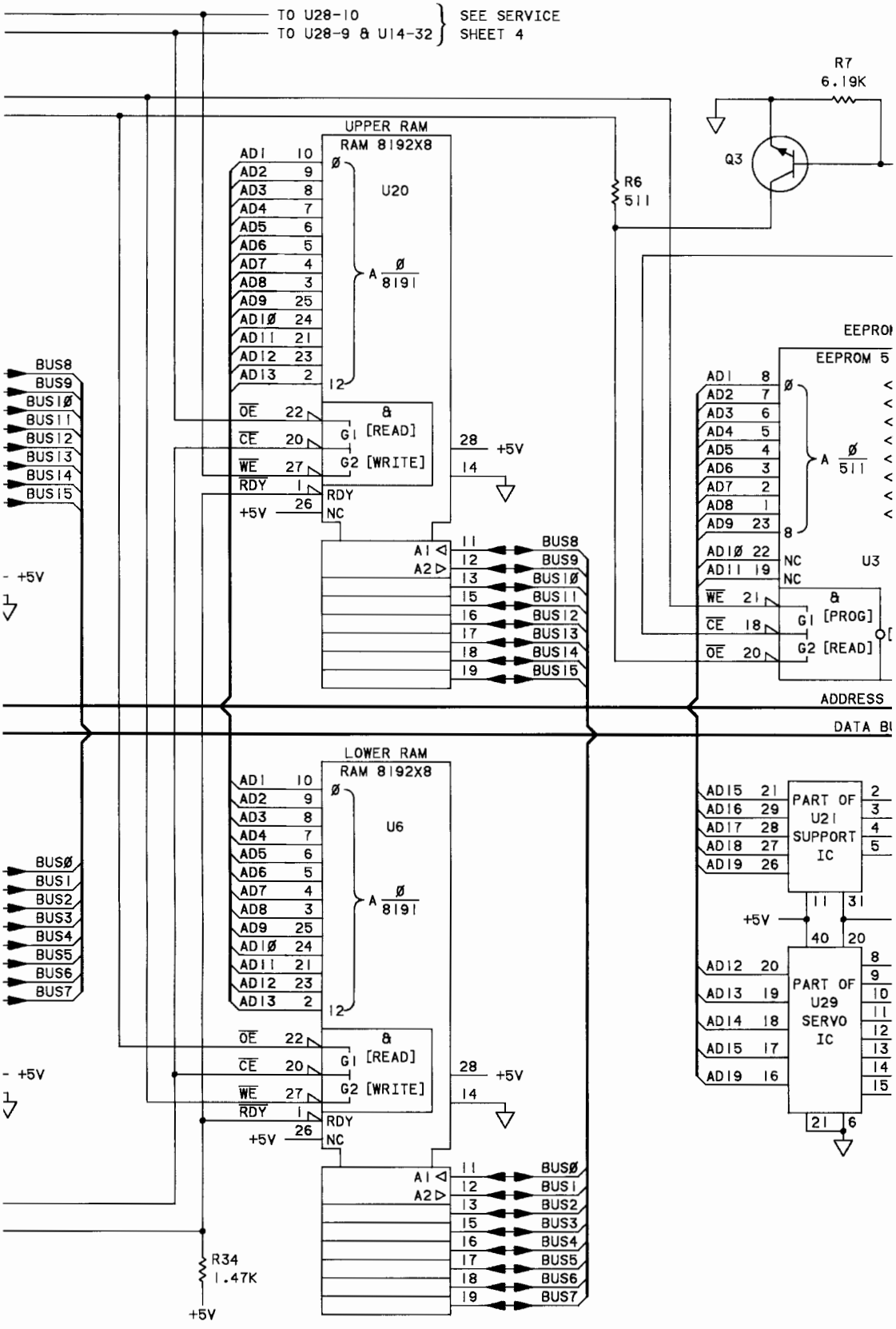
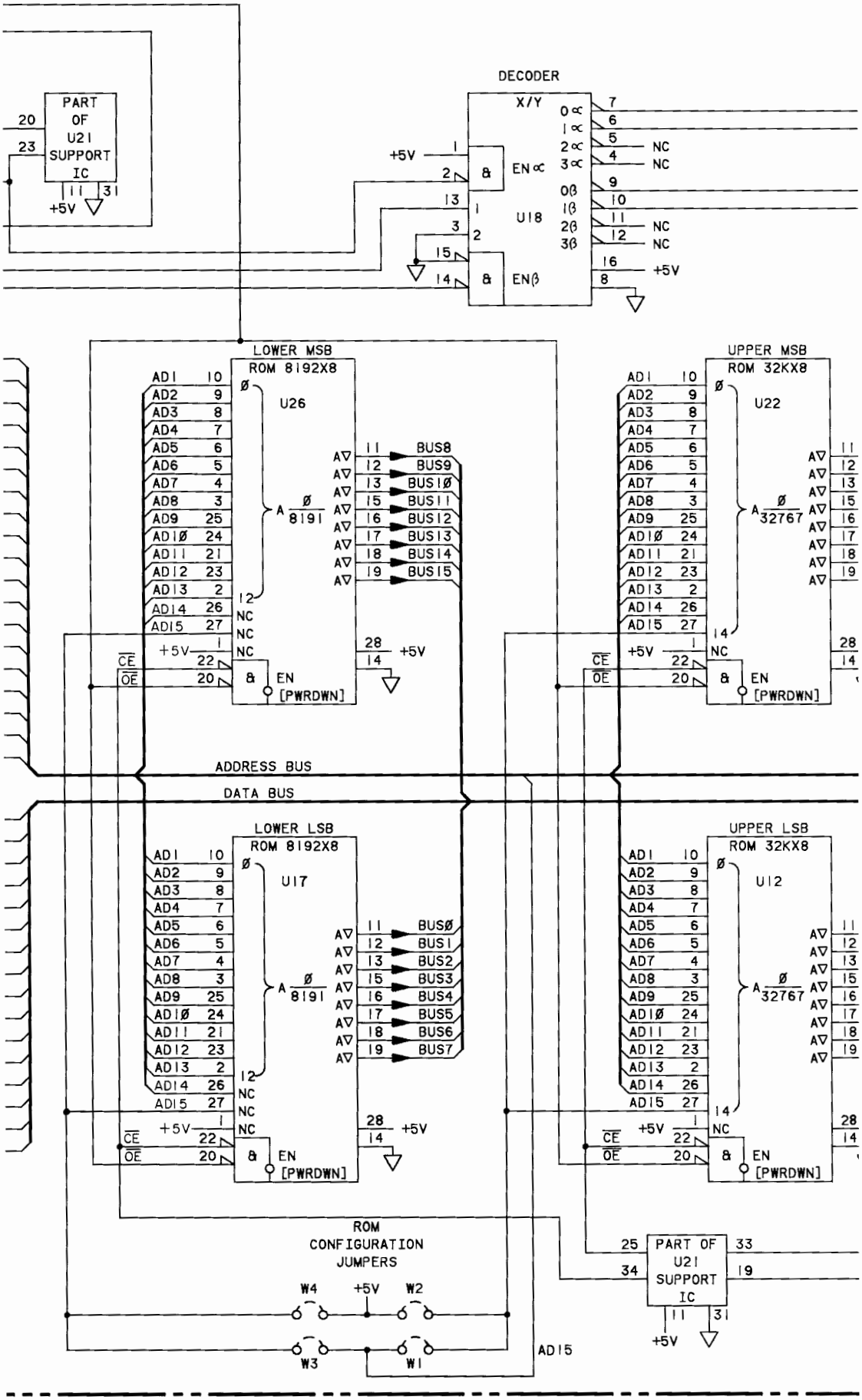
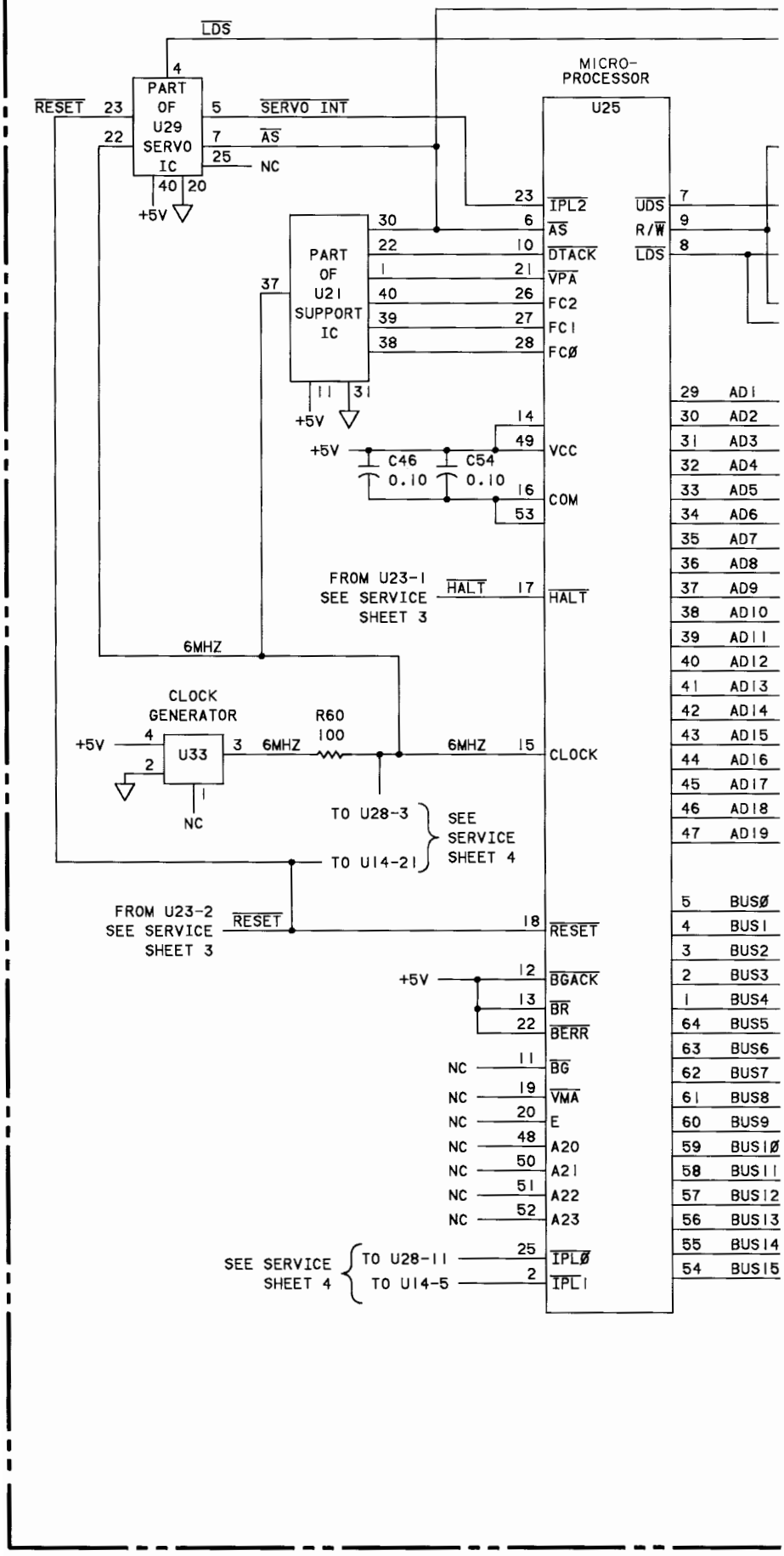
SERVICE SHEET

Figure 6-53. Processor and Memory Circuits, Schematic Diagram


TO U28-10
TO U28-9 & U14-32
SEE SERVICE SHEET 4
R7
6.19K
Q3
R6
511
UPPER RAM
RAM 8192X8
U20
LOWER RAM
RAM 8192X8
U6
EEPROM 5
U3
PART OF U21 SUPPORT IC
PART OF U29 SERVO IC
R34
1.47K
+5V
ADDRESS
DATA BI


PART OF U21 SUPPORT IC
20
23
11
31
+5V
DECODER
X/Y
U18
+5V
EN∝
EN∃
0∝
1∝
2∝
3∝
0∃
1∃
2∃
3∃
NC
NC
NC
NC
+5V
LOWER MSB
ROM 8192X8
U26
UPPER MSB
ROM 32KX8
U22
AD1
AD2
AD3
AD4
AD5
AD6
AD7
AD8
AD9
AD10
AD11
AD12
AD13
AD14
AD15
BUS8
BUS9
BUS10
BUS11
BUS12
BUS13
BUS14
BUS15
8191
32767
CE
OE
EN
[PWRDWN]
ADDRESS BUS
DATA BUS
LOWER LSB
ROM 8192X8
U17
UPPER LSB
ROM 32KX8
U12
BUS0
BUS1
BUS2
BUS3
BUS4
BUS5
BUS6
BUS7
ROM CONFIGURATION JUMPERS
W4
W2
W3
W1
AD15
PART OF U21 SUPPORT IC
25
34
33
19


PART OF A1 MAIN PCA (07550-60109)
LDS
MICRO-
PROCESSOR
U25
PART
OF
U29
SERVO
IC
RESET
SERVO INT
AS
NC
+5V
PART
OF
U21
SUPPORT
IC
IPL2
AS
DTACK
VPA
FC2
FC1
FCØ
UDS
R/W
LDS
VCC
C46
0.10
C54
0.10
COM
FROM U23-1
SEE SERVICE
SHEET 3
HALT
6MHZ
CLOCK
GENERATOR
U33
R60
100
CLOCK
TO U28-3
TO U14-21
SEE
SERVICE
SHEET 4
FROM U23-2
SEE SERVICE
SHEET 3
RESET
BGACK
BR
BERR
BG
VMA
E
A20
A21
A22
A23
IPLØ
IPL1
TO U28-11
TO U14-5
AD1
AD2
AD3
AD4
AD5
AD6
AD7
AD8
AD9
AD10
AD11
AD12
AD13
AD14
AD15
AD16
AD17
AD18
AD19
BUSØ
BUS1
BUS2
BUS3
BUS4
BUS5
BUS6
BUS7
BUS8
BUS9
BUS10
BUS11
BUS12
BUS13
BUS14
BUS15

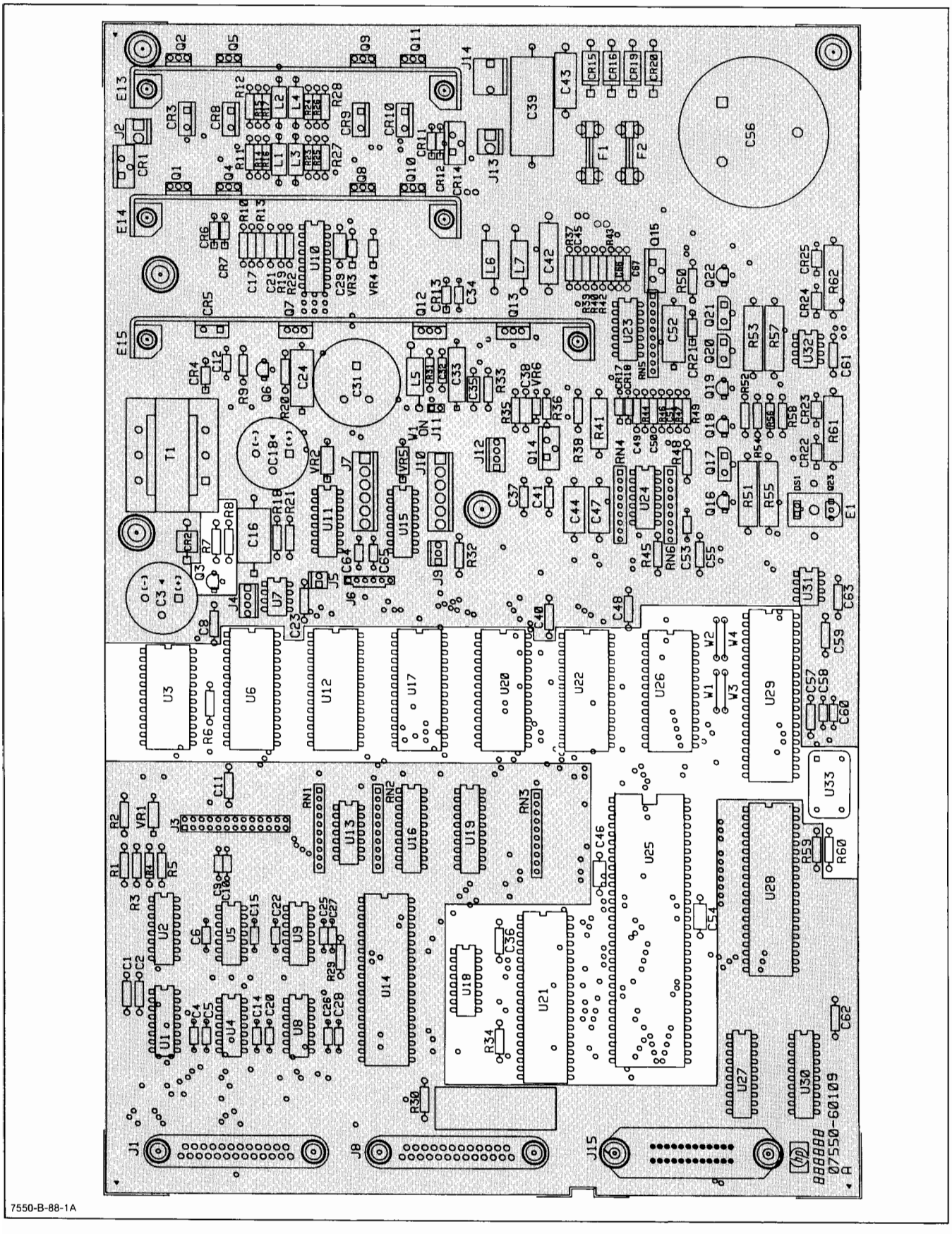


Figure 6-52. Processor and Memory Circuits, Component Location Diagram

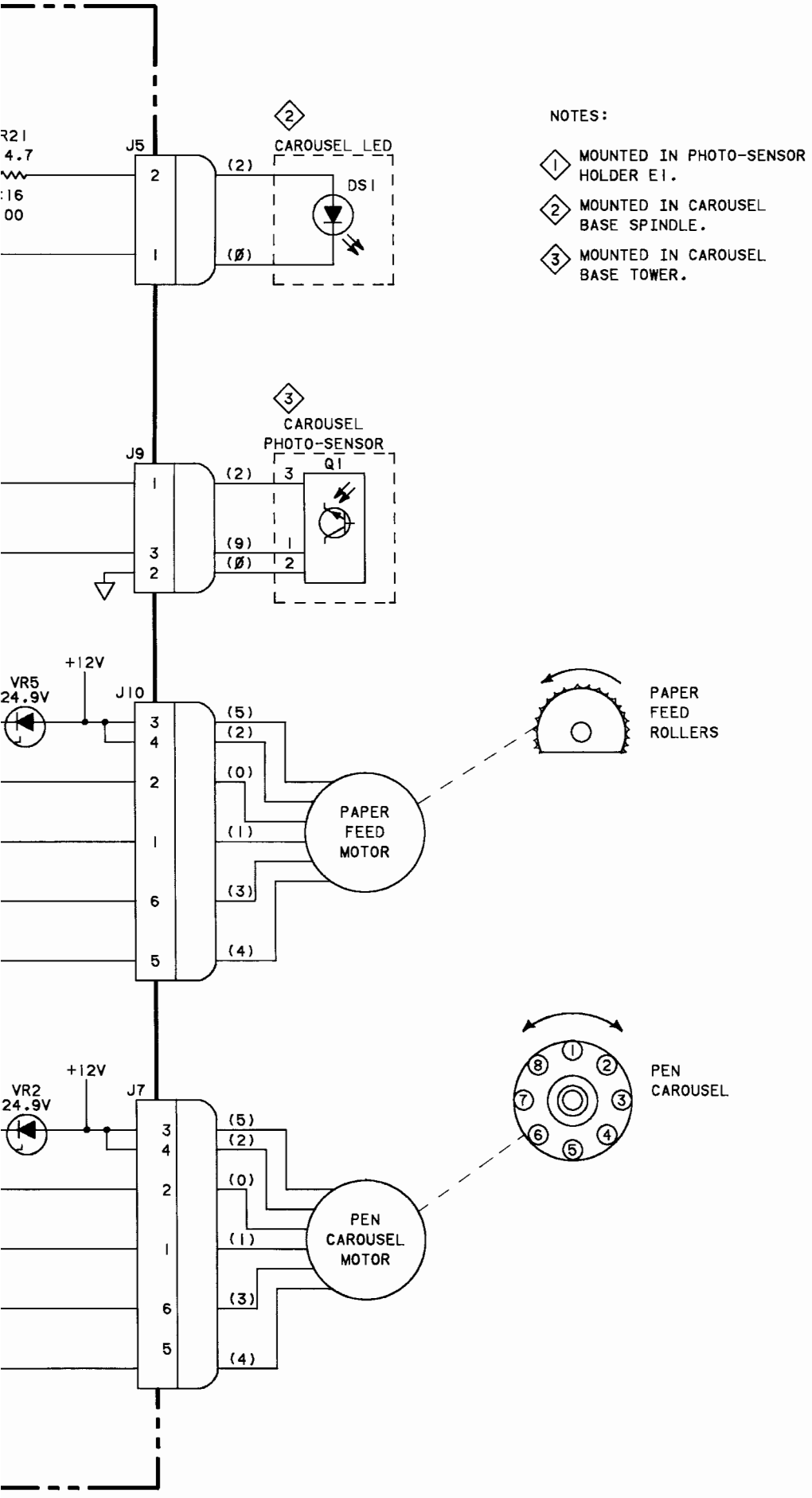


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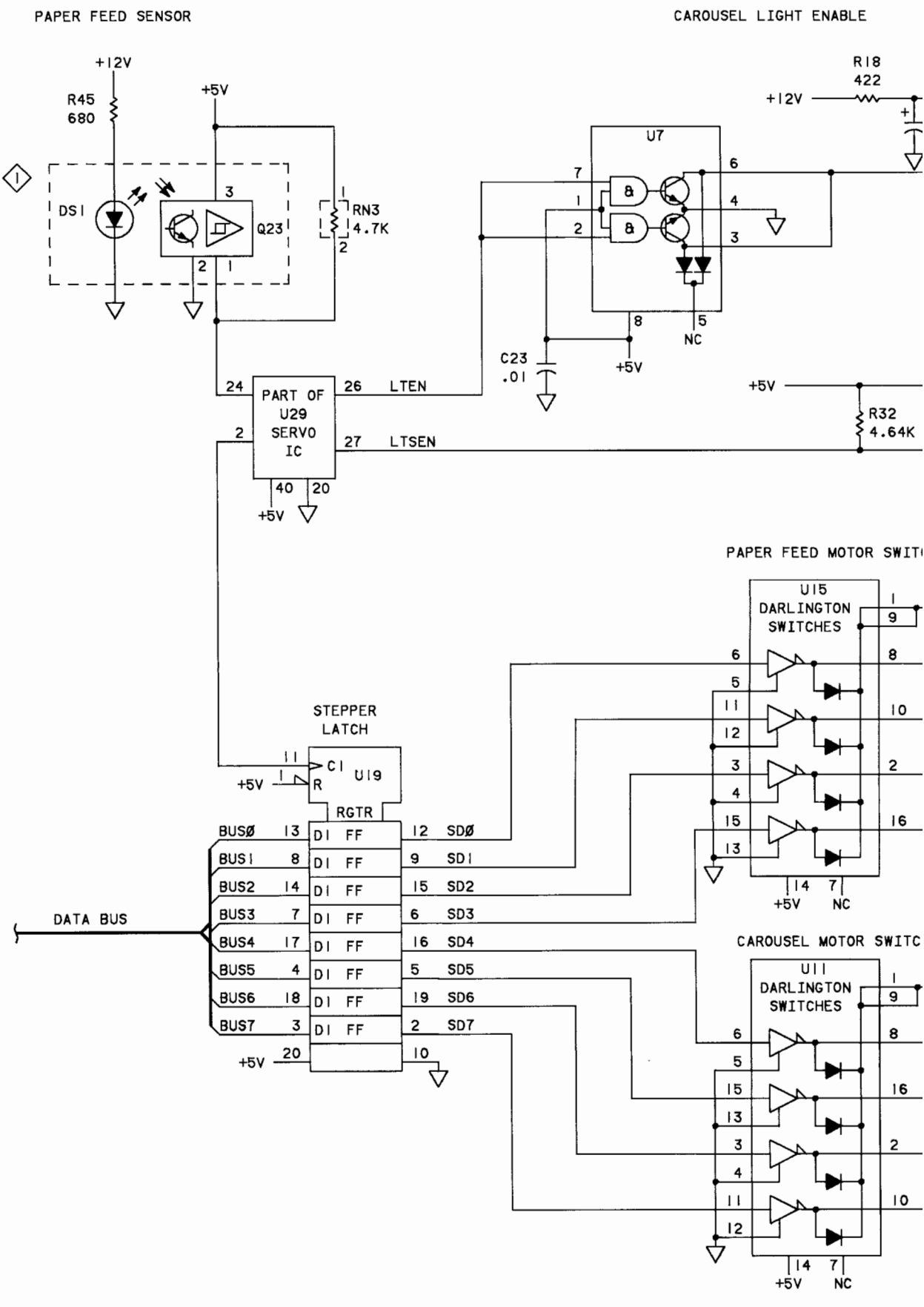
Figure 6-55. Carousel Motor and Paper Feed Motor — Sensing and Drive Circuits, Schematic Diagram

PART OF A1 MAIN PCA (07550-60109)



7550-C-116-1A

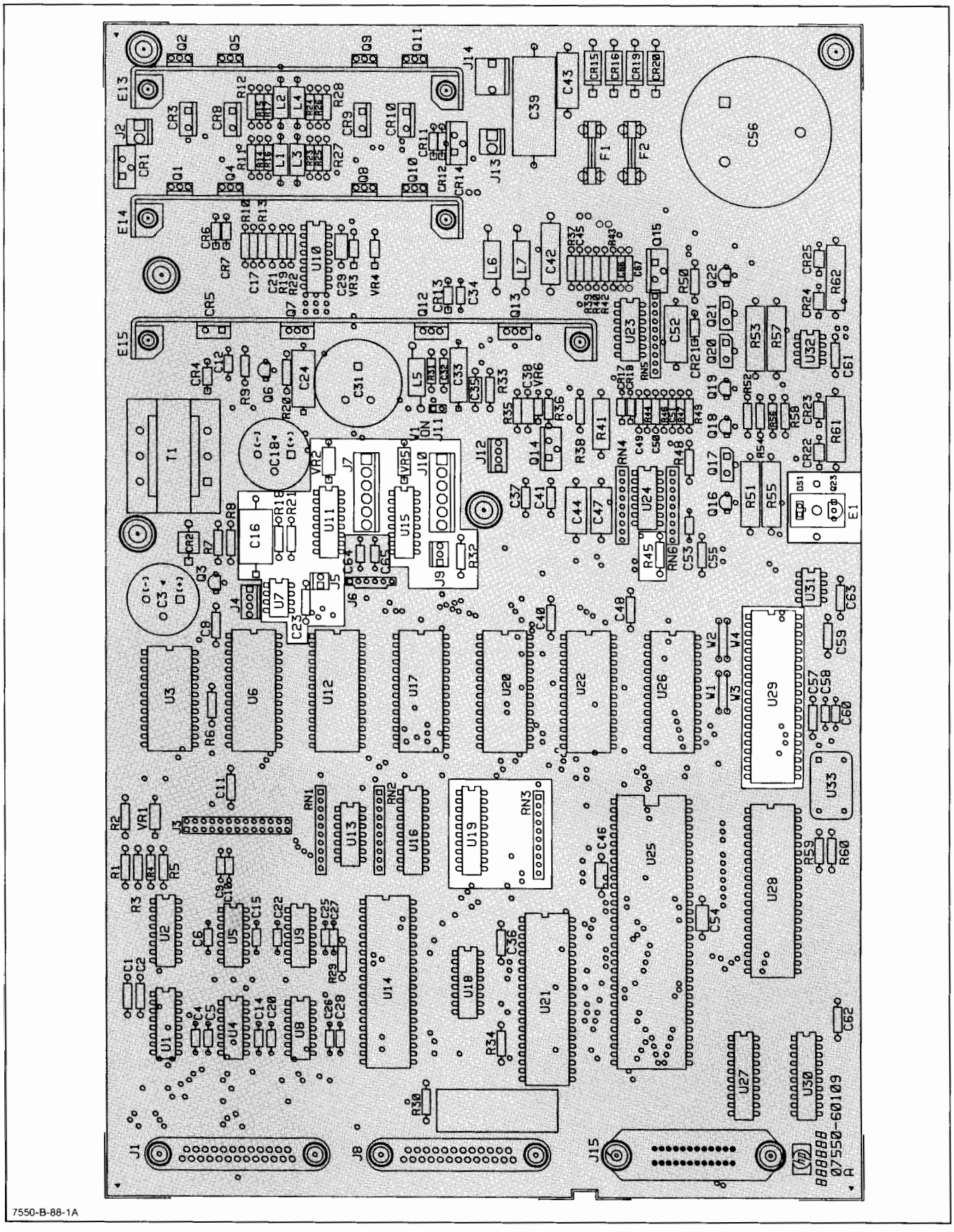


Figure 6-54. Carousel Motor and Paper Feed Motor — Sensing and Drive Circuits, Component Location Diagram

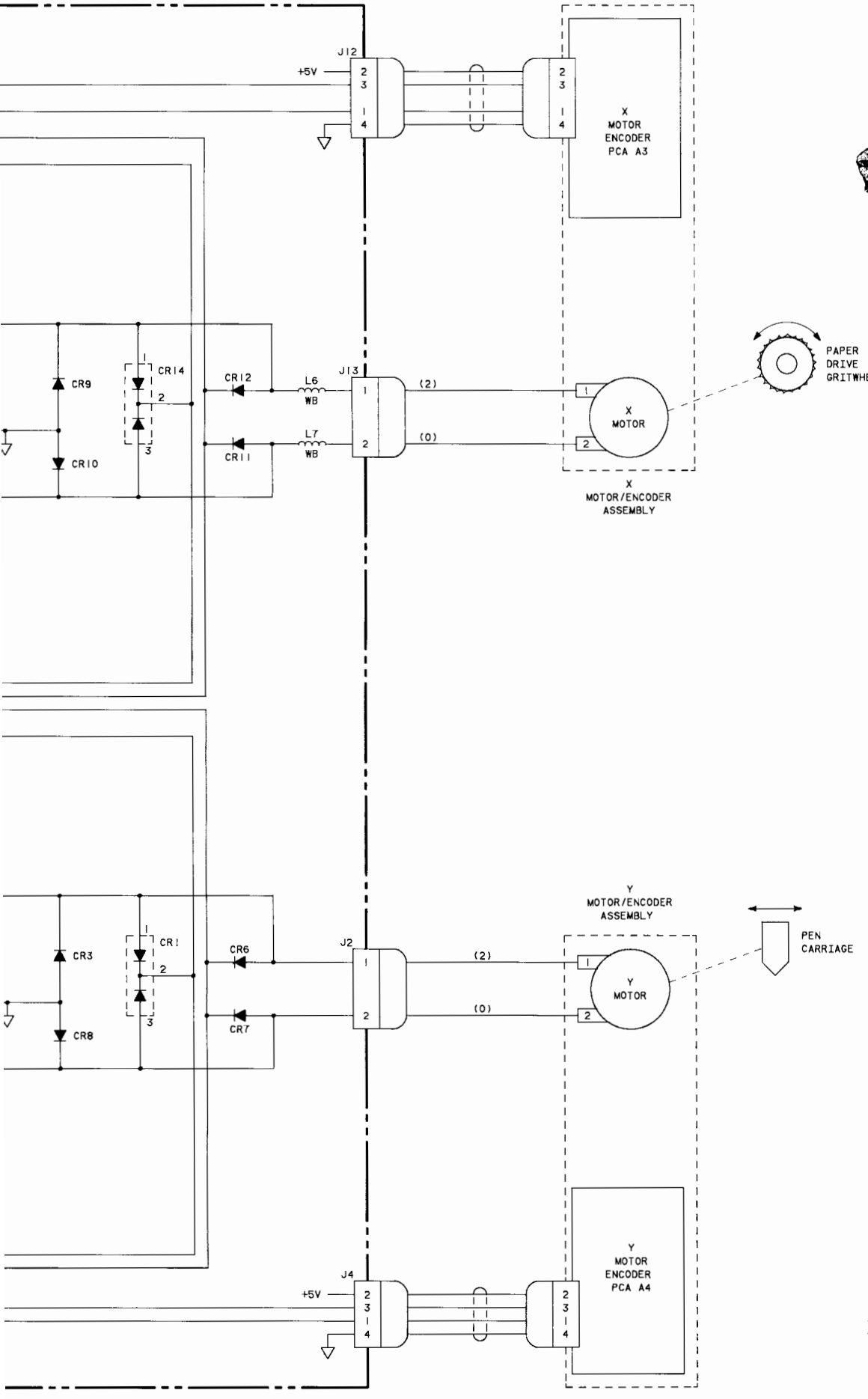


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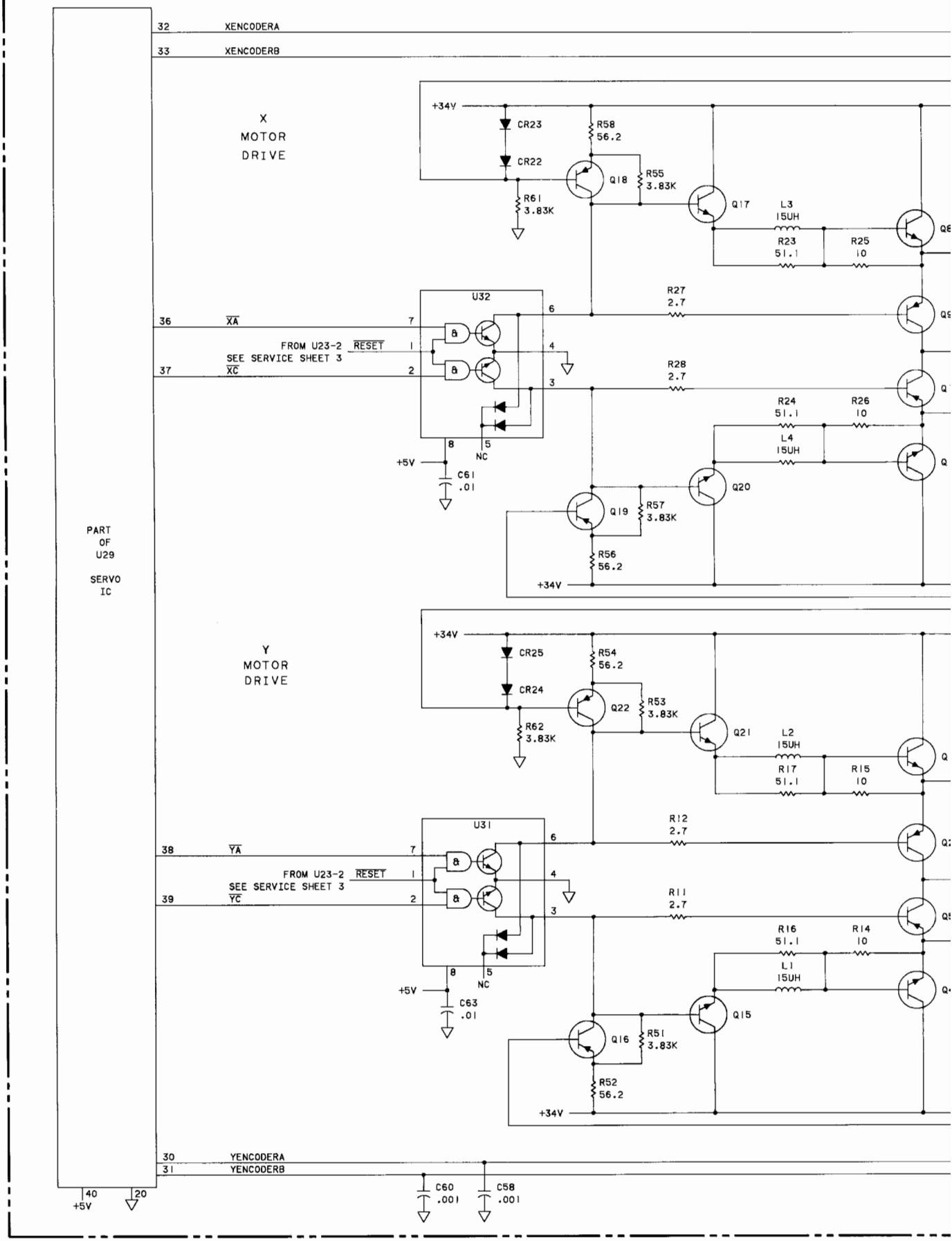
Figure 6-57. X- and Y-Motor Drive Circuits Schematic Diagram

PART OF A1 MAIN PCA (07550-60109)



7550-E-117-1A

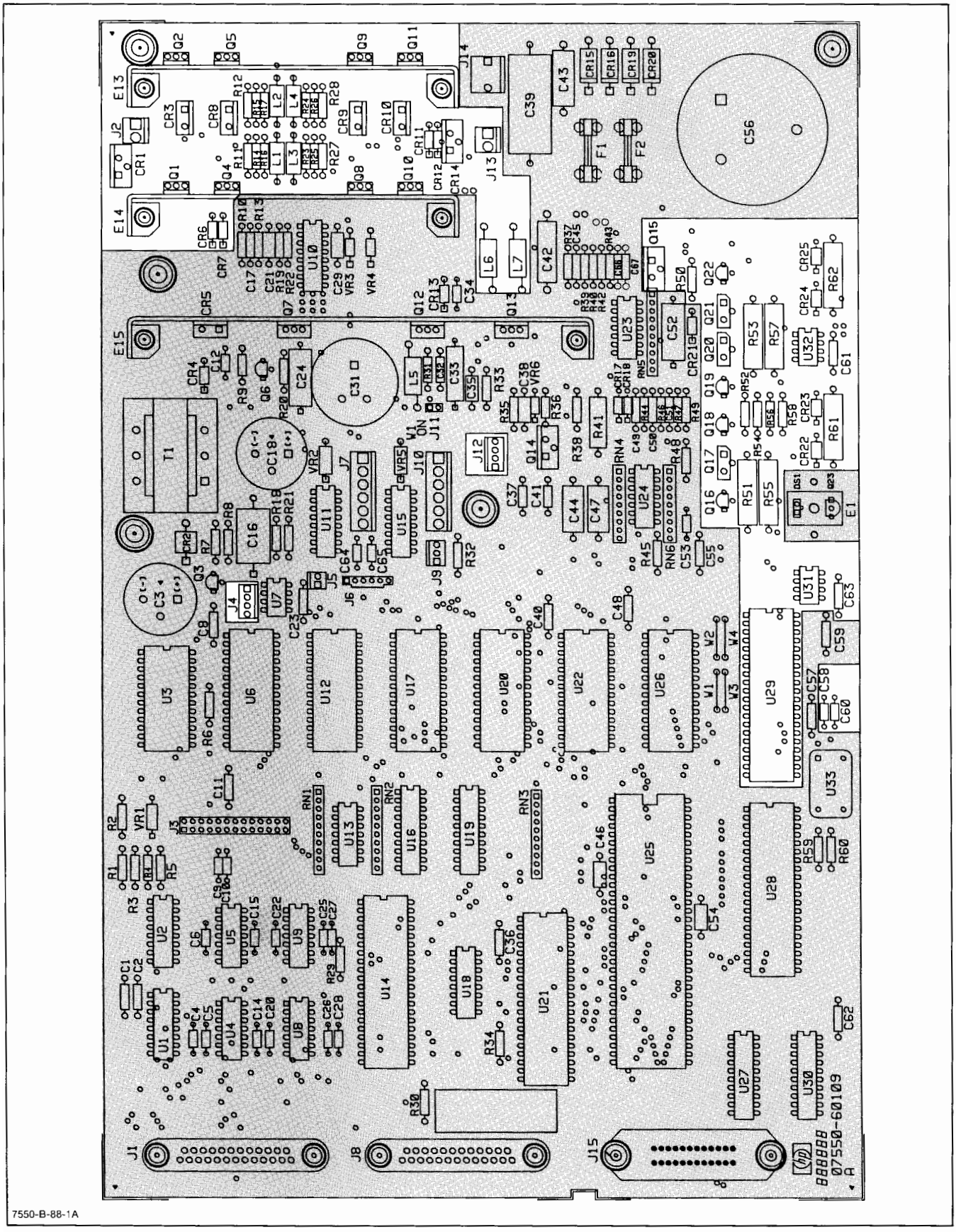


Figure 6-56. X- and Y-Motor Drive Circuits, Component Location Diagram

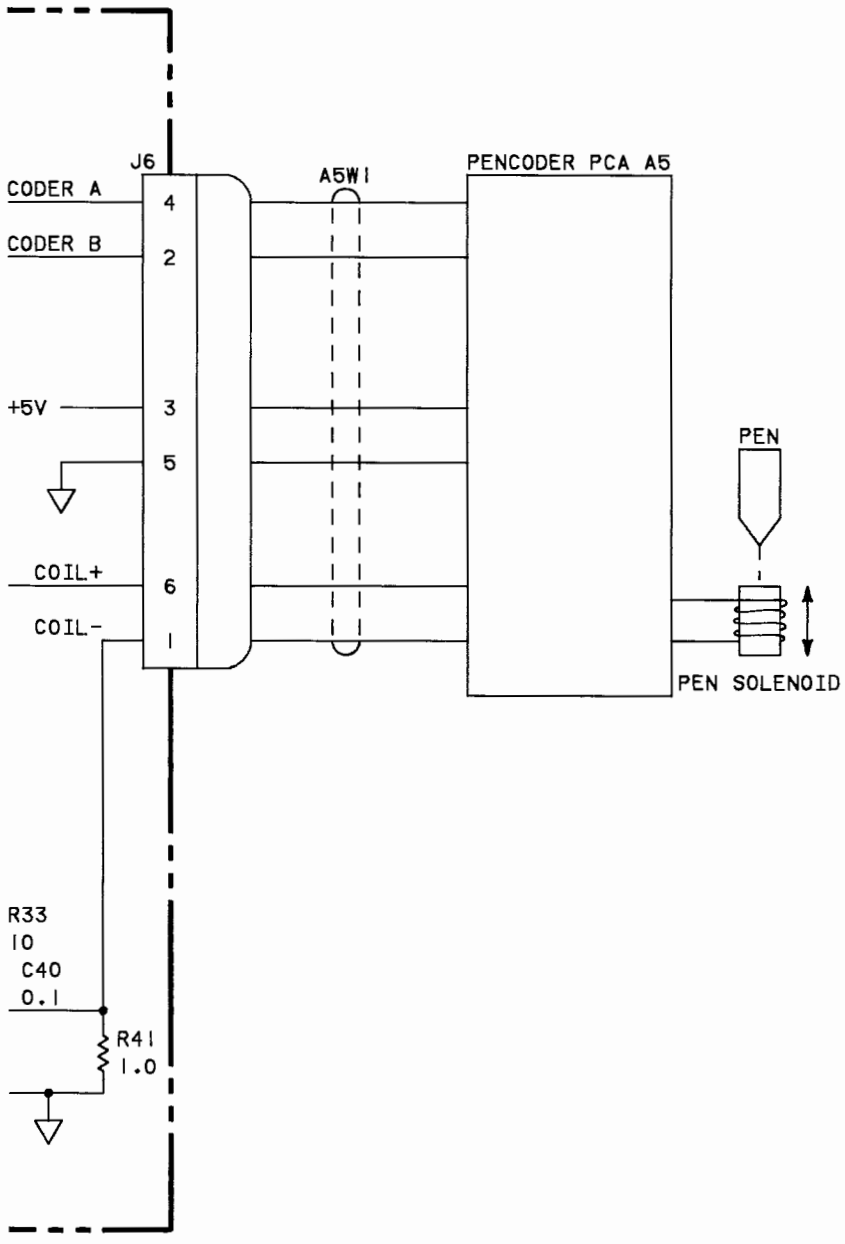


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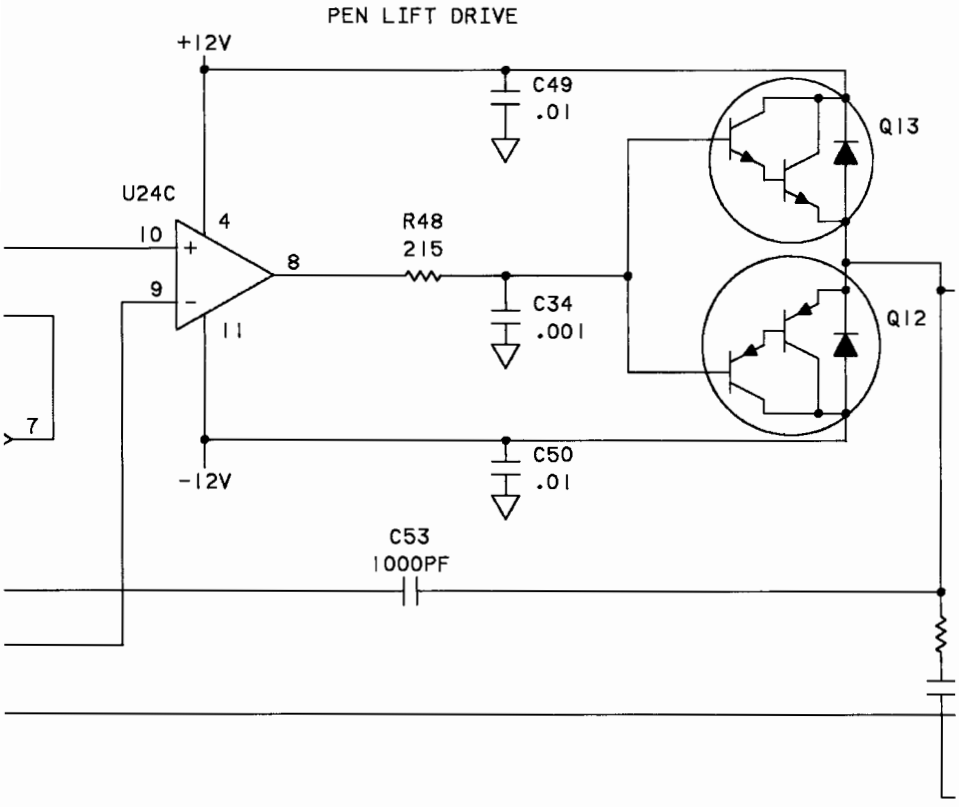
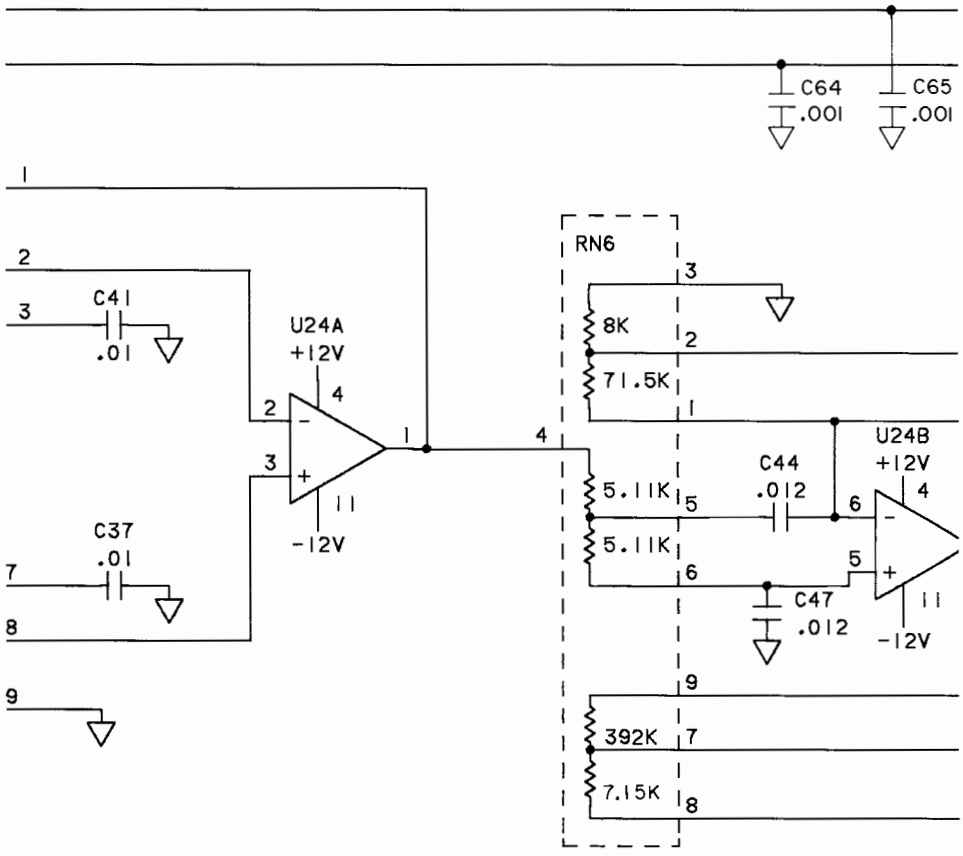
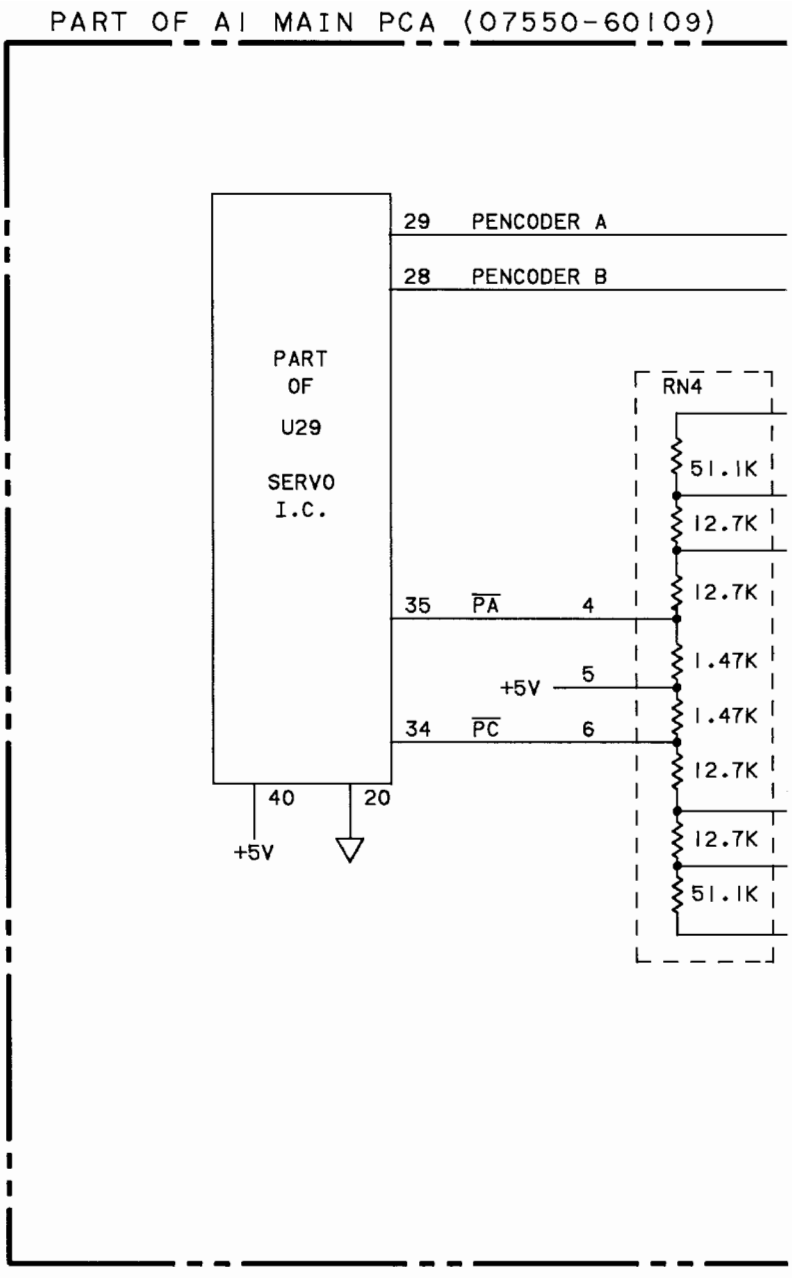
Figure 6-59. Penlift Drive Circuit, Schematic Diagram

PEN

PEN


PEN LIFT DRIVE
+12V
C49
.01
Q13
U24C
10
4
R48
215
8
9
11
C34
.001
Q12
7
-12V
C50
.01
C53
1000PF




PART OF AI MAIN PCA (07550-60109)
PART
OF
U29
SERVO
I.C.
29 PENCODER A
28 PENCODER B
35 PA 4
+5V 5
34 PC 6
40
20
+5V
RN4
51.1K
12.7K
12.7K
1.47K
1.47K
12.7K
12.7K
51.1K

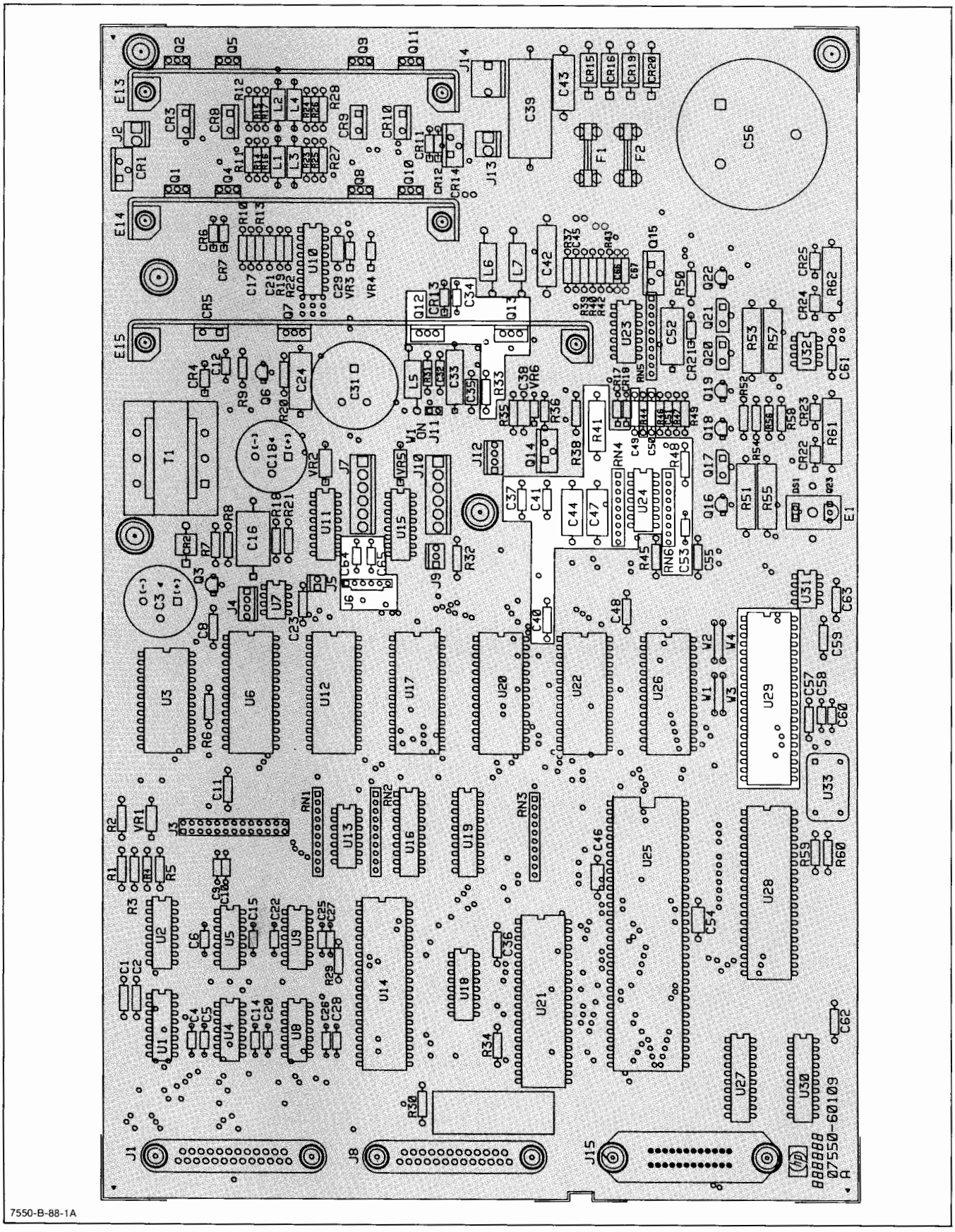


Figure 6-58. Penlift Drive Circuit, Component Location Diagram