HEWLETT hp PACKARD

SERVICE MANUAL

2607A

LINE PRINTER

Serial Numbers Prefixed: 1416, 1431, 1435, 1444, 1445, 1446, 1505, 1516, 1519, 1520 and 1528.

Manual Part No. 02607-90901
Microfiche Part No. 02607-90801
Print Date: May 1975

HEWLETT-PACKARD COMPANY
15 N. PHILLIPPI ST., BOISE, IDAHO, U.S.A.

PRINTED: MAY 1975

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www.hpmuseum.net

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FOREWORD

This manual contains service and parts information for the HP 2607A Line Printer. Other manuals containing information pertinent to this line printer are as follows:

12845B Line Printer Interface Kit Installation and Service Manual, HP part no. 12845-90011.

2607A Line Printer Operator's Manual, HP part no. 02607-90005.

2607 Line Printer Diagnostic, HP part no. 12987-90004.

2000 Computer Systems Diagnostic Configurator Reference Manual, HP part no. 02100-90157.

2607 SIO Line Printer Driver, HP part no. 12987-90006.

2607 BCS Line Printer Driver, HP part no. 12987-90008.

DOS-III Line Printer Driver (DVR 12) Reference Manual, HP part no. 24307-90016.

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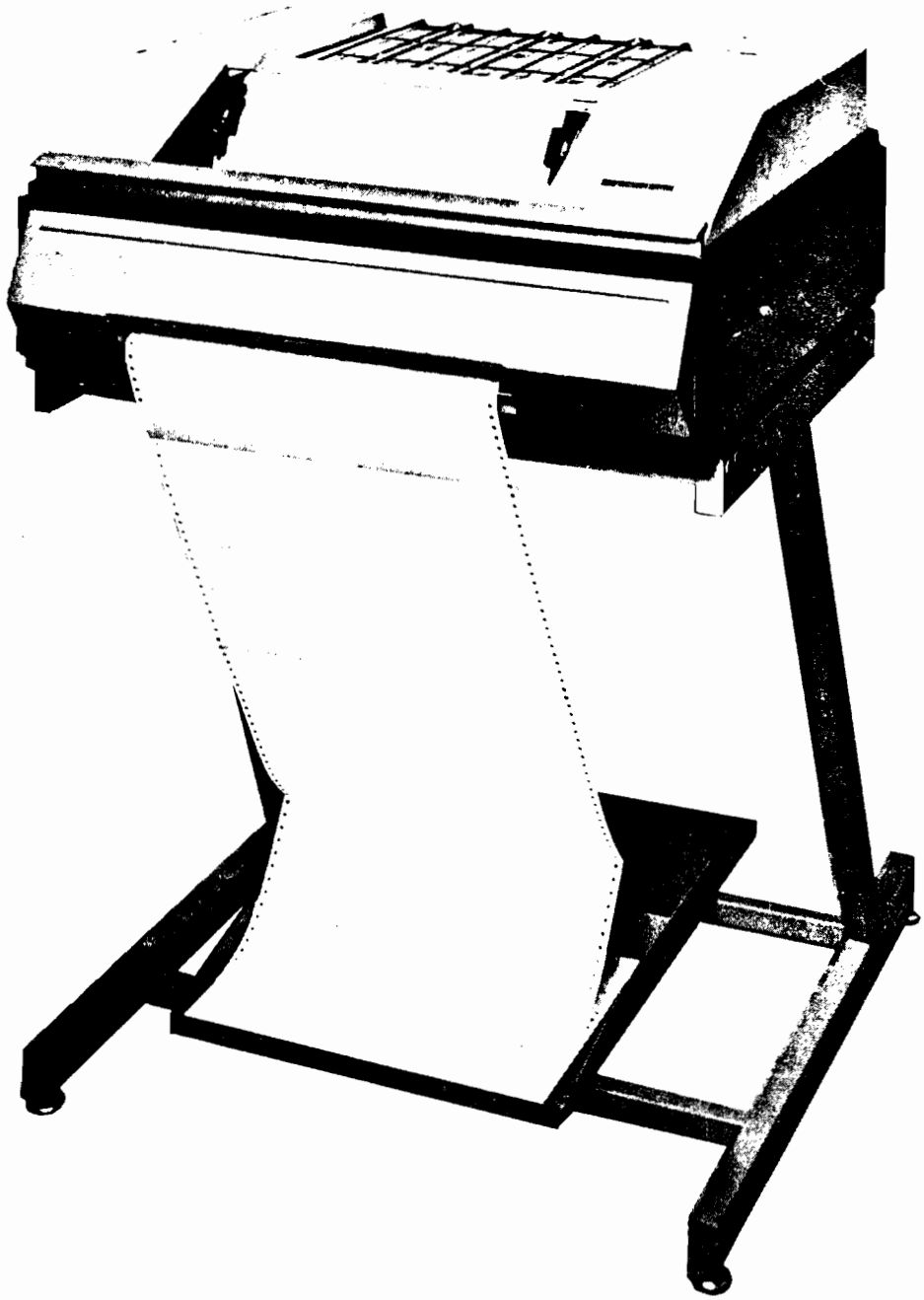


Figure 1-1. HP 2607A Line Printer

SECTION I. GENERAL INFORMATION

1-1. INTRODUCTION.

This section contains information regarding identification of the line printer (figure 1-1), accessories, available options and specifications.

1-2. DESCRIPTION.

The HP 2607A Line Printer is an intermediate speed printer featuring a mechanical dot-matrix print mechanism controlled by electronics. The printer provides quality printout on up to six copies. Paper loading and ribbon changing require no tools. Forms control is accomplished through use of a Vertical Format Unit (VFU) using eight channel punched paper tape; format control codes (table 1-3) are issued from the computer. A punch and die assembly integral to the line printer provides tape punching capabilities.

Characters are formed by a dot matrix and are available in either upper-case only or upper-and lower-case printouts. The printer can be used as a tabletop version or mounted on a stand (care must be taken to be sure paper feeds easily and freely). Information to be printed is provided by the computer in the form of 7-bit parallel ASCII character codes (table 1-2).

1-3. OPTIONS.

Five options are available on the HP 2607A Line Printer. These options are field installable. The options are listed below.

	OPTION NO.	DESCRIPTION
*	Standard	USASCII 64 character set (upper case only)
*	001	USASCII 128 character set (upper and lower case)
*	002	Scandanavian character set (upper case only)
*	003	Scandanavian character set (upper and lower case)
*	015	HP 2607A Line Printer requiring a 230-volt, 50 Hertz power source
*	016	HP 2607A Line Printer requiring a 100-volt, 50 Hertz power source.

1-4. ACCESSORIES.

Accessories furnished with each line printer are as follows:

* VFU Tape Splice Patches, 25 each, HP part no. 0460-0594.
* VFU Tape, one roll, HP part no. 02607-80015.
* Punched Standard VFU Tape Loop, one each, HP part no. 02607-80024, (table 1-3).
* Inked Ribbon, black, two rolls, HP part no. 9282-0531
* AC Power Cord, one each, HP part no. 8120-1348.
* Printer Stand with Form Shelf, one each, HP part no. 0950-0639

1-5. SPECIFICATIONS.

Line printer specifications are listed in table 1-1.

TABLE 1-1.

Specifications	
Character Style:	Dot matrix 5x7; 5x9 for certain lower case and special characters.
Characters Per Line:	132
Character Density:	10 characters per inch.
Line Density:	Six or eight lines per inch, switch selectable.
Printing Rate:	200 lines per minute (upper case only); 165 lines per minute (upper and lower case).
Forms	
Type:	Continuous fanfold, edge perforated.
Copies:	One to six part (one original, five copies), 11 lbs. per part maximum.
Width:	Maximum 14 7/8 inches (37.4 cm). Minimum 4 inches (10.2 cm).
Perforations:	Maximum 0.25 inches (6.4 mm) from perforation centerline to edge of form.
Feed Mechanism:	Tractor-feed with adjustable sprocket wheels on both right and left margins.
Form Control:	Eight channel paper tape vertical format control.
Paper Advance Slew Speed:	Minimum 3.2 inches (81 mm) per second (19 lines per second at 6 lines per inch; 26 lines per second at 8 lines per inch).
Paper Adjustment:	A friction release knob is provided for paper positioning.
Paper Out Indicator:	Audio alarm sounds. Printing stops at next top-of-form position.
Inking System	
Type:	Fabric inked ribbon, .75 inch (19.1 mm) x 42 yards (38.4 m). Automatic reversing.
Life:	12 million characters minimum.
Power Consumption: (Average)	Stand by. 10 watts Non-printing. 500 watts Printing. 800 watts
Line Voltages:	Standard. 105 to 140 Vac 60 $\pm$ 3 Hz Option 015. 187 to 264 Vac 50 $\pm$ 3 Hz Option 016. 90 to 110 Vac 50 $\pm$ 3 Hz

TABLE 1-1. (continued)

Power Supply Voltages:	8.0 Vdc at 12 amperes 11.5 Vdc at 40 amperes 15.0 Vdc at 0.5 amperes -17.0 Vdc at 2.0 amperes
Current:	35 amps power up surge,7 amps printing at 115 Vac. 17.5 amps power up surge, 3.5 amps printing at 230 Vac.
Circuit Breaker:	Trips upon power supply overload or loss of ±5 volts on any circuit board.
Interface Cable:	Differential Driver/Receiver allows use of cables up to 500 ft (152 m). The HP 12987A Line Printer Subsystem includes as standard a 25 ft (7.6 m) cable.
Physical Characteristics:	
Height:	11 inches (28 cm); 40 inches (102 cm) with stand
Width:	28 inches (71 cm)
Depth:	25 inches (64 cm)
Weight:	147 lbs (67 kg); 182 lbs (83 kg) with stand
Shipping Weight:	249 lbs (113 kg)
Altitude:	50,000 ft (15.2 km) non-operating
Temperature	
Operating:	+50 to +105 degrees Farenheit (+10 to +40 degrees Centigrade)
Storage:	0 to +145 degrees Farenheit (-17 to +62 degrees Centigrade)
Relative Humidity:	5 to 95% operating and non-operating (noncondensing)

1-6. IDENTIFICATION.

Each line printer has a plate attached to the rear of the unit containing a model, serial and option number. The combination of the option number(s) and the model number indicates the configuration of the unit.

The model number is an alphanumeric number (eg 2607A). The option number(s) lists factory installed options indicating various character sets or power supply requirements. The option number is a three-digit number (eg 015).

The serial number consists of a four number prefix, a letter and a five number suffix (0000A00000). The first four digits are used to indicate design changes. The letter in the fifth location designates the country in which the printer was manufactured ("A" indicates the United States). The five digit suffix is a sequential number which changes with each printer shipped by Hewlett-Packard. If the serial number prefix does not agree with the number on the title page of this manual, there are differences between the printer and information contained in this manual. These differences are described in updating supplements available at the nearest HP Sales and Service Office. Sales and Service Offices are listed at the back of this manual.

Table 1-2. Character Codes and Symbols

CODE (OCTAL)	2607A 2607A-002	2607A-001	2607A-003	CODE (OCTAL)	2607A 2607A-001	2607A-002 2607A-003	CODE (OCTAL)	2607A 2607A-001	2607A-002 2607A-003	CODE (OCTAL)	2607A	2607A-001	2607A-002	2607A-003
0xx000				0xx040	(blank)		0xx100	@		0xx140	@	'		ü
0xx001				0xx041	!		0xx101	A		0xx141	A	a		
0xx002				0xx042	"		0xx102	B		0xx142	B	b		
0xx003				0xx043	#	£	0xx103	C		0xx143	C	c		
0xx004				0xx044	$		0xx104	D		0xx144	D	d		
0xx005				0xx045	%		0xx105	E		0xx145	E	e		
0xx006				0xx046	&		0xx106	F		0xx146	F	f		
0xx007				0xx047	'		0xx107	G		0xx147	G	g		
0xx010				0xx050	(		0xx110	H		0xx150	H	h		
0xx011				0xx051	)		0xx111	I		0xx151	I	i		
0xx012				0xx052	*		0xx112	J		0xx152	J	j		
0xx013				0xx053	+		0xx113	K		0xx153	K	k		
0xx014				0xx054	,		0xx114	L		0xx154	L	l		
0xx015				0xx055	-		0xx115	M		0xx155	M	m		
0xx016				0xx056	.		0xx116	N		0xx156	N	n		
0xx017				0xx057	/		0xx117	O		0xx157	O	o		
0xx020				0xx060	0		0xx120	P		0xx160	P	p		
0xx021				0xx061	1		0xx121	Q		0xx161	Q	q		
0xx022				0xx062	2		0xx122	R		0xx162	R	r		
0xx023				0xx063	3		0xx123	S		0xx163	S	s		
0xx024				0xx064	4		0xx124	T		0xx164	T	t		
0xx025				0xx065	5		0xx125	U		0xx165	U	u		
0xx026				0xx066	6		0xx126	V		0xx166	V	v		
0xx027				0xx067	7		0xx127	W		0xx167	W	w		
0xx030				0xx070	8		0xx130	X		0xx170	X	x		
0xx031				0xx071	9		0xx131	Y		0xx171	Y	y		
0xx032				0xx072	:		0xx132	Z		0xx172	Z	z		
0xx033				0xx073	;		0xx133	[	Ä	0xx173	[	{	Ä	ä
0xx034				0xx074	<		0xx134	\	Ö	0xx174	\	|	Ö	ö
0xx035				0xx075	=		0xx135	]	Å	0xx175	]	}	Å	å
0xx036				0xx076	>		0xx136	^		0xx176	^	~		
0xx037				0xx077	?		0xx137	_		0xx177	_			

Printed circuit assemblies (PCA's) are identified by a letter, series code, and a division code stamped or etched on the assembly (eg B-1417-46). The letter identifies the version of the etched trace pattern on the unloaded printed circuit board. The four-digit series code pertains to the electrical characteristics of the loaded printed circuit assembly. The division code identifies the Hewlett-Packard division that manufactured the PCA. If the series numbers of the PCA's do not agree with the series numbers shown on the schematic diagrams in this manual, there are differences between the printer and the information in this manual. These differences are described in updating supplements available at HP Sales and Service Offices.

TABLE 1-3.

Format Control Codes and Functions

CODE (Octal)	Function
1xx000	Advance one line
1xx001 THRU 1xx017	Advance one line thru 15 lines (codes 1xx020 thru 1xx077 not used)
1xx100	Select VFU channel one (slew to top-of-form) *
1xx101	Select VFU channel two (slew to bottom-of-form) *
1xx102	Select VFU channel three (single space) *
1xx103	Select VFU channel four (double space) *
1xx104	Select VFU channel five (triple space) *
1xx105	Select VFU channel six (slew to next half-page line) *
1xx106	Select VFU channel seven (slew to next quarter-page line) *
1xx107	Select VFU channel eight (slew to next sixth-page line) *

* Slew action noted occurs when using punched Standard VFU tape supplied with the line printer for 6 LPI operation, HP part no. 02607-80024.

1-7. POWER CORDS.

Three power cord options are available for the line printer to allow operation in other countries. These power cords are described in figure 1-2. Various power supply wiring configurations are described in figure 4-23.

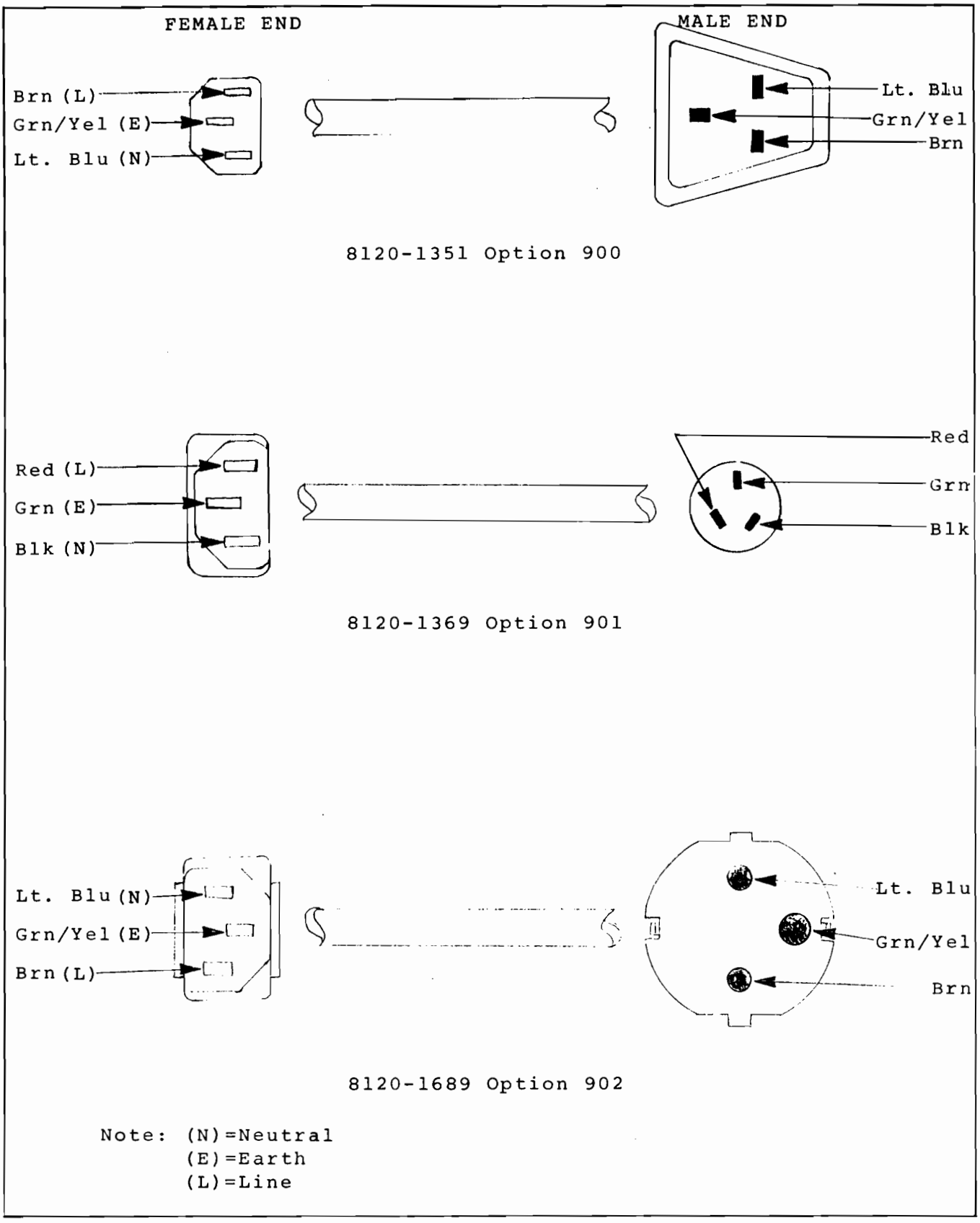


Figure 1-2. Power Cord Options

SECTION II INSTALLATION

2-1. INTRODUCTION.

This section contains information relating to unpacking, inspection, and claims for damage. Site selection and installation procedures are covered as well as shipping information.

2-2. UNPACKING AND INSPECTION.

If the shipping carton is damaged upon receipt, request that the carrier's agent be present when the unit is unpacked. Inspect the unit for damage (cracks, broken parts, etc). If the unit is damaged and fails to meet specifications, notify the carrier and the nearest HP Sales and Service Office immediately (Sales and Service Offices are listed at the back of this manual). Retain the shipping container for the carrier's inspection. The HP Sales and Service Office will arrange for repair or replacement of the damaged unit without waiting for claims against the carrier to be settled.

When unpacking the unit, retain all packing materials and hardware for future use.

2-3. PRINTER STAND ASSEMBLY.

To assemble the printer stand (HP part no. 0950-0639) proceed as follows (see figure 2-1):

a. Install the four adjustable feed (item K), two in each side brace (A and B).

b. Attach crossbars (C, D, E and F) to side braces (A and B) with Allen head screws using the Allen wrench provided. Crossbar D must have the metal cup with the short end to the left. Crossbar E and F must have the hole nearest the end to the left. (Crossbar E has two mating holes which must face upward.) Crossbar C must have the holes facing upward and nearer to the front. The hole nearest the end should be to the left.

c. Tighten all screws firmly and install the hole cover caps (item J) over the Allen head screws.

d. Install tray G using screws (N) and nuts (P). The two holes in the tray must be aligned with the mating holes in the lower rear crossbar before tightening these screws.

CAUTION

The unit weighs approximately 147 lbs (67 kg). Two persons are required to lift the unit from the shipping container.

e. Install the printer on the stand and secure it with the 2½ inch bolts (M) in the rear brace and the 1½ inch bolts (L) in the front brace.

f. Peel the backing off the power cord clip and attach to the rear of the printer wherever convenient.

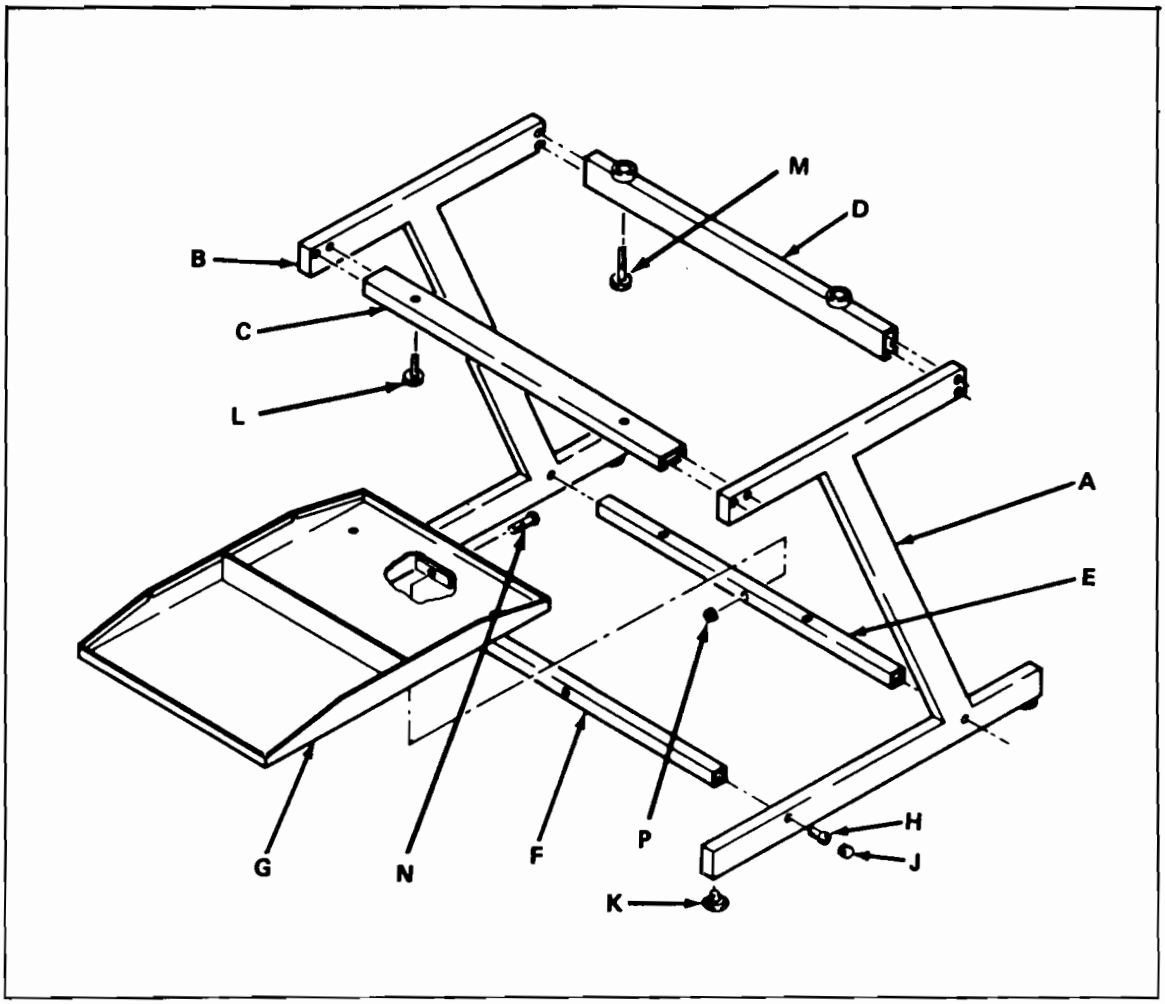


Figure 2-1. Printer Stand Assembly.

2-4. SITE SELECTION.

The line printer is suited for operation in non-airconditioned office and factory environments. The unit should be located to provide access to the front and rear sections of the cabinet with sufficient room for the maximum swing radius of the cover door. Space should also be provided on the right side for suspending the card cage on the outside of the unit in the event that servicing is required. Due to paper dust from the line printer, avoid locating the unit near a disc drive or magnetic tape unit, if possible. Additional heating or cooling systems are not required where the temperature will not exceed 105°F (40°C) or fall below 50°F (10°C). Refer to the Specifications table in Section I of this manual for further environmental requirements.

2-5. SET-UP.

Initial setup consists only of connecting the interface cable and inserting the female end of the power cord into the receptacle on the rear of the unit and the male end into the power source.

2-6. CHECKOUT PROCEDURES.

After the unit is installed and interface connections completed, visually inspect the installation. Ensure that the power source is adequate and all cables are properly anchored. Perform the following procedures to ensure proper operation of the unit (refer to figure 2-2):

a. Ensure that the hammer bank assembly moves freely right and left.

b. Visually inspect the printer for broken wires, loose connectors or missing parts and accumulations or dirt, oil, grease, or ink.

c. Remove the card cage cover and ensure that all printed circuit boards are seated firmly in their connectors.

d. Check the ribbon brake arms to be sure that arms will clear the brake stops easily. The stops should hold the arms in the stop position.

e. Loosen the thumbwheel locks and slide the left and right paper tractor assemblies along the shaft laterally. Check for maximum and minimum forms width adjustment.

f. Turn the clutch knob while observing the VFU tape loop. The loop should track evenly and ride just against the paper punch pin. The tape tension handle should be adjusted such that the VFU tape will ride firmly but not tightly over the drive sprocket.

g. Place ON switch in off position. At the rear of the unit, place the circuit breaker in the ON position.

h. Cycle power on and off at approximately five second intervals, 10 cycles minimum, and ensure that the circuit breaker does not trip.

i. Apply power and verify that the hammer bank shifts to the left on power-up, the blower operates, and no hammers pull back to the coils.

j. At power-up the ribbon should move for one to five seconds. Manually actuate the right-hand ribbon reversing switch then press and release the FORM FEED switch. The ribbon spools should advance clockwise for one to five seconds. Manually actuate the left-hand ribbon reversing switch then press and release the FORM FEED switch. The ribbon spools should advance counter-clockwise for one to five seconds.

k. Press and release the PRINT switch. An alarm will sound to indicate no paper is in the unit. Press and release the PRINT switch.

l. Load forms on the line printer.

m. Press and release the FORM FEED switch. Check for paper advance to top-of-form.

n. Press and release the Line Feed switch. Check for paper advance of one line.

o. Check for proper formscale adjustment as per paragraph 5-24 of this manual.

p. Adjust paper hold-downs (figure 2-2) to just touch paper with six-part paper installed. Paper hold-downs should not touch the paper when single part paper is installed.

q. Using the platen lever, pull the platen open then press and release the PRINT switch. An alarm will sound to indicate the platen is open. Press and release the PRINT switch and push the platen lever forward. The unit is now ready for operation.

2-7. RESHIPMENT.

If the line printer or any part of the unit is to be shipped to Hewlett-Packard for service or repair, attach a tag to the item identifying the owner and indicating the service or repair to be accomplished. Include all information shown on the model plate.

If the complete unit is to be shipped, observe the following precautions and use the original packing materials.

a. Tighten the shipping screws on the print mechanism to prevent damage due to shifting. On units not having shipping screws, reinstall the shipping blocks.

b. Raise the top cover, pull the formscale forward and apply masking tape from the form scale to the hammer driver cover.

c. Tape both ribbon spools keeping a slight tension on the ribbon.

d. Close the top cover and tape closed.

CAUTION

The unit weighs approximatley 147 lbs (67 kg). Two persons are required to lift the unit.

e. Remove the printer from its stand.

f. Secure the printer to the plywood baseboard using the four bolts provided in shipment.

g. Place the printer in the original shipping container. If the original shpping container is no longer available, order by HP part no. 9211-2104.

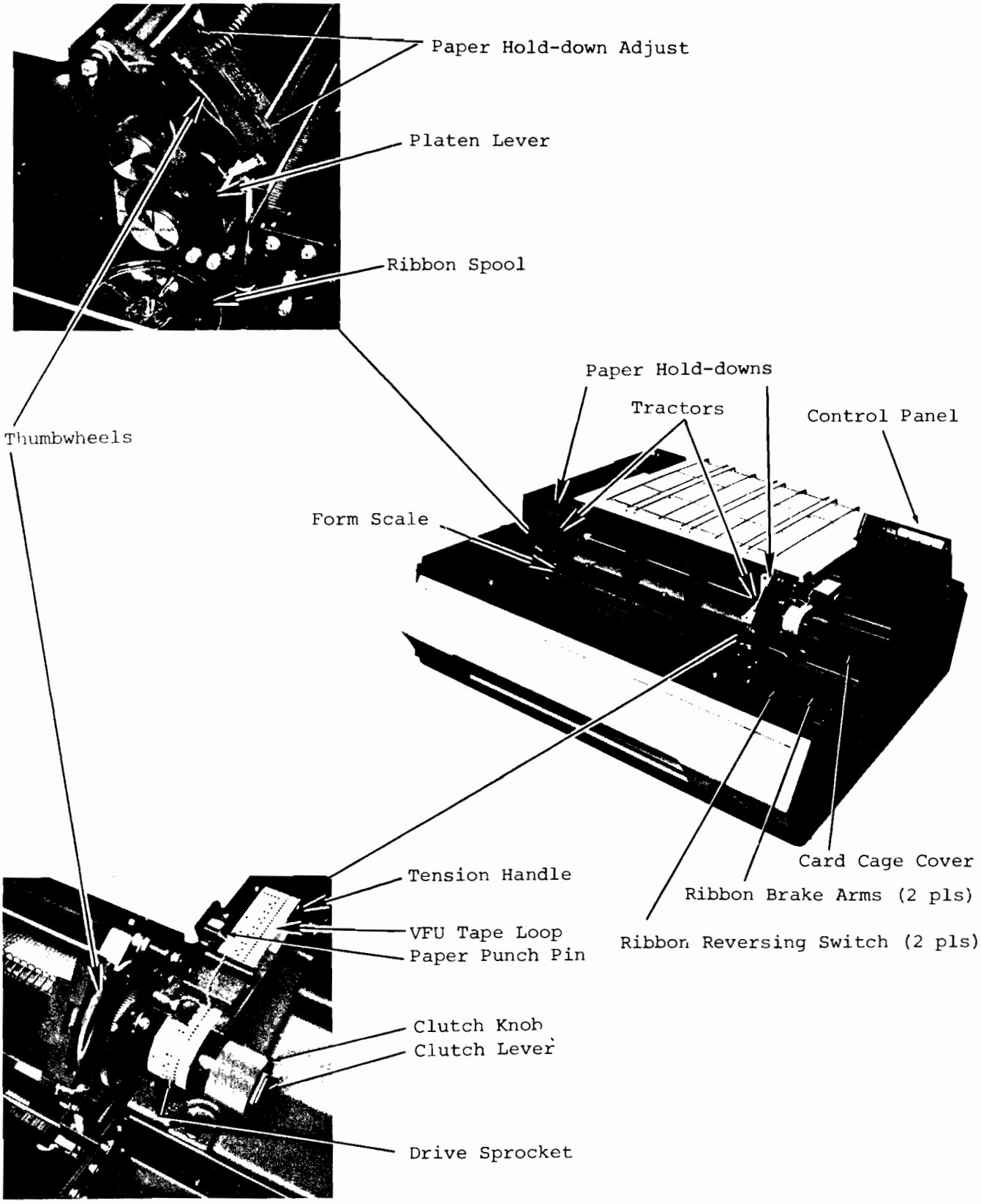


Figure 2-2. Printer Controls Location

SECTION III. THEORY OF OPERATION

3-1. INTRODUCTION.

This section gives a functional description of the mechanical and electronic operation of the line printer. The mechanical description is supported by simplified drawings while the electronic portion uses block diagrams and schematics.

3-2. DESCRIPTION OF PRINT ASSEMBLY.

The print assembly (figure 3-1) consists of the platen, core bar, mogator and print comb. The platen is a metal bar which provides a solid surface behind the paper forms allowing dots to be impacted on the paper by the print comb.

The core bar (figure 3-1) consists of 132 electromagnetic coils. These coils, when energized, pull back the tines of the print comb. The magnetic field is then removed allowing the tines to fly forward and print a dot on the paper.

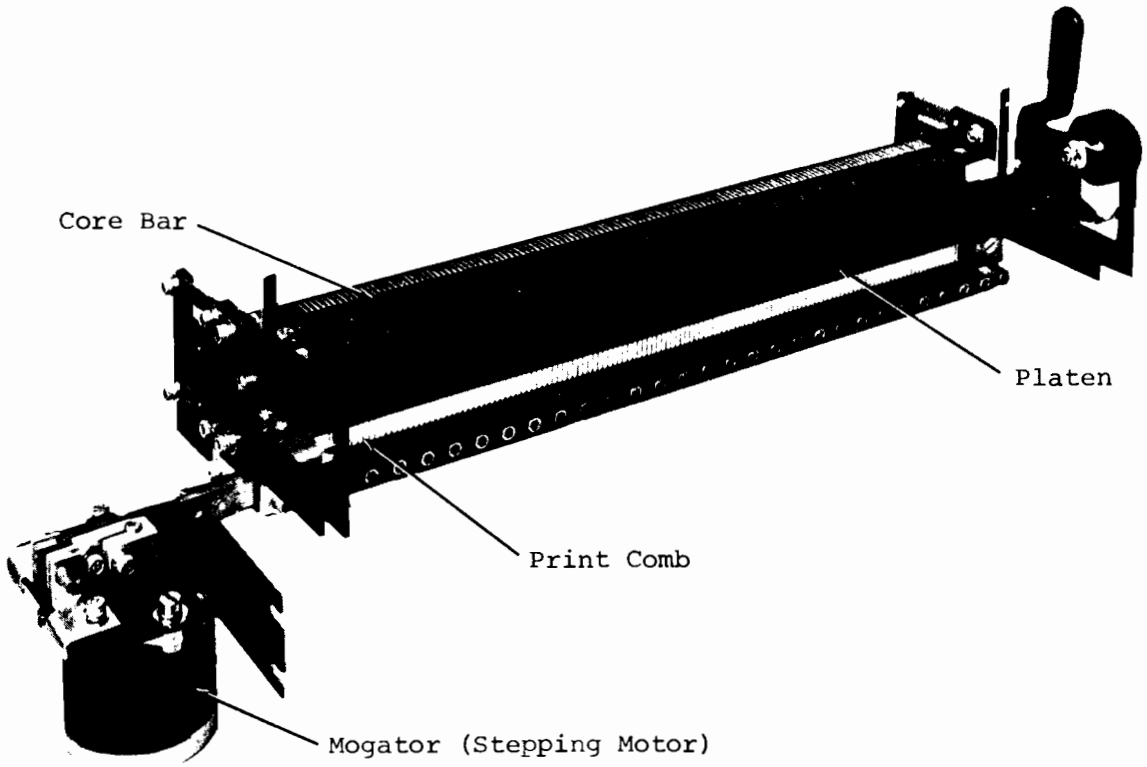


Figure 3-1. Print Mechanism Assembly

The print comb has 132 tines, each with a metal ball welded to it. The combined tine and ball is called a hammer (figure 3-2). Each hammer corresponds to a coil in the core bar. Printing occurs when a coil pulls and releases a hammer allowing it to strike the ribbon, paper, and platen, placing a dot on the paper. Individual characters are formed by a defined pattern of dots within a matrix as commanded by the electronics.

An integral part of the print comb is the hammer damper (figure 3-2). The hammer damper not only dampens hammer rebound, but it adds to hammer spring loading which increases the force with which a hammer strikes. As a coil pulls a hammer back, it loads the hammer and damper and upon release the two act essentially as one until the hammer strikes. At this moment both the hammer and damper begin to resonate at different frequencies resulting in each rapidly dampening the other and coming to rest.

To allow for printing of dots within a pattern, a stepping motor, or mogator (figure 3-1) is used to shift the print comb to the next dot position after completing a printing operation in the previous location.

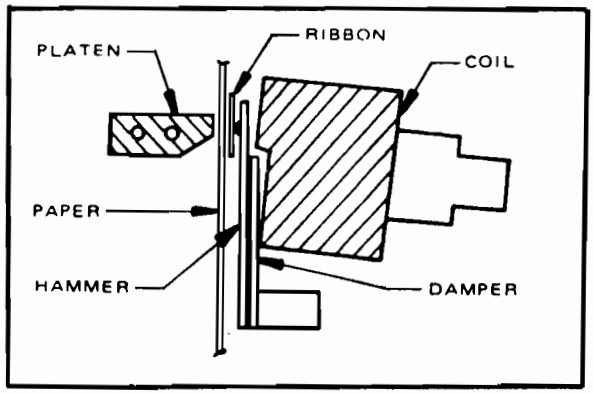


Figure 3-2. Basic Print Elements

3-3. MECHANICAL PRINTER OPERATION.

3-4. HAMMER SEQUENCING. Each line of print contains 132 characters, corresponding to one hammer for each character position. Due to the possibility of electromagnetic interference between adjacent hammers, all hammers are not pulled and released simultaneously. For example: If hammers 14 and 16 were commanded to print a dot and hammer 15 was commanded not to print a dot, acting simultaneously the coils for hammers 14 and 16 would be active while the coil for hammer 15 is inactive. The electromagnetic fields of coils 14 and 16 could possibly pull hammer 15 enough to cause it to print a light dot when it should not print. Interference between hammer coils is minimized by ensuring that there are always at least four inactive hammer coils between any two active coils. This also reduces considerably the peak current drain on the hammer power supply, impact noise and mechanical strain.

3-5. Hammer Groups. The hammers are divided into five groups with two groups having 27 hammers and three groups having 26 hammers for a combined total of 132 hammers. The groups are composed as follows: Hammer group one begins with hammer one and contains every fifth hammer; 1, 6, 11, 16, . . . through 121, 126, and 131. Hammer group two begins with hammer two and contains hammers 2, 7, 12, 17, . . . throught 122, 127 and 132. Hammer group three begins with hammer three and contains hammers 3, 8, 13, 18, . . . through 118, 123, and 128. Hammer group four contains hammers 4, 9, 14, 19, . . . through 119, 124, and 129. Hammer group five contains hammers 5, 10, 15, 20, . . . through 120, 125 and 130.

3-6. FIRING ORDER. The print comb prints while sweeping both left to right and right to left; therefore, two firing orders are needed to maintain proper relationships between the electronics and their mechanical results (dots). When sweeping left to right, the hammer group firing order is 1, 4, 2, 5, 3. The firing order is reversed when sweeping right to left; 3, 5, 2, 4, 1.

3-7. DOT MATRIX. Printing action within a matrix is accomplished as follows: Starting with dot position one of the character matrix (figure 3-3), the group-one hammers required to print this dot for the character being formed are pulled back. As group-one hammers are released, group-four hammers required to print dot position one are pulled back. At about the time group-four hammers are all the way back, group-one hammers have hit the ribbon. As group-four hammers are released, group-two hammers are pulled. As group-two is released, group five is pulled and as group-five is released group-three is pulled then released. At this moment all dot information pertaining to dot position one for all print columns has been printed. The print comb now moves to the right one dot position and the sequence begins again with the individual hammers either printing or not printing this dot as commanded by the electronics. This continues until the comb is all the way to the right which corresponds to dot position five or the upper right corner of the matrix. After printing is completed in dot position five the paper is advanced one dot row, the firing order is reversed (3, 5, 2, 4, 1) and print comb movement is from right to left. Upon completion of dot row two (dot position 10) the paper is once again advanced one dot row, the firing order returns to 1, 4, 2, 5, 3, and movement of the print comb again becomes left to right. Following seven sweeps (5x7 matrix) back and forth, one line of print is complete. This entire action takes about 300 milliseconds. It takes a hammer less then seven milliseconds to print a dot for all character positions.

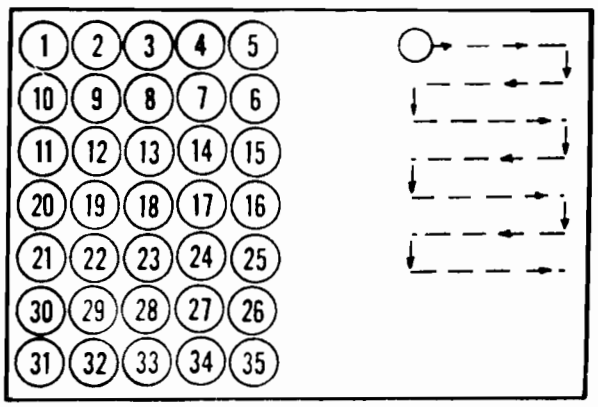


Figure 3-3.
Print Sequence For 5x7 Matrix

3-8. PRINT COMB MOVEMENT. Even though it is driven by a stepping motor, the actual movement of the print comb is linear rather than stop-motion. This is due to the fact that the motor is stepped before the print comb stops. In fact, the motion of the comb is almost a constant velocity of two inches per second from stop to stop and the hammers print with the comb in motion.

3-9. ELECTRICAL PRINTER OPERATION

3-10. POWER-ON-RESET CYCLE. All printed circuit assemblies in the printer are Preset to a pre-determined condition by the Power-On-Reset (PORS) cycle. The PORS cycle also generates what is essentially an end-of-print cycle which results in paper being advanced four dot rows and the print comb shifted to the far left position. This cycle ensures that the printer has established proper electronic and mechanical relationships before it begins to process data. The hammers are inhibited during the entire cycle.

Upon power-up the logic supply voltage causes Power-On-Reset (PORS) at J3-29 (figure 4-10, sh 2) to go active for 40 milliseconds.At the same time, the hammer supply voltage causes Power On Reset Delayed by Hammer Supply (PORH) at J5-17 (figure 4-14, sh 1) to go active for 100 milliseconds.

On the I/O Interface circuit board (figure 4-8), the PORS signal at J2-29 is inverted low to clear the HRDB Mem FF and is gated to become Power-On-Reset (POR). The POR signal causes Auto Print Mem to clear and the Line Cntr to load a zero since all inputs to it are low. After being gated low, POR clears the remaining Mem FF's on the I/O Interface board. The Buffer 1 Cntr's on the Buffer ROM circuit board (figure 4-10, sh 2) are cleared by PORS which also sets the Pre-Print FF (sh 3) enabling the PRINT signal at J3-56. The Control circuit board (figure 4-12, sh 1) has its Buffer 2 Cntr's cleared by PORS which enters the board at J4-29.

While PORS is running its 40 ms cycle, PORH clears Overcurrent Mem 1 and 2 (figure 4-14, sh 1). PORH enters the Control board (figure 4-12, sh 2) at J4-17 where it allows the Mogator Cntr and Dot Column Cntr to load and clears the Rext and Tail Mem FF's. PORH now allows the TS Cntr (figure 4-12, sh 1) load input to go to a load condition. After being inverted at gate UA7-10, PORH becomes Dot Row Counter Load (DRCLD) which removes the clear on the Dot Row Cntr (figure 4-12, sh 2) and enables the load input. The currently cleared Rext FF issues a Reset Extended (REXT) signal allowing the Mogator Cntr and Dot Column Cntr to load, clears the Mog Direction FF which steers the Mogator Cntr to count down, and removes the clear on the Dot Column Cntr so it can load. The REXT signal also removes the clear on the TS Cntr (figure 4-12, sh 1), appears at the Hammer Latch board (figure 4-14, sh 2) at J5-26 clearing the A Mem and B Mem FF's, and on the Buffer ROM board (figure 4-10, sh 2) it clears the MFF, RDY, and POUT FF's.

After 40 ms, PORS goes inactive. This causes a low at J4-29 on the Buffer ROM board (figure 4-10, sh 1) which removes the clear on the Buffer 2 Cntr. Being a free running counter, it increments with each Clock Phase One (CLØ1) until the count of 204. At this time UG3-6 (zone D-4) goes high, placing a low on the counter clear inputs. At the next CLØ1, the leading edge generates Buffer Two Clock Per Revolution (B2 CL/REV, zone C-4) and the trailing edge clears the Buffer 2 Cntr. After being inverted, B2CL/REV clocks the TS Cntr and it loads a count of zero. The B2CL/REV signal also clocks the Mogator Cntr (figure 4-12, sh 2) to load a count of two, the Dot Column Cntr to a count of nine, and the Dot Row Cntr to a count of 15.

The currently active PRINT signal removes the clear from Mog Start A and B (figure 4-12, sh 2) and holds the clear input to the Dot Column Cntr disabled. Gate input UG6-1 (zone A-4) is enabled by the PRINT signal and Tail Mem goes to the clear state on the next clock pulse. This results in INH HAMMERS (zone C-1) disabling the hammer selection logic.

PORH becomes inactive after 100 ms allowing the Mogator, Dot Column, Dot Row and TS Cntr's to count. The TS Cntr (figure 4-12, sh 1) increments on each B2CL/REV generating Time Slot A (TSA) every other count. The Mogator Cntr (figure 4-12, sh 2) is enabled by TSA. As the B2CL/REV increments the TS Cntr from one to two, it decrements the Mogator Cntr from two to one (counting down). The TS Decoder (figure 4-12, sh 1) generates TS2 (zone C-2) which is gated to become Row Feed After Print (figure 4-12, sh 2, zone A-3) and enables Paper Advance Step (PA STEP) when ANDED with B2CL/REV. The TS2 cycle occurs four times causing paper to advance four dot rows.

At each count of six from the TS Decoder (figure 4-12, sh 1), Slot Four (S4) goes high enabling UC8-2 (figure 4-12, sh 2). Since the Dot Column Cntr started at a count of nine and increments with each TS CARRY from the TS Cntr, it is now at a count of 12. Pin 12 on the Dot Column Cntr now enables UC8-1 (zone C-6) satisfying the other input to that gate. The output of this gate, when gated with END OF PRINT and Time Slot Advance (TS ADV), activates PRINT RST at J4-57. PRINT RST clears the Pre-Print FF (figure 4-10, sh 3) and is inverted low and gated with PORH (now low) to set the Rext FF (figure 4-12, sh 2). These FF's clear and set respectively on the next B2CL/REV. With the Rext FF set, the TS Cntr, Dot Column Cntr and Dot Row Cntr will clear and the Mogator Cntr will load a zero count. Pin 7 of the Mog Direction FF is now low which sets this FF, causing the Mogator Cntr to count up. The REXT signal is now inactive (high) which removes the clear and allows the Buffer 1 Cntr (figure 4-10, sh 2) to count. The Power-On-Reset cycle is now complete.

3-11. PRINT CYCLE. Activation of the printer power switch causes an ON signal at J2-30 (figure 4-8, zone D-2) resulting in a READY status signal to the computer interface indicating printer power is applied. With paper in the printer, activation of the Print switch causes REDY to go high at J2-25. The resulting ON LINE at J7-S goes to the computer interface to indicate the printer is ready to process data. REDY also causes a high at UC7-9 (zone D-4). Since Command Reset (CRST) is currently low and Strobe Mem is clear, UC7-8 goes low enabling DEMAND at J7-R. This indicates to the computer interface that data transfer and commands may be issued to the printer.

Character codes (table 1-2) are presented to the Data Latch UE4 and 5 (zone B-7) one character at a time from the computer interface. Each character code is accompanied by a STROBE signal which enters the I/O Interface board at J7-U (zone C-2). STROBE is gated with REDY and inverted. The resulting signal sets the Strobe Mem FF (zone C-6) and is inverted at UF6-4 (zone D-7) to clock data into the Data Latches. With a character code in the Data Latch and Strobe Mem set, the low at pin 14 of Strobe Mem disables DEMAND preventing another character from being sent to the I/O until the previous one has been entered into the printer Buffer #1 (Input Buffer).

The Strobe Sync Mem FF (zone C-6) is steered set by Strobe Mem and it sets on the next clock pulse. The resulting Strobe Sync (STR SYN) signal is gated with outputs of Auto Print Mem and PA Mem (both clear) to generate Character Strobe Command (CSCD) at J2-10 (zone C-1). CSCD sets the Valid Char Mem FF (zone C-4) which inhibits Buffer Reset (BRST) at J2-12. CSCD also enters the Buffer ROM board (figure 4-10, sh 3) at J3-10. The CSCD Input Mem FF (zone C-7) will now go set. Since the CRST FF (zone C-5) is currently clear, the highs at UC6-4 and 5 (zone C-5) generate a BUFFER 1 CLOCK pulse at UE7-1 (zone C-1). This clock pulse allows the current character in the Data Latch to be entered into Buffer #1.

With CSCD Input Mem set, the next CLØ3 will cause Pre-CRST (zone C-6) to set. The following CLØ1 pulse will set the CRST FF activating the Command Reset (CRST) signal at J3-7. It enters the I/O Interface at J2-7 and applies a high at the K input to Strobe Sync Mem (zone C-6) placing it in a clear state which disables CSCD (zone C-1).

With CSCD now low, CRST will deactivate. With CRST low, Strobe Mem clear and REDY high, DEMAND(zone D-3) goes high signalling the computer interface that the printer will now accept another character. This cycle occurs for the transfer of each character code.

A full line of print is 132 characters in length. If a full line is received, the Buff FF enables the Print Command (PCMD) signal. PCMD is initiated by a PAPER INST from the computer interface if less than a full line of print is received. All remaining character positions must have the ASCII code for a space entered in each position.

If a full line of print is received, the Buff FF (figure 4-10, sh 3) goes set. This set caused Auto Print Mem (figure 4-8) to set when the CRST associated with the 132nd character goes low. The resulting high at UA5-2 (zone C-5) disables CSCD at J2-10. The STROBE associated with the 133rd character causes Strobe Sync Mem (zone C-6) to set. With Strobe Sync Mem and Auto Print Mem both set and HRDB inactive (high), UB5-11 (zone C-4) goes high. Since Valid Char Mem (zone C-4) is currently set (CLØ3 has not cleared the FF), PCMD is enabled at J2-13.

Providing less than 132 characters are received, PCMD is activated as follows: After the last character is sent, the computer interfaces issues a PAPER INST to the I/O Interface at J7-10 which sets PA Mem (zone D-5). The low at pin 14 of PA Mem is inverted and gated with HRDB which is inactive (high) causing UB5-11 to go high. Valid Char Mem being set enables PCMD.

Upon receipt of the PCMD at J3-13 (figure 4-10, sh 3), PCMD Input Mem 1 and 2 set on successive clock pulses. Pre-CRST and CRST Disable are steered to set by the setting of PCMD Input Mem 1 and they set on the same clock pulse that sets PCMD Input Mem 2. With the Pre-CRST FF set and the CRST FF clear, CLØ1 (zone D-8) is inhibited from clearing PCMD Input Mem 1 should PCMD signal be removed before the printer has time to act on it. (PCMD Input Mem 1 can only change on a positive going clock pulse.)

As previously mentioned, if less than 132 characters are received, spaces

must be clocked in behind the data to fill the remainder of the line. When PCMD Input Mem 2 sets it steers B1 Mem Fill (zone B-5) to set. It sets on the next B2CL/REV.

With B1 Mem Fill set, UC6-11 (zone C-4) will go high, activating Recirculate Buffer One (RECIRC B1). Gate inputs UC6-9 and 10 are both high (B1 Mem Fill set, B1 CNT 132 high) activating B1 CLOCK ENABLE and BUFFER 1 CLOCK (zone C-2). RECIRC B1 is tied to pins 4 and 13 of UB2, 4, 6, and 8 (figure 4-10, sh 1) enabling the recirculate inputs. Pins 3 and 14 of UB2, 6 and 8 and pin 3 of UB4 are grounded low while UB4-14 is held high by +5 Vdc. Therefore, Buffer #1 sees the ASCII code for a space at its recirculate inputs. Each BUFFER 1 CLOCK enters a space behind the data in Buffer #1 until the Buffer 1 Cntr (figure 4-10, sh 2), which has been incrementing at each B1 CLOCK ENABLE, reaches a count of 132. At count 132, B1 CNT 132 (zone D-2) goes active (low). This low appears at UC6-9 (figure 4-10, sh 3, zone C-4) where it disables B1 CLOCK ENABLE; so the Buffer 1 Cntr no longer counts and no more spaces are clocked into Buffer #1.

A total of 132 characters have now been clocked into Buffer #1. Since Buffer #1 is a 133 bit register, one unknown character is present at its output. This unknown character will be shifted to Buffer #2 but will not be loaded into the Shift Register on the Hammer Latch board; consequently, it will not be printed.

Currently set B1 Mem Fill steers itself clear because its Q output is connected to its K input. On the next B2CL/REV, B1 Mem Fill will clear and Shift B1-B2 will set. Since Shift B1-B2 and PCMD Input Mem 1 are both set, the J input (pin 9) to Pre-Print (zone B-3) is steered set, PRINT SET at J3-38 is active, and RECIRC B1 is held active. Time Slot Advance (TS ADV) is gated with RECIRC B1 (figure 4-10, sh 2, zone C-1) to clear the Buffer 1 Cntr. The Q output of Shift B1-B2 (figure 4-10, sh 3) is gated with the fact that the Buffer 1 Cntr is now clear (B1 CNT 133 high) to cause UE2-8 (zone C-3) to go low. This activates the following signals at zone C-1: B1 CLOCK ENABLE, B2 CLOCK ENABLE and BUFFER 1 CLOCK.

Data is now clocked into Buffer #2 (figure 4-10, sh 1) from Buffer #1 by B2 CLOCK ENABLE. As the data is transferred out of Buffer #1, RECIRC B1 and BUFFER 1 CLOCK (zone D-8) again clocks the ASCII code for a space into Buffer #1 behind the data as it is shifted down the register.

The Buffer 1 Cntr (figure 4-10, sh 2) is counting as data is transferred from Buffer #1 to Buffer #2. At a count of 133, B1 CNT 133 (zone D-2) goes active (low) causing a high at UE2-8 (figure 4-10, sh 3, zone C-3). This results in B1 CLOCK ENABLE, B2 CLOCK ENABLE and BUFFER 1 CLOCK all being disabled.

The currently active PRINT SET signal at J3-38 goes to the Hammer Latch board (figure 4-14, sh 2) at J5-19 (zone D-8). PRINT SET is gated with the next TS ADV to steer the A Mem FF set, and enable the final input to generate Latch Clock (LCLK, zone D-6). The next CLØ3 will set A Mem which in turn disables LCLK (high), activates RECIRC B2 at J5-15 (zone C-8), and generates Shift Register Input A (SRIA, zone D-7). (One LCLK is produced each time A Mem clears.)

With A Mem set, B Mem still clear, and MARKER IN PLACE (zone C-4) inactive, UC1-12 (zone D-6) goes high activating Marker (MKR, zone D-5). The output at UC1-12 is also gated with CLØ3 to enable Shift Register Clock (SRCLK, zone D-4).

Due to the status of A and B Mem, Shift Register Clear (SRCLR, zone D-6) is active causing the Shift Register (figure 4-14, sh 1) to clear. SRIA (zone D-7) and MKR will now enable the A and B inputs to the topmost Shift Register and at the next SRCLK, MKR will be loaded into the register. At each successive SRCLK, MKR will be shifted downward one position at the Q outputs of the register.

While PRINT SET is running its cycle on the Hammer Latch board, Shift B1-B2 (figure 4-10, sh3) is steering the Enable CRST FF set. Shift B1-B2 is being steered clear by B1 Mem Fill and Pre-Print has not yet been set (pin 9 high). At the next TS ADV and CLØ1, UC7-4 (zone B-5) enables B2CL/REV which clocks Enable CRST set, Shift B1-B2 clear and Pre-Print set. PRINT and Hardware Busy (HDWB, zone B-1) will now go active.

The Q output of currently set Enable CRST causes a low at UC7-10 (zone B-6) resulting in CRST Disable going clear. Since Pre-CRST (zone C-6) is set, the CRST FF will set enabling the CRST signal.

CRST and HDWB appear at the I/O Interface (figure 4-8) at J2-7 and J2-15, respectively. CRST is gated with PRINT (active) to set HRDB Mem (zone C-3), and with PCMD to clear Valid Char Mem (zone C-4). When Valid Char Mem clears on CLØ3, PCMD is disabled at J2-13. HDWB is inverted to disable the K input (pin 4) to HRDB Mem to prevent it from clearing.

PCMD Input Mem 1 (figure 4-10, sh 3) is steered clear due to the fact that PCMD is low. The CRST FF being in a set state allows CLØ1 (zone D-8) to be gated and clock PCMD Input Mem 1 clear. After PCMD Input Mem 1 clears, the high at pin 6 disables PRINT SET at J3-38 and steers Pre-CRST (zone C-6), CRST Disable (zone B-6) and Pre-Print (zone B-3) to clear. Pin 7 steers PCMD Input Mem 2 to clear. Pre-CRST and CRST Disable will clear on their next clock pulse, but Pre-Print will be held set since the K input at pin 12 is held low (PRINT RST low). Enable CRST (zone B4) will now be steered clear by PCMD Input Mem 2 and it clears on the next B2CL/REV. At this time the I/O Interface can begin receiving data for the next line of print while the data in Buffer #2 is being printed.

Currently active RECIRC B2 from the Hammer Latch board (figure 4-14, sh 2) appears at J3-52 on the Buffer ROM board (figure 4-10, sh 1, zone D-8). It enables the ROM Output Multiplexer at pin 9 (zone C-2) and the recirculate control inputs of Buffer #2. RECIRC B2 also activates the clock inputs of Buffer #2 on each CLØ3/2 pulse allowing the data in Buffer #2 to be recirculated.

The data in Buffer #2 is now presented to ROM's UA1 and UA2 one character at a time as a character code address. There it is addressed with a dot row code, which is an output of the Dot Row Counter entering the board at J3-43, 42, 41 and 46. The combined character code and dot row code is then presented to the ROM Output Multiplexer UA3.

The coded data now has a dot column code added to it which enters the board at J3-51, 55, 54 and 53. The Multiplexer can now output Dot Serial Data (DSD) for a given row and a given column (high=no dot, low=dot) at J3-50.

PRINT (figure 4-10, sh 3) being active (Pre-Print set), causes a low at J4-56 (figure 4-12, sh 1, zone B-7) which removes the clear on the TS Cntr (zone B-5) allowing it to count, and activates Dot Row Count Enable During Feed (DRC EN FD, zone B-8). The Latch Clear (LCLR) signal at J4-10 is disabled (high) by PRINT causing the clear to be removed from the Memory Latches (figure 4-14, sh 1). The clear on the Mog Start FF's (figure 4-12, sh 2) is removed by PRINT appearing at UG5-2 (zone C-6) as a high. This high also satifies the remaining inputs needed to disable INH HAMMERS at J4-12 (zone C-1). The clear on the Dot Column Cntr (zone C-2) is removed by PRINT (UC8-10 low) allowing it to count. DRC EN FD (zone A-7) removes the clear from pin 1 of Dot Row Cntr allowing it to load. The TS Cntr, Dot Column Cntr and Dot Row Cntr are now free to count.

When the Buffer 2 Cntr reaches a count of 204, UG3-6 (zone D-4) goes high. This high is inverted low to activate TS ADV at UE2-8 which in turn is gated with CLØ1 to generate B2CL/REV at UE1-10 (zone C-4). Each TS ADV causes a high at the enable inputs (pins 7 and 10) of the TS Cntr. The corresponding B2CL/REV clocks the TS Cntr and it increments one count. Being a decade counter, the TS Cntr produces a TS Carry at pin 15 for every ten clocks. TS CARRY (figure 4-12, sh 2, zone C-8) enables the Dot Column Cntr inputs and the same B2CL/REV that clocks the TS Cntr also clocks the Dot Column Cntr. So the Dot Column Cntr will increment one count for every 10 counts of the TS Cntr.

At each count of 7 or 15 from the Dot Column Cntr, UD8-6 (zone D-4) goes low enabling the Dot Row Cntr. The Dot Row Cntr will increment on the next B2CL/REV. Therefore the Dot Row Cntr counts twice for each revolution of the Dot Column Cntr.

Starting from a TS Cntr (figure 4-12, sh 1) count of zero, all its Q outputs are low making all inputs to the TS Decoder (zone B-4) low. This results in a low at TS Decoder output pin 1 while all other outputs remain high. This low, called Time Slot Zero (TSO) is inverted to generate Slot One (S1) at J4-30. When the TS Cntr increments to a count of one the resulting low at pin 2 of the TS Decoder is inverted to cause S1 to remain high. Consequently a Slot (S) remains active for two TS Decoder counts. This high at J4-30 is applied to Buffer Group Select and Hammer Select on the Hammer Latch board (figure 4-14, sh 2).

Since the TS Cntr is just beginning its count, the Dot Column Counter is at a count of zero, having been previously cleared. The low appearing at J5-22 (DCC-D) is also applied to Buffer Group Select and Hammer Select enabling one input to all the "A" gates in those chips and disabling all the "B" gates. PRINT and S1 being active enable gate 1A in the Buffer Group Select chip outputting a high at pin 12 which is Buffer Group One (BFG1).

At this moment the MKR loaded into Shift Register UD4 (figure 4-14, sh 1) is at pin 3 (high). This high (F27, zone D-7) appears at the Marker Comparator (figure 4-14, sh 2, zone C-6). With BFG1 active, MKR IN PLACE (COMPARE) is now active. The resulting low at UC1-12 (zone D-6) deactivates MKR (zone D-5) and disables UA6-4 so SRCLK cannot be generated through this path.

With COMPARE high and A Mem (zone D-7) set, B Mem (zone D-6) is steered set at pin 9. This high at pin 9 is also present at UB6-5 (zone D-6). Input UB6-4 is also high (B Mem still clear). The next CLØ1 will satisfy the remaining input to this gate (UB6-3), generating a SRCLK (low) at UB2-2 (zone D-4) and setting B Mem. Now SRCLK cannot be generated through this path since UB6-4 will be held low by B Mem.

The DSD pulse train from the ROM Output Multiplexer (figure 4-10, sh 1) is fed to the Shift Register (figure 4-14, sh 1) from J5-50. The first SRCLK generated after COMPARE clocks DSD into the register and shifts MKR one position to UD4-4.

RECIRC B2 (figure 4-14, sh 2) is held active at J5-15 due to the fact that B Mem is set. Since A Mem and B Mem are both set, the Dual Clock Cntr (zone C-5) will simultaneously be enabled and remove its clear. The Dual Clock Cntr is clocked by both CLØ1 and CLØ3. Being a decade counter the carry output will enable SRCLK (zone D-4) once for every five CLØ1 pulses.

After one line of data (132 characters and spaces) has been clocked into the printer, the DSD representing that line of print is presented to the Shift Register input at pin 2 (figure 4-14, sh 1). Only every fifth bit of DSD will be clocked into the register since the data is clocked by CLØ1 and the register is clocked by SRCLK (SRCLK = 5 CLØ1). This allows only the DSD for the hammer group selected for firing at this time to be entered into the Shift Register. DSD will be clocked into the Shift Register unitl the Buffer 2 Cntr reaches a count of 132. At this time the MKR has been shifted through the register to position 28 (UD1-6), zone A-7). Positions 1 through 27 are filled with DSD. The outputs of the Shift Register now represent a dot to be printed if the output is high or no dot if the output is low.

When the Buffer 2 Cntr (figure 4-12, sh 1) is at count 132, B2=132 at J4-7 (zone A-1) goes high. On the Hammer Latch board (figure 4-14, sh 2), B2=132 clears A Mem which deactivates SRIA (zone D-7). SRIA being inactive disables the Shift Register. Pin 14 of A Mem is now high causing the Dual Clock Cntr to loose its enable input and activate its clear input, and B Mem is caused to go clear. Both A Mem and B Mem in a clear state cause UB4-6 (zone C-6) to go low disabling the RECIRC B2 signal. RECIRC B2 is gated with RECIRC B1 (high) (figure 4-10, sh 1) at UC3-6 (zone D-6) to disable the recirculate controls of Buffer #2 and the ROM Multiplexer.

The Buffer 2 Cntr (figure 4-12, sh 1) continues counting and, at a count of 204, UG3-6 (zone D-4) goes high resulting in another TS ADV and B2CL/REV which increment the TS Cntr to a count of one. This count of one and the 204 count of Buffer 2 Cntr enable A SET at J4-24 (zone C-1). B2 CNTR CLR at UE2-6 (zone C-3) will activate at a count of 204 which clears Buffer 2 Cntr on the next CLØ1.

The TS Cntr is now at a count of 1 (pin 14- high) which causes a low at pin 2 of the TS Decoder keeping S1 active. Currently active A SET (low) steers A Mem (figure 4-14, sh 2) set and it sets on the trailing edge of the next CLØ3. On the leading edge of the same CLØ3, A SET being active and currently clear A Mem generate LCLK at UA5-12 (zone D-6). This clocks data from the Shift Register (figure 4-14, sh 1) into the Mem Latch. A Mem now goes set and activates SRIA which again enables the Shift Register.

The SRCLR signal (figure 4-14, sh 2, zone D-6) goes active (low) since A Mem is set and B Mem is presently clear. This clocks the Shift Register and it clears.RECIRC B2-6 (zone C-8) again goes active (A Mem set) at J5-15, enabling the ROM Output Multiplexer (figure 4-10, sh 1) and the recirculate inputs of Buffer #2. The clock inputs to Buffer #2 begin clocking the device to recirculate the data in it.

The Buffer 2 Cntr, which has been continuously counting, once more reaches a count of 204 generating TS ADV and B2CL/REV. The TS Cntr now increments to a count of two which places a low at TS Decoder pin 3 and activates S2 at J4-20.

With A Mem set, B Mem clear, and COMPARE low, UC1-12 (figure 4-14, sh 2, zone D-6) goes high activiating MKR. This same high at UC1-12 is gated with CLØ3 to activate SRCLK (zone D-4). The Shift Register (figure 4-14, sh 1) is once again enabled and loads the MKR bit. SRCLK continues to shift the MKR down the register until it reaches UD4-4 activating F26 (zone D-7). This will correspond to BFG4 at the Marker Comparator (figure 4-14, sh 2) which is currently high (S2, PRINT and DCC-D all active make gate 2A active). The Marker Comparator will now activate COMPARE resulting in every fifth bit of DSD being fed into the Shift Register.

Recirculation of data continues in this manner until buffer groups two, five, then three (remember the firing order) of dot column one, row one are all printed. The print comb then shifts to allow dot position two, then three and so on to be printed. At the end of the row the paper advance during print cycle advances the paper one dot row and the hammer firing order is reversed.

Reversal of the firing order is accomplished when DCC-D entering the Hammer Latch board (figure 4-14, sh 2) from the Dot Column Cntr is high (Dot Column Cntr count of eight or more). This causes the "B" gates of Buffer Group Select and Hammer Select to go active. The buffer groups will now activate COMPARE in reverse sequence.

This print cycle continues until the entire line of print is printed onto paper.

3-12. PAPER ADVANCE DURING PRINT CYCLE. Paper advance during a print cycle can be either a dot row advance within a print line or an advance from the end of a print line to the beginning of the next print line. A dot row advance occurs as follows: Each time the Dot Column Cntr (figure 4-12, sh 2) reaches a count of five, the input to UF6-1, 4 and 5 (zone B-3) are all low. Upon receiving a TS1 (low) at UF6-2 from the TS Decoder (figure 4-12, sh 1), all inputs to this gate are satisfied enabling Row Feed During Print. This signal, when gated with Buffer Two Clock Per Revolution (B2CL/REV), generates a PA STEP signal at J4-21. On the Hammer Latch board (figure 4-14, sh 2) at J5-21, PA STEP clocks the two Paper Adv FF's which operate as a Grey Code counter causing paper advance of one dot row. After paper advance of seven dot rows (5 x 7 matrix) or nine dot rows (5 x 9 matrix) the Row Feed During Print signal cannot go high again during that print cycle.

The number of dot rows advanced between lines of print is dependent on character size and the number of lines printed per inch. There are 72 dot rows per inch. When printing 5 x 7 matrices (upper case only) at six lines per inch (LPI), the line of print consumes seven dot rows leaving five dot rows between lines of print. When printing 5 x 7 matrices at eight LPI the paper must advance two dot rows between lines. When printing 5 x 9 matrices (upper and lower case with descending tails) at six LPI, the paper must advance three dot rows between lines of print and when printing this matrix size at eight LPI, the paper must advance no dot rows between lines.

Upon completing a print line, the END OF PRINT signal (figure 4-12, sh 2, zone A-5) goes active. When gated with PRINT and each TS2 (both active) a ROW FEED AFTER PRINT signal results. This signal, when gated with B2CL/REV generates PA STEP allowing paper advance of 12 (6 LPI) or 9 (8 LPI) dot rows since the beginning of that line of print at the rate of one dot row per TS2. Normal paper advance after printing is five dot rows (for a 5 x 7 matrix at 6 LPI). The paper advance count is shortened by Paper Advance Disable in order to provide for the three other combinations of character size and line density. When a character in a line of print requires nine dot rows (lower case with tail) one of the ROM's (figure 4-10, sh 1) will activate the Lower Case with Tail (LOCA) signal which sets Tail Mem FF (figure 4-12, sh 2). At 6 LPI with a 5 x 9 matrix, with Tail Mem set, UE3-1 (zone A-4) goes high. At a Dot Column Cntr count of three or more, UE3-13 also goes high. The resulting low at UE1-11 and the low at UE1-12 (END OF PRINT low) disable the strobe input to UF6-11 (zone A-3) and paper advance ceases after three dot rows. Using 8 LPI operation in a 5 x 7 matrix, UE3-4 (zone A-3) goes high (8 LPI switch on) and UE3-5 will go high upon a count of two from the Dot Column Cntr. This high is gated to disable the strobe input to UF6-11 causing paper advance to cease after two dot rows. When operating at 8 LPI in a 5 x 9 matrix, the 8 LPI switch and Tail Mem being set cause UE3-2 and 3 to go high disabling paper advance immediately after End of Print Cycle is declared resulting in no dot row advance between lines.

Depending on the state of Tail Mem, END OF PRINT will activate after seven or nine dot rows of advance. This signal, when gated with DCC=C at S4 and Time Slot Advance (TS ADV) at UE6-3,4 and 5 (zone B-4) will activate PRINT RST at J4-57 (zone B-8). PRINT RST steers the Pre-Print FF (figure 4-10, sh 3) to clear and it clears on the next B2CL/REV. This ends the print cycle and clears the TS Cntr, Dot Column Cntr, Dot Row Cntr, and loads the Mogator Cntr with a zero.

3-13. PAPER ADVANCE BY COMMAND. There are two types of paper advance commands. One causes paper to advance while monitoring a selected VFU channel and the other causes paper to advance a pre-determined number of lines. In both cases a PAPER INST and STROBE signal must be generated to initiate the advance cycle. Two dot rows of advance at low speed begin and end each slew cycle to allow smooth acceleration and deceleration of paper. Paper advance of a pre-determined number of lines is as follows:

The PAPER INST signal (figure 4-8) at J7-10 and STROBE at J7-U both go high as commanded by the computer interface. STROBE is gated with REDY (print switch on) and inverted to set the Strobe Mem FF (zone C-6). This same STROBE signal is again inverted and used to clock the count code (table 1-3) into the Data Latches (zone A-7). When STROBE and PAPER INST are both active (STROBE low, PAPER INST high) at UB4-5 and 6 (zone D-7), PA Mem is set. Pin 14 of currently set Strobe Mem deactivates DEMAND (zone D-3) while pin 15 steers Strobe Sync Mem to set and it sets on the next CLØ3.

The fact that Hardware Busy (HRDB) is inactive (paper not yet moving) and PA Mem is set causes a high at UB5-11 (zone C-4) enabling PRINT. If a valid character was received prior to the PAPER INST signal, Valid Char Mem (zone C-4) is set, enabling Print Command (PCMD) at J2-13. This allows the current line of print to be printed before paper slew begins.

With PA Mem set, Character Strobe Command (CSCD) is disabled at J2-10. The J Input to Paper Instruction Memory (JPI) signal at UC1-12 (zone B-5) is high due to the status of PA Mem, HRDB Mem being clear and the Data Latch input to that gate being low. With JPI active, the Line Cntr (zone A-6) loads the complement of the count code from the Data Latch, and the LF Strobe Mem FF and Line Feed Mem set. After the printer completes the current print cycle, Hardware Busy (HDWB) from the Buffer ROM board at J2-15 and PRINT go low. Since Line Feed Mem is set, all inputs to the gate leading to pin 8 of Slew Mem (zone B-3) are satisfied causing Slew Mem to set. The resulting high at J2-8 activates SLEW.

Since SLEW is high at J3-8 of the Buffer ROM board (figure 4-10, sh 3), Slew Input Mem 1 and 2 set on successive clock pulses. The HDWB signal at J3-15 (zone A-1) now goes active and Slew Start Mem (zone A-4) is steered set; it sets on the next B2CL/REV. Slew Start Mem being set results in the following conditions: The HDWB signal is maintained high to the I/O Interface, Feed (FD) is now active (low), and Low Speed Feed (LSFD) goes high (Slew Continuous Mem being clear).

The FD signal appears at J4-34 of the Control Board (figure 4-12, sh 1) where it is inverted at UC6-6 then gated to become Dot Row Count Enable During Feed (DRC EN FD) which removes the clear on the TS Cntr and the Dot Row Cntr (figure 4-12, sh 2) allowing them to count. When the TS Cntr reaches a count of two, it is decoded as a low at TS Decoder pin 3 which is TS2 (low). This signal causes a low at UG6-3 (figure 4-12, sh 2, zone A-4). LSFD at J4-58 is gated with the fact that the Dot Row Cntr is at zero causing a low at UG6-5. When Time Slot Advance (TS ADV) goes active (low) at UG6-4 a PA STEP pulse at J4-21 is generated on the next B2CL/REV allowing paper advance of one dot row at low speed.

The still active FD signal at J4-34 (figure 4-12, sh 1) is gated with a count of nine from the TS Decoder to enable Time Slot Reset During Feed (TS RST FD) at zone A-2. After being inverted (figure 4-12, sh 2), TS RST FD enables the Dot Row Cntr at pins 7 and 10 once for every revolution of the TS Decoder at TS9 (low). The Dot Row Cntr increments to a count of one on the next B2CL/REV. On the next TS2, paper advances one more dot row at low speed. (Low speed feed occurs at the rate of one dot row per TS Cntr revolution.)

With the Dot Row Cntr at a count of one and TS RST FD currently active, Dot Row Count = One (DRC=1) goes active (low) at J4-49. It appears at J3-49 on the Buffer ROM board (figure 4-10, sh 3). Since Slew Start Mem is set (zone A-4), UE6-10 goes high steering Slew Continuous Mem to set. Slew Continuous Mem sets and the Dot Row Cntr increments to a count of two, both on the next B2CL/REV. The fact that both Slew Start Mem and Slew Continuous Mem are now set results in the following conditions: HDWB and FD are maintained active (zone B-1), LSFD goes inactive (low) and High Speed Feed (HSFD) goes active (low).

HSFD enters the Control board (figure 4-12, sh 2) at J4-32 where it is gated with TS ADV and each Time Slot Zero and Five (TS0/5) enabling HS SLEW CLK at UG6-8 (zone A-7). So HS SLEW CLK goes high twice for each revolution of the TS Decoder. PA STEP is generated at each HS SLEW CLK and B2CL/REV, so paper is now advancing at high speed. Paper has already advanced two dot rows at low spped, and TSO and TS5 have caused two dot rows of advance at high speed making a total of four dot rows. When the TS Decoder reaches TS9, TS9 and FD are gated to generate another TS RST FD at Zone B-8 which increments the Dot Row Cntr to a count of three. The next TSO and TS5 cause paper to advance two more dot rows (total of six dot rows) at high speed and the next TS9 increments the Dot Row Cntr to a count of four.

If the printer is operating at 8 LPI, UC1-4 (figure 4-12, sh 1, zone B-7) is now low. With FD active (low) the next TS ADV completes the inputs to the gate causing a Line Complete (LCOM) signal to be issued to the I/O Interface Board. This sequence is further explained in the 6 LPI operation which follows.

Operating at 6 LPI with six dot rows advanced at this moment, the next TSO and TS5 cause paper to advance a total of eight dot rows and TS9 increments the Dot Row Cntr (figure 4-12, sh 2) to a count of five.

Now TSO and TS5 cause paper to advance a total of 10 dot rows. The Dot Row Cntr is still at a count of five and DRC=5 (zone B-8) is active (low). With DRC=5 and TS5 both active and the printer in 6 LPI operation, a LCOM (figure 4-12, sh 1) at J4-11 is issued to the I/O Interface (figure 4-8, zone A-5) two dot rows before paper advances one full line (12 dot rows at 6 LPI). This is to allow two dot rows of advance at low speed at the end of the slew cycle. Each LCOM signal clocks the Line Cntr toward a count of 15. (Remember that the Line Cntr has been loaded with the complement of the count code.) At the next TS9 (figure 4-12, sh 1) UE6-12 (zone C-7) goes high. When gated with FD, the resulting low at UE7-12 (zone B-6) clears the TS Cntr and the Dot Row Cntr. Since DRC=5 is now inactive (high) the clear inputs to the counters disable and the counters again count causing PA STEP to occur twice per count of the Dot Row Cntr. The slew cycle continues at high speed until the LCOM signal has clocked the Line Cntr to a count of 14 or 15.

If a PAPER INST (figure 4-8) signal was issued and at least one valid character was in the printer Input Buffer, SLEW will deactivate at a Line Cntr count of 14. This is due to the fact that one of the lines will be advanced during the print cycle. If no print cycle occurs, SLEW will continue until the Line Cntr reaches a count of 15.

If a print cycle did occur, BRST Mem (zone B-1) is clear. This clear, when gated with a Line Cntr count of 14 causes highs at UF3-1,2,4 and 5 (zone A-5). Since LF Strobe Mem (zone A-4) is set, Line Feed Mem (zone B-3) will clear on the next CLØ3. Form Feed Mem being clear results in a high at UB4-13 (zone B-2) which steers Slew Mem to clear. Slew Mem clears on the next CLØ3 disabling SLEW. If no print cycle had occurred, BRST Mem is set. Consequently, only a Line Cntr count of 15 will simultaneously enable UF3-1,2,3, and 5 allowing Line Feed Mem to clear, which clears Slew Mem and disables SLEW at J2-8.

With SLEW disabled at J3-8 (figure 4-10, sh 3) Slew Input Mem 1 and 2 will clear on successive clock pulses. With Slew Input Mem 2 clear, Slew Start Mem (zone A-4) currently set, and TS ADV at J3-39 low, the next TS 4/9 at J3-59 causes UD6-6 (zone A-4) to go high activating Dot Row Counter Preset (DRC-PRST) at J3-33. The same TS 4/9 is gated with the low from currently cleared Slew Input Mem 2 to steer Slew Start Mem to clear. It clears on the next B2CL/REV. Since Slew Continuous Mem is set, HSFD is disabled and LSFD is activated.

Currently active DRC-PRST appears at J4-33 on the Control board (figure 4-12, sh 1) where it enables the load input to the TS Cntr and it loads a count of zero. DRC-PRST is also inverted to activate DRCLD (low) which causes the Dot Row Cntr (figure 4-12, sh 2) to load a count of six. The resulting high at UG7-4 (zone B-5) is gated with LSFD entering the Control board at J4-58. One input to the Low Speed Slew Clock (zone A-4) is now enabled. At TS ADV and TS2 the other two inputs are enabled generating PA STEP at the next B2CL/REV. Paper has now advanced one dot row at low speed making a total of 11 dot rows in the last line of slew. When the Dot Row Cntr increments to a count

of seven at TS2, paper is advanced one more dot row at low speed (total of 12 dot rows). SLEW RST at J4-47 is now active (DRC=7 and TS RST FD active).

SLEW RST appears at J3-47 of the Buffer ROM board (figure 4-10, sh 3) where it steers Slew Continuous Mem to set and it sets on the next B2CL/REV. The FD signal now goes high which clears both the TS Cntr and Dot Row Cntr. LSFD at J3-58 also goes low and since the Pre-Print FF (zone B-3) is clear, HDWB at J3-15 is disabled. Paper advance of a pre-determined number of lines is now ended.

When paper is to be advanced while monitoring a VFU channel, the computer interface causes a high at J7-7 (figure 4-8). The resulting low at UC1-9 (zone B-5) is gated with the fact that PA Mem (zone D-5) is set and HRDB is low, causing Form Feed Mem to set. Line Feed Mem is clear so UB4-13 (zone B-2) is low. This results in J-SLEW at UA5-8 (zone B-3) since PRINT is currently low (UA5-10) and HDWB is low (UA5-11; printer not yet moving paper). Slew Mem now sets enabling SLEW at J2-8. The slew cycle now begins in the same manner as slew for a pre-determined number of lines.

J-SLEW and Form Feed Mem being set cause VFU Strobe Mem (zone B-2) to set. This enables the strobe input to VFU Sel (zone C-8). The VFU channel select code (table 1-3) enters Data Latch UE4 (zone A-7) then goes to the VFU Sel Buffer (zone C-7) inputs. The output of the VFU Sel Buffer is a code indicating which channel VFU Sel, UA7,must monitor. When a hole is detected in the selected channel it causes UA7-5 to go high. Line Feed Mem is currently clear so Form Feed Mem will clear on the next CLØ3. With Form Feed Mem and Line Feed Mem both clear, the K input to Slew Mem goes high. Slew Mem is now in a clear state so SLEW is disabled and paper advance is terminated.

When the printer issues a CRST in response to the PCMD at its Input Buffer, HRDB Mem (zone C-3) sets and Strobe Mem clears, enabling DEMAND at J7-R. This allows the Interface board to receive data while the current paper instruction is carried out.

3-14. MOGATOR DRIVE. When the Pre-Print FF sets (figure 4-10, sh 3) it generates print (low) which removes the clear from Mog Start A and B (figure 4-12, sh 2). The J input to Mog Start A will go high when TSB (zone D-8) is low and TSC is high. Mog Start A will then set on the next CLØ1. The low at pin 14 of Mog Start A releases the set on the Mog Direction FF, UG8 (zone D-3), and puts a count of two at the input of the Mogator Cntr (zone D-3). With Mog Start A set and Mog Start B clear, UF4-4 (zone C-4) goes high enabling the load input to the Mogator Cntr and it loads a count of two. Mog Start B is now steered set by Mog Start A and it sets on the next clock pulse. The load input to the Mogator Cntr is now disabled. Each time the TS Decoder (figure 4-12, sh 1) activates TSA (zone C-2), TSA activates the enable input to the Mogator Cntr (figure 4-12, sh 2) at UB6-4. The Mogator Cntr then increments to every other B2CL/REV while TSA is active. Mogator motor phasing is determined by the signals at J4-37 and 40 which appear at the Hammer Latch board (figure 4-14, sh 2)

at J5-37 and 40. After being inverted, four mogator driver phases are available to the Motor Driver board (figure 4-17) with two phases being on at any given time. As one phase goes off, another goes on.

At this moment the Mog Direction FF is set, so the Mogator Cntr is counting up, causing the mogator motor to drive the print comb to the right. When DRC-A is low and DCC-C, MGC-B and D are all high, UF7-8 (zone D-4) will steer Mog Direction to clear. It clears the next time the clock pulse (B2=132) goes high. With Mog Direction clear, the Mogator Cntr will count down, which reverses the mogator motor and drives the print comb to the left. The Mogator Cntr continues counting down until DRC-A, MGC-D, and DCC-C are high and MGC-B is low causing a high at UF7-6 (zone D-4). This high steers Mog Direction to set and it sets the next time B2=132. Now the Mogator Cntr is counting up and the print comb drives to the right again.

3-15. RIBBON DRIVE. Advance of the print ribbon occurs during the Power-On-Reset (PORS) cycle and the Print cycle. Logic control of the ribbon drive is provided by a Ribbon Adv flip-flop (figure 4-14, sh 2) which is triggered by an output of the Dot Row Cntr causing relay K3 (figure 4-6) to energize. When relay K3 is energized, power is available to either the right or left hand ribbon motor depending on the status of relay K4. A bypass network for relay switch K3 allows a small amount of tension to be maintained on the ribbon. Reversal of the direction of ribbon drive is controlled by the ribbon switches.

3-16. POWER SUPPLY (figure 4-6). The power supply circuit board receives power inputs from three transformers; the control transformer (T2), the logic supply transformer (T1) and the hammer transformer (T3). The center-tapped secondary of the control transformer is full-wave rectified to provide +15 volts filtered and unfiltered for internal use on the power supply circuit board. The logic supply transformer has two secondary windings both of which have full-wave bridge rectifiers. One of these windings is a -18 volt supply to the Buffer ROM circuit board and the LED array on the Vertical Format Unit. The other winding supplies +8 volts to all circuit boards and the sonalert. On the power supply circuit board it lowers the +8 volts to a regulated +5 volts which is the logic supply voltage on the Hammer Driver circuit board. The hammer supply transformer provides filtered +14 volts to the hammer coils by way of the A14 buss bar on the capacitor bank assembly.

The triacs Q9 and Q10 (zone B-2) control the AC voltage supply to the primary windings of the logic supply transformer and the hammer transformer respectively. This is accomplished as follows: The control transformer has AC power applied whenever the circuit breaker is in the ON position, providing +15 volts to the power supply PCA. When the ON switch is activated, J17-A (zone D-7) is no longer grounded low. Diode CR9 is now forward biased causing Q4 to conduct. Transistors Q1 and Q2 conduct causing relay K1 to activate and close its switch. With the switch closed, Q9 will reach breakover voltage and start to conduct. Power is now available to the logic supply transformer enabling the +8 volt logic supply. Transistor Q6 (zone C-5) now starts to conduct and activates relay K2. When relay switch K2 closes, Triac Q10 reaches breakover voltage and AC voltage is now available to the hammer transformer.

When power is removed from the printer, the components R1, C1, R2, CR1 and CR2 delay deactivation of relay K1 until relay switch K2 opens and the hammer supply voltage decays. This prevents the circuit breaker from tripping each time power is removed.

3-17. VERTICAL FORMAT UNIT.

3-18. FORMS CONTROL. The Vertical Format Unit is an eight channel paper tape reader used to control the vertical location of the print on forms. Normally a tape is punched with one program which corresponds to one type of form. However, it is possible to punch more than one program on a tape and use it with more than one type of form. The software program determines how the vertical format unit tape program will be read and consequently how the form will be handled. So the VFU tape program is used in conjunction with the software program to determine vertical location of print on a form. Horizontal location of print is determined by coding spaces into the data presented to the printer as required.

3-19. MANUAL FORM FEED. Channel one of a VFU tape is normally defined as top-of-form. The printer must use a VFU tape with at least a hole in the top-of-form channel in order to allow proper operation of the form feed circuit since form feed stops when this channel is detected. If a tape in the VFU has no hole in the top-of-form channel, the printer will slew continuously upon activation of the Form Feed switch or a print instruction specifying channel one. If no tape is installed in the VFU, paper will slew upon activation of the Form Feed switch and stop whenever the switch is released without continuing to the top-of-form.

SECTION IV. DIAGRAMS AND PARTS LISTS

4-1. INTRODUCTION.

This section contains schematic and cabling diagrams, parts location diagrams and replaceable parts lists. Block diagrams, flowcharts, and information regarding mnemonics is also included.

4-2. MNUEMONICS.

The mnemonics used with respect to the line printer are listed in Table 4-1.

The mnemonics which appear only on the interface circuit board logic diagram are listed in Table 4-2.

The signal index shown in Table 4-3 is intended as an aid in tracing signals between circuit boards. To determine which circuit boards contain the signal, find the signal name which is listed alphabetically (numerical mnemonics are at the bottom of the list) and in each column with connector information, read the circuit board name at the top of that column. For example, to trace the signal BUFF, reading across the page you will find in the Interface circuit board column the information "J2-14" (connectorJ2-pin 14). The signal will also be found in the Buffer ROM column as "connector J3-pin 14." At these pin locations on the schematic diagrams you will find the signal BUFF. The asterisk identifies that signal location as the signal source.

4-3. PARTS ORDERING PROCEDURE.

To order parts from Hewlett-Packard, or to obtain further information about parts, address the order or inquiry to the nearest Hewlett-Packard Sales and Service Office. (These offices are listed at the back of this manual.) When ordering parts give the following information for each part:

a. Line Printer model and serial number.

b. Hewlett-Packard part number.

c. Description of the part.

d. Circuit reference designation if the part is an electronic component.

e. If the part is installed on a printed circuit assembly or board, give the series code stamped or etched on the PCA.

To order a part not listed in the replaceable parts tables, give a complete description of the part and describe its function and location.

TABLE 4-1 LINE PRINTER MNEMONICS

MNEMONIC	DEFINITION
A	Enable
A SET	A Enable ("A" Flop Set)
B1 CLK	Buffer One Clock
B1 CNT	Buffer One Count
B2 CLK	Buffer Two Clock
B2 CNT	Buffer Two Count
B2 CL/REV	One Clock Per Buffer Two Revolution
BFG	Buffer Group
BRST	Buffer Reset
BUFF	Buffer Full
BZR	Buzzer
CB	Circuit Breaker
CKT	Circuit
CL	Clock
CLK	Clock
CLØ	Clock Phase
CLR	Clear
CNT	Count
CNTR	Counter
CRST	Command Reset
CS	Current Sensor
CSCD	Character Strobe Command
DATA(n)	Data (Channel n)
DCC	Dot Column Counter
DN	Down
DRC	Dot Row Counter
DRCENFD	Dot Row Count Enable During Feed
DRCLD	Dot Row Counter Load
DRC-PRST	Dot Row Counter Preset
DSD	Dot Serial Data
DSR	Data Set Ready
EN	Enable
FD	Feed
F	Feedback
FFSW	Form Feed Switch
FF	Form Feed
HDWB	Hardware Busy
HS	Hammer Supply
HSFD	High Speed Feed
INH	Inhibit
I/O	Interface Circuit Board
LCLK	Latch Clock
LCLR	Latch Clear
LCOM	Line Feed Complete
L.C. ROM	Lower Case Read Only Memory
LD	Load
LED	Light Emitting Diode
LF	Line Feed
LFSW	Line Feed Switch
LG	Latch Group
LOCA	Lower Case with tail
LPI	Line Per Inch
LSFD	Low Speed Feed
MFF	Manual Form Feed
MG	Mogator
MGØ	Mogator Phase
MGC	Mogator Counter
MGDØ	Mogator Drive Phase
MKR	Marker
MLF	Manual Line Feed
MRST	Manual Reset

Table 4-1.(continued)

MNEMONIC	DEFINITION	MNEMONIC	DEFINITION
PA	Paper Advance	SPOR	System Power on Reset
PADØ	Paper Advance Driver Phase	S/R	Shift Register
PAPO	Paper Out	SR CLK	Shift Register Clock
PA STEP	Paper Advance Step	SR CLR	Shift Register Clear
PCMD	Print Command	SRIA	Shift Register Input A
PF	Paper Feed	SRST	System Reset
PORH	Power On Reset Delayed by Hammer Supply	ST	Schmitt Trigger
PORS	Power On Reset	TOF	Top of Form
POUT	Paper Out	TS	Time Slot
POUT SW	Paper Out Switch	TS ADV	Time Slot Advance
PRE-CRST	Pre-Command Reset	TS RST FD	Time Slot Reset During Feed
PRINT RST	Print Reset	U.C. ROM	Upper Case Ready-Only Memory
PRSW	Print Switch	VFU	Vertical Format Unit
PRT-SET	Print Set	VFU-TOF	Vertical Format Unit Top of Form
PSON	Power Supply On	VS	Hammer Select
P/U	Pull Up		
RECIRC	Recirculate		
REDY	Ready		
REXT	Reset Extended		
RIBCT	Ribbon Control		
RING	Telephone Modem Indicator		
RVCH	Reverse Channel		
S	Slot		
SLEW RST	Slew Reset		
SONA	Sonalert		

TABLE 4-2 INTERFACE MNEMONICS

MNEMONIC	DEFINITION
HRDB	Hardware Busy (This is not the same signal as HDWB)
JFF	J Input to Form Feed Memory
JLF	J Input to Line Feed Memory
JPI	J Input to Paper Instruction Memory
J-SLEW	J Input to Slew Memory
KFF	K Input to Form Feed Memory
KLF	K Input to Line Feed Memory
KSTR	K Input to Strobe Memory
PAPER INSTR	Paper Instruction
POR	Power On Reset (This is not the same signal as PORS)
STR SYN	Strobe Synchronization
STROBE	Strobe

Table 4-3 SIGNAL INDEX

MNUEMONIC	POWER SUPPLY Fig. 4-6	INTER-FACE Fig. 4-8	BUFFER ROM Fig. 4-10	CONTROL LATCH Fig. 4-12	HAMMER LATCH Fig. 4-14	HAMMER DRIVER Fig. 4-16	MOTOR DRIVER Fig. 4-17	COMMENTS
$\overline{\text{A SET}}$				*J4-24	J5-24			*INDICATES SOURCE OF SIGNAL
B2-132				*J4-7	J5-7			
B2 CL/REV			J3-9	*J4-9				
BRST		*J2-12	J3-12					
BUFF		J2-14	*J3-14					
BZR			*J8-13					TO SONALERT
CB TRIP	J17-H				*J5-33 J5-6			
CLØ1		J2-27	*J3-27	J4-27	J5-27			
CLØ3		J2-16	*J3-16		J5-16			
CRST		J2-7	*J3-7					
CS1					J21-A3			*FROM CURRENT
CS2					J21-4			SENSOR ASSY
CSCD		*J2-10	J3-10					
DATA 1		J2-24 J7-1	J3-24					
$\overline{\text{DATA 1}}$		J7-A						
DATA 2		J2-21 J7-2	J3-21					
$\overline{\text{DATA 2}}$		J7-B						
DATA 3		J2-22 J7-3	J3-22					
$\overline{\text{DATA 3}}$		J7-C						
DATA 4		J2-19 J7-4	J3-19					*FROM DATA
$\overline{\text{DATA 4}}$		J7-D						SOURCE
DATA 5		J2-18 J7-5	J3-18					
$\overline{\text{DATA 5}}$		J7-E						
DATA 6		J2-17 J7-6	J3-17					
$\overline{\text{DATA 6}}$		J7-F						
DATA 7		J2-20 J7-7	J3-20					
$\overline{\text{DATA 7}}$		J7-H						

TABLE 4-3 (Continued)

MNUEMONIC	POWER SUPPLY Fig. 4-6	INTER-FACE Fig. 4-8	BUFFER ROM Fig. 4-10	CONTROL Fig. 4-12	HAMMER LATCH Fig. 4-14	HAMMER DRIVER Fig. 4-16	MOTOR DRIVER Fig. 4-17	COMMENTS
DCC-A			J3-53	*J4-53				
DCC-B			J3-54	*J4-54				
DCC-C			J3-55	*J4-55				
DCC-D			J3-51	J4-22 *J4-51	J5-22			
DEMAND		*J7-R						TO DATA SOURCE
$\overline{\text{DEMAND}}$		*J7-14						
DRC-A			J3-43	*J4-43	J5-43			
DRC-B			J3-42	*J4-42				
DRC-C			J3-41	*J4-41				
DRC-D			J3-46	*J4-46				
DRC-PRST			*J3-33	J4-33				
$\overline{\text{DRC = 1}}$			J3-49	*J4-49				
$\overline{\text{DSD}}$			*J3-50		J5-50			
$\overline{\text{FD}}$			*J3-34	J4-34				
FFSW			J8-U					FROM SWITCH ASSY PIN 10
$\overline{\text{FFSW}}$			J8-18					FROM SWITCH ASSY PIN 9
FL						P20-4		FROM POWER SOURCE
GND	J19-6, -12	J7-20, J2-1 -2,-61,-62	J-A, -1, J3 -1-2,-61,-62	J4-1,-2, -61,-62	J21-10, -A10, J5-1, -2,-61,-62	A14-1, -7	P20-3, -5	FROM CAPACITOR BANK ASSY
HDWB		J2-15	*J3-15					
HS	J17-2							FROM CAPACITOR BANK ASSY
$\overline{\text{HSFD}}$			*J3-32	J4-32				
INH HAMMERS				*J4-12	J5-12			
$\overline{\text{LCLR}}$				*J4-10	J5-10			
LCOM		J2-11	J3-11	*J4-11				
LED SUPPLY					*J21-[illegible]			TO VFU ASSY
LFSW			J8-C					FROM SWITCH ASSY PIN 8
$\overline{\text{LFSW}}$			J8-3					FROM SWITCH ASSY PIN 7

TABLE 4-3 (Continued)

MNUEMONIC	POWER SUPPLY Fig. 4-6	INTER-FACE Fig. 4-8	BUFFER ROM Fig. 4-10	CONTROL Fig. 4-12	HAMMER LATCH Fig. 4-14	HAMMER DRIVER Fig. 4-16	MOTOR DRIVER Fig. 4-17	COMMENTS
LG1					*J9-C			
LG2					*J9-2			
LG3					*J9-B			
LG4					*J9-M			
LG5					*J9-L			
LG6					*J9-6			
LG7					*J9-F			
LG8					*J9-5			
LG9					*J9-E			
LG10					*J9-D			
LG11					*J9-4			
LG12					*J9-J			
LG13					*J9-8			
LG14					*J9-7			TO CABLING FOR HAMMER DRIVER BOARD
LG15					*J9-H			
LG16					*J9-R			
LG17					*J9-S			
LG18					*J9-P			
LG19					*J9-N			
LG20					*J9-11			
LG21					*J9-10			
LG22					*J9-K			
LG23					*J9-9			
LG24					*J9-14			
LG25					*J9-15			
LG26					*J9-12			
LG27					*J9-13			
LOCA			*J3-35	J4-35				
LSFD			*J3-58	J4-58				

TABLE 4-3 (Continued)

MNUEMONIC	POWER SUPPLY Fig. 4-6	INTER-FACE Fig. 4-8	BUFFER ROM Fig. 4-10	CONTROL Fig. 4-12	HAMMER DRIVER Fig. 4-14	HAMMER DRIVER Fig. 4-16	MOTOR DRIVER Fig. 4-17	COMMENTS
MASTER CLEAR		J7-8						*FROM DATA
$\overline{\text{MASTER CLEAR}}$		J7-J						SOURCE
MG ØA				*J4-37	J5-37			
MG ØB				*J4-40	J5-40			
MGD ØA					*J9-19		J14-2	
$\overline{\text{MGD ØA}}$					*J9-X		J14-1	TO MOGATOR
MGD ØB					*J9-W		J14-4	MOTOR
$\overline{\text{MGD ØB}}$					*J9-20		J14-3	
ON	J17-A	J2-30	J3-30 J8-5					*FROM SWITCH ASSY PIN 14
$\overline{\text{ON}}$			J8-E					*FROM SWITCH ASSY PIN 15
$\overline{\text{ON INDICATOR}}$			*J8-Z					TO SWITCH ASSY PIN 18
ON LINE		J7-S						TO DATA
$\overline{\text{ON LINE}}$		J7-15						SOURCE
PAD ØA					*J9-Y		J13-2	
$\overline{\text{PAD ØA}}$					*J9-21		J13-1	TO PAPER ADVANCE MOTOR
PAD ØB					*J9-22		J13-4	
$\overline{\text{PAD ØB}}$					*J9-Z		J13-3	
PAPER INST		J7-10						*FROM DATA
$\overline{\text{PAPER INST}}$		J7-L						SOURCE
PA STEP				*J4-21	J5-21			
PCMD		*J2-13	J3-13					
PORH				J4-17	*J5-17			
PORS		J2-29	*J3-29	J4-29				
POUT SW			*J8-16					TO SONALERT
$\overline{\text{PRINT}}$			*J3-56	J4-56	J5-56			
$\overline{\text{PRINT INDICATOR}}$			*J8-W					TO SWITCH ASSY PIN 13
PRINT RST			J3-57	*J4-57				
PRINT SET			*J3-38	J4-19,-38	J5-19			

TABLE 4-3 (Continued)

MNUEMONIC	POWER SUPPLY Fig. 4-6	INTER-FACE Fig. 4-8	BUFFER ROM Fig. 4-10	CONTROL Fig. 4-12	HAMMER LATCH Fig. 4-14	HAMMER DRIVER Fig. 4-16	MOTOR DRIVER Fig. 4-17	COMMENTS
PRSW			J8-T					*FROM SWITCH ASSY PIN 12
$\overline{\text{PRSW}}$			J8-V					*FROM SWITCH ASSY PIN 11
READY		*J7-T						TO DATA SOURCE
$\overline{\text{READY}}$		*J7-16						
RECIRC B2			J3-52	J4-15,-52	*J5-15			
REDY		J2-25	*J3-25					
$\overline{\text{R-EXT}}$			J3-26	*J4-26	J5-26			
RIB CT	J17-1				*J5-38			
RVCH		*J2-60	J3-60					
S1				*J4-30	J5-30			
S2				*J4-20	J5-20			
S3				*J4-18	J5-18			
S4				*J4-31	J5-31			
S5				*J4-44	J5-44			
SLEW		*J2-8	J3-8					
SLEW RST			J3-47	*J4-47				
SRST		*J2-31	J3-31					
STROBE		J7-U						*FROM DATA SOURCE
$\overline{\text{STROBE}}$		J7-17						
TOF		*J2-42	J3-45					
TS ADV				*J4-8	J5-8			
$\overline{\text{TS ADV}}$			J3-49	*J4-39				
$\overline{\text{TS 4/9}}$			J3-59	*J4-59				

TABLE 4-3 (Continued)

MNUEMONIC	POWER SUPPLY Fig. -46	INTER-FACE Fig. 4-8	BUFFER ROM Fig. 4-10	CONTROL Fig. 4-12	HAMMER LATCH Fig. 4-14	HAMMER DRIVER Fig. 4-16	MOTOR DRIVER Fig. 4-17	COMMENTS
VFU-1		J2-45			J21-A6 J5-45			
VFU-2		J2-47			J21-6 J5-47			
VFU-3		J2-49			J21-A7 J5-49			
VFU-4		J2-51			J21-7 J5-51			* FROM VFU MODULE
VFU-5		J2-59			J21-9 J5-59			
VFU-6		J2-57			J21-A9 J5-57			
VFU-7		J2-55			J21-A8 J5-55			
VFU-8		J2-53			J21-8 J5-53			
VS 1					*J9-16			
VS 2					*J9-U			
VS 3					*J9-17			TO CABLING FOR HAMMER DRIVER BOARD
VS 4					*J9-V			
VS 5					*J9-18			
+5V	J19-1,-9				J21-5			
+5V SENSE	J17-H	*J2-6	*J3-6	*J4-6	*J5-6			
6 LPI			J8-11					
$\overline{6}$/8 LPI			*J3-48	*J4-48				
8 LPI IND			J8-20					
8 LPI			J8-17					
+8V		J2-3,-4	J3-3,-4 J8-B,-2	J4-3,-4	J5-3,-4			* FROM POWER
−18V			J3-5		J5-5			SOURCE

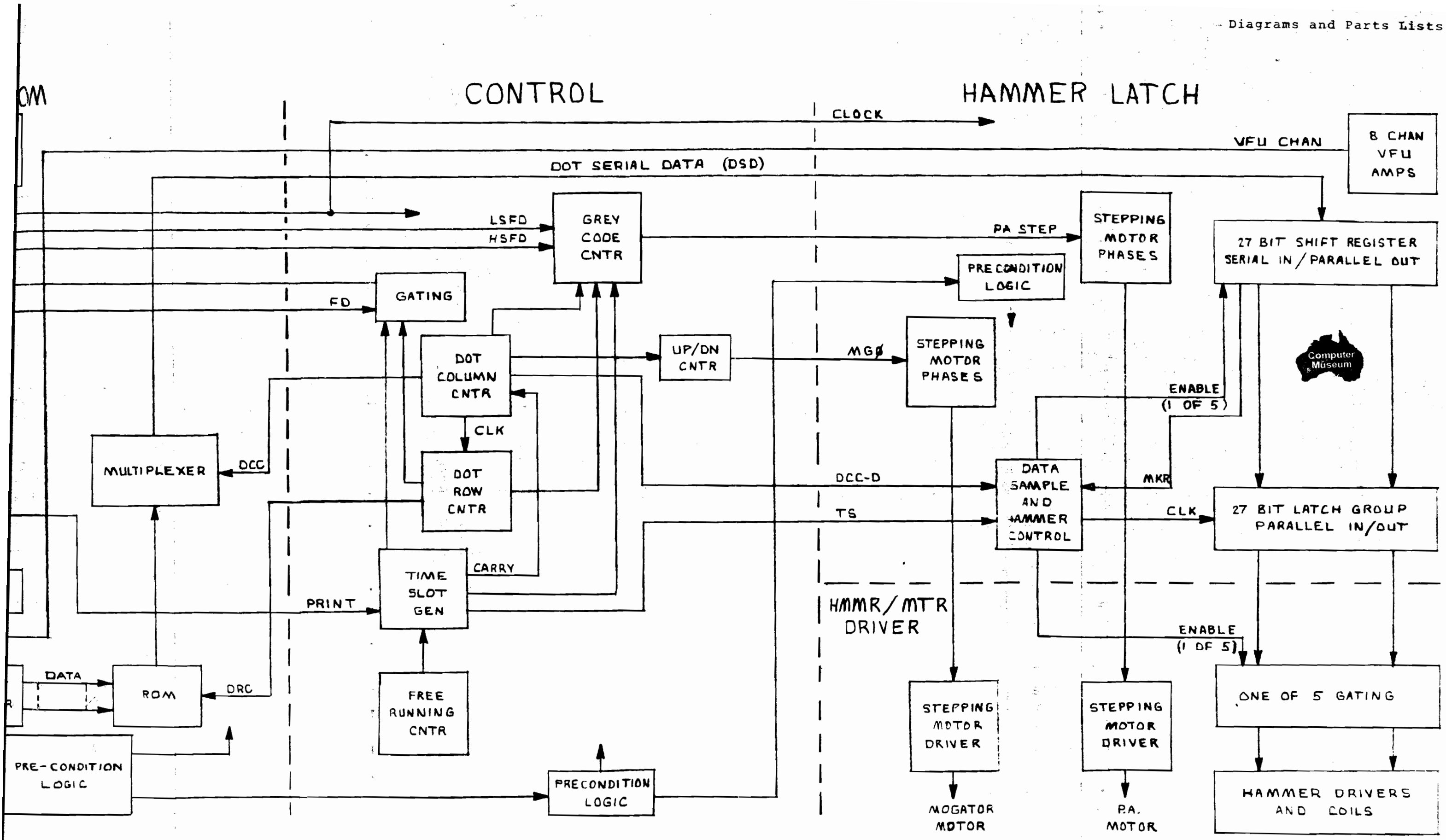
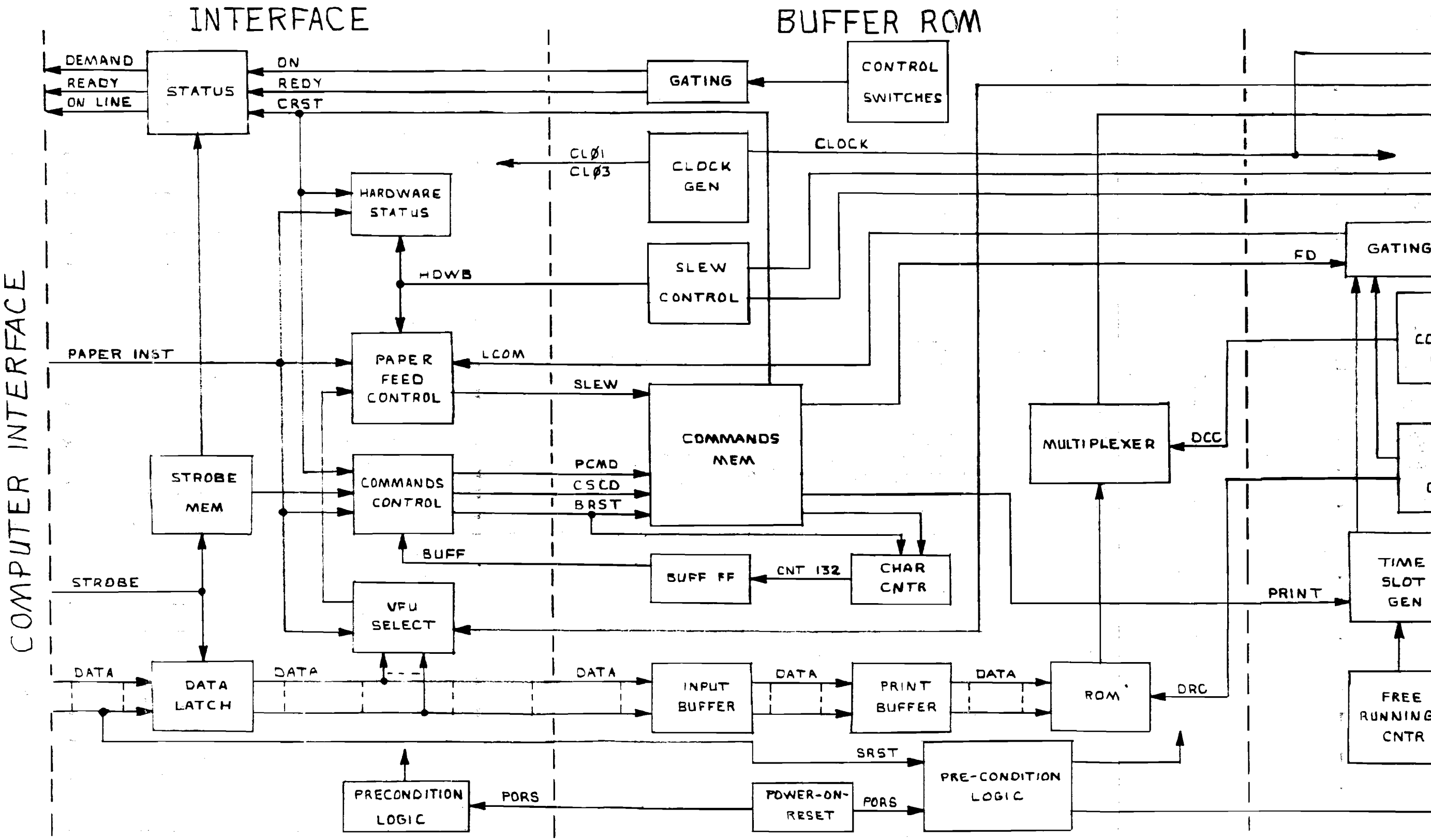


Figure 4-1. Block Diagram


INTERFACE
BUFFER ROM
COMPUTER INTERFACE
DEMAND
READY
ON LINE
STATUS
ON
REDY
CRST
GATING
CONTROL SWITCHES
CLØ1
CLØ3
CLOCK GEN
CLOCK
HARDWARE STATUS
HDWB
SLEW CONTROL
FD
GATING
PAPER INST
PAPER FEED CONTROL
LCOM
SLEW
COMMANDS MEM
MULTIPLEXER
DCC
STROBE MEM
COMMANDS CONTROL
PCMD
CSCD
BRST
BUFF
BUFF FF
CNT 132
CHAR CNTR
TIME SLOT GEN
PRINT
STROBE
VFU SELECT
DATA
DATA LATCH
DATA
DATA
INPUT BUFFER
DATA
PRINT BUFFER
DATA
ROM
DRC
FREE RUNNING CNTR
SRST
PRE-CONDITION LOGIC
PRECONDITION LOGIC
PORS
POWER-ON-RESET
PORS

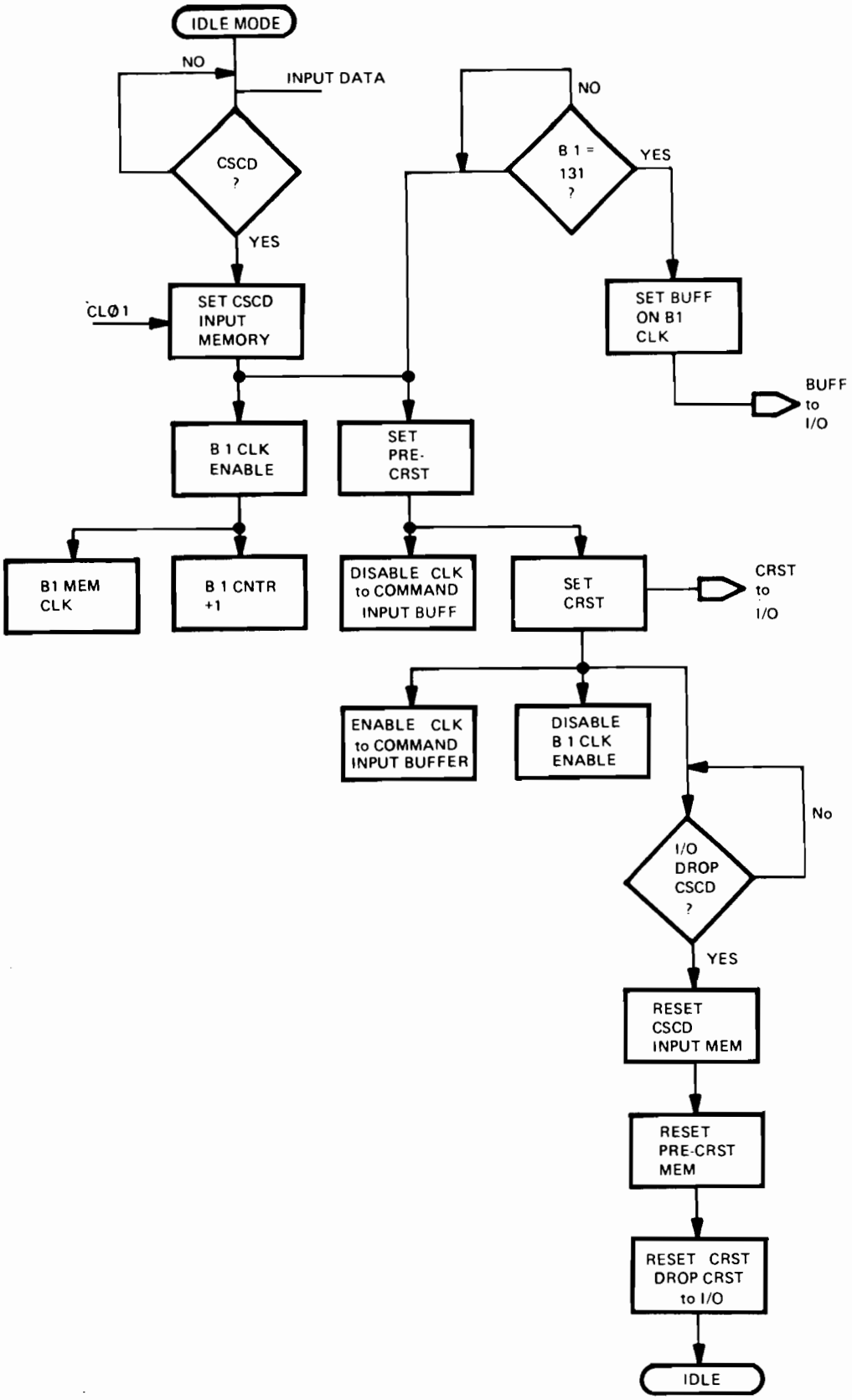


Figure 4-2. Character Strobe Command Cycle (Data Load)

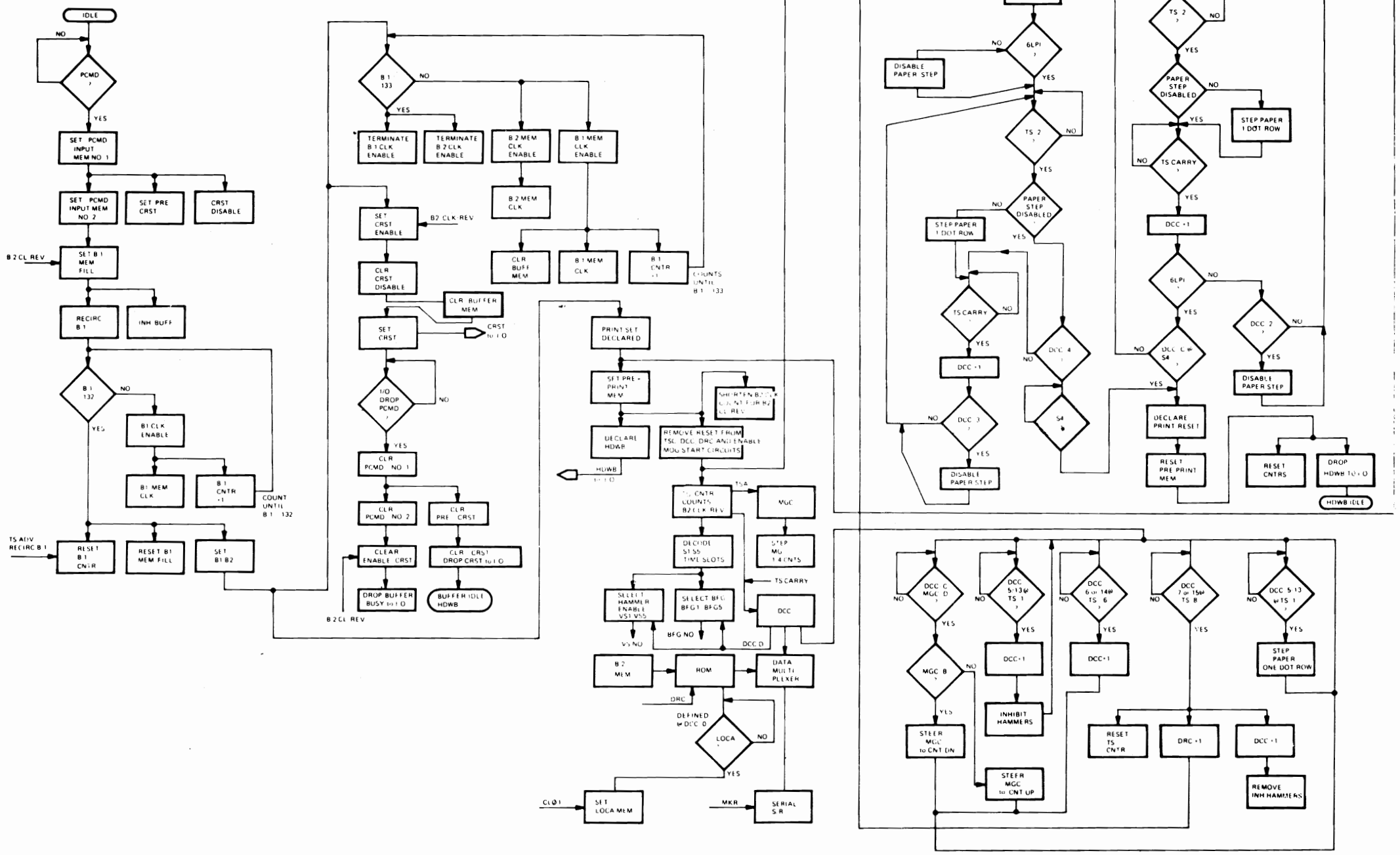
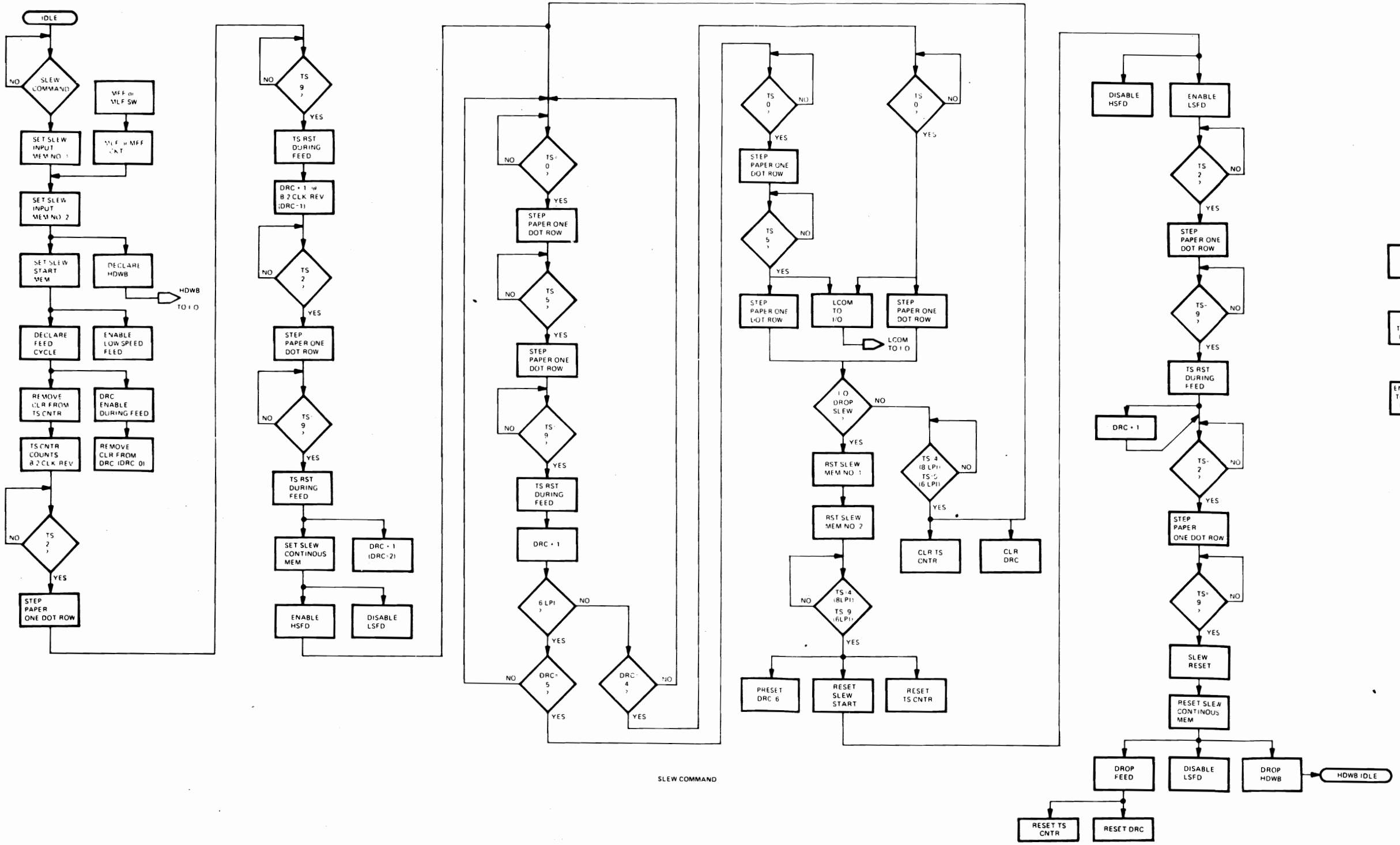


Figure 4-3. Print Command Cycle

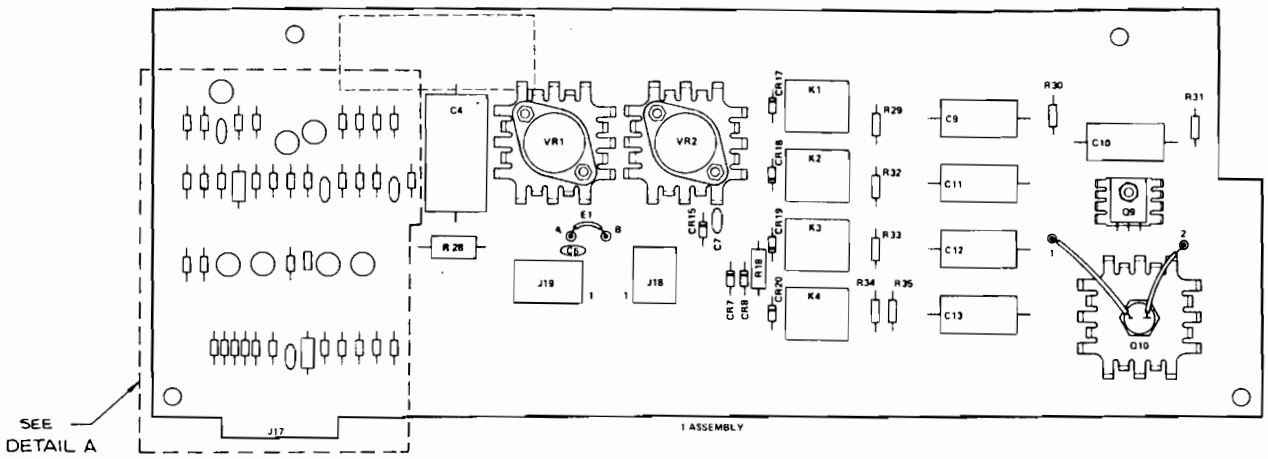


SLEW COMMAND

BUFFER RESET COMMAND

Figure 4-4. Slew and Buffer Reset Command Cycle

02607-60008 (Series 1415, 1431, 1444, 1445) Power Supply Assembly



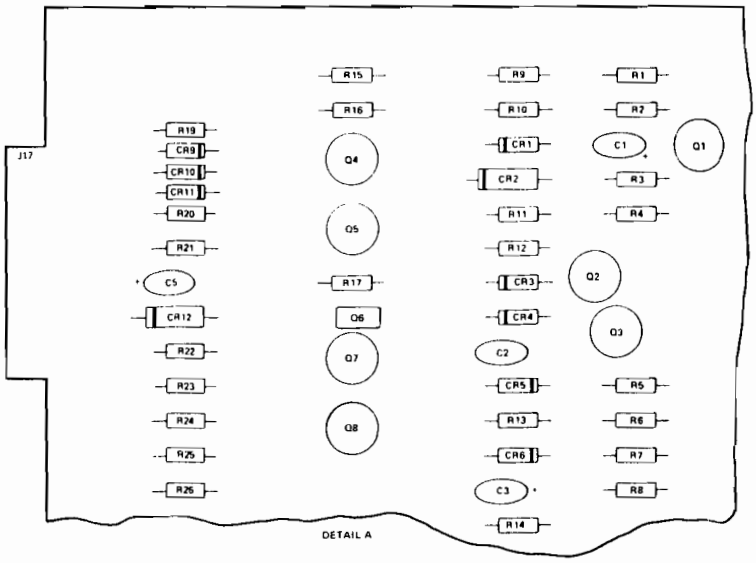


Figure 4-5. Power Supply Assembly 02607-60008, Parts Location Diagram (Series 1415, 1431, 1444, 1445)

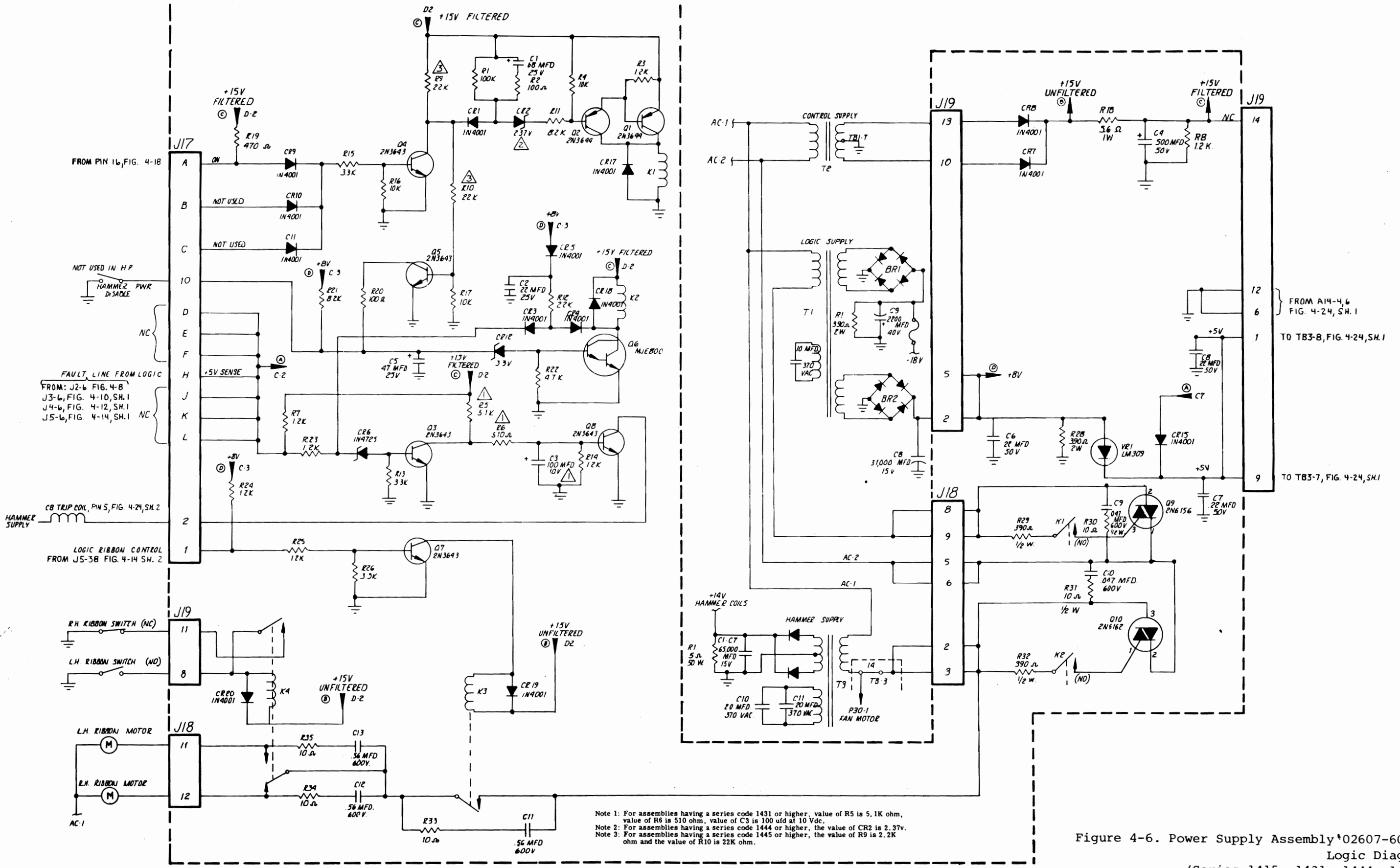
Table 4-4. Power Supply PCA 02607-60008 (Series 1415, 1431, 1444, 1445)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
C1	0180-0375	1	C: FXD 68 uf 20 VDC	400342-32
C2	0180-1719	1	C: FXD 22 uf 25 VDC	400342-12
C3	0180-1719	1	C: FXD 22 uf 25 VDC 20% (Note 1)	400342-12
C3	0180-2207	1	C: FXD 100uf 10VDC 10% (Note 2)	
C4	0180-0498	1	C: FXD 500 uf 60VDC	400273-11
C5	0180-0097	1	C: FXD 47 uf 35 VDC	400342-06
C6-8	0160-0263	3	C: FXD .22uf 50 VDC	400955-01
C9, 10	0160-0819	2	C: FXD .047 uf 600 VDC	400910-21
C11-13	0160-4181	3	C: FXD .56 uf 600 VDC	400910-35
CR1,3-5, 7-11,15, 17-20	1901-0194	14	Diode, PWR 1N4001	400698-01
CR2	1902-0551	1	Diode, 6.2V (Note 3)	400077-11
CR2	1902-3002	1	Diode, 2.37V (Note 4)	
CR6, 12	1902-1299	2	Diode, ZNR 1N4728	400077-04
J18	1251-2513	1	Connector, 12 contact	400130-12
J19	1251-2096	1	Connector, 15 contact	400130-15
K1-4	0490-0560	4	Relay	400954-02
Q1, 2	1853-0058	2	Transistor: PNP 512N3644	400707-05
Q3-5,7,8	1854-0246	5	Transistor: PL5 2N3643	400175-03
Q6	1854-0633	1	Transistor: NPN, SI, DARL	400951-01
Q9	1884-0236	1	Triac, 10A 2N6156	401021-03
Q10	1884-0237	1	Triac, 30A 2N6162	401021-06
R1	0757-0465	1	R: FXD 100K 1% 1/8w	400071-25
R2, 20	0683-1015	2	R: FXD 100 ohm 5% 1/4w	400070-35
R3,7,8,14, 23-25	0683-1225	7	R: FXD 1.2K 5% 1/4w	400071-02
R4,16,17	0683-1035	3	R: FXD 10K 5% 1/4w	400071-13
R5, R6	0683-1225	2	R: FXD 1.2K 5% 1/4w (Note 1)	
R5	0683-5125	1	R: FXD 5.1K 5% 1/4w (Note 2)	
R6	0683-5115	1	R: FXD 510 ohm 5% 1/4w (Note 2)	
R9	0683-8225	1	R: FXD 8.2K 5% 1/4w (Note 5)	400071-12
R9	0683-2225	1	R: FXD 2.2K 10% 1/4w (Note 6)	
R10	0683-1535	1	R: FXD 15K 5% 1/4w (Note 5)	400071-15
R10	0683-2235	1	R: FXD 22K 10% 1/4w (Note 6)	
R11,21	0683-8225	2	R: FXD 8.2K 5% 1/4w	400071-12
R12	0683-2225	1	R: FXD 2.2K 5% 1/4w	
R13,15,26	0683-3325	3	R: FXD 3.3K 5% 1/4w	400071-07
R18	0811-1675	1	R: FXD 5.6 ohm 5% 2w PW	400761-108
R19	0683-4715	1	R: FXD 470 ohm 5% 1/4w	400070-45
R22	0683-4725	1	R: FXD 4.7K 5% 1/4w	400071-09
R28	0811-1764	1	R: FXD 390 ohm 5% 2W PW	400899-44
R29, 32	0686-3915	2	R: FXD 390 ohm 1/2w	400050-44
R30,31, 33-35	0686-1005	5	R: FXD 10 ohm 5% 1/2w CC	400050-25
VR1	1826-0181	1	Regulator +5V	400522-01
7	02607-80008	1	PCB: Power Supply	602664-1
10	0490-0539	4	Socket, Relay	400143-16
24	1205-0219	1	Heat Dissipator, Shunt	400117-01
25	1205-0057	1	Heat Dissipator, TO-3	401039-01

Table 4-4(Continued) Power Supply PCA 02607-60008 (Series 1415, 1431, 1444, 1445)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
26	1205-0288	1	Heat Sink	603911-2
40	8500-0059	0	Compound, Silicone Seal	400507-1
41	2200-0143	1	Screw: 4-40 .375 Pan	
42	2260-0009	1	Nut, Hex 4-40	400783-01
43	3050-0222	1	Washer, Flat #4	400216-07
59	1251-3524	27	Contact, Connector Pin	400902-01
61	2360-0199	2	Screw, 6-32 .438 Pan	400016-08
63	2420-0001	2	Nut, Hex 6-32	400783-05
67	8151-0014	0.5ft	Wire, Elec. 24 AWG	400802-05
70	0890-0870	0.2ft	Tubing, HS .093 D	400682-57
76	7120-0137	1	Label, High Voltage	603575-01
77	2950-0134	1	Nut, 1/2-28	
78	2190-0421	1	Washer, Flat 1/4	400216-13
79	2190-0388	1	Washer, Lock 1/4	

NOTE 1. Series codes below 1431.
NOTE 2. Series codes 1431 or higher.
NOTE 3. Series codes below 1444.
NOTE 4. Series codes 1444 or higher.
NOTE 5. Series codes below 1445.
NOTE 6. Series codes 1445.



Note 1: For assemblies having a series code 1431 or higher, value of R5 is 5.1K ohm, value of R6 is 510 ohm, value of C3 is 100 ufd at 10 Vdc.
Note 2: For assemblies having a series code 1444 or higher, the value of CR2 is 2.37v.
Note 3: For assemblies having a series code 1445 or higher, the value of R9 is 2.2K ohm and the value of R10 is 22K ohm.

Figure 4-6. Power Supply Assembly 02607-60008
Logic Diagram
(Series 1415, 1431, 1444, 1445)

02607-60001, 02607-60339 (Series 1415, 1417, 1505, 1520) Interface

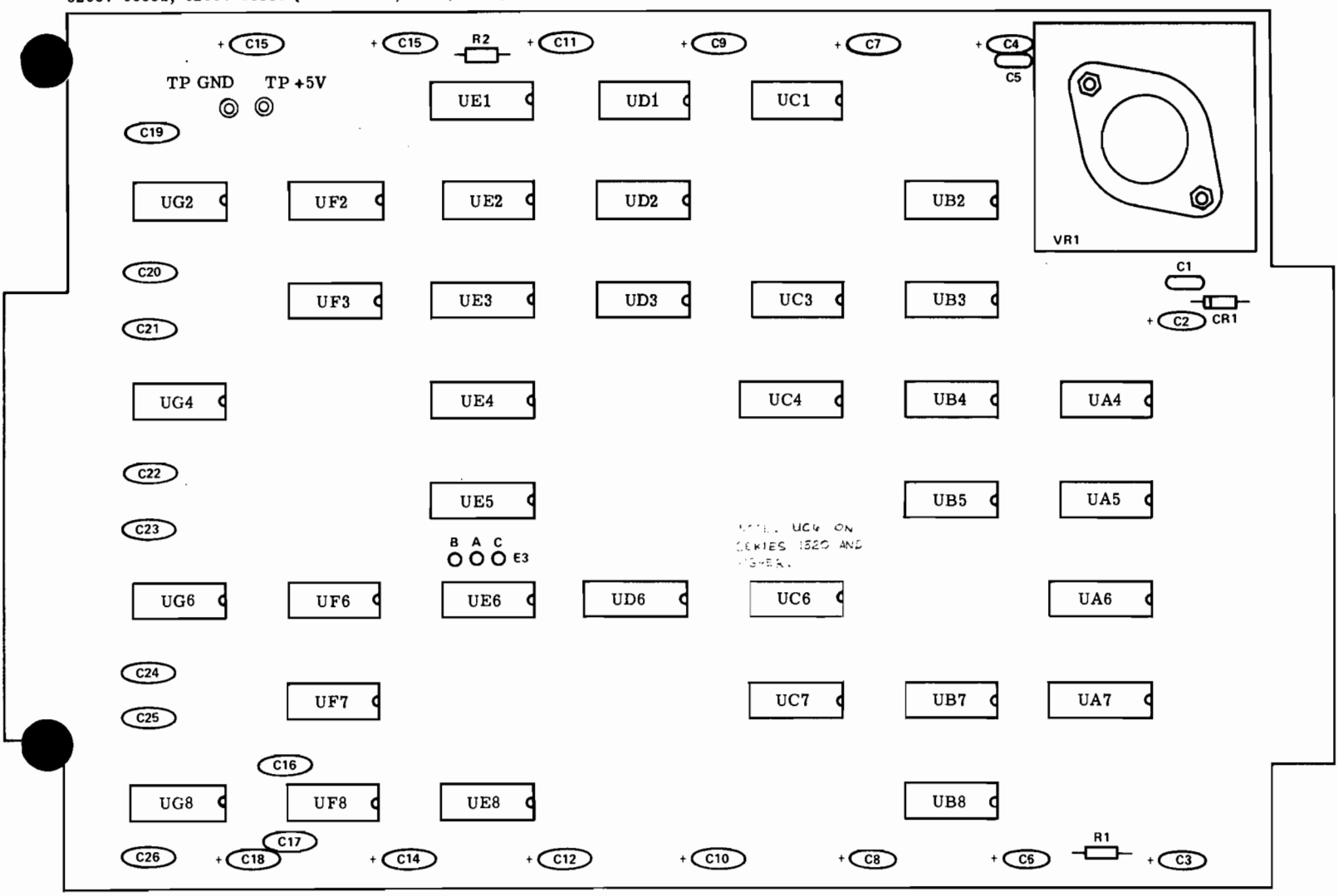


Table 4-5. Interface PCA 02607-60001, 02607-60339 (Series 1415,1417, 1505, 1520)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
UA4,UB7,UD2	1820-0281	3	IC: Digital: FF 74107	400195-01
UA5, UC1	1820-0782	2	IC: Digital: Gate 7427	400929-01
UA6, UE4,5	1820-0839	3	IC: Digital: FF 74175	400923-01
UA7	1820-0622	1	IC: Digital: 74151	401001-01
UB2	1820-0539	1	IC: Digital: BUF 7437	400466-01
UB3,UB5,8,UF3	1820-0511	4	IC: Digital: Gate 7408	400190-01
UB4, UE2	1820-0328	2	IC: Digital: Gate 7402	400192-01
UC3,UD1,UF6	1820-0174	3	IC: Digital: INU 7404	400194-01
UC4,UD6, UE1	1820-0076	3	IC: Digital: FF 7476	400812-01
UC6	1820-0077	1	IC: Digital: FF 7474 (Series 1520)	400059-01
UC7	1820-0068	1	IC: Digital: Gate 7410	400173-01
UD3	1820-0063	1	IC: Digital: Gate 7451	400723-01
UE3	1820-0545	1	IC: Digital 74191	400919-01
UE6, UF2	1820-0054	2	IC: Digital: Gate 7400	400106-01
UE8, UF7	1820-0720	2	IC: Digital: DM 8830N	401166-01
UF8,UG2,4, UG6, UG8	1820-0721	5	IC: Digital: DM 8820AN	401165-01
C1, 5	0160-0263	2	Capacitor: FXD .22uf 50V	400955-01
C2-4, 6-15,18	0180-0228	14	Capacitor: FXD 22uf 15VDC	400342-12
C16, 17,19-26	0160-2204	10	Capacitor: FXD 100pf 300V	400001-21
C27, 28	0160-2055	2	Capacitor: FXD .01uf 100V	400012-13
CR1	1901-0194	1	Diode: PWR 1N4001	400698-01
R1, 2	0683-1025	2	Resistor:FXD 1K 5% 1/4w cc	400071-01
VR1	1820-0430	1	IC: LIN: V. Regulator	400522-01
21	02607-80001	1	PCB: Interface	
60	1205-0057	1	Heat Dissipator: TO-3	401039-01
64	8151-0014	0.20ft	Wire: Elec: 24 AWG	400802-05
66	2360-0119	2	Screw: 6-32	400016-05
67	3050-0227	2	Washer: Flat .149	
68	2420-0001	2	Nut: HEX 6-32	400783-05
69	0360-0535	2	PIN: Test Point	

Figure 4-7. Interface Assembly 02607-60001, 02607-60339 Parts Location Diagram(Series 1415, 1417, 1505, 1520)

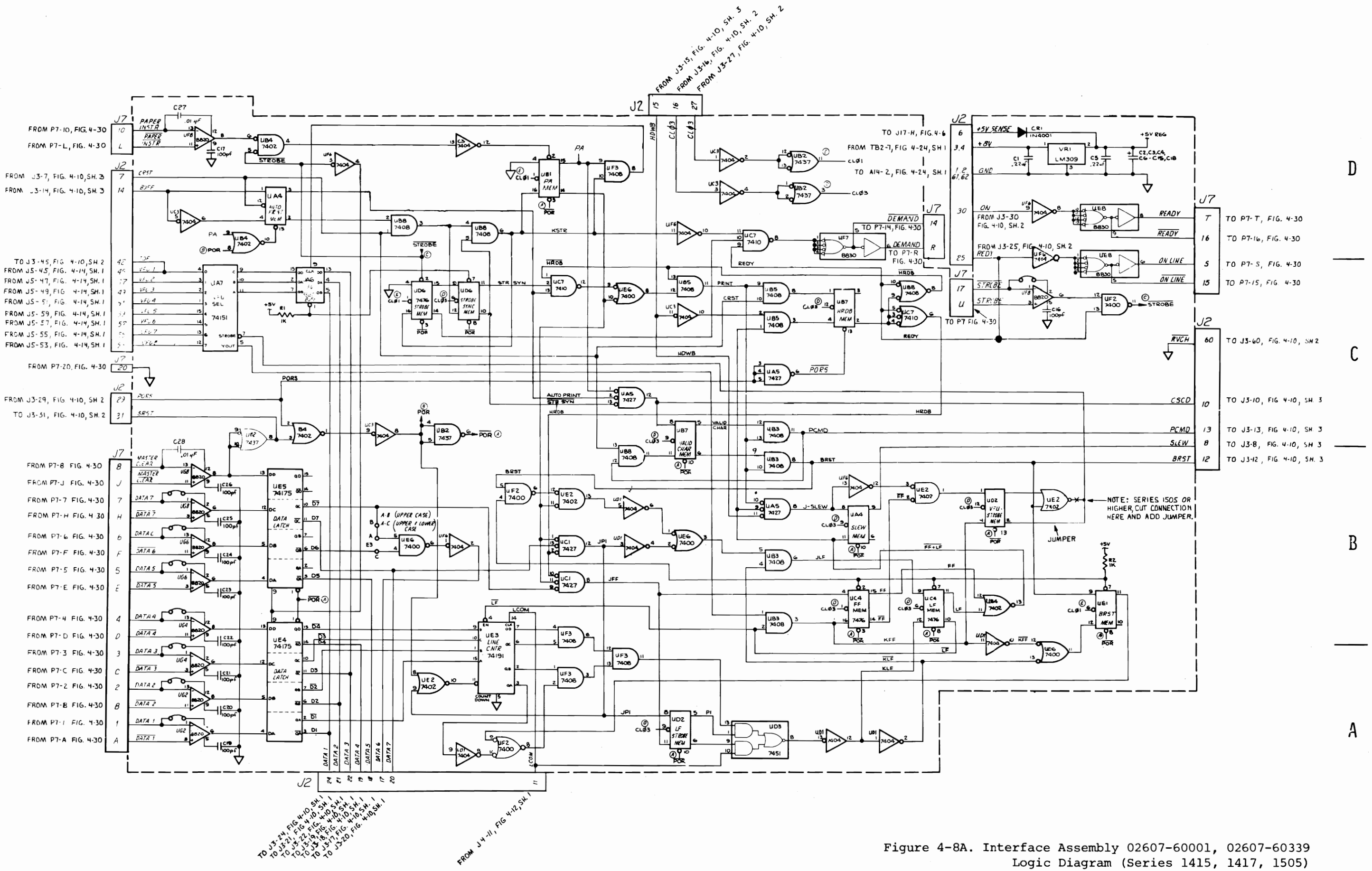


Figure 4-8A. Interface Assembly 02607-60001, 02607-60339
Logic Diagram (Series 1415, 1417, 1505)

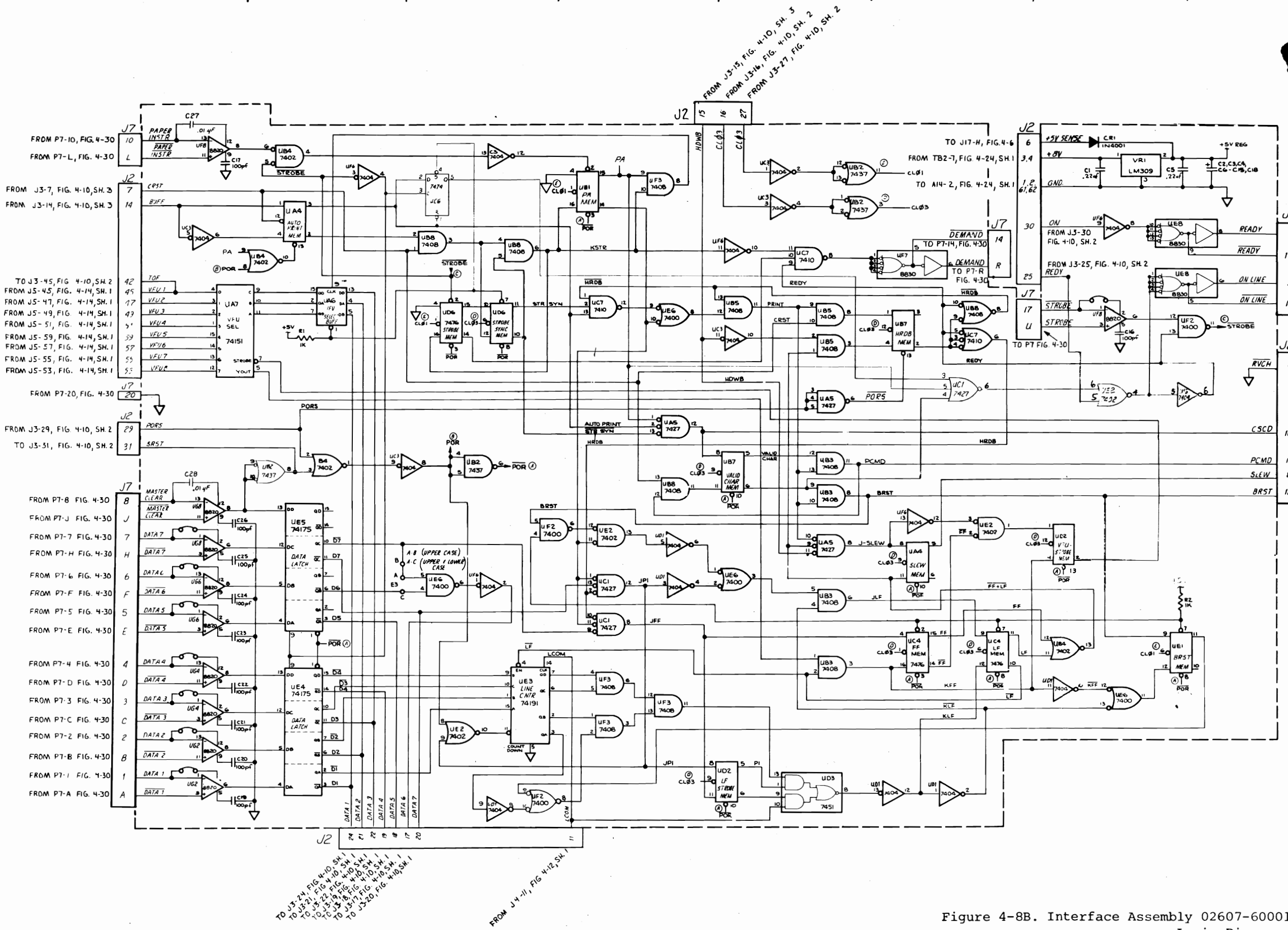


Figure 4-8B. Interface Assembly 02607-60001, 02607-60339
Logic Diagram (Series 1520)

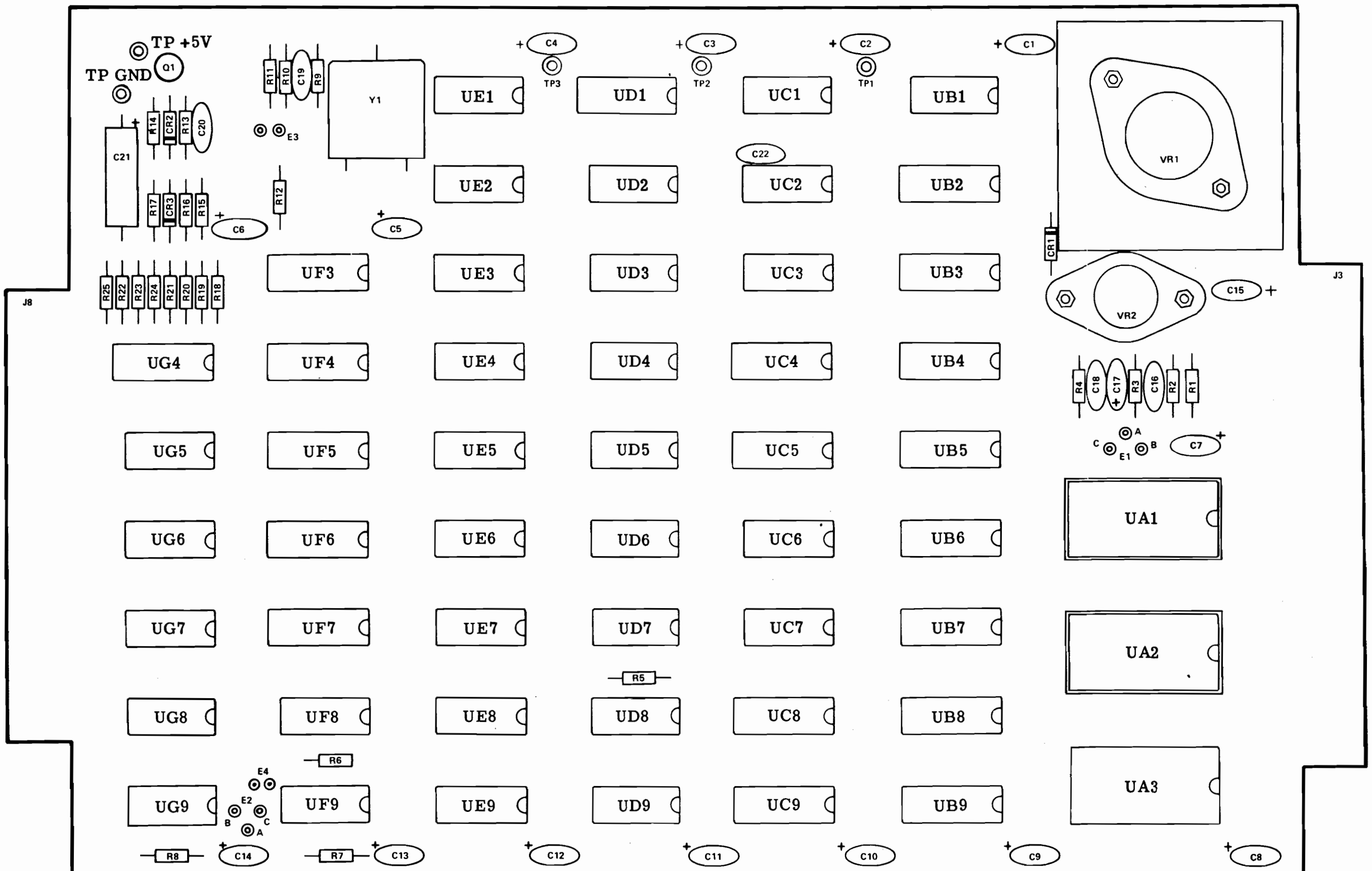


Figure 4-9. Buffer ROM Assembly 02607-60002, 02607-60015, 02607-60337
02607-60338, Parts Location Diagram (Series 1415, 1417, 1446, 1528)

Table 4-6. Buffer ROM PCA 02607-60002, 02607-60015, 02607-60337, 02607-60338 (Series 1415, 1417, 1446, 1528)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
UA1	SEE BELOW		SEE BELOW	
UA2	SEE BELOW		SEE BELOW	
UA3	1820-0640	1	IC: DGTL: MUX 74150	400922-01
A1S, A2S	1200-0433	2	Socket, Elec. IC	401038-01
UB1	1820-0282	1	IC: Digital, Gate 7486	400396-01
UB2-9	1820-1186	8	IC: DGTL, TMS 3113	400925-01
UC1,7, UD2, UE6, 7, UF8	1820-0328	6	IC: DGTL, Gate 7402	400192-01
UC2, UD5, UE4, UE9,UG6	1820-0174	5	IC: DGTL, Gate 7404	400194-01
UC3, 6, UD8 UE2,5,UG4,8	1820-0054	7	IC: DGTL, Gate 7400	400106-01
UC4,5,	1820-0713	2	IC: DGTL, CNTR 74163	400927-01
UC8,9	1820-0839	2	IC: DGTL FF 74175	400923-01
UD1, UF3-7	1820-0076	6	IC: DGTL, FF 7476	400812-01
UD3,9, UG9	1820-0068	3	IC: DGTL, Gate 7410	400173-01
UD4	1820-0069	1	IC: DGTL, Gate 7420	400488-01
UD6	1820-0655	1	IC: DGTL, Gate 7425	400930-01
UD7	1820-0077	1	IC: DGTL, FF 7474	400059-01
UE1	1820-1187	1	IC: DGTL, SP 380	400531-01
UE3, 8	1820-0782	2	IC: DGTL, Gate 7427	400929-01
UF9, UG7	1820-0471	2	IC: DGTL, INU 7406	400459-01
UG5	1820-0537	1	IC: DGTL 7413	400924-01
C1-14	0180-0228	14	Capacitor: FXD 22 ufd 15 Vdc	400342-12
C15	0160-0263	1	Capacitor: FXD .22ufd 50 Vdc	400955-01
C16, 22	0160-4180	2	Capacitor: FXD 1200pfd 100Vdc	400165-01
C17	0180-0499	1	Capacitor: FXD 10 ufd 20 Vdc	400342-04
C18	0160-3667	1	Capacitor: FXD .15 ufd 50 Vdc	400955-03
C19,20	0160-3914	2	Capacitor: FXD .01 ufd 100Vdc	400527-02
C21	0180-0300	1	Capacitor: FXD 20 ufd 16 Vdc	400526-01
CR1, 3	1901-0194	2	Diode: PWR 1N4001	400698-01
CR2	1901-0703	1	Diode: Switching	400860-01
Q1	1854-0215	1	Transistor: NPN Silicon	
R1	0683-6825	1	Resistor: FXD 6.8K 5% 1/4w	400073-21
R2	0757-0758	1	Resistor: FXD 16.2K 1% 1/4w	400665-309
R3	0698-8369	1	Resistor: FXD 2.7 ohm 5% 1/8w	400072-35
R4-6, 11, 12, 16	0683-1025	6	Resistor: FXD 1K 5% 1/4w CC	400071-01
R7,8,13-15 18-25	0683-3315	13	Resistor: FXD 330 ohm 5% 1/4w	400070-43
R9, 10, 17	0683-1035	3	Resistor: FXD 10K 5% 1/4 w	400071-13
VR1	1826-0430	1	IC: LIN: V Regulator	400522-01
VR2	1826-0032	1	IC: LIN: V Regulator	400931-01
Y1	0410-0557	1	Crystal: 1.2288 MHZ	400932-01
24	02607-80002	1	PCB: Buffer ROM	602660-1

Table 4-6(Continued). Buffer ROM PCA 02607-60002, 02607-60015, 02607-60337, 02607-60338 (Series 1415, 1417, 1446, 1528)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
43	2200-0141	2	Screw: 4-40 .312 Pan	
44	2260-0009	2	Nut: Hex 4-40	400783-01
51	3050-0227	2	Washer: Flat .149	
53	1205-0057	1	Heat Dissipator: TO-3	401039-01
57	2360-0119	2	Screw: 6-32	400016-05
58	2420-0001	2	Nut: Hex 6-32	400783-05
60	3050-0300	2	Washer: #4 Nylon Flat	
61	0360-0535	5	Pin: Test Point	

SERIES CODE & REF. DES.	ASSEMBLY NUMBER			
	02607-60002	02607-60015	02607-60337	02607-60338
UA1 (All Series)	02607-60017	1816-0349 (CM8050N)	02607-60017	1820-1352 (CM 6660)
UA2(Series Below 1446)	1818-0092 (CM6580)	1818-0092 (CM6580)	1820-1351 (CM6650)	1820-1351 (CM6650)
UA2(Series 1446)	1818-0125 (CM8630)	1818-0125 (CM8630)	1820-1351 (CM6650)	1820-1351 (CM6650)
UA2(Series 1528)	1818-0152 (CM9390)	1818-0152 (CM9390)	1820-1351 (CM6650)	1820-1351 (CM6650)

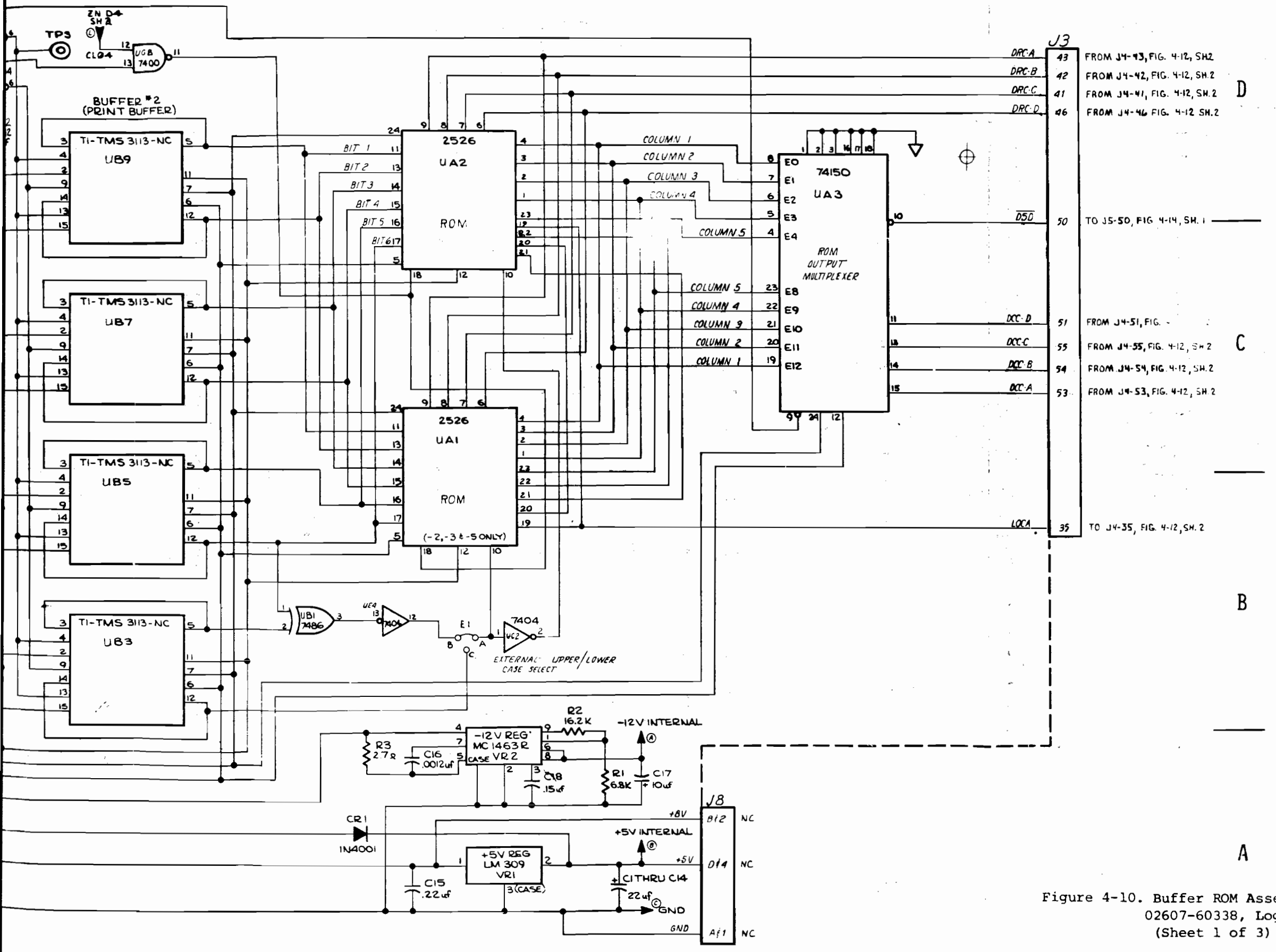


Figure 4-10. Buffer ROM Assembly 02607-60002, 02607-60015, 02607-60337 02607-60338, Logic Diagram (Series 1415, 1417, 1446, 1528) (Sheet 1 of 3)

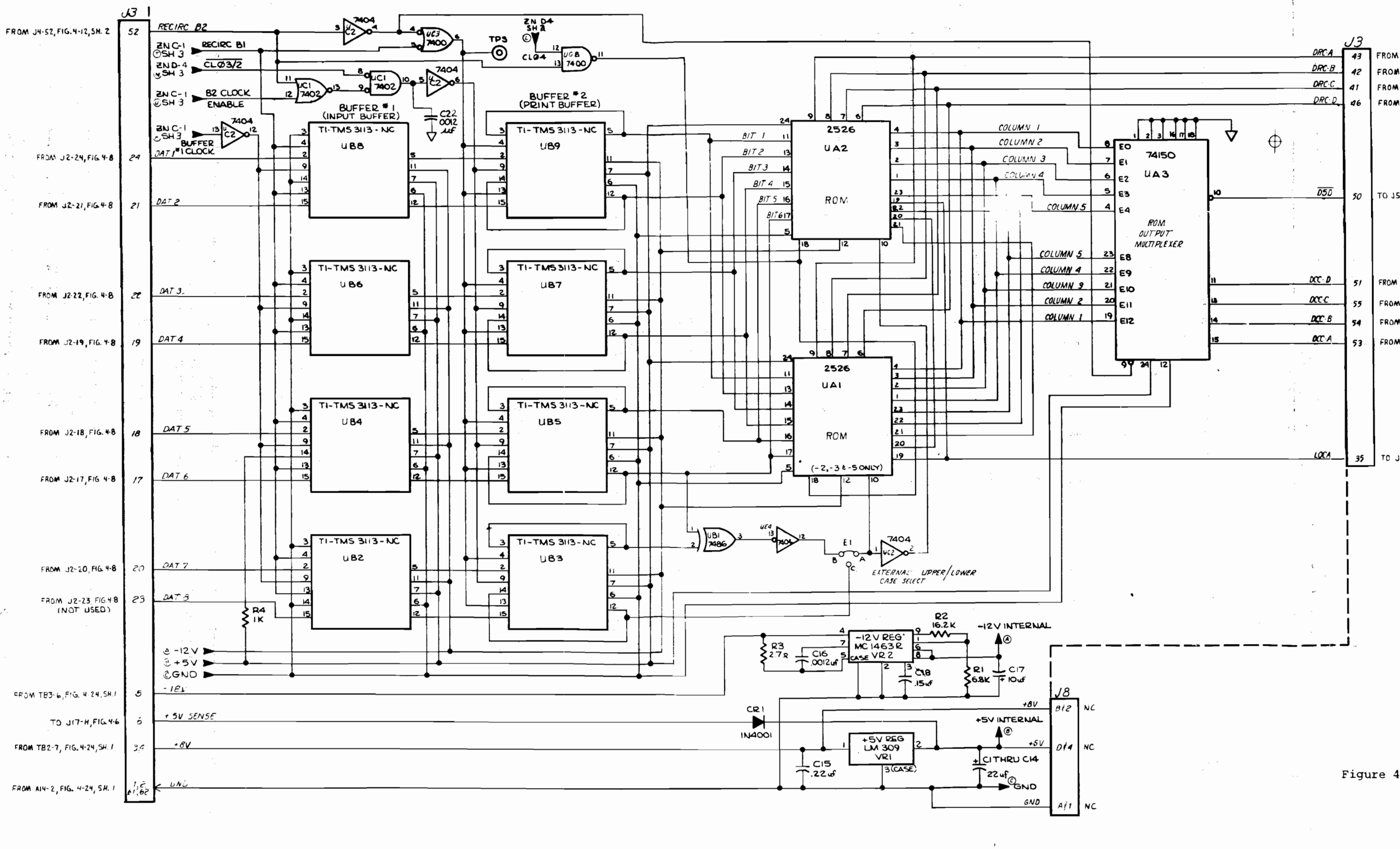

J3
FROM J4-S2, FIG. 4-12, SH. 2
52
RECIRC B2
ZNC-1 SH 3
RECIRC B1
ZND-4 SH 3
CLØ3/2
ZNC-1 SH 3
B2 CLOCK ENABLE
ZNC-1 SH 3
BUFFER #1 CLOCK
7404
UC2
UC3 7400
UC1 7402
TPS
ZN D4 SH 2
CLØ4
UC8 7400
C22 .0012 µF
BUFFER #1 (INPUT BUFFER)
BUFFER #2 (PRINT BUFFER)
TI-TMS 3113-NC
UB8
UB9
UB6
UB7
UB4
UB5
UB2
UB3
FROM J2-24, FIG. 4-8
24
DAT 1
FROM J2-21, FIG. 4-8
21
DAT 2
FROM J2-22, FIG. 4-8
22
DAT 3
FROM J2-19, FIG. 4-8
19
DAT 4
FROM J2-18, FIG. 4-8
18
DAT 5
FROM J2-17, FIG. 4-8
17
DAT 6
FROM J2-20, FIG. 4-8
20
DAT 7
FROM J2-23, FIG. 4-8 (NOT USED)
23
DAT 8
R4 1K
-12V
+5V
GND
FROM TB3-6, FIG. 4-24, SH. 1
5
-12V
TO J17-H, FIG. 4-6
6
+5V SENSE
FROM TB2-7, FIG. 4-24, SH. 1
34
+8V
FROM A14-2, FIG. 4-24, SH. 1
1,2
GND
2526
UA2
ROM
UA1
(-2, -3 & -5 ONLY)
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
BIT 6&7
UB1 7486
UE4 7404
E1
EXTERNAL UPPER/LOWER CASE SELECT
74150
UA3
ROM OUTPUT MULTIPLEXER
COLUMN 1
COLUMN 2
COLUMN 3
COLUMN 4
COLUMN 5
DRC-A
DRC-B
DRC-C
DRC-D
DSO
DCC-D
DCC-C
DCC-B
DCC-A
LOCA
TO J5
-12V REG MC 1463R VR2
R2 16.2K
-12V INTERNAL
R3 2.7K
C16 .0012uf
C18 .15uf
R1 6.8K
C17 10uf
CR1 IN4001
+5V REG LM 309 VR1
C15 .22uf
C1 THRU C14 22uf
+5V INTERNAL
GND
J8
+8V
+5V
B12
D14
A11
NC

Figure 4

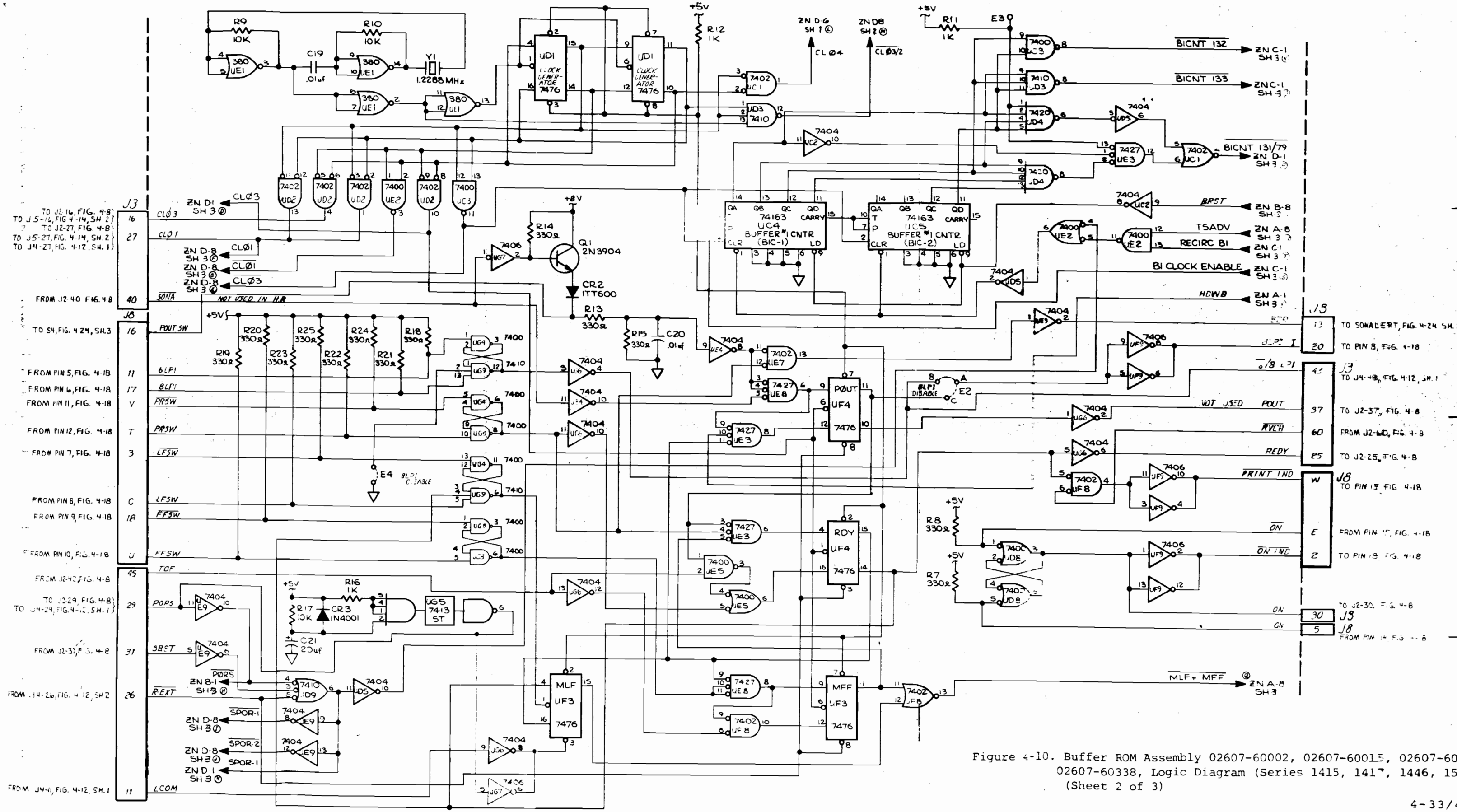


Figure 4-10. Buffer ROM Assembly 02607-60002, 02607-60015, 02607-603
02607-60338, Logic Diagram (Series 1415, 1417, 1446, 152
(Sheet 2 of 3)

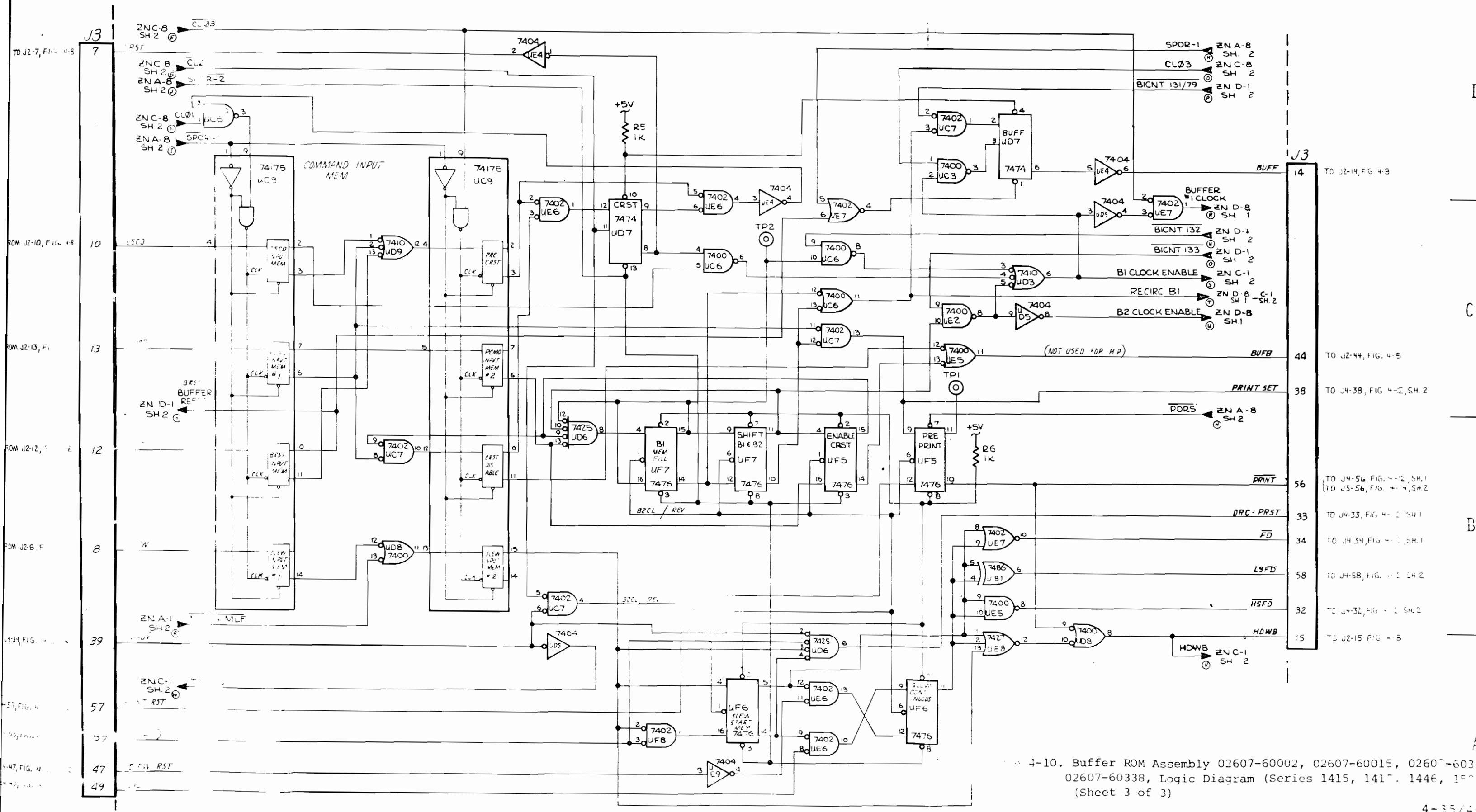


Figure 4-10. Buffer ROM Assembly 02607-60002, 02607-60015, 02607-603
02607-60338, Logic Diagram (Series 1415, 141[illegible]. 1446, 15[illegible]
(Sheet 3 of 3)

02607-60003 (Series 1415, 1417) Control PCA

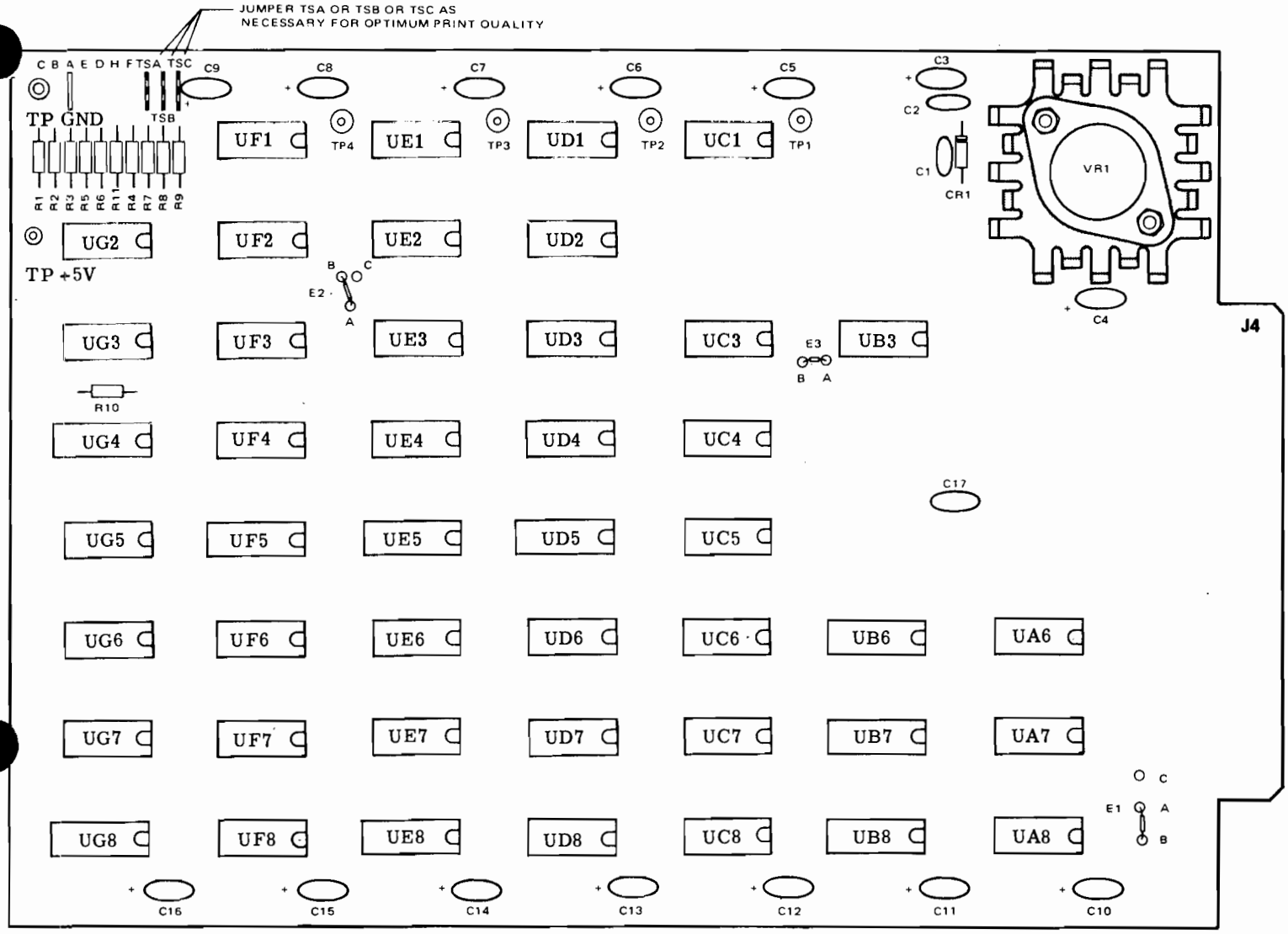


Table 4-7. Control PCA 02607-60003 (Series 1415,1417)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
UA6,UF1,3, UG2	1820-0282	4	IC: Digital : Gate 7486	400396-01
UA7,UD6, UE1, UF4	1820-0328	4	IC: Digital: Gate 7402	400192-01
UA8,UC1,UD1 UE2,6,UF7, UG6	1820-0782	7	IC: Digital: Gate 7427	400929-01
UB3,UC6,UE4 UF8, UG5	1820-0174	5	IC: Digital : INU 7404	400194-01
UB6	1820-0545	1	IC: Digital: 74191	400919-01
UB7,8, UE8 UF5	1820-0713	4	IC: Digital: CTR 74163	400927-01
UC3, UG4,8	1820-0076	3	IC: Digital: FF 7476	400812-01
UC4,5,8, UD3, UG7	1820-0054	5	IC: Digital: Gate 7400	400106-01
UC7,UD8,UE7	1820-0068	3	IC: Digital: Gate 7410	400173-01
UD2, 4	1820-0511	2	IC: Digital: Gate 7408	400190-01
UD5	1820-0214	1	IC: Digital:DCDR 7442	400388-01
UD7	1820-0069	1	IC: Digital:Gate 7420	400488-01
UE3	1820-0074	1	IC: Digital:Gate 7454	400920-01
UE5	1820-1185	1	IC: Decade 74162	400927-02
UF2,6,UG3	1820-0655	3	IC: Digital: Gate 7425	400930-01
C1,2	0160-0263	2	Capacitor: FXD .22uf 50V	400955-01
C3-16	0180-0228	14	Capacitor: FXD 22 uf 15 VDC	400342-12
C17	0160-4180	1	Capacitor: FXD 1200pf 100V	400165-01
CR1	1901-0194	1	Diode: PWR 1N4001	400698-01
R1-11	0683-1025	11	Resistor:FXD 1K 5% 1/4w cc	400071-01
VR1	1826-0181	1	Regulator +5V	400522-01
8	02607-80003	1	PCB- CONTROL	602662-1
28	8151-0014	0.1ft	Wire: ELEC: 24 AWG	400802-05
38	2360-0119	2	Screw: 6-32	400016-05
39	2420-0001	2	Nut: HEX 6-32	400783-05
41	3050-0227	2	Washer: Flat .149	
43	1205-0057	1	Heat Dissipator: TO-3	401039-01
44	0360-0535	6	Pin: Test Point	
	8500-0059	0	CHEM: MISC	400507-1
	5040-1485	2	Jumper: Plug	

Figure 4-11. Control Assembly 02607-60003
Parts Location Diagram (Series 1415, 1417)

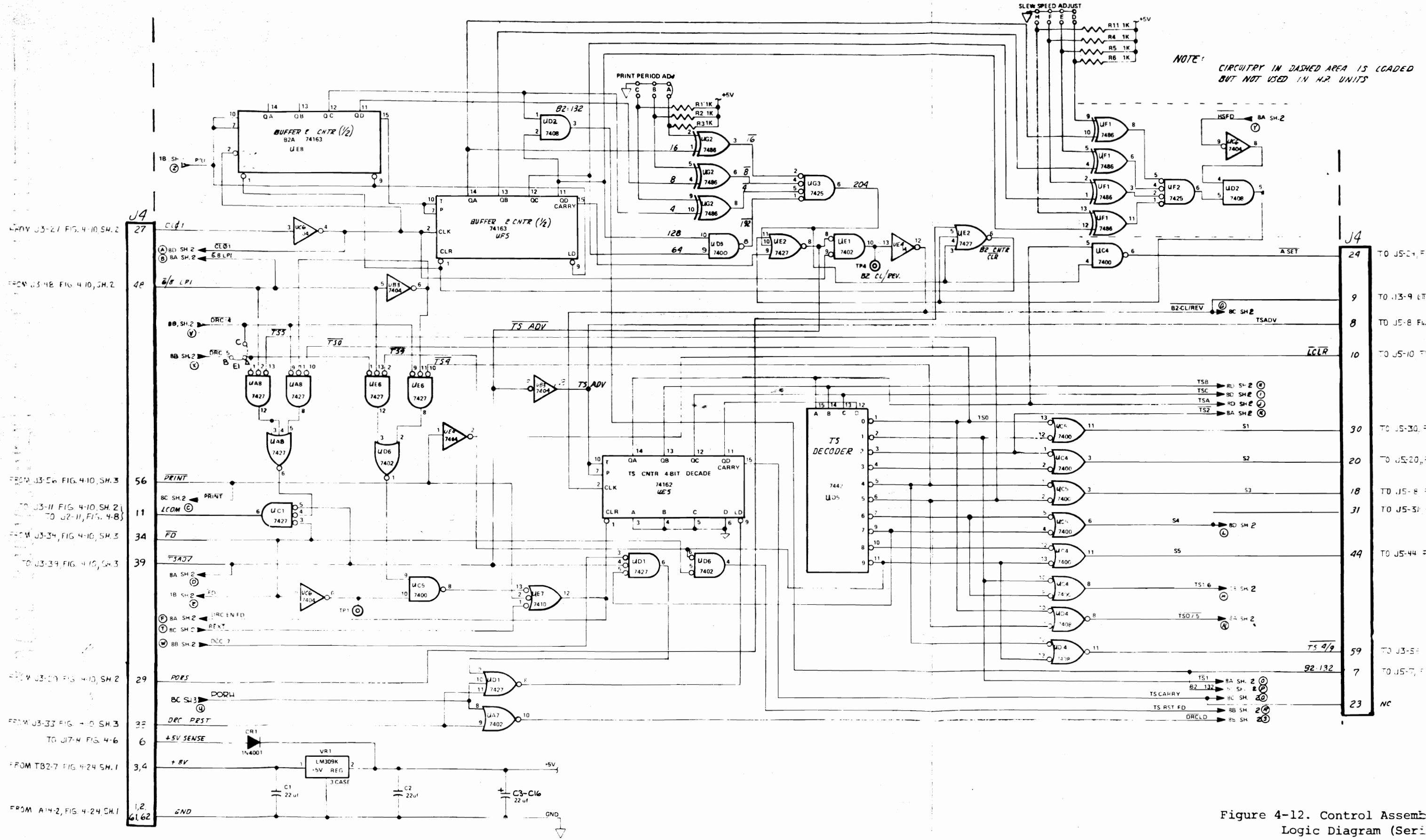


Figure 4-12. Control Assembly 02607-6000 Logic Diagram (Series 1415, 1417 (Sheet 1 of 2)

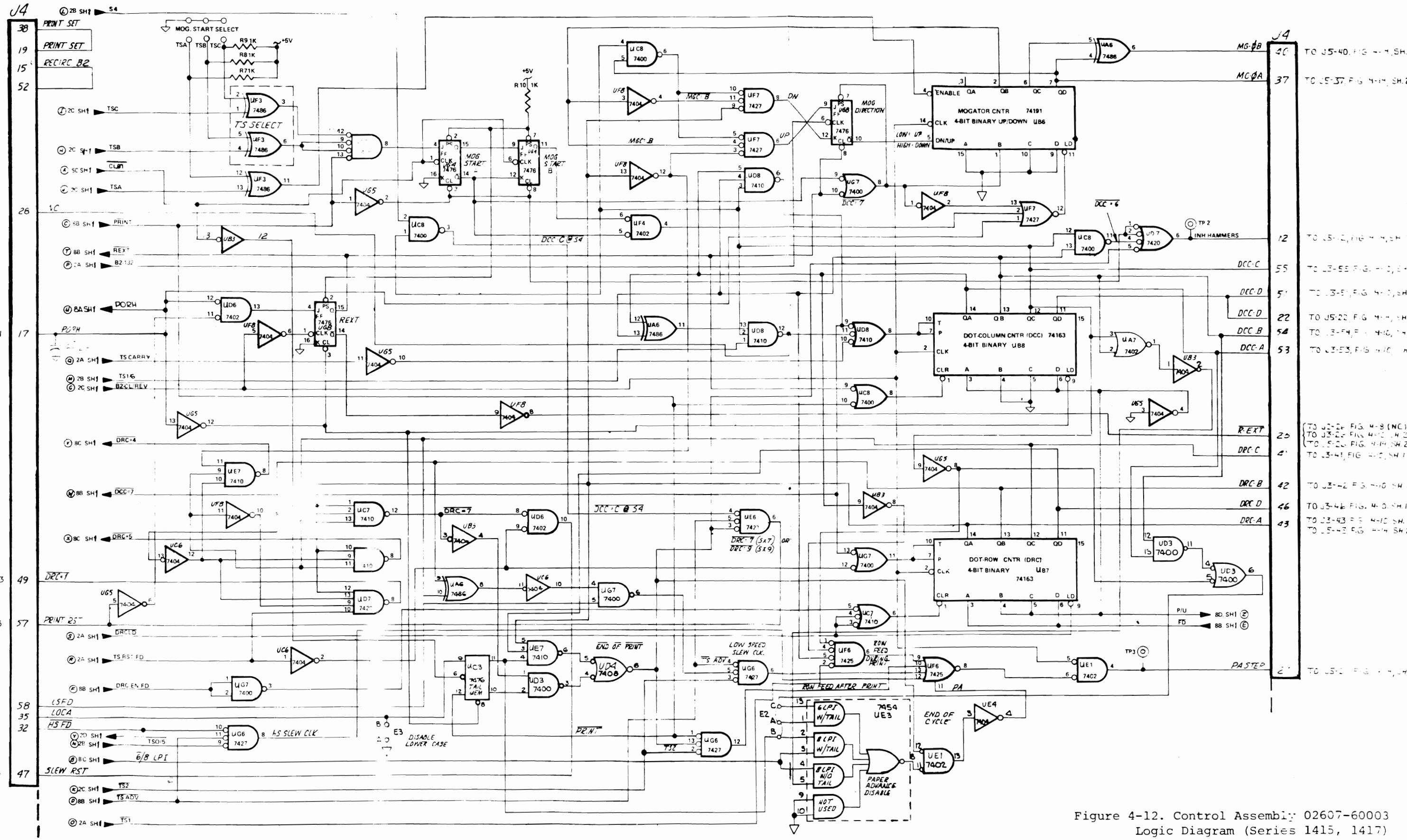


Figure 4-12. Control Assembly 02607-60003
Logic Diagram (Series 1415, 1417)
(Sheet 2 of 2)

02607-60004 (Series 1415, 1417, 1431, 1435)

Hammer Latch PCA

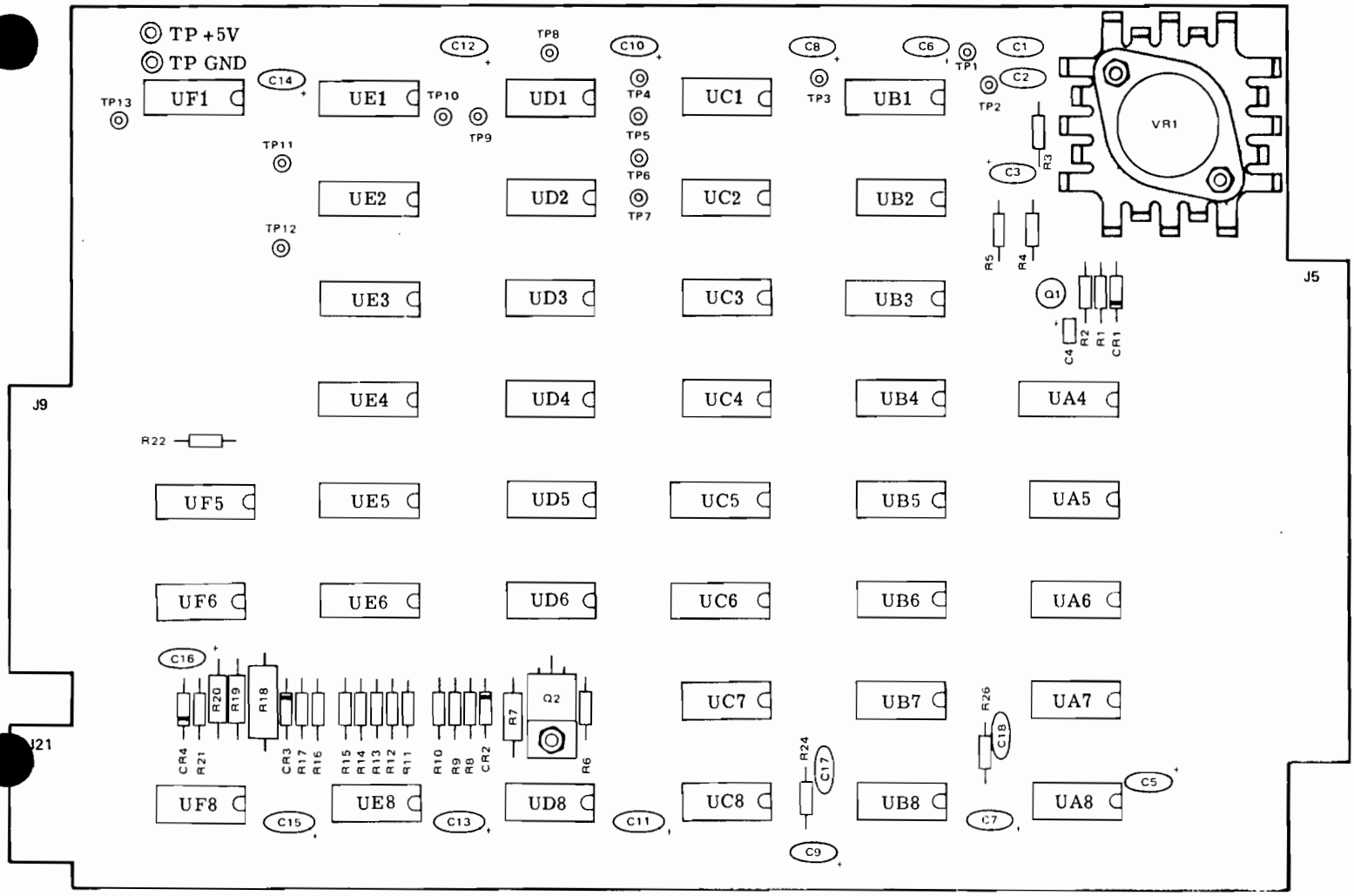


Table 4-8. Hammer Latch PCA 02607-60004 (Series 1415, 1417, 1431, 1435)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
UA4	1820-0579	1	IC:Digital, MV 74123	401003-01
UA5, UB6	1820-0068	2	IC:Digital, Gate 7410	400173-01
UA6,UB4,7,UC2	1820-0054	4	IC:Digital, Gate 7400	400106-01
UA7,8,UB8, UC3, UD5	1820-0174	5	IC:Digital, INU 7404	400194-01
UB1, UF5	1820-0076	2	IC:Digital, FF 7476	400812-01
UB2	1820-0328	1	IC:Digital, Gate 7402	400192-01
UB3	1820-1185	1	IC:Decade, 74162	400927-01
UB5	1820-0077	1	IC: Digital, FF 7474	400059-01
UC1	1820-0782	1	IC: Digital, Gate 7427	400929-01
UC4	1820-0074	1	IC: Digital, Gate 7454	400920-01
UC5, 6	1820-0762	2	IC: Digital, MX 74157	400948-01
UC7, UD6	1820-0471	2	IC: Digital, INU 7406	400459-01
UC8, UD8, UE8 UF6, 8	1820-0537	5	IC: Digital, 7413	400924-01
UD1-4	1820-1064	4	IC:Digital, 74164	400921-01
UE1-6,UF1,	1820-0839	7	IC:Digital, FF 74175	400923-01
C1, 2	0160-0263	2	Capacitor: FXD .22uf 50V	400955-01
C3,5-15	0180-0228	12	Capacitor: FXD 22uf 15VDC	400342-12
C4	0180-0309	1	Capacitor: FXD 4.7uf 10 VDC	400342-24
C16	0180-0375	1	Capacitor: FXD 68 uf 20VDC	400342-32
C17, 18	0160-2640	2	Capacitor: FXD .01uf 50 V	400527-02
CR1	1901-0194	1	Diode, PWR 1N4001	400698-01
CR2	1902-0036	1	Diode ZNR 6.19V	400093-40
CR3	1902-3138	1	Diode, ZNR,1N746 (Note 1)	400377-01
CR3	1902-3139	1	Diode, ZNR,1N756 (Note 2)	
CR4	1901-0703	1	Diode, Switching	400860-01
Q1	1854-0215	1	Transistor: NPN Silicon	
Q2	1854-0456	1	Transistor: NPN Silicon	400101-01
R1	0683-3935	1	Resistor: FXD 39K 5% 1/4w	400071-20
R2	0683-1055	1	Resistor: FXD 1M 5% 1/4w	400071-41
R3-6,8,21,22	0683-1025	7	Resistor: FXD 1K, 5% 1/4w cc	400071-01
R7	0686-4715	1	Resistor: FXD 470 ohm 5% 1/2w	400050-42
R9-17	0683-4725	9	Resistor: FXD 4.7K 5% 1/4w	400071-09
R18	0689-4715	1	Resistor: FXD 470 ohm 5% 1w cc	400525-21
R19	0686-1035	1	Resistor:FXD 10K 1/2w	400051-13
R20	0686-3925	1	Resistor:FXD 3.9K 5% 1/2w	400051-08
R23, 25	0683-3025	2	Resistor:FXD 3K 1/4w	
R24, 26	0683-1005	2	Resistor: FXD 10 ohm 5% 1/4w	400070-25
VR1	1820-0430	1	IC, LIN, V. Regulator	400522-01
7	02607-80004	1	PCB: Hammer Latch	602663-1
58	1205-0057	1	Heat Dissipator: TO-3	401039-01
60	2200-0769	1	Screw: 4-40 x 3/8 Pan	400013-08
61	2360-0119	2	Screw: 6-32	400016-05
63	3050-0229	1	Washer: Flat #4	400216-08
64	3050-0227	2	Washer: Flat .149	
66	2260-0009	1	Nut: Hex 4-40	400783-01
67	2420-0001	2	Nut: Hex 6-32	400783-05
70	0360-0535	15	Pin: Test Point	
	8500-0059	0	Chem: Misc	400507-1

NOTE 1. Series codes below 1435.
NOTE 2. Series codes 1435

Figure 4-13. Hammer Latch Assembly 02607-60004 Parts Location Diagram (Series 1415, 1417, 1431, 1435)

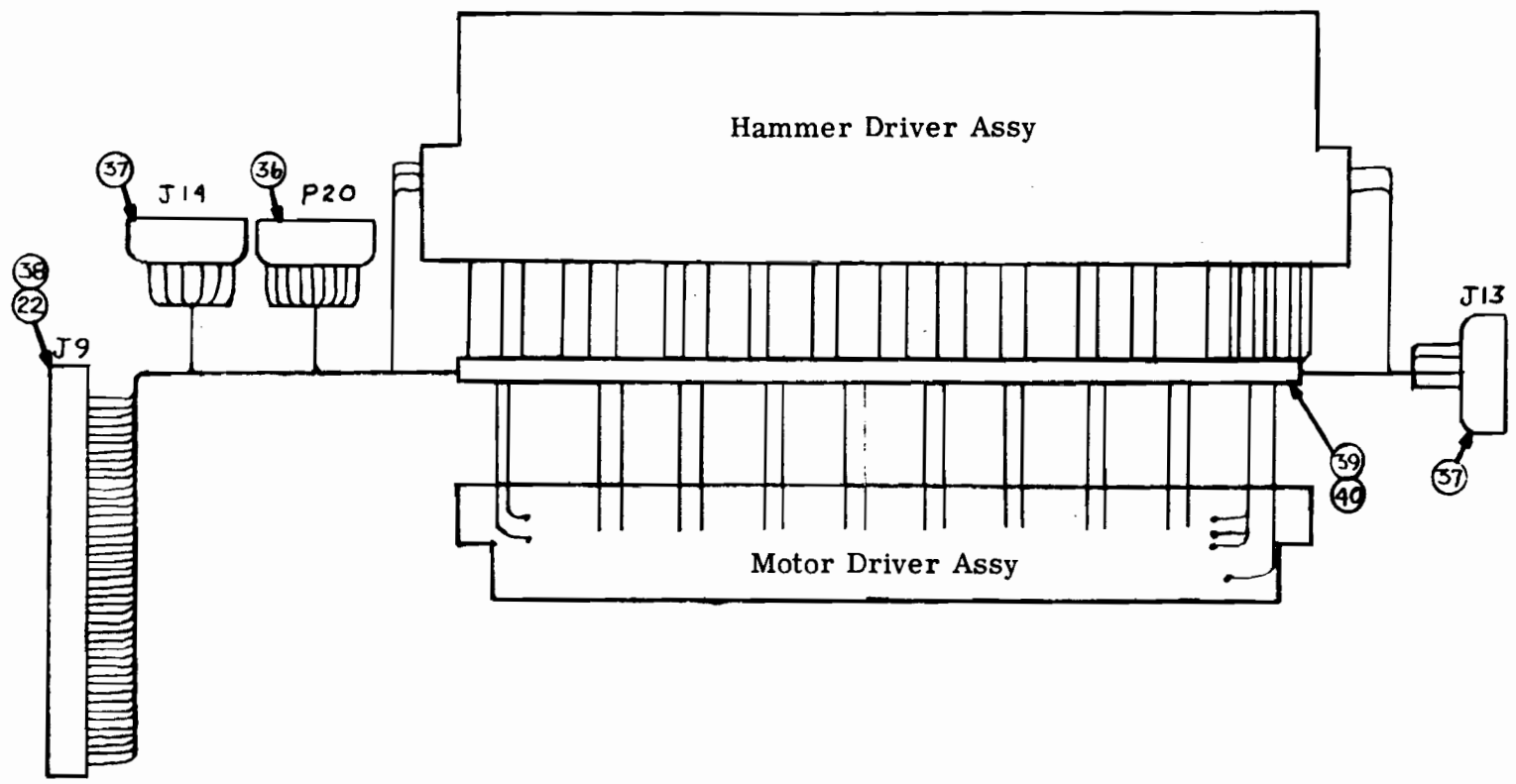
Figure 4-14. Hammer Latch Assembly 02607-60004 Logic Diagram (Series 1415, 1417, 1431, 1435) (Sheet 1 of 2)

Figure 4-14. Hammer Latch Assembly 02607-60004 Logic Diagram (Series 1415, 1417, 1431, 1435) (Sheet 2 of 2)

Figure 4-14. Hammer Latch Ass
Logic Diagram (Series 1415,
(Sheet 2 of 2)

Table 4-9. Hammer Driver PCA 02607-60005 (Series 1415, 1417)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
CR1-132	1901-0711	132	DIODE	401150-01
J9	1251-3903	1	Connector: 22 POS .100	
J13	1251-2512	1	Connector: 4-CONT	
J14	1251-2516	1	Connector: 6-CONT Fem	400091-31
P1-3	02607-80019	3	PC Connector, Modified	
P20	1251-2496	1	Connector: 9 CONT Male	
Q1-132	1854-0633	132	Transistor: NPN SI DARL	400951-01
R1-132	0686-2215	132	Resistor: FXD 220 ohm 5% 1/2w	400050-41
U1-33	1820-1184	33	IC : Digital: 7428	401134-01
U34-37	1820-0174	4	IC : Digital: INU 7404	400194-01
7	02607-80005	1	PCB: Hammer Driver	
22	1251-1400	1	Connector: Polarizing	400962-04
36	1251-2599	9	Contact: Conn Male	400118-01
37	1251-2527	9	Contact: Conn Female	400716-01
38	1251-3340	44	Twin Leaf Contact	
39	02607-20011	1	Cover: Clamp-Cable	602589-3
40	02607-20035	1	Cover: Cable	602589-2
	1400-0249	25	Clip: Cable Tie	400341-01
	1400-0879	15	Cable Tie	



02607-60005 (Series 1415, 1417) Hammer Driver PCA

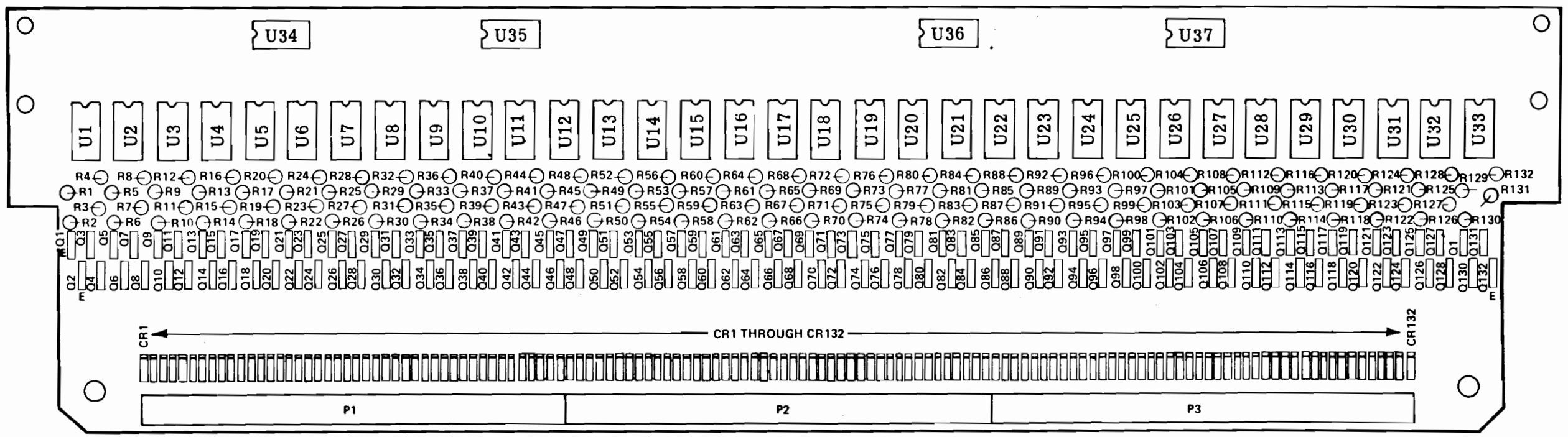
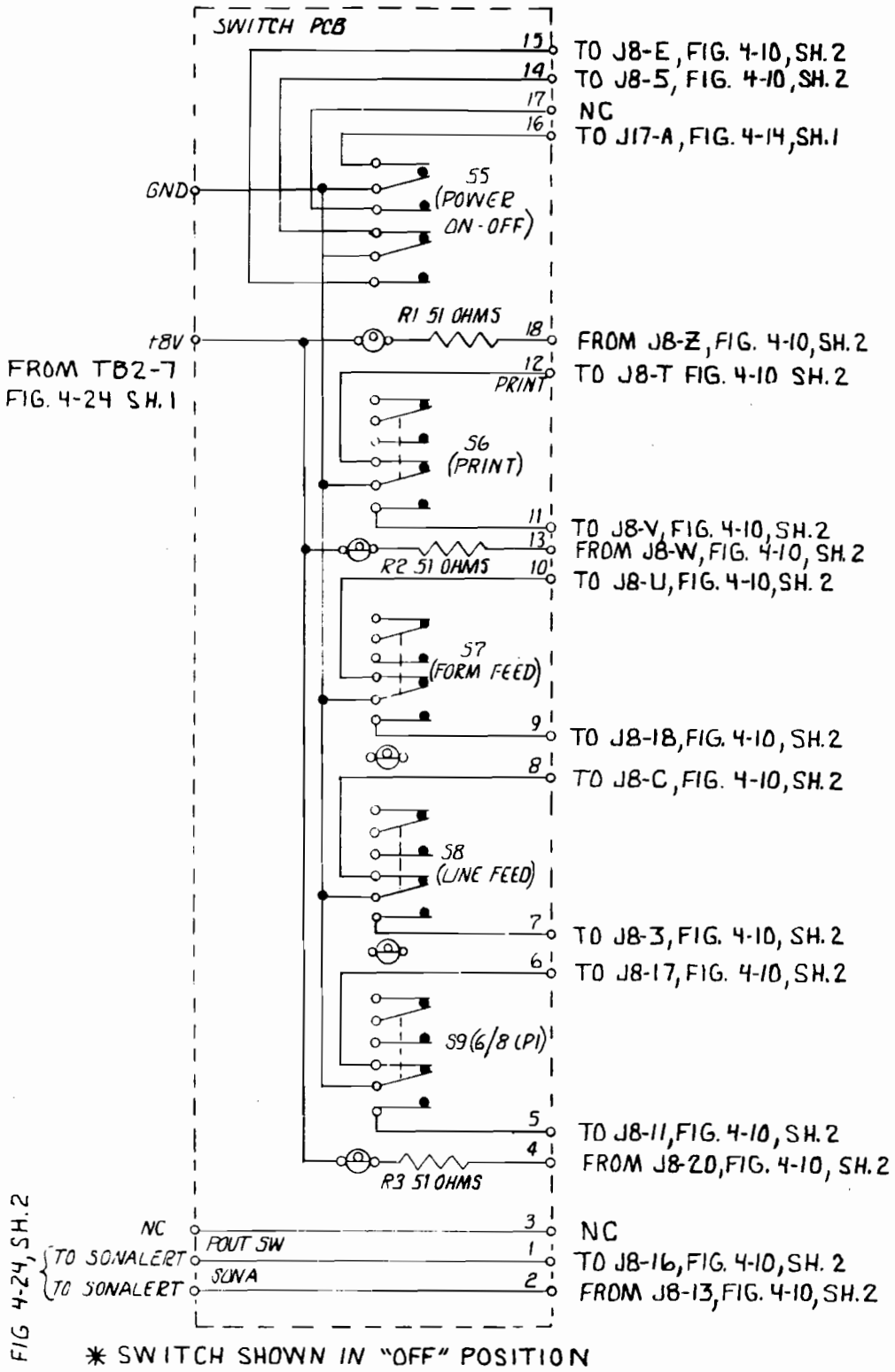


Figure 4-15. Hammer Driver Assembly 02607-60005
Parts Location Diagram (Series 1415, 1417)



✱ SWITCH SHOWN IN "OFF" POSITION

02607-60120 (SERIES 1415 1417) SWITCH ASSEMBLY

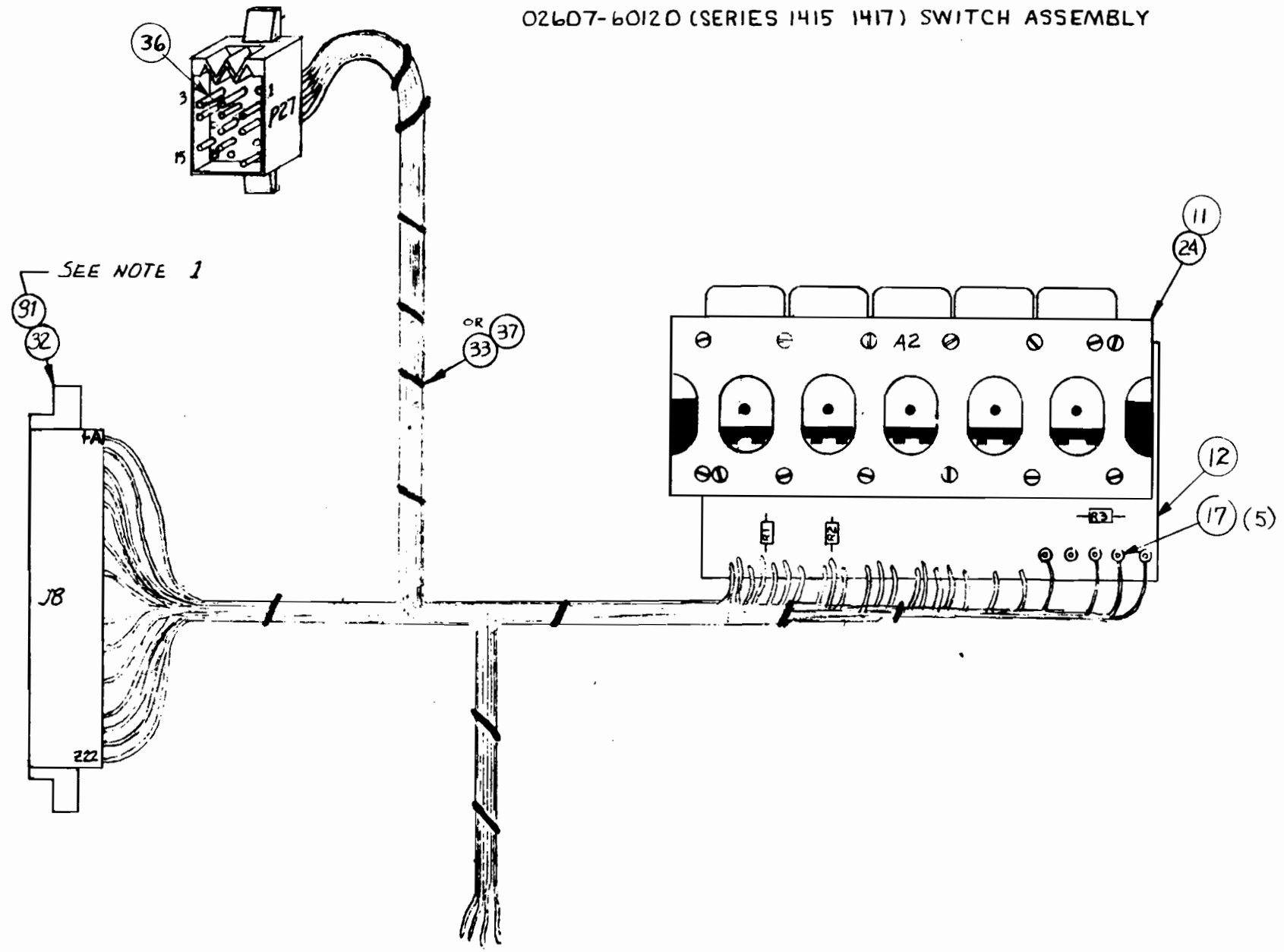
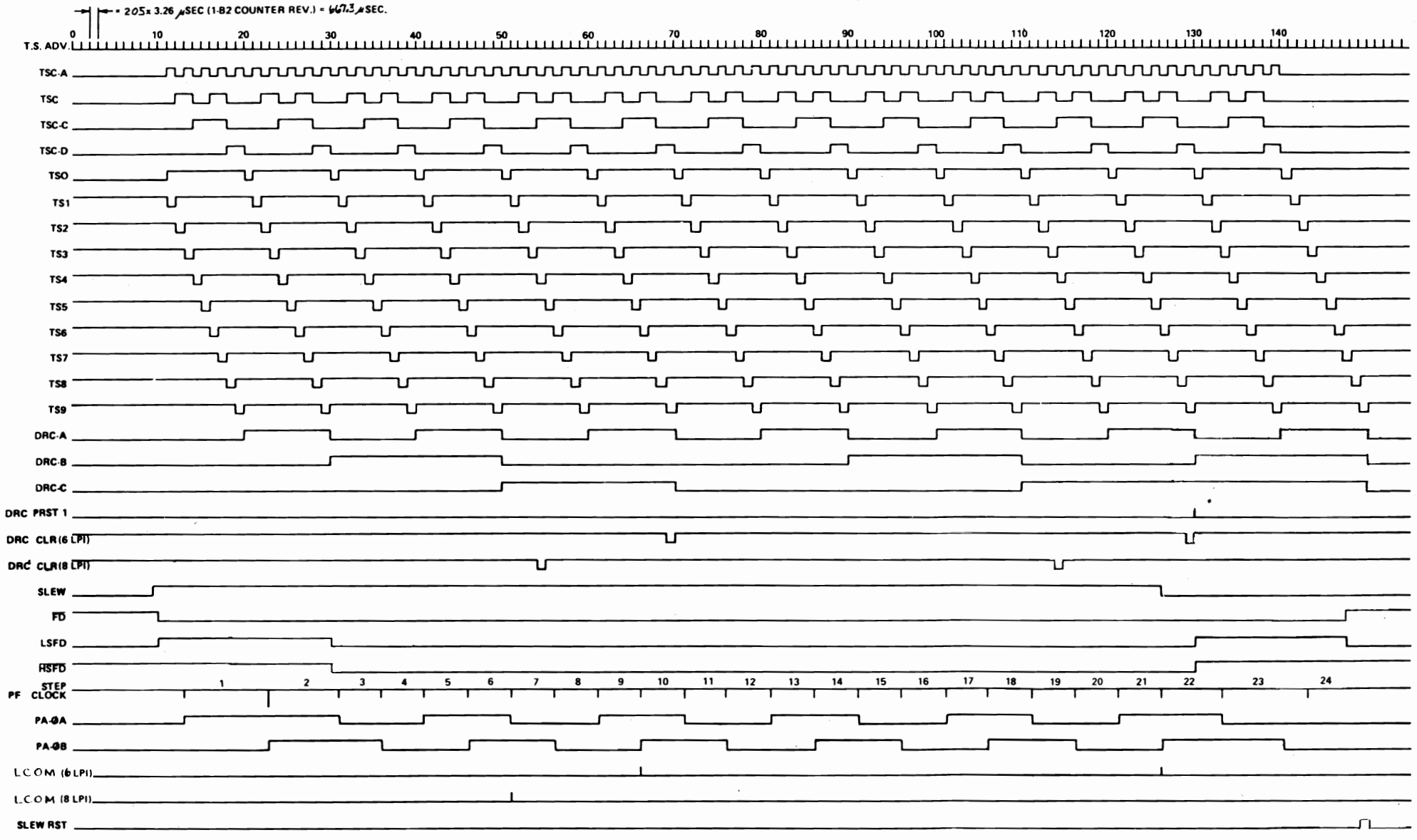


Table 4-11. Switch Assembly 02607-60120 (Series 1415, 1417)

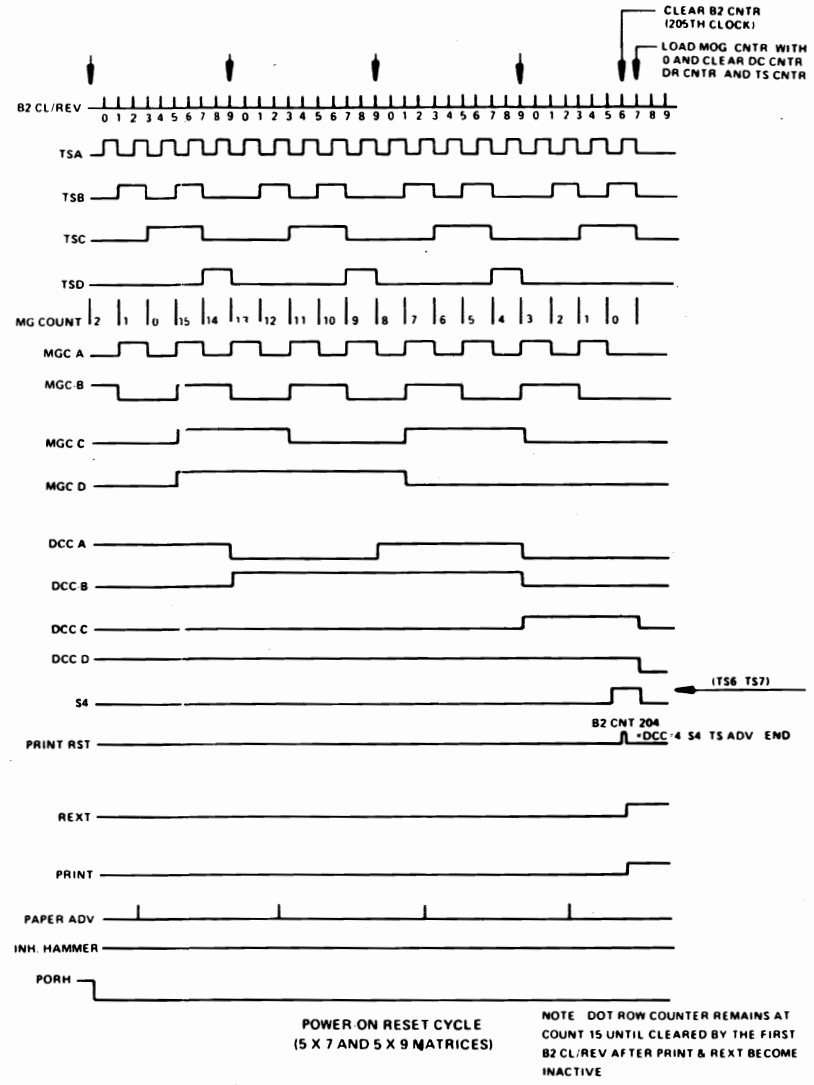
REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
J8	1251-3908	1	Connector: 22 Position .156	
P27	1251-2096	1	Connector: 15-CONT	400130-15
R1-3	0683-5105	3	Resistor: FXD 51 ohm 5% 1/4w	400072-66
11	3101-0691	1	Switch: 5 System	400563-11
12	02607-80009	1	PCB: Switch	
17	0360-0572	5	Terminal : Swaged	400152-02
24	02607-60009	1	PCA: Switch	603465-2
31	1251-3340	44	Twin Leaf Contact	
32	1251-1400	1	Connector: Polarizing (Tally Made)	400962-04
32	1251-4024	1	Connector: Polarizing (HP Made)	
33	1400-0249	21	Clip: Cable Tie	400341-01
36	1251-2599	10	Contact: Conn Male	400118-01
37	1400-0879	15	Cable Tie	
	3131-0350	1	Logo: ON	400563-06
	3131-0351	1	Logo: PRINT	400563-10
	3131-0352	1	Logo: FORM FEED	400563-11
	3131-0353	1	Logo: LINE FEED	400563-12
	3131-0354	1	Logo: 8 LPI	400563-13

Figure 4-18. Switch Assembly 02607-60120
Parts Location and Logic Diagram (Series 1415, 1417)

(Two Lines at 6 LPI)



PAPER ADVANCE CYCLE



POWER-ON RESET CYCLE
(5 X 7 AND 5 X 9 MATRICES)

NOTE DOT ROW COUNTER REMAINS AT COUNT 15 UNTIL CLEARED BY THE FIRST B2 CL/REV AFTER PRINT & REXT BECOME INACTIVE

Figure 4-19. Paper Advance Cycle and Power-On-Reset Timing Diagram

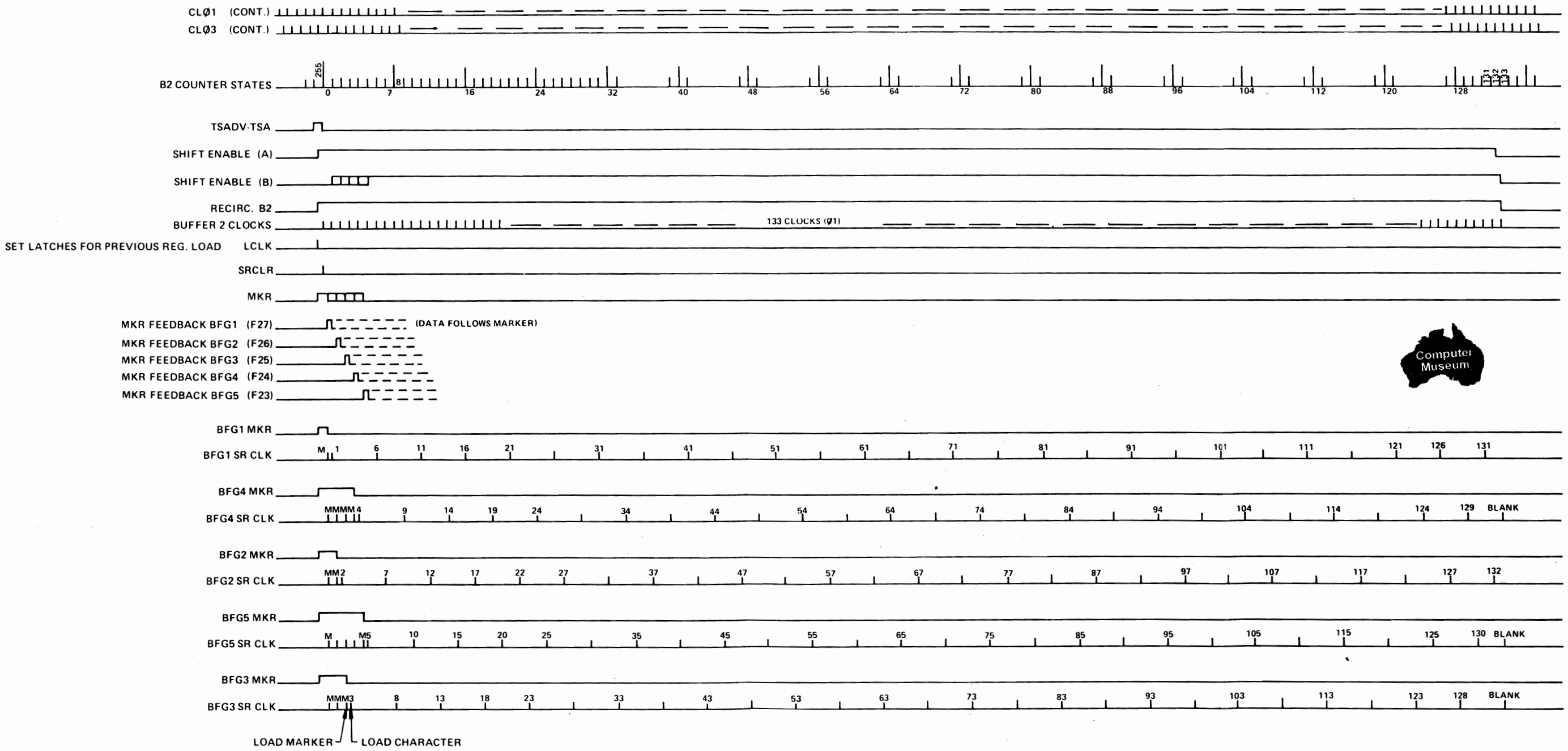


Figure 4-20. Shift Register Load Cycle Timing Diagram

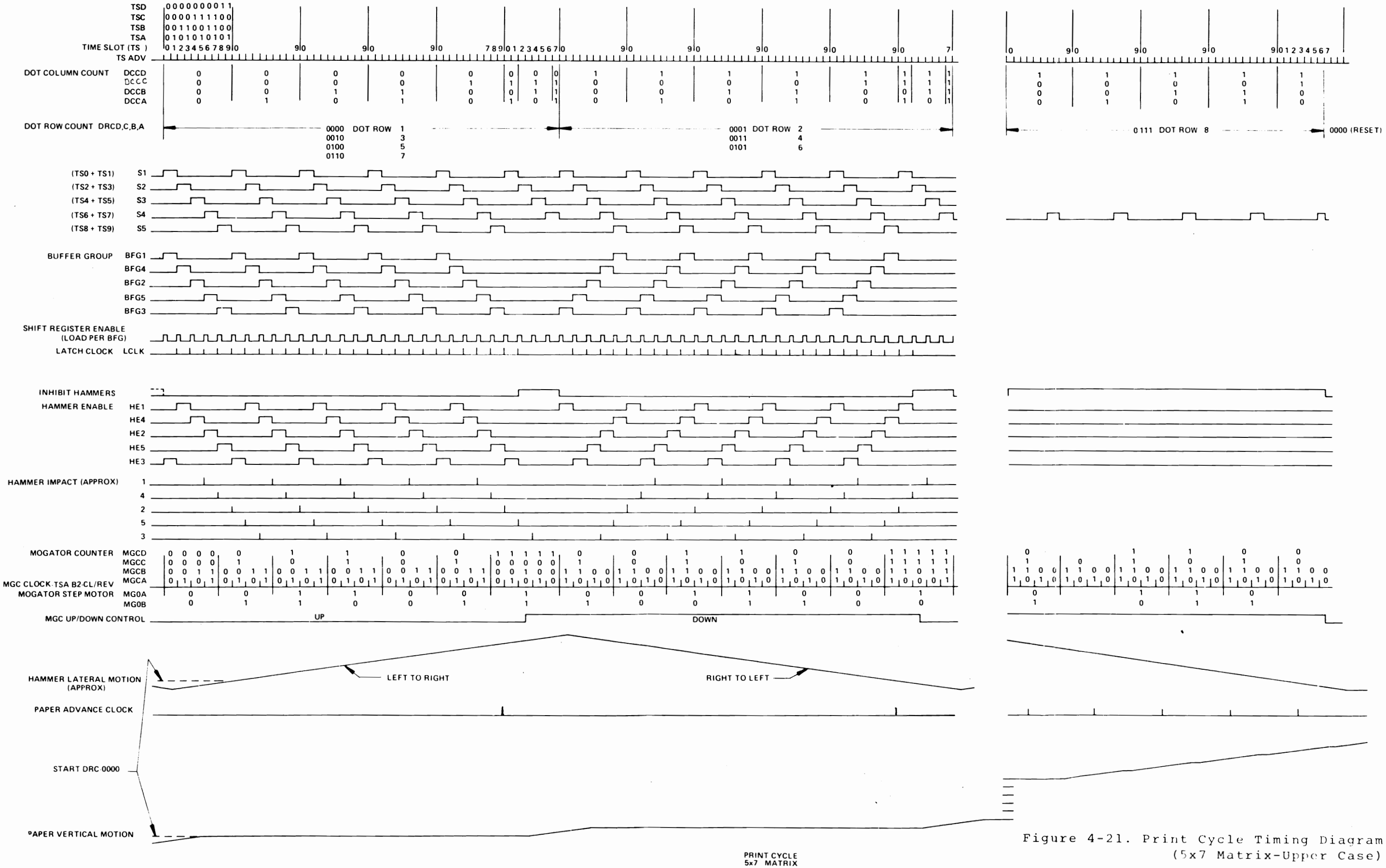


Figure 4-21. Print Cycle Timing Diagram (5x7 Matrix-Upper Case)

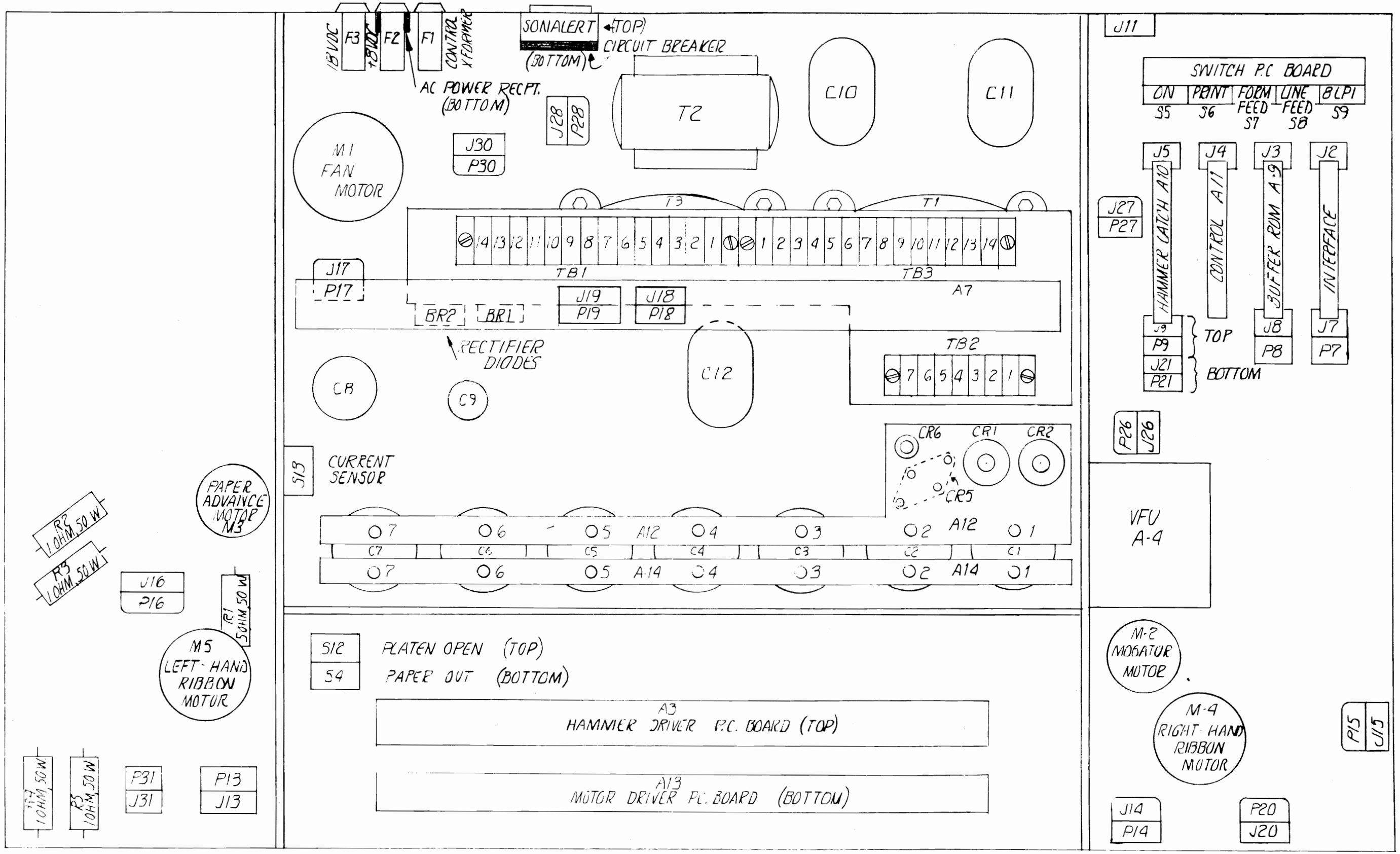
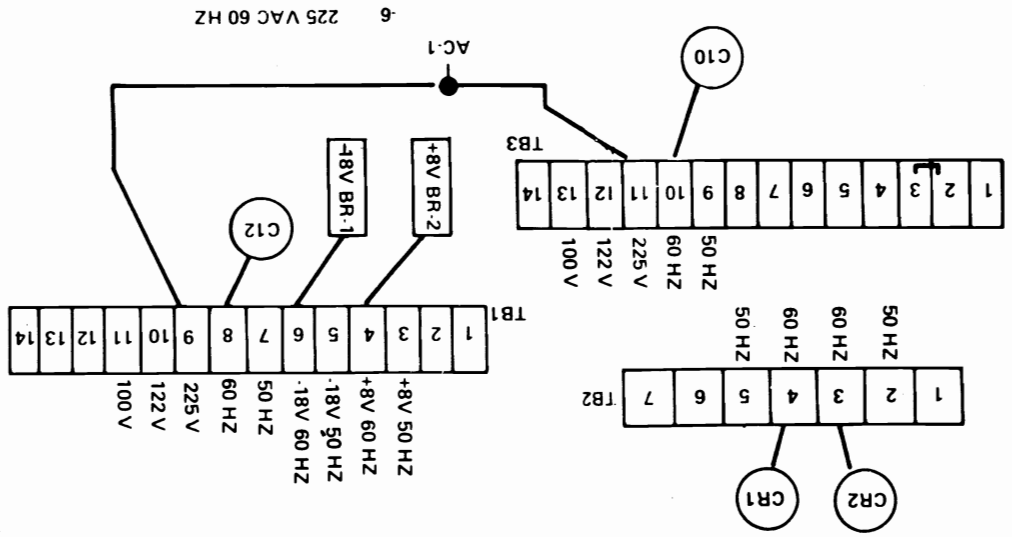
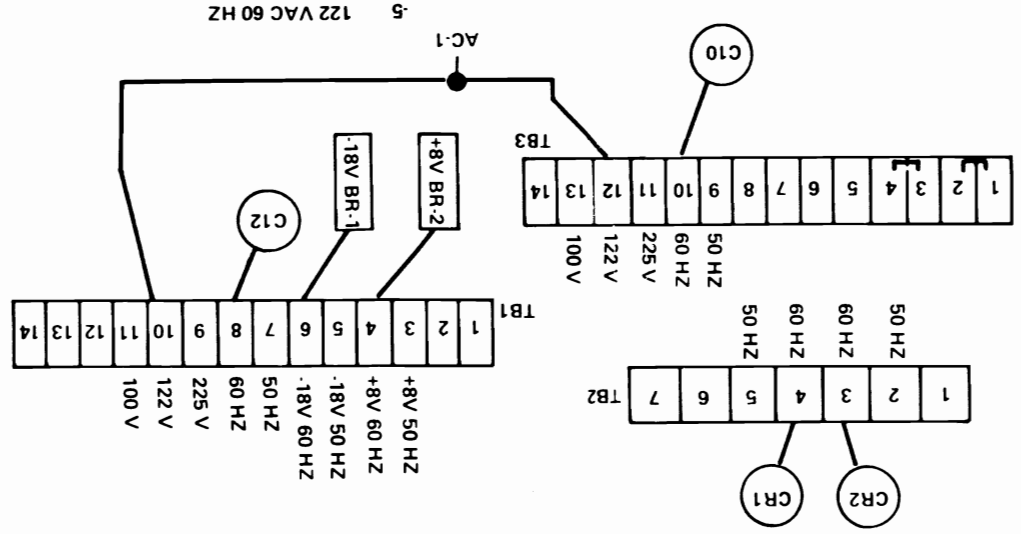


Figure 4-22. Major Electrical Components Location Diagram





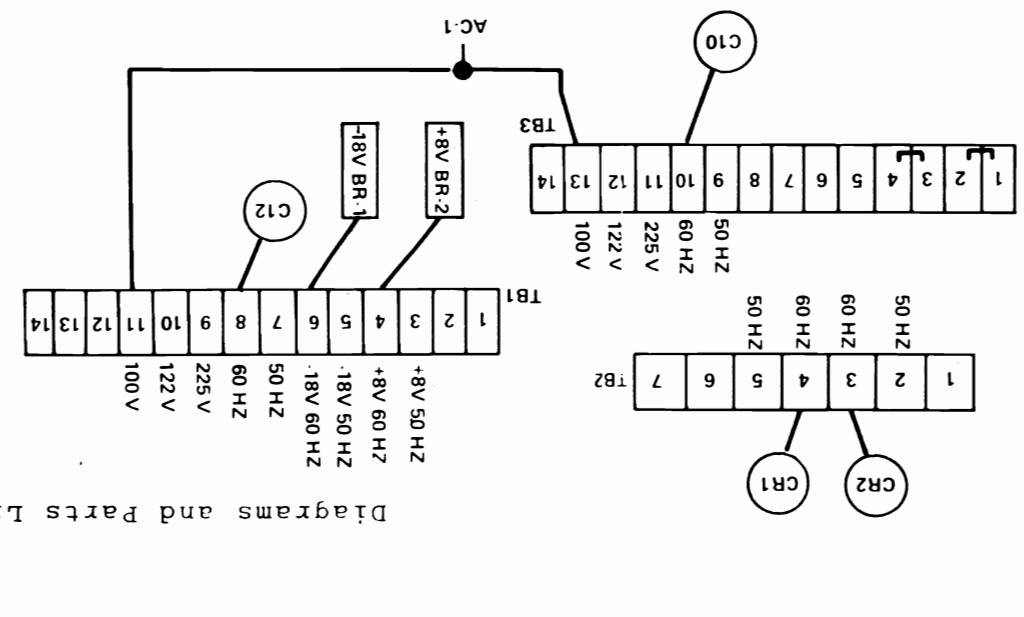


Figure 4-23. Power Supply Configurations

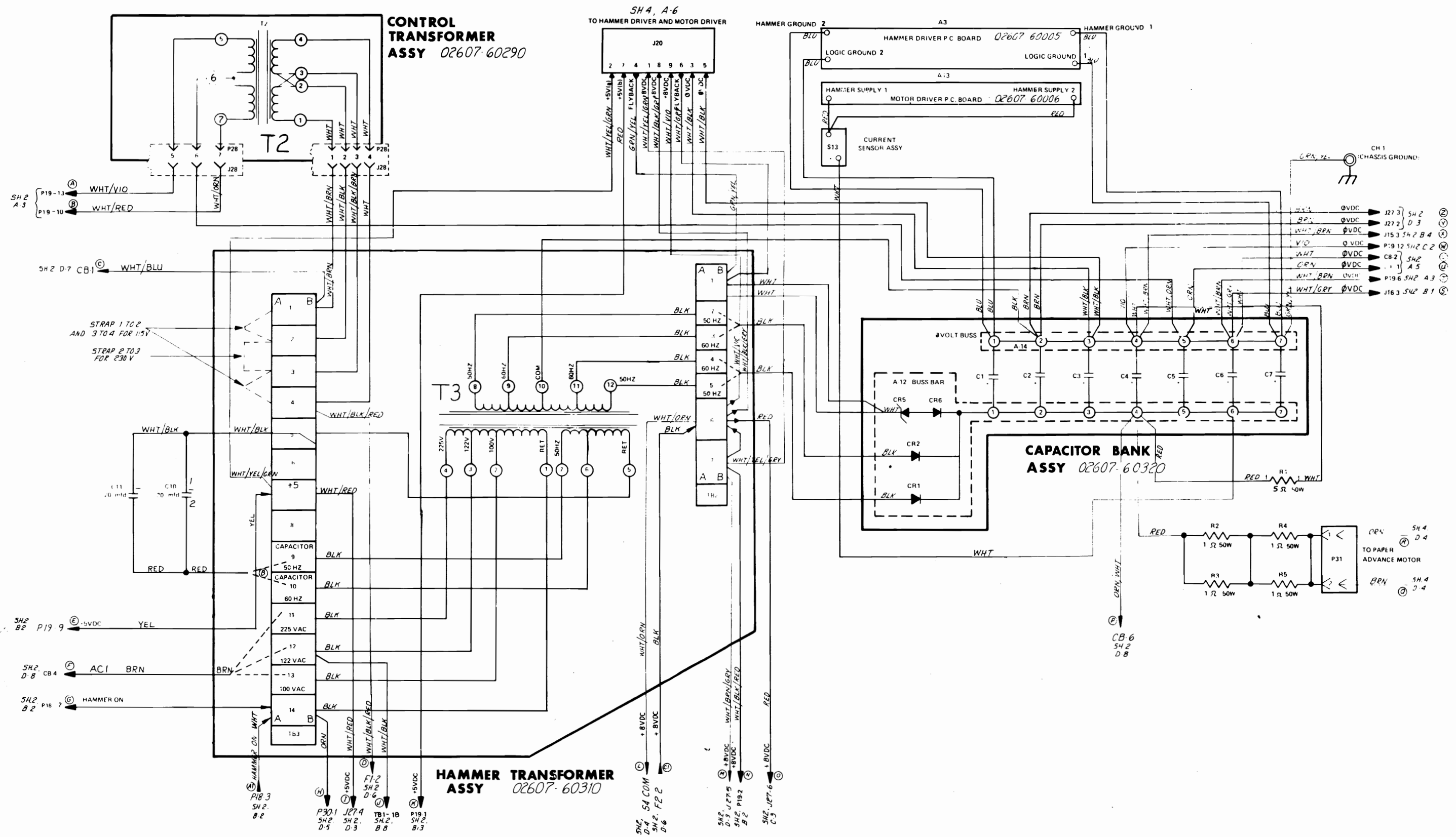
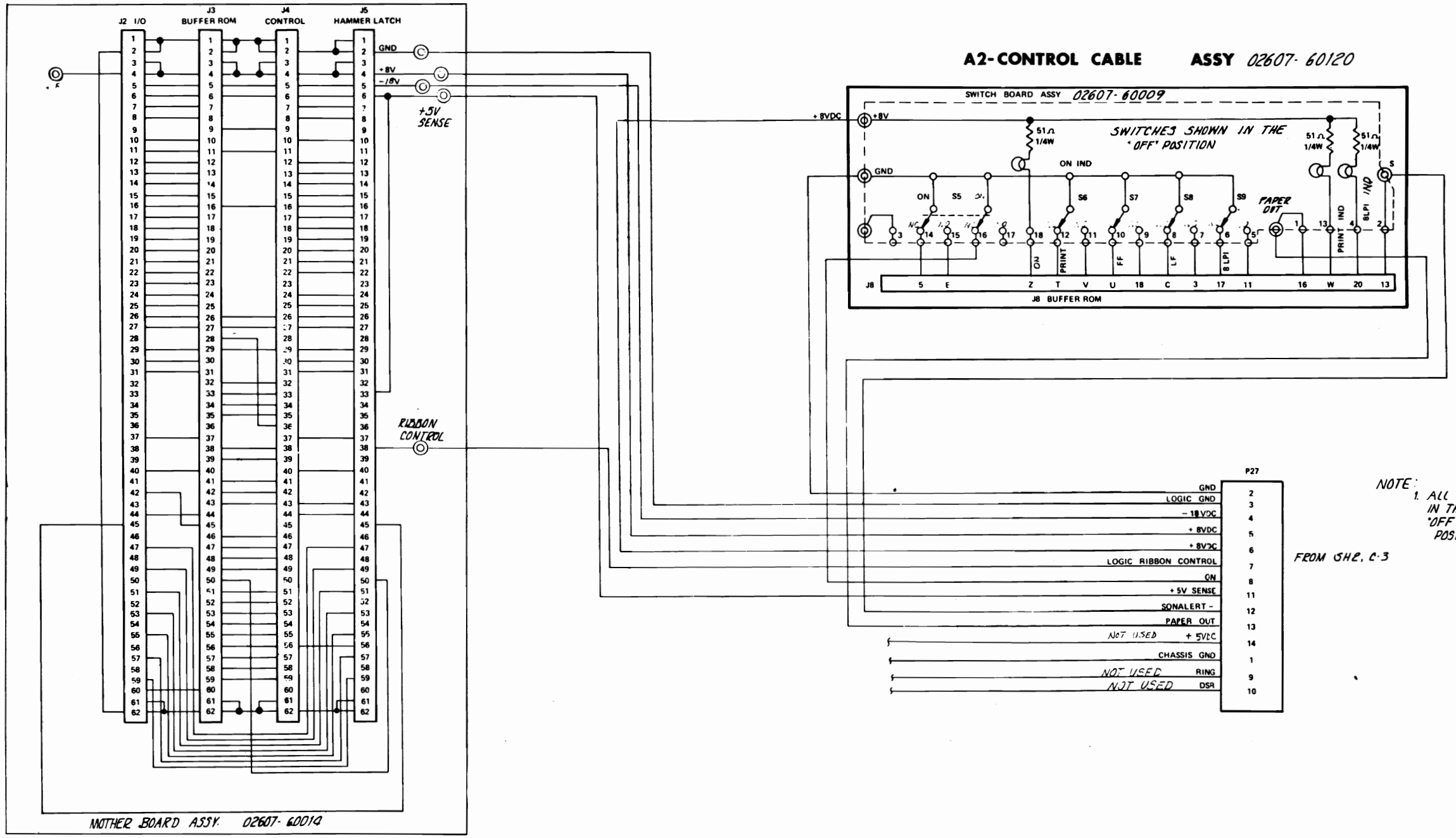


Figure 4-24. Wiring Diagram (Sheet 1 of 4)

POWER SUPPLY BOARD 02607-60008

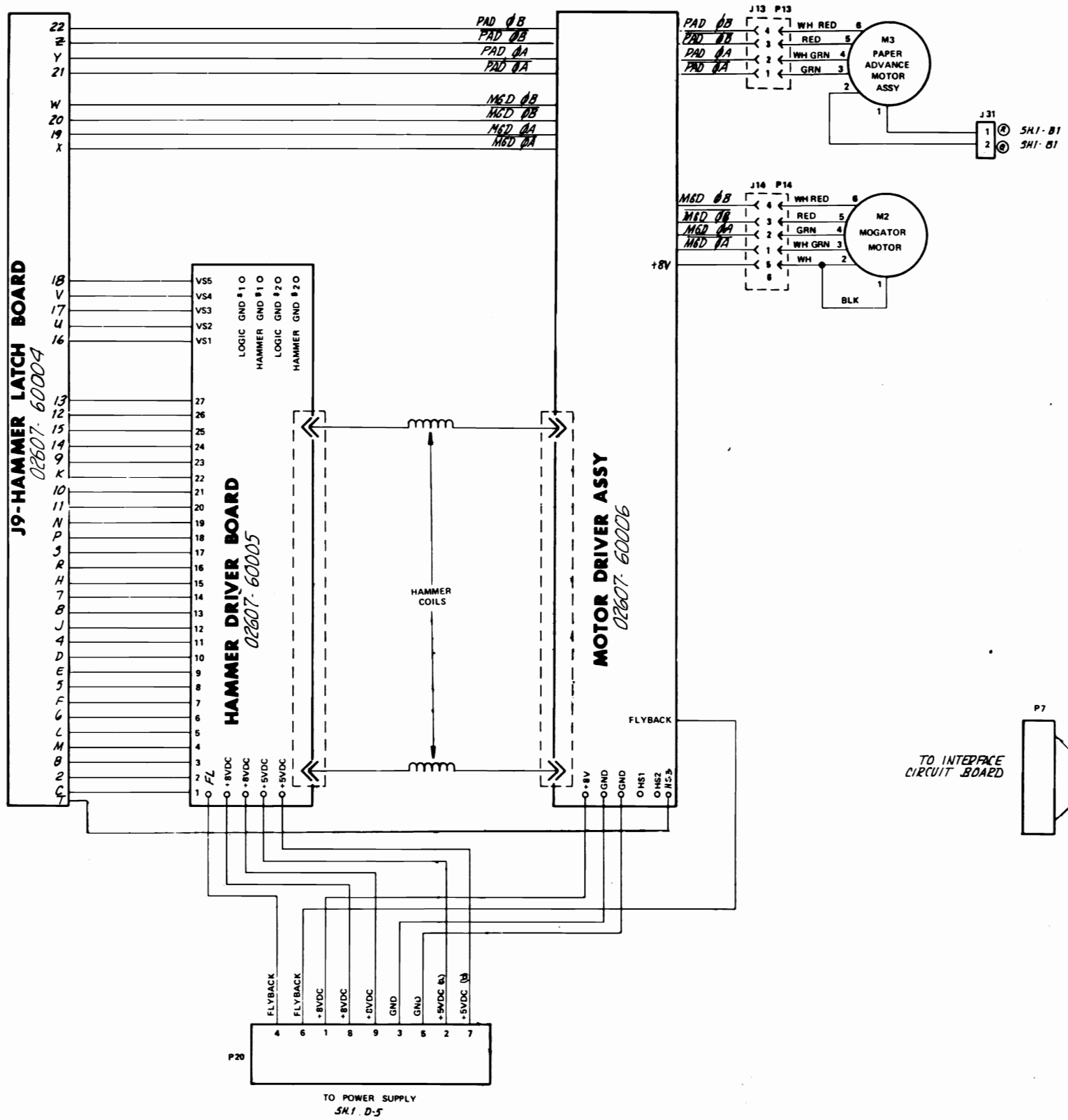
LOGIC TRANSFORMER ASSY 02607-60300

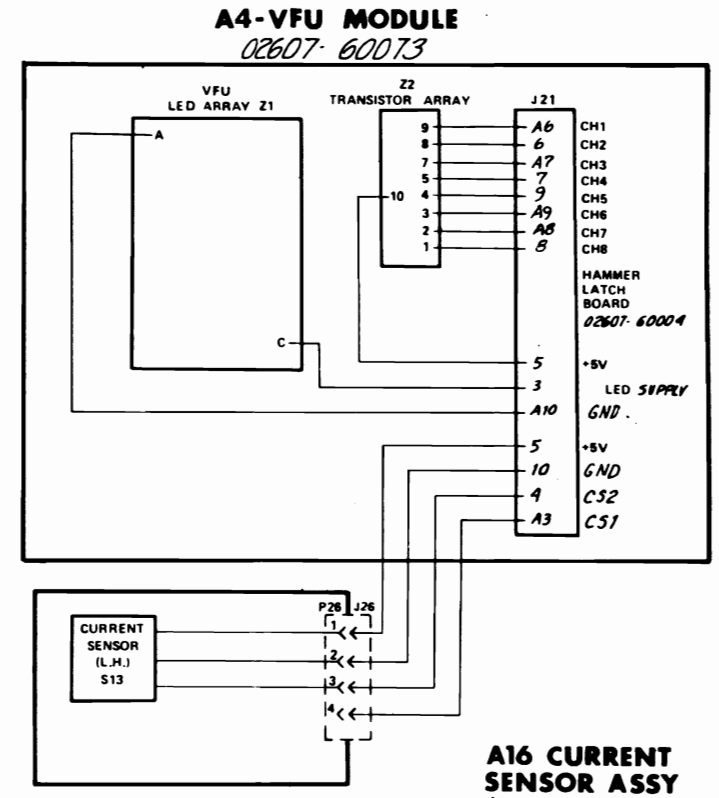
Figure 4-24. Wiring Diagram (Sheet 2 of 4)



CARD CAGE ASSEMBLY
02607-60013

Figure 4-24. Wiring Diagram (Sheet 3 of 4)





A16 CURRENT SENSOR ASSY
02607-60140

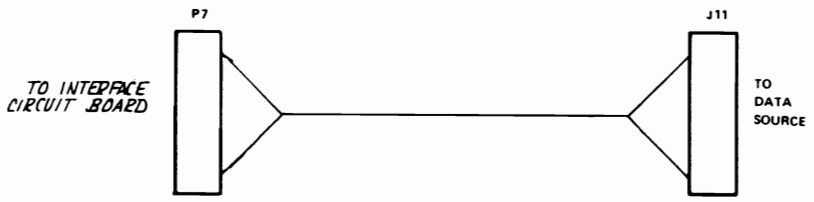


Figure 4-24. Wiring Diagram
(Sheet 4 of 4)

Table 4-12. General Assembly Parts List 2607A

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
2	0400-0065	0	Chan. Grommett	
10	3030-0536	2	Screw, 4-48 Hex .5	400617-519
12	1600-0465	1	Paper Guide, Upper	602616-1
13	1600-0464	1	Paper Guide, Lower	602615-1
14	4040-0653	2	Block, Paper Guide	602617-1
15	02607-60020	1	Print Mech. Assy.	602651-1
16	02607-00070	1	Baffle, Lower	602619-1
17	02607-00071	1	Baffle, Upper	602618-1
18	3050-0662	6	Washer, Clamp Base	
19	02607-60010	1	Card Cage Assy.	602704-1
20	1460-0657	1	Paper Rack	603803-1
21	02607-20001	4	Rubber Tube	602679-1
22	02607-00074	4	Washer Clamp RR PNL	602678-1
27	0380-0550	4	Spacer, #8 x 3/8	401145-34
33	02607-60001	1	PCA, Interface, Upper Case	604064-1
33	02607-60339		PCA, Interface, Upper & Lower	Option 001
36	02607-20039	1	Shaft, Retainer	603395-2
37	0370-2515	1	Knob, Black	400571-24
38	02607-60090	1	Paper Ret. Assy R.H.	603397-2
39	02607-60091	1	Paper Ret. Assy L.H.	603397-1
40	1530-0694	2	Paper Stripper	603505-2
41	0460-0569	0	Tape, Industrial	400323-05
48	1400-0579	2	Clamp, Capacitor	400747-01
52	02607-60131	1	Ribbon Dr. Assy. L.H.	602644-2
53	02607-00063	1	Bracket, PC BD L.H.	602671-2
54	02607-00072	1	Tie Down Assy. L.H.	602594-2
55	7120-3582	1	Label, Service	
56	3050-0239	1	Washer, Non-Metal	
59	02607-80021	1	Actuator Arm	602687-1
60	02607-60110	1	Motor, Paper Drive	603984-1
62	02607-60060	1	Gear & Pinwheel Assy	603480-2
63	3140-0537	1	Motor, Blower	400938-03
64	3160-0268	1	Rotor, Air Blower	400934-01
65	3101-0136	1	Switch	400834-02
66	02607-00061	1	Bracket, Switch MTG	602686-1
67	02607-00036	1	Cover, Terminal	603924-1
68	0590-0563	2	Nut, Thumb	603475-1
69	02607-20032	1	Shaft, Pinwheel	603472-1
70	4040-0654	2	Pinwheel, Paper	602583-1
71	4040-0655	2	Idler	602584-1
72	02607-20057	1	Plug, Tensioner	603524-1
75	1460-0650	3	Spring, Compression	602631-1
76	0510-0520	2	Ring, Retaining 5/16	400260-18
77	0890-0539	0.50ft	Tubing, H.S. .25D	400064-08
81	1530-0693	1	Cam Lever	603471-1
84	4040-0656	2	Bushing, Paper Drive	603477-1
85	4040-0657	1	Knob, Clutch	603474-1
86	1480-0380	1	Pin, Roll .125 x .75	400793-71
87	3050-0642	12	Washer, Belleville	401044-16
93	02607-60130	1	Ribbon Dr. Assy. R.H.	602644-1
94	02607-60070	1	VFU Assy.	603769-3

Table 4-12(Continued). General Assembly Parts List 2607A

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
95	4040-0658	1	Tensioner, Tape	602637-1
97	02607-00059	1	Tie Down, PC, BD, RH	602594-1
98	02607-00062	1	Bracket, PC BD, RH	602671-1
99	1460-0644	3	Spring Comp	400937-01
101	6040-0057	0	Mold Release	401152-01
103	1600-0460	1	Flexure, Motor	602550-1
104	02607-20033	1	Clamp, Motor	602598-1
105	02607-20063	1	Angle, Flexure	602599-1
106	02607-00049	1	BKT, Stop Mgtr. LH	602604-1
107	02607-00050	1	BKT, Stop Mgtr. RH	602604-2
108	02607-00048	1	BKT, Motor Mgtr.	602605-2
109	0403-0326	2	Bumper Pad	601315-1
110	7120-3894	1	Nameplate	401192-01
111	0470-0446	0	ACH: BNDG/SEG	400658-19
112	02607-00134	1	Hinge, BKT Upper LH	604115-1
113	02607-00132	1	Hinge, BKT Upper RH	604115-2
114	2110-0048	1	Fuse, 15A 32V	400552-07
115	2110-0303	1	Fuse, 2A 250V	400031-23
117	2360-0127	2	Screw, 6-32 x .875 Pan	400016-07
118	2190-0479	2	Washer, Flat #2	
119	0520-0133	2	Screw, 2-56 x .5 Pan	
121	3030-0467	26	Screw, 8-32 x .375 Hex	400512-245
122	2580-0017	3	Nut, Hex-Keps 8-32	400783-25
123	3030-0025	6	Screw, 8-32 x .625 Hex	400512-249
124	2510-0103	37	Screw, 8-32 x .375 Pan	400017-05
125	3050-0637	4	Washer, Nylon .312	400487-13
126	2200-0139	10	Screw, 4-40 .25 Pan	400013-05
127	0610-0001	2	Nut, Hex 2-56	400726-27
128	2190-0087	96	Washer, Lock #8	400215-10
129	3050-0001	98	Washer, Flat #8	
130	2190-0362	14	Washer, Lock #4	400215-07
131	3050-0222	6	Washer, Flat #4	400216-07
135	2190-0376	2	Washer, Flat #4	400782-04
136	1400-0126	1	Clamp, Cable	400056-05
137	02607-20038	2	Nut, Plate	603425-1
138	02607-20031	1	Form Scale	602603-1
139	02607-20040	4	Corner Post	602675-1
140	1251-2357	1	AC Power Receptacle	401181-01
141	0960-0313	1	Sonalert	400407-01
142	0811-3277	4	Resistor: FXD 1 ohm 50w	400603-01
145	0811-0661	1	Resistor: FXD 5 ohm 50w	400603-03
146	4208-0066	2	Acoustical Liner	602692-8
147	4208-0067	1	Acoustical Liner	602692-7
149	4208-0065	4	Acoustical Liner	602692-10
150	4040-0648	1	Cover, Module	603849-1
151	0460-0599	0	Tape, Foam Ureth	400271-04
152	02607-60210	1	Air Filter Assy	603792-1
155	02607-20070	1	Frame, Upper	602673-2
157	02607-60340	1	Nose Cone Assy	604069-2
158	02607-00025	1	Cover, Right Side	602596-20

Table 4-12(Continued). General Assembly Parts List 2607A

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
159	02607-00026	1	Cover, Rear LH	602608-1
160	02607-00027	1	Cover, Rear RH	602608-2
161	02607-00028	1	Cover, Hammer Dr	602658-1
163	2190-0467		Washer, Lock #10	400069-04
167	4208-0073	1	Acoustical Liner	602692-2
170	3131-0349	1	Switch Actuator	400669-01
171	3101-1112	1	Switch, Subminiature	400834-02
172	7120-4175	1	Label, Ribbon Load	603403-1
173	1460-0671	1	Spring-Form Scale	602612-2
178	3050-0663	4	Washer, Hood	603604-1
179	02607-00030	1	Plate, Switch	603845-1
180	02607-60150	1	Hood Assy	603569-8
181	02607-40043	1	Cover-Power Supply	603537-6
183	3105-0037	1	Circuit Breaker	401048-03
185	3050-0628	1	Washer, Flat #4	
186	2190-0421	2	Washer, Flat 1/4	400216-13
187	3050-0456	3	Washer, Spring #10	401103-17
188	0590-0839	5	Nut, Hex 8-32	400434-04
189	3050-0641	1	Washer, Square Hole	401158-01
191	3030-0550	2	Screw, 8-32 Shoulder	401074-07
193	2190-0357	1	Washer, Belleville .150 D	401103-03
194	02607-00033	1	Bracket, Support	603661-1
195	02607-00031	1	Strap, Paper Rack	603889-1
197	2510-0099	3	Screw, 8-32 x .25 Pan	400017-03
199	1390-0104	2	Fastener, Panel, Snap-In	400237-01
200	1390-0303	2	Fastener, Panel, Snap-In	400237-04
205	02607-00032	1	Bracket, Switch	603681-1
206	7120-4174	1	Scale-Platen PIV	603665-1
214	8151-0011		Wire, Elec. 18 AWG	
216	2680-0105	2	Screw, 10-32 x 5/8 Pan	
222	0362-0328	2	Terminal Lug #6 Blu	400067-50
224	0362-0407	8	Terminal-CRP	400349-16
231	2200-0155	2	Screw, 4-40 1 Pan	400013-16
232	2260-0009	8	Nut, Lock 4-40	400783-01
233	3030-0002	1	Screw, Set 8-32 x .5 Flat	400689-55
234	3030-0526	8	Screw, 8-32 x .5 Flat	400231-01
235	2510-0109	8	Screw, 8-32 x .625 Pan	400017-09
236	2510-0115	3	Screw, 8-32 x 1 Pan	400017-13
238	2190-0034	9	Washer, Lock #10	400215-11
243	2940-0055	11	Screw, 1/4 -20 x .625	400324-08
245	2510-0107	15	Screw, 8-32 x .5 Pan	
247	2360-0354	4	Screw, 6-32 x .375 Pan	400360-05
249	2190-0032	9	Washer, Lock 1/4	400215-13
251	3050-0229	12	Washer, Flat #4	400216-08
252	2360-0203	6	Screw, 6-32 . 625 Pan	
253	3050-0019	6	Washer, Flat #10	
256	3030-0529	2	Screw, 8-32 x 7/8 SCT	400512-251
257	2190-0103		Washer, Lock #2	400786-01
258	02607-60180	1	Weld-Fan Housing	603706-1
259	0400-0082	0	Grom., Channel	400335-02

Table 4-12(Continued). General Assembly Parts List 2607A

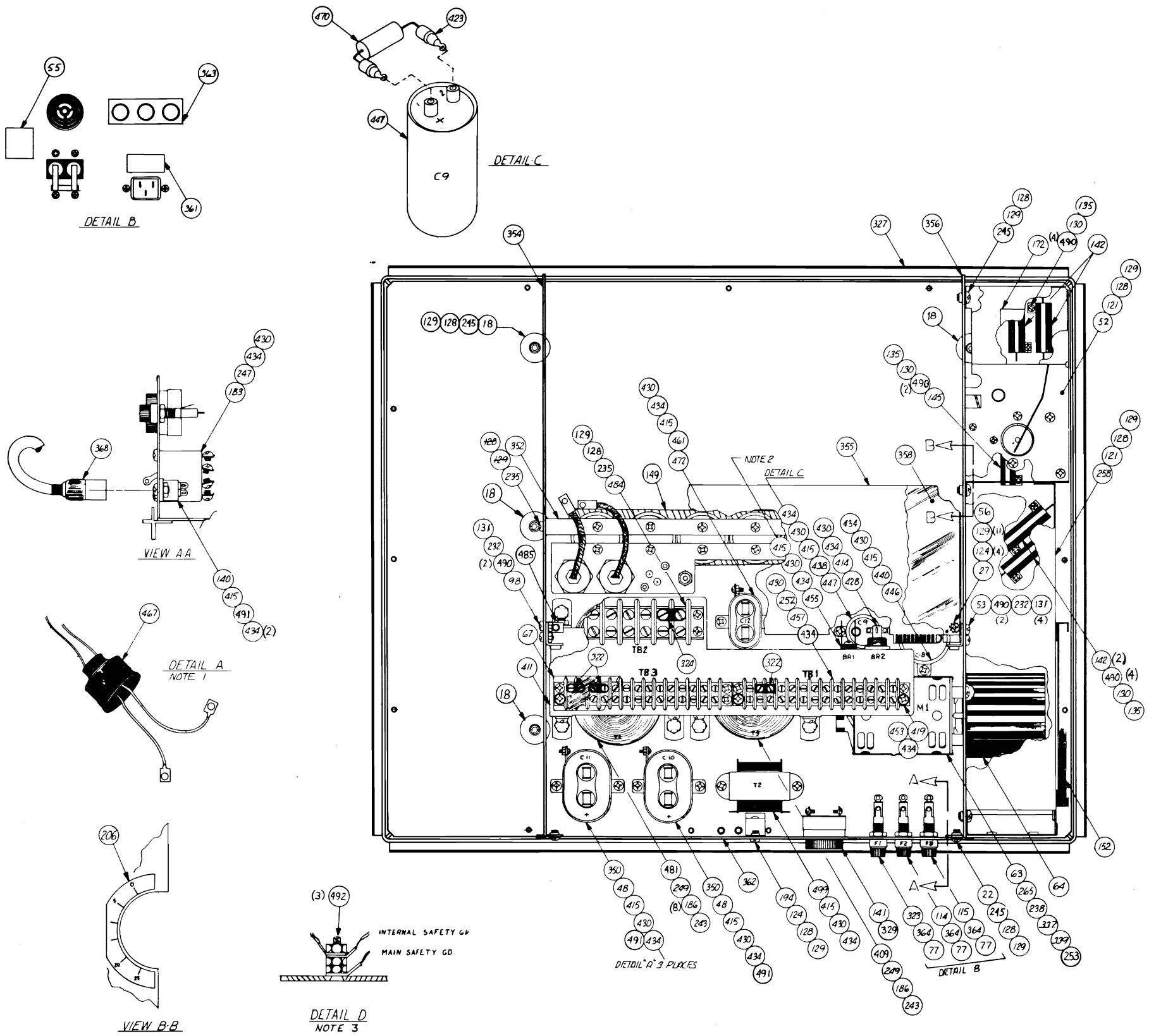
REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
260	02607-00075	1	Cover, Left Side	602596-21
261	4208-0072	1	Acoustical Liner	602692-5
262	4208-0070	1	Acoustical Liner	602692-6
263	2190-0321	2	Washer, Lock #8	400786-06
264	02607-20030	2	Torsion Bar Hood	603540-1
265	2680-0179	4	Screw, 10-24 x .5 Pan	400018-07
270	2940-0142	4	Screw, 3/8 -16 x 10	400725-52
271	3050-0636	5	Washer, Flat .51 D	400688-01
272	2190-0871	1	Washer, Spring 1/4	400995-11
273	3050-0638	1	Washer Fiber 1/4	400301-04
274	0460-0598	0	Tape Foam Ureth	400271-02
291	3050-0660	2	Washer, Paper Mech	
292	1410-0573	2	Ball-Bearing, RDL FLG	401030-19
293	02607-60100	1	Shaft & Gear Assy	603983-1
294	4040-0662	1	Adapter, Bearing	603987-1
298	4040-0663	9	Roller, Paper Rack	604006-1
299	7120-4182	1	Label, Card Cage	
303	2200-0736	1	Screw, 4-40 x .25 Pan	400013-32
304	6040-0307	0	Lubt: Grease	400005-01
308	02607-80024	1	Tape, VFU (6 LPI)	603709-10
309	02607-00110	1	ADJ Plate, MGTR	604161-1
310	1530-0696	1	Eccentric	604162-1
315	02607-00135	1	Hinge, BKT - Lower LH	604114-1
316	02607-00133	1	Hinge, BKT - Lower RH	604114-2
317	2360-0191	2	Screw, 6-32 .188 PN	
318	2200-0174	6	Screw, 4-40 x .25 FL	
322	0360-1279	3	Term, Jumper Barr BK	400736-01
323	2110-0201	1	Fuse, 250V 1/4 amp	400031-10
324	02607-00131	1	Jumper, Barrier Strip	
327	02607-60030	1	Baseplate Assy	602674-3
329	02607-60040	1	Harness Assy	604148-1
330	02607-60041	1	Wire, Harness 10 G	
331	02607-60120	1	Switch Assy	602703-1
337	1251-2097	2	Contact, Connector	400118-03
338	02607-60007	1	Hmmr/MTR, DR. ASSY.	604147-1
339	1251-3530	1	Connector, Plug 2 Cont	400130-27
340	02607-60004	1	PCA, Hammer Latch	603820-1
342	02607-60003	1	PCA, Control	603818-1
344	02607-60002	1	PCA, Buff ROM (ASCII Upper Case)	603949-1
	02607-60015		PCA, BUFF ROM (ASCII Upper & Lower Case)	Option 001
344	02607-60337		PCA, BUFF ROM (Scandanavian Upper Case)	Option 002
344	02607-60338		PCA, BUFF ROM (Scandanavian Upper & Lower Case)	Option 003
350	0160-4202	2	Capacitor, FXD 20 uf 370 VAC	401195-11
352	02607-60320	1	Capacitor Bank Assy	604157-1
354	02607-00080	1	Panel, Side RH	602689-2
355	02607-60008	1	PCA, Power Supply	604082-1
356	02607-00081	1	Panel, Side LH	602690-2

Table 4-12 (Continued). General Assembly Parts List 2607A

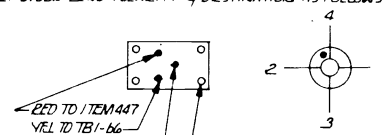
REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
358	02607-00035	1	Cover, PCB PWR Supply	603557-2
360	02607-60080	1	Stepping MTR, Mogator	603624-2
361	7124-2342	1	Label, UL	
362	02607-00073	1	Panel, Rear	602628-2
363	7120-4176	1	Label, Back Panel	604024-2
364	2110-0482	3	Fuse Holder 250V	400474-06
368	8120-1348	1	Cable, Unshielded 18 AWG	401182-01
369	02607-60140	1	Current Sensor	604181-2
371	8150-2435	2.80ft	Wire, Elec, BLK 10 AWG	
372	8150-1419	5.40ft	Wire, Elec, RED, 10 AWG	400494-63
374	8150-1791	1.60ft	Wire, Elec, BLK, 16 AWG	400494-42
375	8150-1793	1.0ft	Wire, Elec, RED 16 AWG	400494-43
376	8150-1800	1.10ft	Wire, Elec, WHT 16 AWG	400494-41
377	8150-1668	4.70ft	Wire, Elec, WHT 18 AWG	400321-126
409	02607-60300	1	Logic Transformer Assy	604152-1
411	02607-00127	1	Bracket, Term. Block	604091-1
414	2360-0197	1	Screw, 6-32 .375 Pan	400016-05
415	2360-0199	23	Screw, 6-32 .25 Pan	
419	2360-0133	3	Screw, 6-32 1.25 Pan	
423	0362-0333	6	Terminal, CRP #10 RED	400067-44
428	1906-0059	1	Diode, Rectifier	400134-01
430	2190-0851	31	Washer, Lock Hel #6	400215-09
434	3050-0227	50	Washer, Flat .149	
438	0160-2149	1	Clamp, Capacitor	400292-01
440	0180-1969	1	Clamp, Capacitor	400292-02
446	0180-2257	1	Capacitor, FXD 31,000uf	400565-03
447	0180-0632	1	Capacitor, FXD 2200uf 40 VDC	400565-08
453	0380-0359	3	Spacer, #6 x .50	
455	1906-0052	1	Diode, 6 AMPS	400630-01
457	0360-0573	2	Terminal, Block 14 PT	400734-01
461	1400-0578	1	Clamp, Capacitor	400747-01
467	0340-0543	3	Boot, Capacitor Terminal	400810-01
470	0811-1764	1	Resistor: FXD 390 ohm 5% 2w PW	400899-44
472	0160-4203	1	Capacitor: FXD 10 uf 370 VAC	401195-09
481	02607-60310	1	Hammer Transformer Assy.	604153-1
484	0360-0587	1	Terminal Block, 7 Pt	401213-01
485	2740-0003	2	Nut, Hex 10-32	
490	2200-0143	14	Screw, 4-40 x .375 Pan	
491	2420-0002	3	Nut, Hex 6-32	
492	2580-0004	3	Nut, 8-32 Hex	
493	2190-0158	2	Washer, Flat .625	
494	2360-0201	4	Screw: 6-32, .5 Pan	
499	02607-60290	1	Transformer Assy 24V	604151-1
---	02607-60270	1	I/O Cable Assy	604099-1
---	02607-60230	1	VFU Tape Kit	603683
---	9282-0531	1	Ribbon	400667-07
---	0950-0639	1	Stand and Shelf, L/P	603218-6
500	1480-0258	1	Pin: Roll	400793-47
501	1530-0557	1	Pin Gear	
502	1400-0571	1	Clip: Cable	

Table 4-12(Continued). General Assembly Parts List 2607A

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
503	2190-0413	5	Washer Flat #5	
504	2190-0467	1	Washer Lock #10	
505	07970-00510	2	Strap Ground	



NOTES:
1. CAPACITOR BOOT TO BE INSTALLED PRIOR TO TERMINATION OF CAPACITOR LEADS.
2. DIODE LEAD POLARITY & DESTINATION AS FOLLOWS:



3. CAPTURE AC RECEPTACLE GROUND WITH 2 NUTS AS SHOWN. OTHER GROUNDS WITH ONE NUT.

Figure 4-25. General Assembly (Sheet 1 of 3)

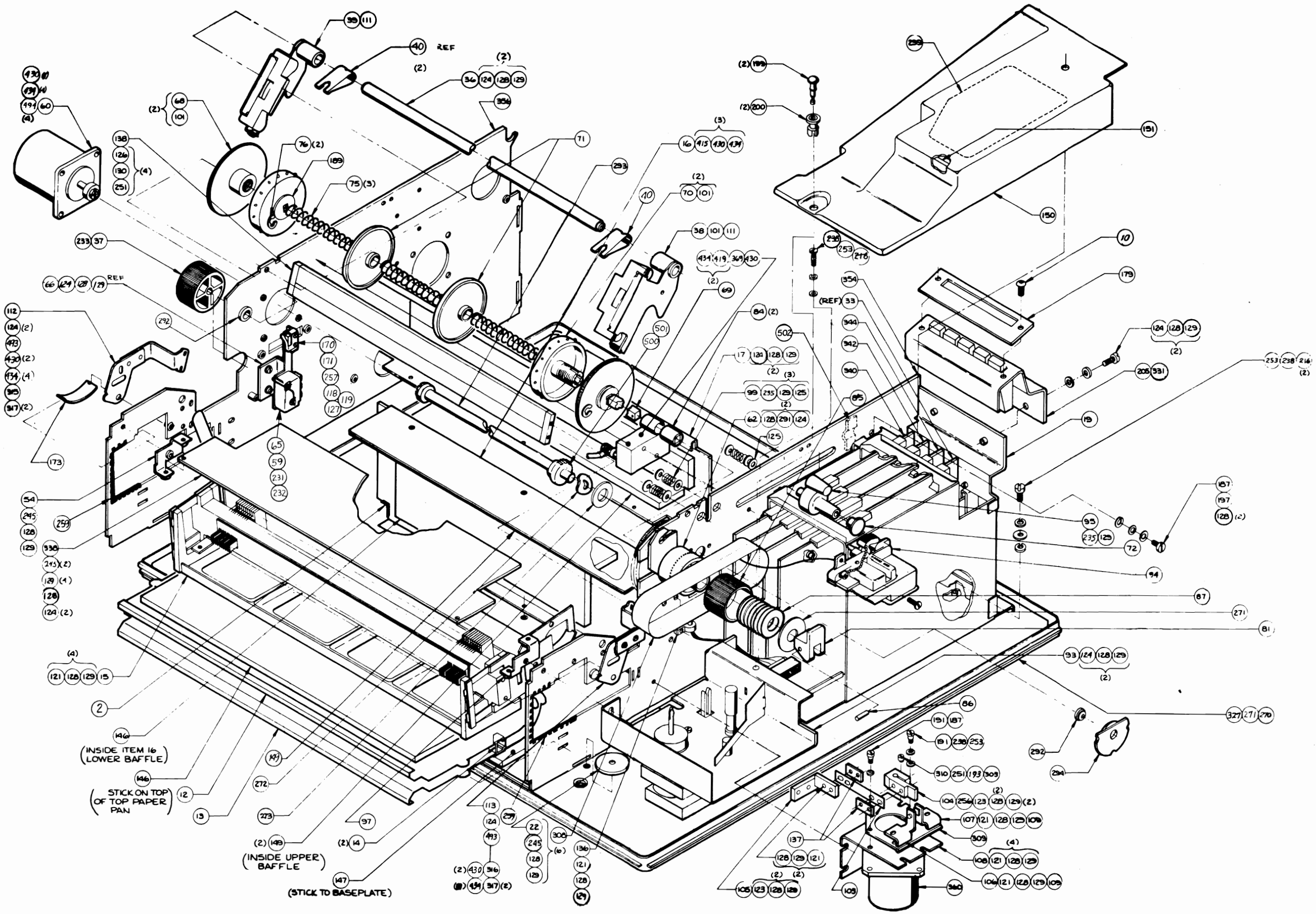


Figure 4-25. General Assembly (Sheet 2 of 3)

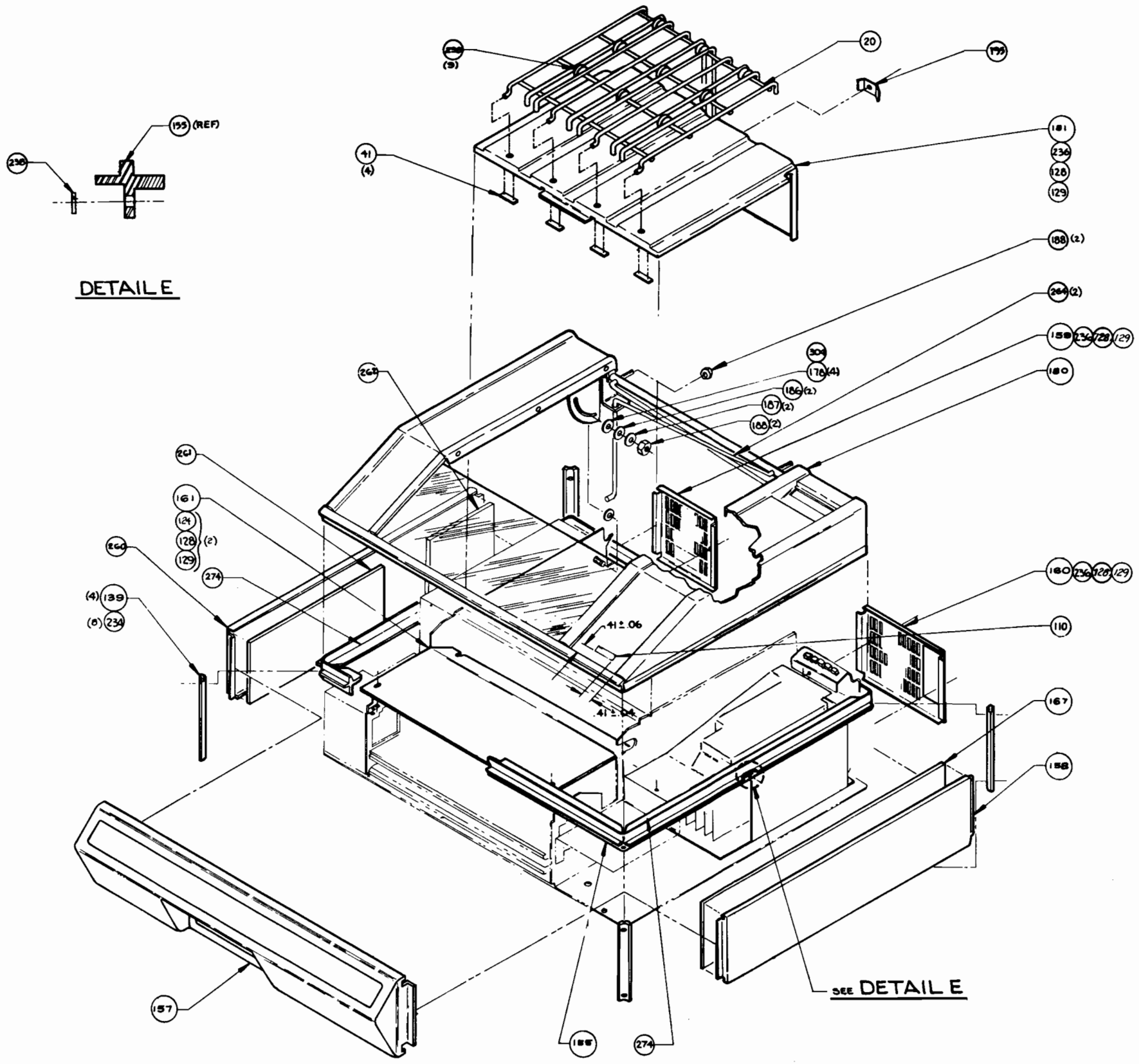


Figure 4-25. General Assembly
(Sheet 3 of 3)

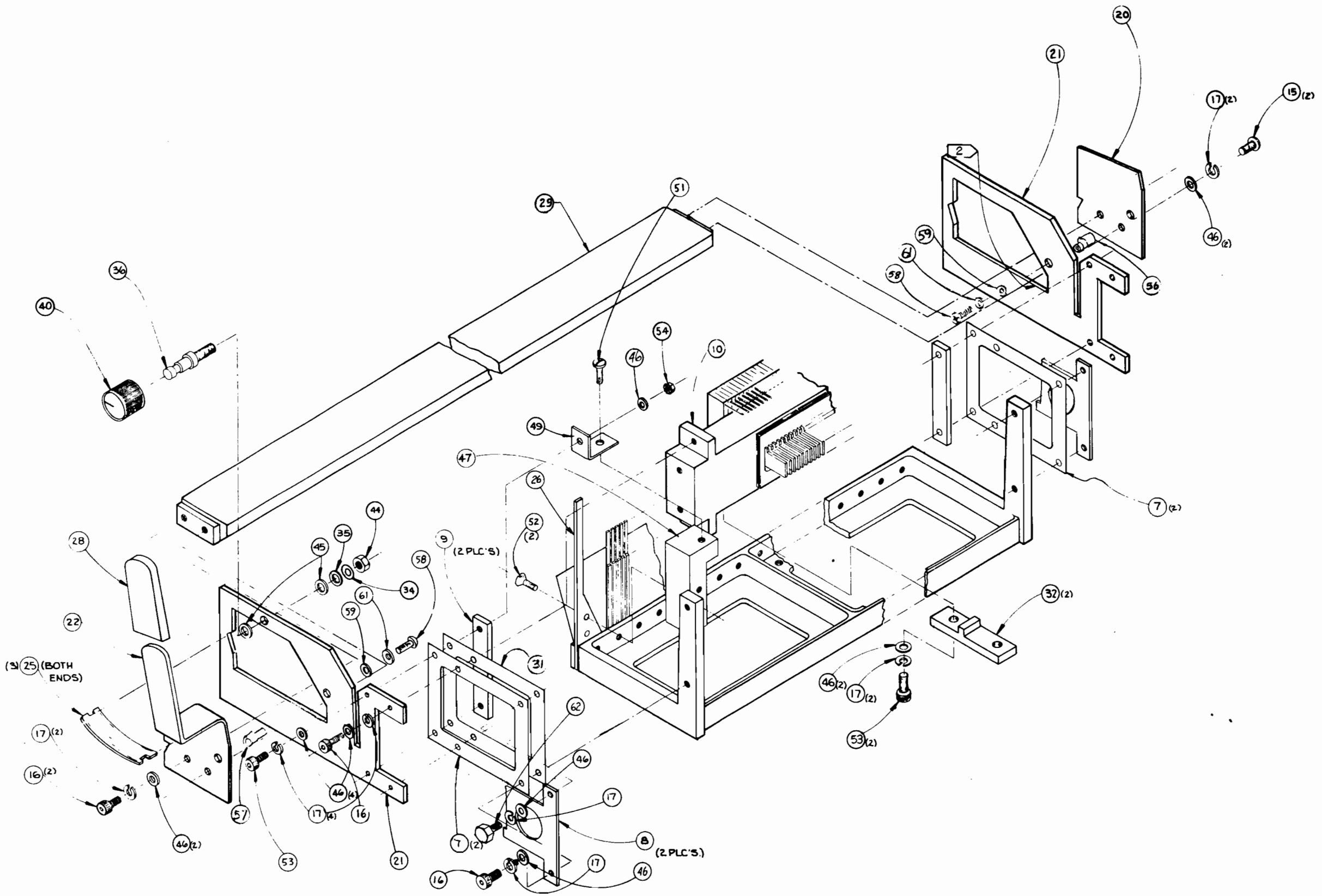

20
21
17 (2)
15 (2)
2
46 (2)
59
61
58
56
29
51
54
46
10
49
40
36
47
26
44
7 (2)
52 (2)
9 (2 PLC'S)
35
45
34
58
61
59
28
22
(3) 25 (BOTH ENDS)
31
32 (2)
46 (2)
17 (2)
53 (2)
62
17 (2)
16 (2)
57
17 (4)
46 (4)
16
46
17
8 (2 PLC'S)
7 (2)
46 (2)
53
21
16
17
46

Table 4-13. Print Mechanism Assembly 02607-60020

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
7	02607-20013	4	Flexure Carriage	602588-1
8	02607-00104	2	ADJ. Plate-RR FLXR	602590-1
9	02607-00055	2	Plate-THRD FLXRE	602590-2
10	02607-60021	1	Core Bar Assy	602648-1
11	02607-20019	1	Carriage Hammer	603869-2
12	02607-20014	1	Clamp-Hammer	602601-1
13	4040-0646	1	Ribbon Guard	602680-1
15	3030-0533	2	Screw: 8-32 Hex SKT	400650-64
16	3030-0467	45	Screw: 8-32 x .375 HEX	400512-245
17	2190-0087	22	Washer: Lock #8	400215-10
20	02607-00018	1	Plate-PLT. PIV RH	603396-4
21	02607-00086	2	Clamp: Flexure	602589-2
22	02607-00019	1	Plate-PLT. PIV LH	603396-3
23	02607-20018	1	Platen	603332-1
25	1460-0672	6	Spring-PRNT Mech	602612-1
26	02607-00103	1	Ribbon Guide LH	603637-1
27	02607-00102	1	Ribbon Guide RH	603637-2
28	4040-0582	1	Grip Handle	401117-10
29	02607-00017	2	Clamp-Ribbon Guide	603874-1
30	02607-60025	1	KT: Hammer SPRG-Damper	603419-2
31	6040-0260	0	Lubricating Oil	
32	4040-0652	2	BKT Hammer BUS	602667-1
33	3030-0501	4	Screw: 8-32 x .25 Hex	400512-243
34	3050-0456	1	Washer: Spring #10	401103-17
35	3050-0659	1	Washer: Print Mech.	600027-1
36	02607-20017	1	ECC-Form Thickness	603635-1
40	0370-2515	1	Knob: Black	400571-10
44	0590-0839	1	Nut: Hex 8-32	400434-04
45	3050-0640	2	Washer: Nylon #8	400326-05
46	3050-0001	12	Washer: Flat #8	
47	02607-20015	1	Block-Holdown LH	603913-1
48	02607-20016	1	Block Holdown RH	603913-2
49	02607-00015	1	Bracket: Angle LH	603912-1
50	02607-00016	1	Bracket: Angle RH	603912-2
51	2510-0120	2	Screw: 8-32 x .312 FLT	400017-32
52	2370-0022	4	Screw: 6-32 x .312 FLT	400362-04
53	3030-0528	2	Screw: 8-32 X 9/16	400512-248
54	2580-0017	2	Nut: Hex: KEPS 8-32	400783-25
55	3050-0722	2	Washer: Flat .166	400782-07
56	1530-0696	1	Eccentric	
57	02607-20012	1	Stud-Pivot	603888-1
58	2200-0736	1	Screw: 4-40 x .25 Pan	400013-32
59	3050-0229	1	Washer: Flat #4	400216-08
60	3030-0047	2	Screw: 8-32 .625 Hex	
61	3050-0445	1	Washer: Spring # 4	

Figure 4-26. Print Mechanism Assembly (Sheet 1 of 2)

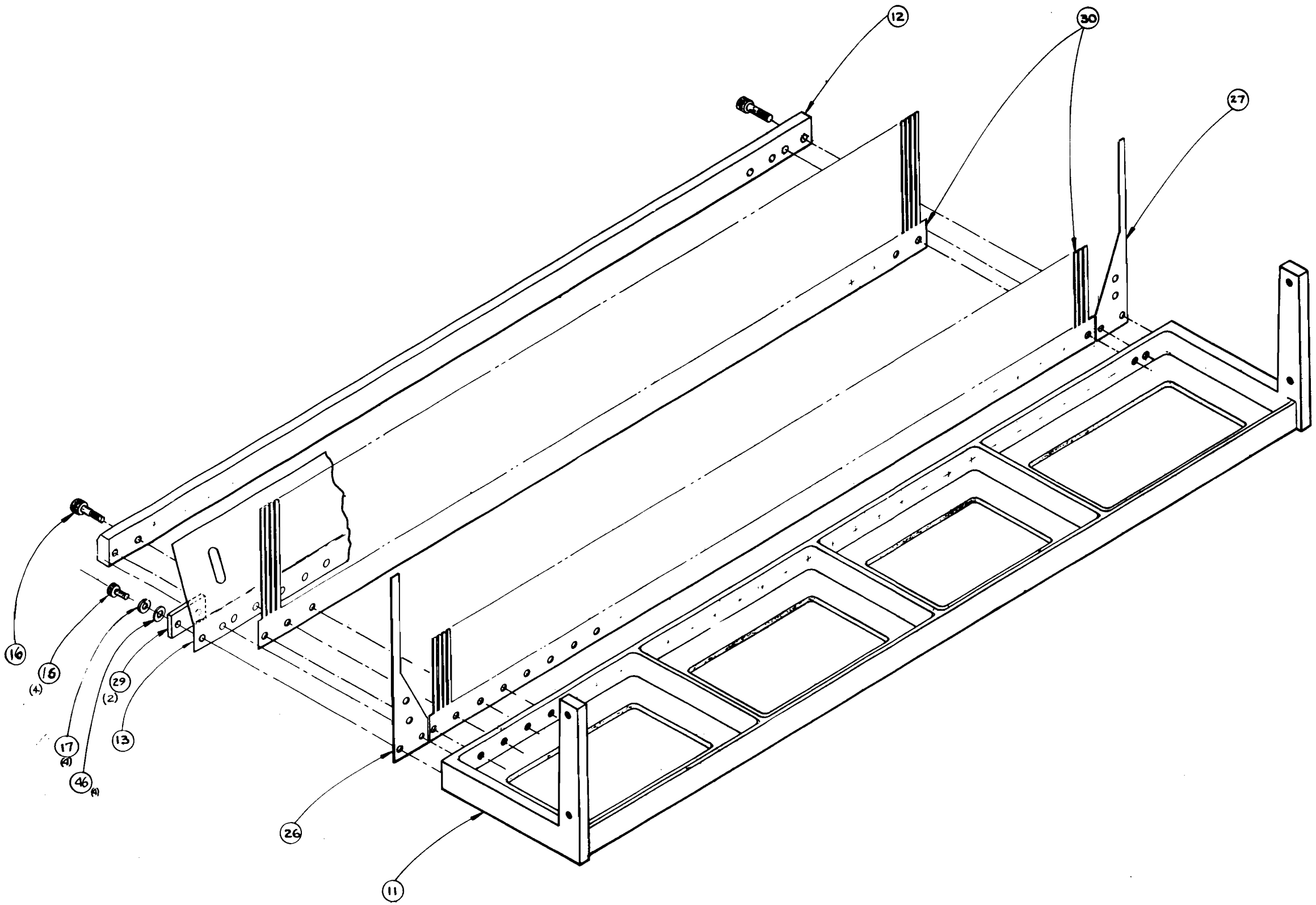


Figure 4-26. Print Mechanism Assembly (Sheet 2 of 2)

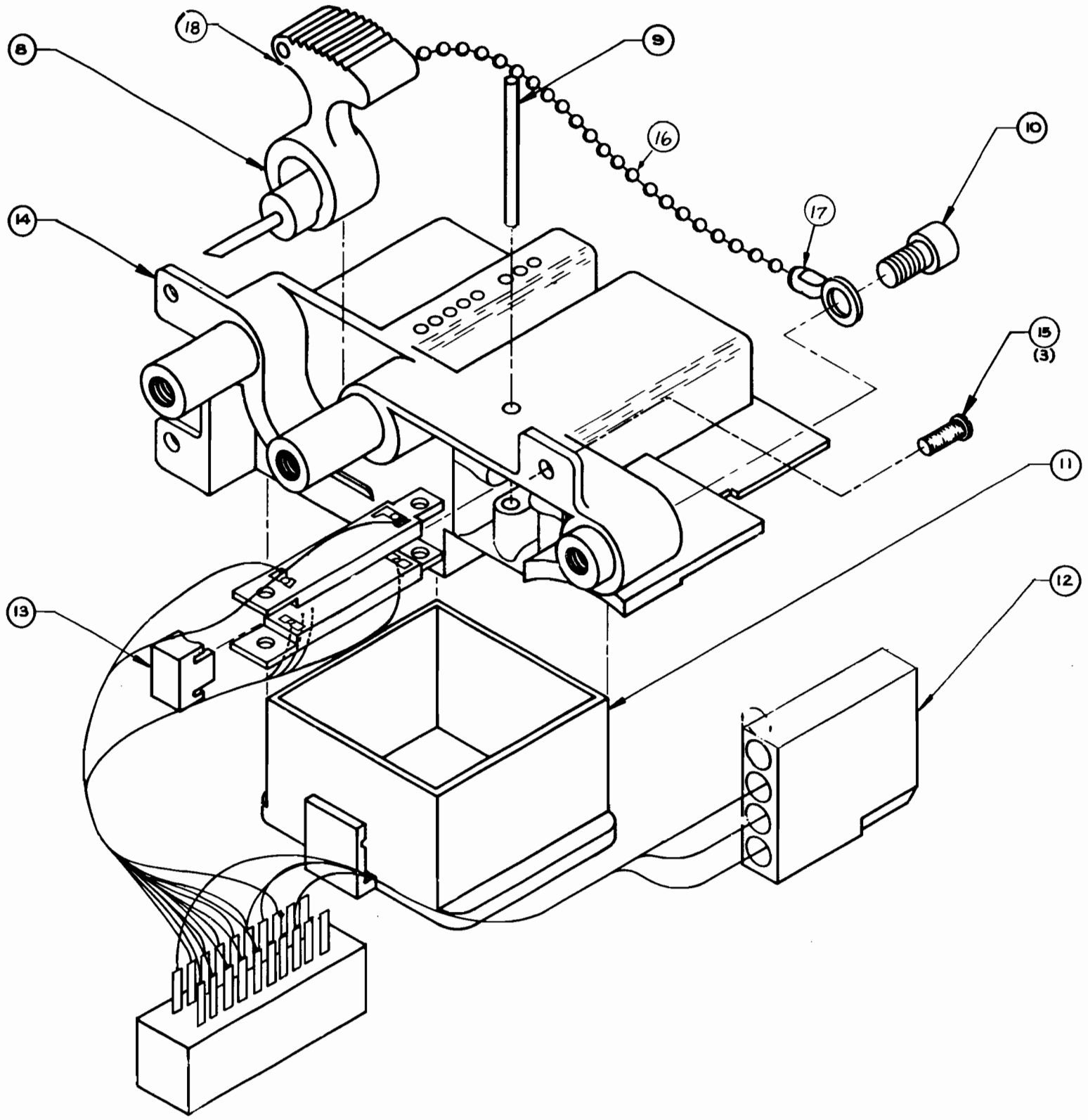
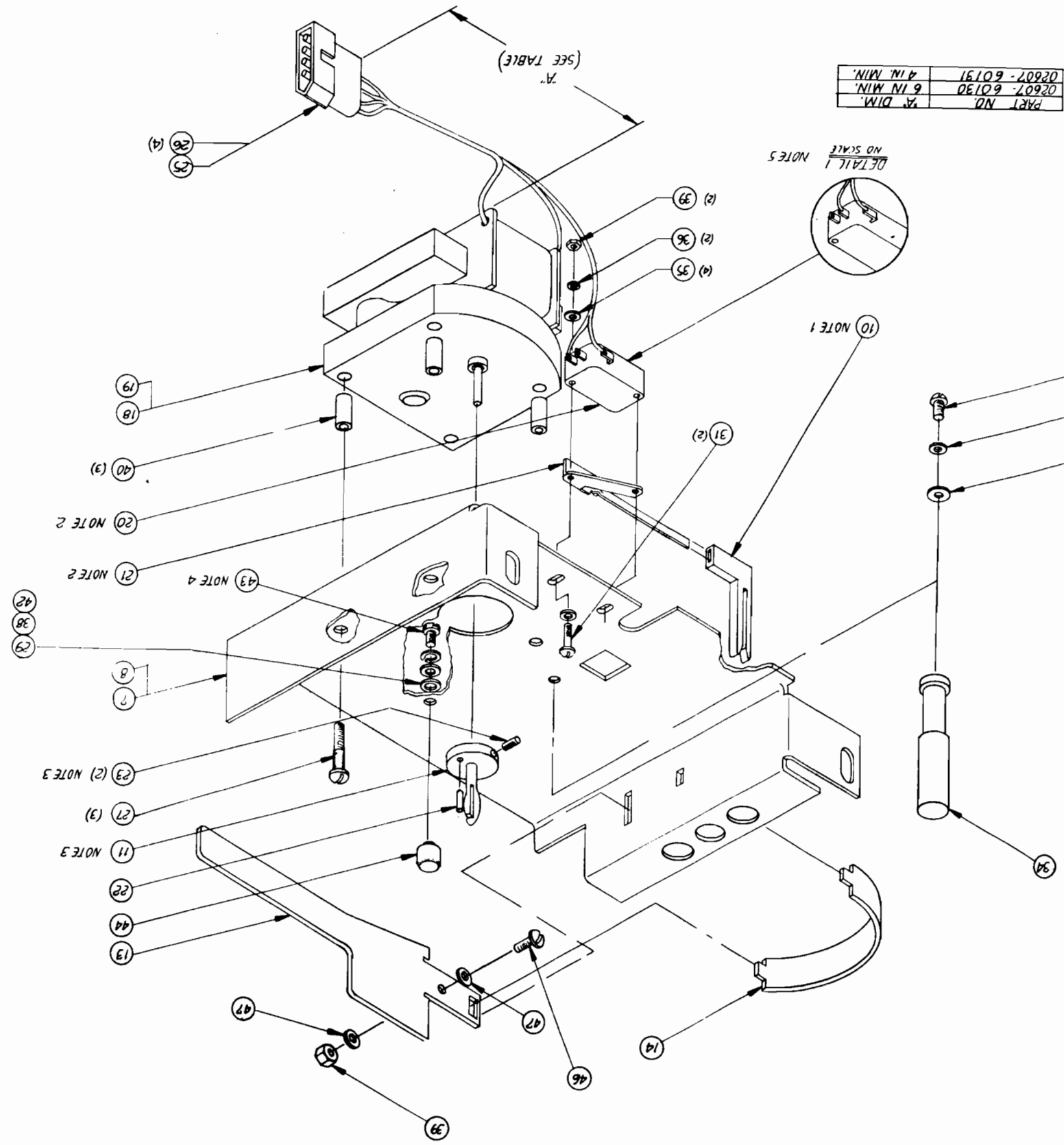


Table 4-14. Vertical Format Unit Assembly 02607-60070

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
8	4040-0665	1	Pin-Punch VFU	602638-1
9	1480-0414	1	Pin-Locator VFU	603534-1
10	3030-0133	1	Screw: 6-32 x .25 Hex	400512-183
11	4040-0650	1	VFU Chad Box	603259-1
12	02607-60073	1	VFU Module	603424-3
13	4040-0651	1	Spacer-VFU	603535-2
14	4040-0664	1	Body VFU	602636-2
15	2200-0736	3	Screw: 4-40 x .25 PAN	400013-05
16	1500-0411	0.25ft	Chain: Ball	401080-05
17	1530-0656	1	Coupling: Ball	401080-14
18	0470-0089	0	ADH: EPOXY	
	1251-4024	1	Connector-Polarizing	
	1251-1400		Connector-Polarizing (Tally Made Unit)	

NOTE:
1. PART #16 EPOXIED TO ITEM#5 WITH ITEM#18

Figure 4-27. Vertical Format Unit



PART NO.	"A" DIM.
02607-60130	6 IN MIN.
02607-60131	4 IN MIN.

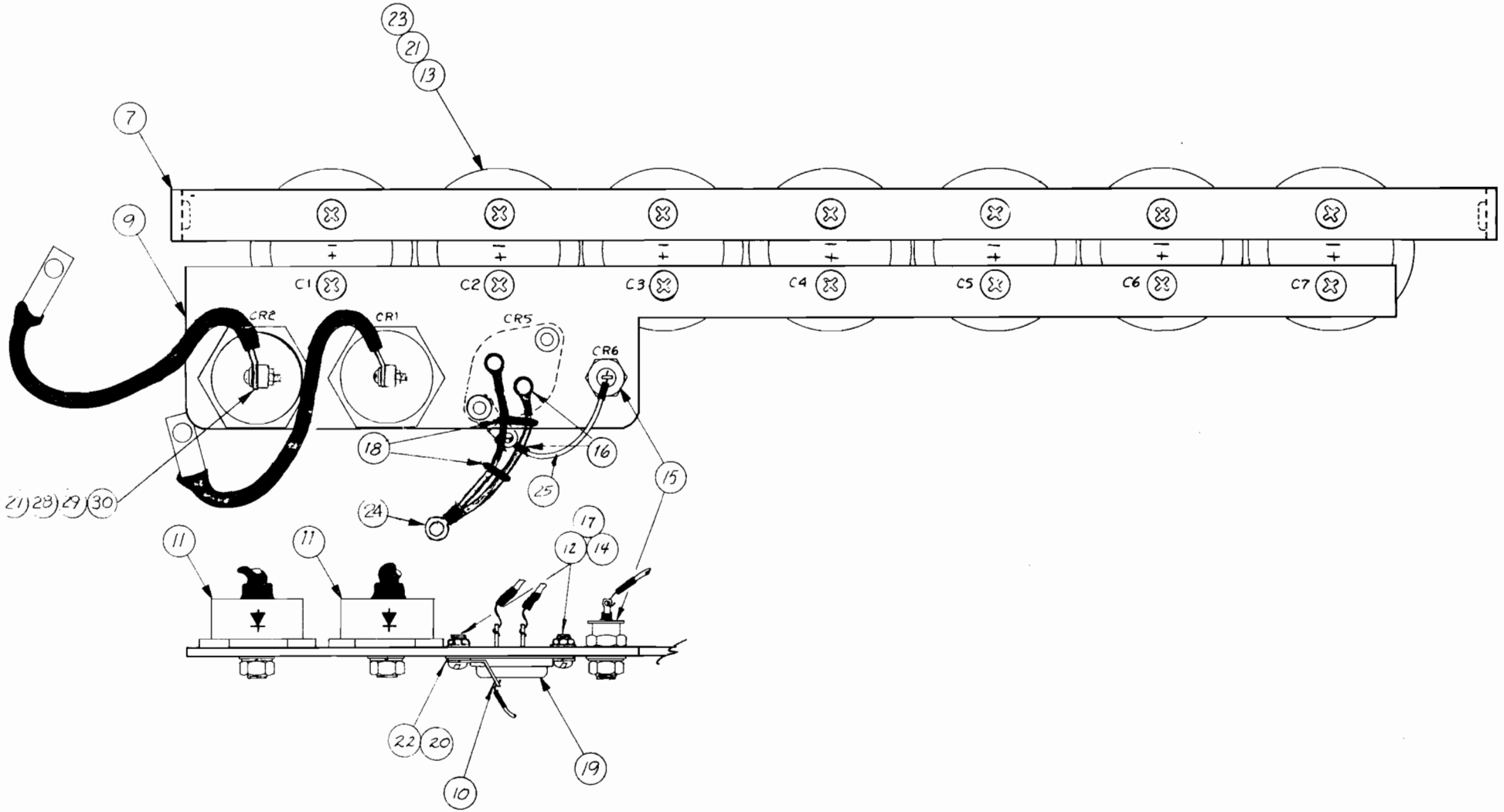
NOTES:

1. APPLY LOC-TITE TO ITEM 10 AFTER ADJUSTMENT
2. INVERT ON ASSEMBLY 02607-60131 (L.H.)
3. PRESS HUB FULL ON TO SHAFT SHOULDER & TIGHTEN ITEM (23)
4. REVERSE HARDWARE ON 02607-60131 (L.H.)
5. WIRE AS SHOWN FOR 02607-60131 (L.H.)

Table 4-15. Ribbon Drive Assembly 02607-60130, 02607-60131

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
7	02607-00064	1	BKT-Ribbon RH	602607-1
8	02607-00065	1	BKT-Ribbon LH	602672-1
10	4040-0660	1	Finger, Ribbon DR	602684-1
11	4040-0659	1	Reel Hub-Ribbon DR	603641-2
13	02607-00067	1	Brake Arm	603636-1
14	1460-0673	1	Spring Brake	603640-1
17	8150-1800	3	Wire: 16 AWG Wht	400494-41
18	3140-0526	1	Motor: Gear CW Rotation	401073-03
19	3140-0527	1	Motor: Gear CCW Rotation	401073-04
20	3101-1832	1	Switch: Sensitive	400906-01
21	3102-0013	1	Switch: THRM 71C	400907-01
22	1480-0381	1	Pin: Roll .078 X 1.4	400793-34
23	3030-0033	2	Screw: 6-32 x .188 Set	
24	2510-0103	1	Screw: 8-32 .375 Pan	400017-05
25	1251-2511	1	Connector : 4- Contact	400130-04
26	1251-2263	4	Contact: Connector Male	400118-03
27	2510-0063	3	Screw: 8-32 x 1.5 Pan	
28	2190-0087	1	Washer: Lock #8	400215-10
29	3050-0200	3	Washer: Flat .149	40[illegible]-32
31	2200-0151	2	Screw: 4-40 .75 Pan	400013-14
34	4040-0668	1	Guide Post	603638-1
35	3050-0229	6	Washer: Flat #4	400216-08
36	2190-0362	2	Washer: Lock #6	400215-07
38	3050-0227	3	Washer: Flat .149	
39	2260-0009	3	Nut, Hex 4-40	400783-01
40	0380-0011	3	Spacer: .750 LG	400613-46
41	0470-0446	0	ADH: BNDG: SEG	400658-19
42	2190-0851	1	Washer: Lock Hel #6	400215-09
43	2360-0197	2	Screw: 6-32 .375 Pan	400016-05
44	1530-0695	1	Cam- Ribbon DR	601926-1
46	2200-0147	1	Screw: 4-40 .5 Pan	400013-10
47	3050-0222	2	Washer Flat #4	400216-07

Figure 4-28. Ribbon Drive Assembly


23
21
13
7
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C1
C2
C3
C4
C5
C6
C7
CR2
CR1
CR5
CR6
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Table 4-16. Capacitor Bank Assembly 02607-60320

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
7	02607-00077	1	Bus-Ground	602624-2
9	02607-00078	1	Bus + 12V	602626-2
10	0360-0272	1	Terminal: Solder Lug	
11	02607-80016	2	Diode: MR 1210SB	604140-1
12	2260-0009	2	Nut: Hex 4-40	400783-01
13	0180-0631	7	Capacitor: FXD 65,000uf 15V	400565-06
14	1400-0565		Kit: Mounting w/insulators	401100-01
15	1901-0495	1	Diode: Power Rectifier	400789-03
16	0890-0304	0.30ft	Tubing: HS .125D	400064-04
17	3050-0229	2	Washer: Flat #4	400216-08
18	1400-0249	2	Clp: Cable Tie	400341-01
19	1902-1298	1	Diode: Zener 24V 50 w	401056-25
20	2190-0362	2	Washer: Lock #4	400215-07
21	2680-0105	14	Screw: Posi 10-32	400018-57
22	0340-0458	1	Insulator: Transistor	
23	2190-0410	14	Washer Loc Int	400786-07
24	0362-0204	1	Term: CRP #10 Blu	400067-53
25	8150-1800	1.30ft	Wire: 16 AWG Wht	400494-41
26	2200-0147	2	Screw: 4-40 .5 Pan	400013-10
27	2190-0012	4	Washer: Lock #10 Ext	
28	2680-0103	2	Screw: 10-32	
29	0362-0454	4	Terminal : Lug #8	
30	2740-0002	2	Nut: 10-32 Hex	
	8150-2597	1.0ft	Wire: 8 G Wht	
	8500-0059	0	CHEM: Misc	400507-1

Figure 4-29. Capacitor Bank Assembly

Table 4-17. I/O Cable Assembly 02607-60270

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
P7	1251-3908	1	Connector: Dual 2 Contact	400962-02
J11	1251-3673	1	Connector: 50 pin	401028-23
	1251-0185	27	Contact: Connector	401172-03
	1251-4024	1	Connector: Polarizing (Amp)	
	1251-1400	1	Connector: Polarizing (Viking)	400962-04
	1251-3340	44	Twin Leaf connector	
	1400-0249	5	Clp: cable tie	
	1400-0879	11	Clp: cable tie	

NOTE 1. Add polarizing key between pins 2 and 3 on P7

NOTE 2. May use either cable tie

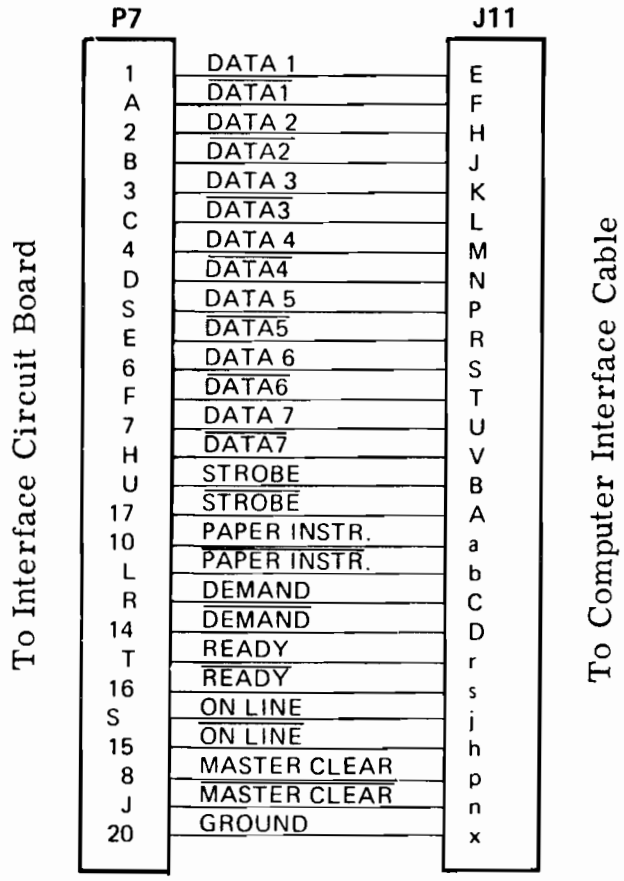


Figure 4-30. I/O Interface Cable Assembly

SECTION V. MAINTENANCE

5-1. INTRODUCTION.

This section contains information concerning periodic maintenance, access to test points, removal and replacement of sub-assemblies and parts, adjustments and troubleshooting.

WARNING

To prevent dangerous electrical shock, disconnect the printer AC line cord before performing any maintenance.

NOTE

To operate the printer with an Exerciser (ASCII Generator) circuit board, remove the Interface circuit board and replace it with the Exerciser circuit board. Circuit board locations are shown in figure 5-1.

5-2. TOOL LIST.

Table 5-1 lists tools and equipment provided in the service kit for the line printer.

TABLE 5-1.
TOOL LIST

DESCRIPTION	SERVICE KIT	HP PART NUMBER
9/64 x 9 inch Tee Handled Allen Driver		1535-2888
Extender Circuit Board		02607-60012
Exerciser Circuit Board		02607-60013

Tools needed by the service personnel to perform normal maintenance and repair are as follows:

a. 3/8 inch Open End Wrench
b. .050 inch Allen Driver
c. 3/32 inch Allen Driver
d. Diagonal Cutters
e. 11/32 inch Nut Driver
f. #2, 4 inch Posidrive Screwdriver
g. #2, 12 inch Posidrive Screwdriver
h. 1/4 inch Nut Driver
i. 1/4 inch Slot-tip Screwdriver
j. .012 and .014 inch Combination Wire Gauge
k. .013 and .047 inch Combination Thickness Gauge
l. .007 and .010 inch Combination Wire Gauge
m. .045 inch Wire Gauge
n. .050 inch Wire Gauge
o. .013 inch Thickness Gauge

5-3. CIRCUIT BOARD AND TEST POINT LOCATIONS.

Although many connections to the circuit boards and other electrical components in the printer can be used as test points, only those shown on the parts location diagrams are designed specifically as test points. See Section IV of this manual for circuit board test point locations. Circuit board locations are shown in figure 5-1.

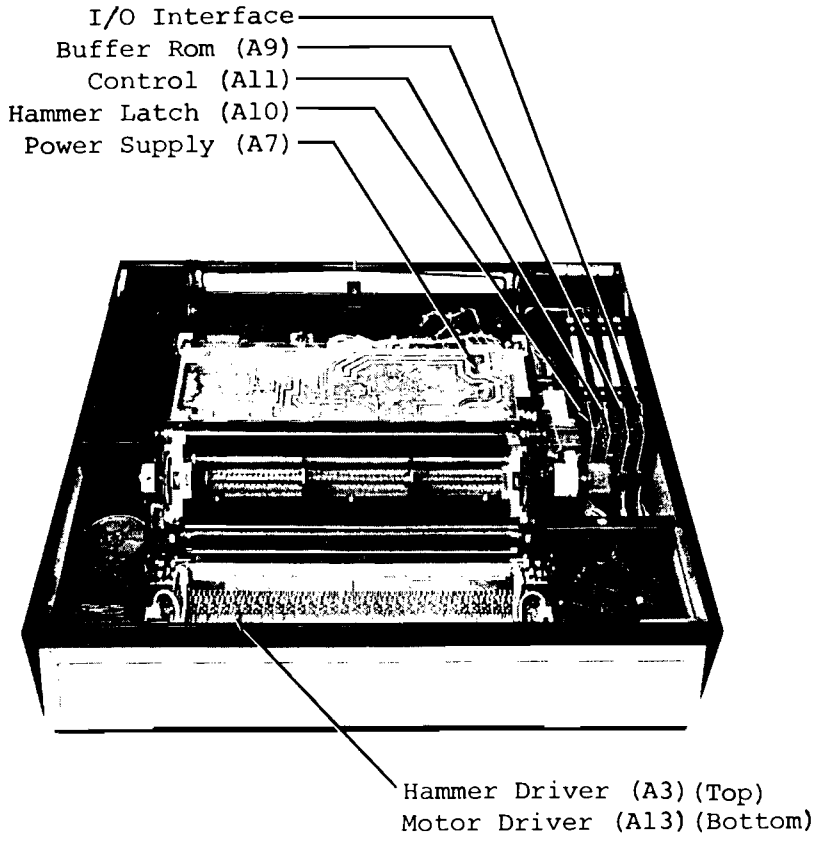


Figure 5-1. Circuit Board Locations

5-4. PERIODIC MAINTENANCE.

5-5. Every 8 Hours of Printing.

a. Remove any paper bits and dust using a soft brush or air.
b. Remove residue from the paper feed tractors, form scale and ribbon guides using air or paper tissues.
c. Inspect the tape loop in the Vertical Format Unit for excessive wear. Replace it if necessary.
d. Inspect the print. If it is uniformly smudged or faint, perform the following steps in order as necessary.

(1) Adjust the form thickness control knob for optimum print quality.
(2) If the ribbon half being used appears worn in relation to the half not being used, exchange the left and right ribbon spools with each other in order to use the unworn half.
(3) If the entire ribbon appears worn, replace it.

5-6. Every 1000 Hours of Printing. This maintenance should only be performed by qualified service personnel.

a. Clean the air filter
b. Perform the 8 hour maintenance and clean the printer interior.
c. Remove the print mechanism and disassemble the hammer and damper assembly as explained in paragraphs 5-19 and 5-20.
d. Clean the hammer and damper assembly (two pieces), core bar, platen, and ribbon guard with alcohol, freon or equivalent.
e. Assemble, adjust, and install the print mechanism as explained in paragraph 5-19.
f. Empty chad box.

5-7. Every 3300 Hours of Printing. Replace the hammer and damper assembly.

5-8. Every 6600 Hours of Printing. Replace the platen.

5-9. REMOVAL AND REPLACEMENT PROCEDURES.

5-10 Power Supply Cover (figure 5-2).

CAUTION

When lifting off the power supply cover, lift from the front; otherwise, damage to the front outside corners could result.

Removal of the power supply cover requires removing the screw, lockwasher, flat washer, and strap which secure it at the rear of the printer. When installing this cover, be sure the tab on the front edge engages the slot provided for it on the printer.

5-11. Circuit Board Module Cover. To facilitate removal of this cover turn the clutch knob (figure 5-2) until the protruding end of the clutch cam lever is facing up. Pull the two cover fasteners straight up until they disengage and remove the cover. When replacing the cover be sure the fasteners are pulled up and the rear edge of the cover is under the front edge of the switch bracket before securing it.

5-12. Side Panels and Nose Cone.

CAUTION

Do not operate the printer with the nose cone removed as it guides vital cooling air past the hammer coils.

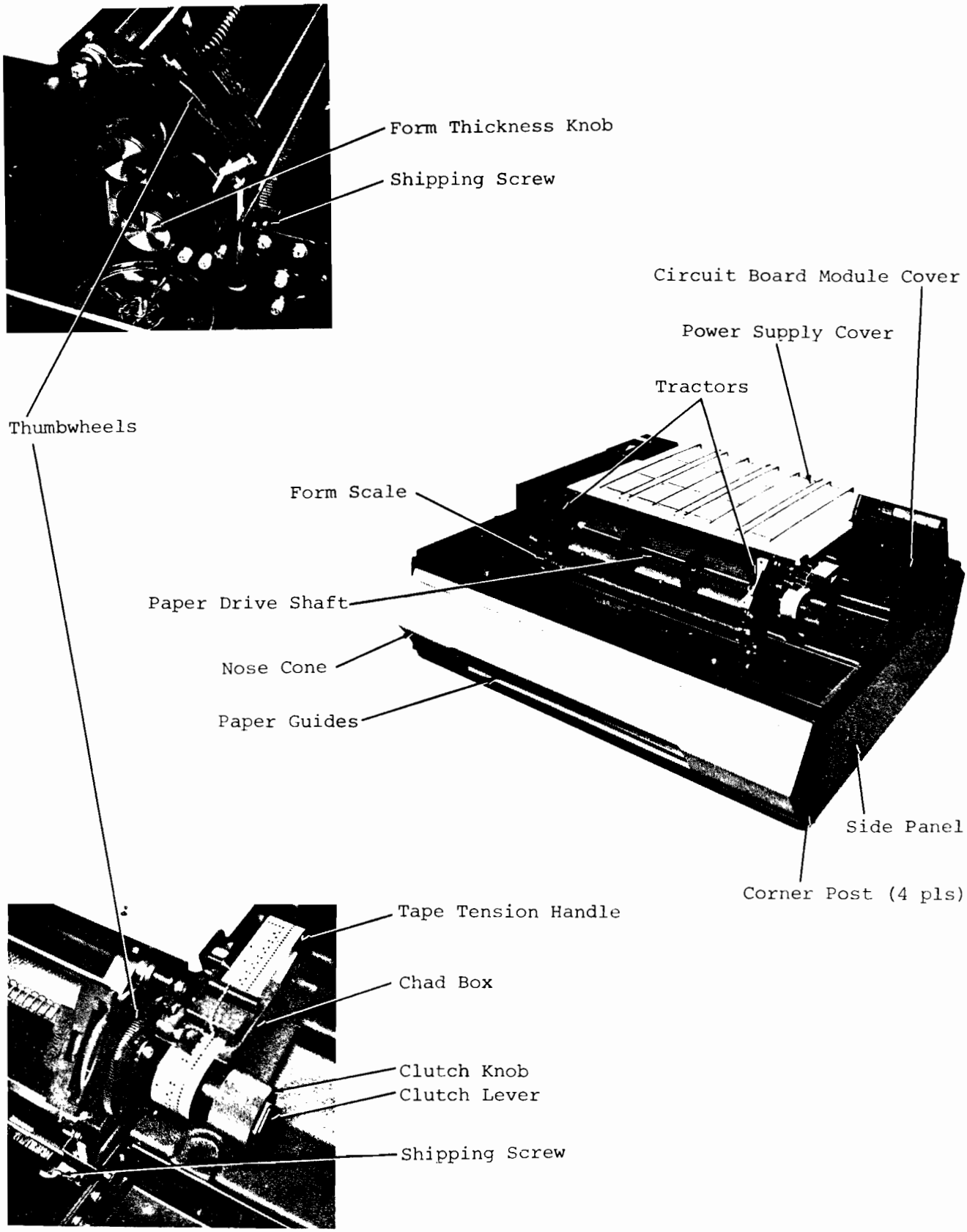


Figure 5-2. Printer Controls Location

The nose cone, left side panel and right side panel are secured to the printer by four corner posts. Be sure to hold the side panel when removing its corresponding corner posts as the panel can fall when the posts are removed. After the corner posts and side panels are removed, the nose cone may be removed by squeezing one end of the upper and lower paper guides together while pulling the corresponding end of the nose cone until it separates from the printer. When installing the nose cone and side panels, be sure the blower motor grille on the left panel is properly located and adjust both side panels and the nose cone for the best fit before tightening the screws to the corner posts.

5-13. Top Cover(figure 5-3). Remove the top cover as follows:

a. Remove the power supply cover as explained in paragraph 5-10.
b. Remove the two locknuts, spring washers, flat washers, and plastic friction washers which provide the braking action for the cover. Raise the cover past the two studs from which the washers were removed and rest it against these studs. Be sure the plastic friction brake remaining on each stud does not become lost.
c. Remove the two locknuts securing the torsion bars to the top cover. Remove the cable tie located where the two bars cross.
d. Hold the cover such that the torsion bars are unloaded. Starting with the uppermost torsion bar, lift each bar out of its locating hole in the cover and turn it toward the front of the printer until it clears its locating slot in the printer baseplate.
e. Rest the cover against the two studs and remove the two screws, lockwashers, and flat washers which secure the cover to the printer and lift the cover straight up.

Install the Cover as follows:

a. Locate the cover on the printer. Rest the round bar at the rear of cover in the hooks at the rear of the interior side panels. Hold the cover perpendicular to the printer baseplate and install the two mounting screws, lockwashers and flatwashers. Do not tighten.
b. Insert the torsion bars into the forward holes of the mounting bracket with the threaded end toward the front of the unit. Position the bars in the locating slots on the printer baseplate. Lift slightly on the threaded end of one bar such that it will clear the plexiglass cover of the power supply circuit board and swing it to its locating hole in the round bar. Install the locknut to secure the torsion bar. Repeat this procedure for the other torsion bar. Install a cable tie where the two bars cross.
c. Be sure there is one plastic friction brake on each stud, then position the hinge bracket on the studs. Install another friction brake on each stud with the hubbed side facing the hinge bracket. Add a flat washer, spring washer and locknut, in that order.
d. Tighten the screws on the mounting brackets.
e. Cover opening and closing force is adjusted by turning the two locknuts on the studs. Adjust the locknuts so that it requires eight pounds of force to pull the cover past the detents on the hinge bracket which hold it in the raised position. Each side should have approximately the same amount of friction.

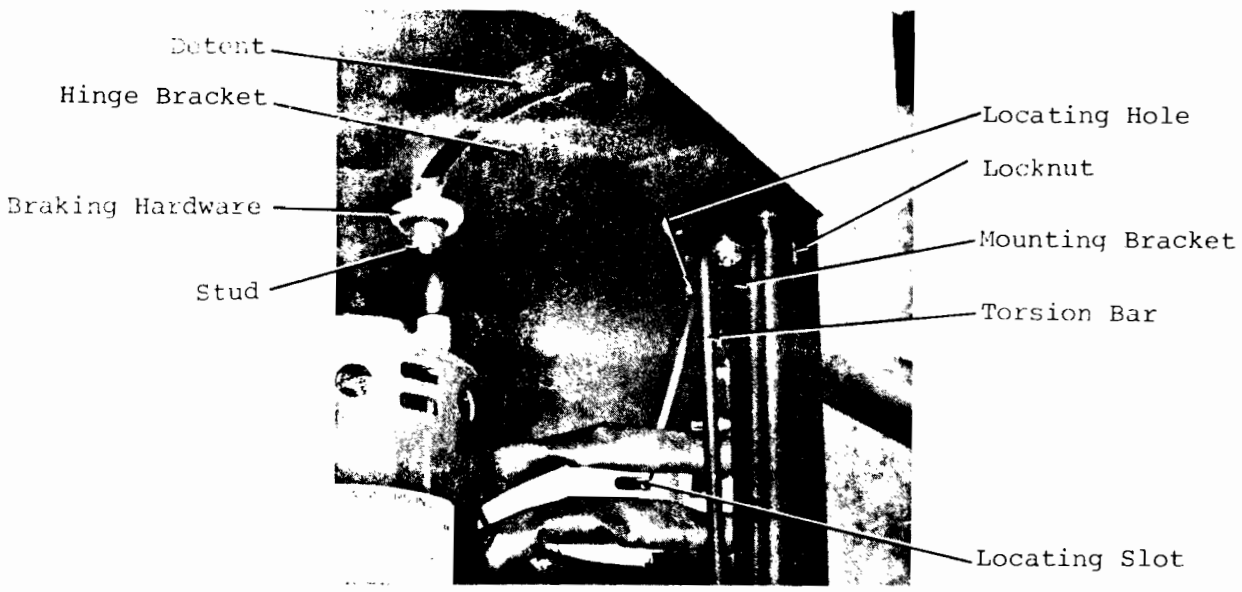


Figure 5-3. Top Cover Mounting

5-14. Circuit Board Module. Remove the circuit board module as follows:

a. Remove the module cover as explained in paragraph 5-11.
b. Disconnect the I/O cable on the rear of the unit.
c. Remove the mounting screw, lockwasher and flatwasher from the left rear panel and remove the panel. Remove the mounting screw, lockwasher and flatwasher located at the bottom rear of the circuit board module.
d. Remove the mounting screw, lockwasher and flatwasher located at the bottom front of the circuit board module.
e. Pull the VFU tape tensioner (figure 5-2) forward.
f. Pull forward on the circuit board module until the mounting bracket on the left side is free of the shoulder screw.
g. Lift the back end of the circuit board module out of the unit first.

To place the module in the service position, place the mounting bracket over the upper frame with the module hanging on the outside of the printer. Use a folded cloth or other pad to prevent scratching the side panel. Reassembly is the inversion of the above steps.

5-15. Hammer Driver and Motor Driver Circuit Boards. Remove the Hammer/Motor Driver circuit board as follows:

a. Remove the side panels and nose cone as explained in paragraph 5-12.
b. Remove the cover located over the Hammer Driver circuit board.
c. Remove the front mounting screw in the upper frame.
d. Remove the two mounting screws which face toward the sides of the printer from the Hammer Driver circuit board mounting brackets. Pull the Hammer Driver board toward the front of the printer until it disconnects. Work it underneath the upper frame until it is out of the printer. Hang it upside down by its connecting wires.

e. Remove the two mounting screws from the Motor Driver board and pull it toward the front of the printer until it disconnects.
f. Separate the remaining wires to the two circuit boards and remove the boards from the printer.

CAUTION

Before installing a Hammer Driver or a Motor Driver circuit board, be sure the pins of the hammer coils are properly aligned. Be extremely careful not to bend any connector pins when installing these boards as permanent damage to the core bar could result.

a. To install the Driver circuit boards, connect all wiring to the boards.
b. Starting with the Motor Driver circuit board, install the boards in printer being careful not to bend any connector pins and reinstall the mounting screws.
c. Replace the front mounting screw in the upper frame and tighten.
d. Replace the cover over the Hammer Driver circuit board.
e. Install the nose cone and side panels as explained in paragraph 5-12.

5-16. Vertical Format Unit. To remove the Vertical Format Unit proceed as follows:

a. Remove the Power Supply cover as explained in paragraph 5-10.
b. Remove the VFU tape loop, plexiglass Power Supply cover, and Power Supply circuit board.
c. Remove the mounting screw (figure 5-4) located nearest the rear of the VFU.
d. Lift the baffle upward from its slots and push slightly to the rear.
e. Remove the forward mounting screw from the VFU.

When installing a VFU, reverse the above procedure. Turn the three adjusting screws as necessary for optimum tape loop tracking.

CAUTION

When installing the Power Supply circuit board, be sure the insulated washer is placed underneath the left front holddown post.

To remove the diode and transistor arrays from the VFU (figure 4-27), pull the locator pin, then the spacer and finally the arrays. When installing this unit, insert the arrays first, then the locator pin and finally, the spacer.

5-17. Paper Drive Shaft and Gear. Remove the paper drive shaft (figure 5-2) and gear as follows:

a. Loosen both thumbnuts and move the right hand paper tractor toward the center of the paper drive shaft.

b. Disengage the Vertical Format Unit clutch. Push in on the VFU clutch lever and remove the retaining ring adjacent to the paper drive gear on the drive shaft.
c. Remove the knob from the left end of the paper drive shaft. If the set screws to this knob caused burrs on the end of the drive shaft, remove the burrs.
d. Remove the retaining ring located approximately 2½ inches from the left end of the paper drive shaft.
e. Slide the shaft out the right side of the printer.
f. Remove the paper drive gear after the drive shaft is removed.

Install the paper drive shaft and gear as follows:

a. Locate the paper drive gear assembly in the printer. Be sure the two bushings are in it and that the square holes in these bushings are at opposite ends. Install, but do not tighten the mounting screws for the paper drive gear.
b. Insert the paper drive shaft through the drive gear and right pinwheel. Install the following parts in order: Spring, idler, spring, idler, spring, square hole washer and retaining ring.
c. Insert the drive shaft through the left pinwheel and into the bearing which supports the left end of the drive shaft.
d. Install the retaining ring located near the right end of the paper drive gear. Be sure this retaining ring is properly seated.
e. Install the knob at the left end of the drive shaft making sure it does not rub.
f. Push the lower part of the paper drive gear mounting plate toward the back of the printer until the two paper drive gears mesh. Allow a small amount of lash and tighten the lower Allen screw enough to retain this relationship. Adjust the upper part of the drive gear mounting plate for zero lash and no binding. Tighten both Allen screws and check for zero lash and no binding.

5-18. Ribbon Drive Assemblies. Removal of the ribbon drive assemblies is described below.

a. Remove the ribbon spools from the printer.
b. Remove the side panels and nose cone as explained in paragraph 5-12.
c. Remove the circuit board module cover as explained in paragraph 5-11.
d. Mark the locations of the ribbon drive assemblies, then remove the two mounting screws (figure 5-5) for both the right and left ribbon assemblies.
e. Carefully work the ribbon assemblies between the top and bottom frames until they are free of the unit.
f. Disconnect the molex connector on each assembly.

Installation of the ribbon drive assemblies is the reverse of the above procedure. At step D, if further adjustment is necessary, see paragraph 5-26.

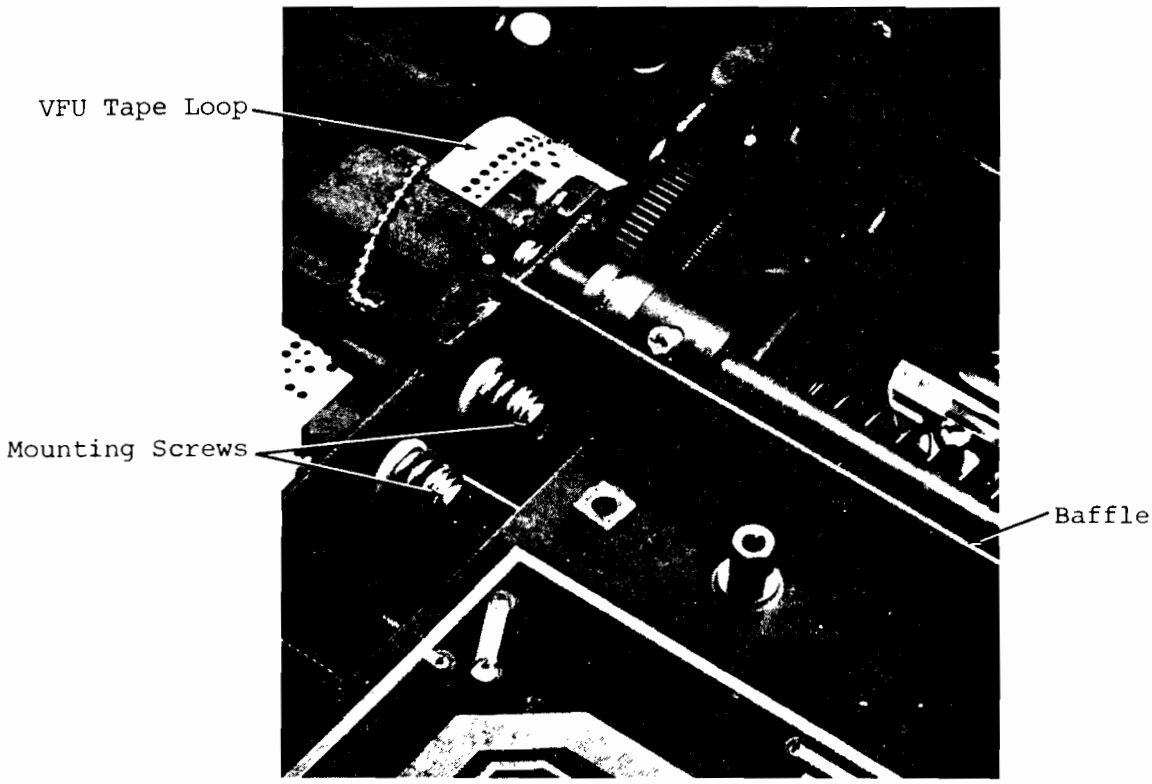


Figure 5-4. VFU Mounting

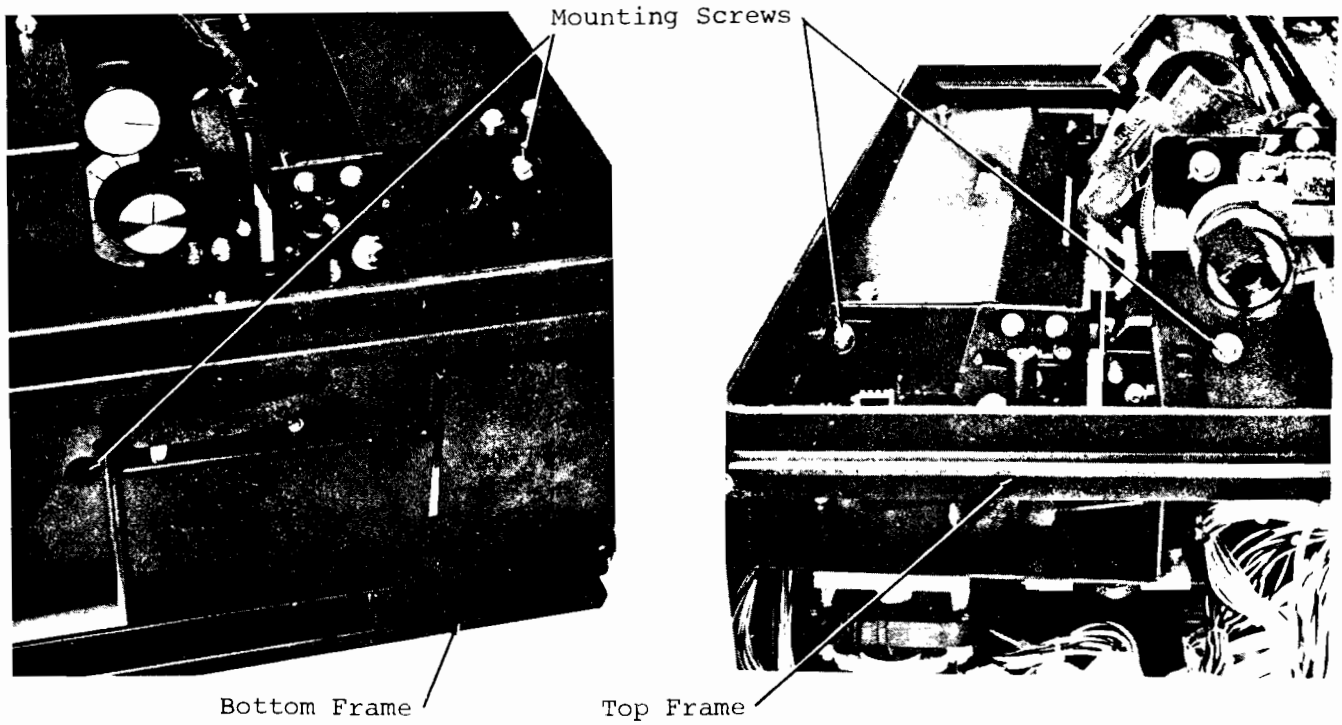


Figure 5-5. Ribbon Drive Assembly Mounting

5-19. Print Mechanism (figure 5-6). Remove the print mechanism as follows:

a. Remove the side panels, nose cone and circuit board module cover as explained in paragraphs 5-11 and 5-12.
b. Remove the Hammer Driver and Motor Driver circuit boards as explained in paragraph 5-15.
c. Remove the ribbon from the printer.
d. Mark the exact location of the left and right ribbon drive assemblies on the printer then remove these assemblies along with the bracket used to secure the Hammer Driver circuit board to the printer.
e. Remove the formscale flexure. Remove the formscale and its mounting brackets as an assembly by removing the two screws at its pivot points
f. Tighten the two shipping screws (figure 5-2) on the print mechanism. On units not having shipping screws, install and tighten the shipping blocks provided in shipment.
g. Remove the two screws that clamp the mogator flexure angle to the print mechanism. DO NOT loosen the two screws holding the angle to the flexure as that will change a critical relationship. Close the platen.
h. The print mechanism is mounted to the printer by four screws. Remove the bottom screw from each end of the print mechanism. Support the print mechanism with one hand and remove the two upper screws. Carefully move the print mechanism toward the front of the printer until it clears all obstructions, then lift it straight up to remove it from the printer.

Before installing the print mechanism be sure it meets the adjustment procedures in paragraph 5-30. Proceed as follows:

a. Locate the print mechanism in the printer.
b. Install but do not tighten the four print mechanism mounting screws.
c. Install but do not tighten the two mogator-angle-to-print-mechanism mounting screws.
d. Lift the right end of the print mechanism to its upper limits and tighten the two right end mounting screws.
e. Allow the left end of the print mechanism to rest against its lower limits and tighten the two left end mounting screws.
f. Loosen the two shipping screws and the two screws which secure the mogator clamp to the mogator motor shaft. In units having shipping blocks, remove the blocks from the printer.
g. Align the mogator angle so that its bottom edge is parallel with the bottom edge of the print mechanism carriage and tighten the two screws which secure the angle to the print mechanism.
h. Hold the print mechanism such that the hammer centers and coil centers coincide (figure 5-7) and position the mogator clamp (figure 5-6) on the mogator motor shaft such that the flexure is flat. Tighten the outboard screw only on the mogator to motor clamp while making sure the hammers and coils still coincide and the flexure is flat. If the flexure has any twist to it with the hammers centered over their corresponding coils, adjust the entire mogator motor assembly to eliminate it. If the flexure has a permanent bend or crease replace it.
i. Install the Motor Driver and Hammer Driver circuit boards as explained in paragraph 5-15 but do not install their mounting screws.
j. Connect the printer to AC power and activate the ON switch.

k. Move the carriage such that the left edges of the hammers coincide with the left edges of their corresponding coils and tighten the inboard screw of the mogator clamp on the mogator motor.

l. With power still on, adjust the front mogator stop for a clearance of .015 inch (.381 mm) between it and the adjacent surface of the mogator motor clamp.

m. Remove AC power from the printer and adjust the rear mogator stop for a distance of .340 ± .010 inch (8.64 ± .25 mm) between it and the front stop.

n. Install the formscale and its flexure. Be sure it opens and closes properly.

o. Install both ribbon drive assemblies and align them with their previously marked positions. Install the ribbon.

p. Install the mounting screws for the Hammer Driver and Motor Driver circuit boards.

q. Install the nose cone.

r. Install an Exerciser (ASCII Generator) circuit board, load the printer with paper and check print quality. If the quality is not acceptable, refer to the troubleshooting tables 5-2 and 5-3 to determine what is out of order.

s. After print quality is acceptable, install the upper frame and Hammer Driver circuit board cover. Install the side panels and circuit board module cover as explained earlier in this section.

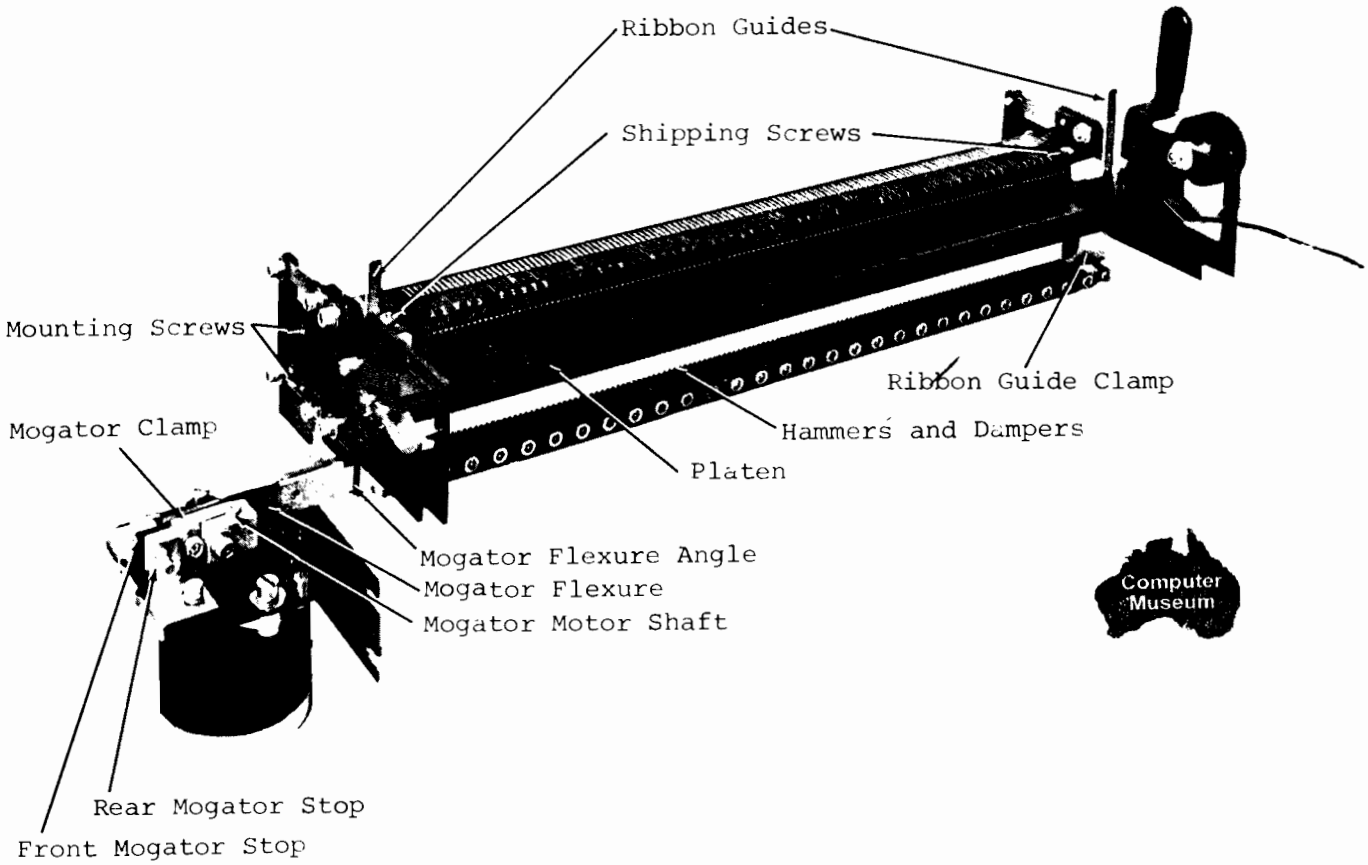


Figure 5-6. Print Mechanism and Mogator Assembly

5-20. Hammer and Damper Assembly (figure 5-6). Remove the hammer and damper assembly as follows:

a. Remove the print mechanism as explained in paragraph 5-19. Leave both shipping screws (or shipping blocks) tight.
b. Rest the print mechanism on a clean flat surface with the coil pins facing down.
c. Remove the two ribbon guide clamps.
d. Remove the hammer clamp. Note the relationship between the ribbon guard, hammer, damper, and core bar as this relationship must not be changed when the print mechanism is assembled.
e. Carefully and thoroughly clean the hammers, dampers, ribbon guard and guides, and core bar with freon or alcohol.

Install the hammer and damper assembly as follows:

a. Install the hammer and damper assembly, ribbon guard and clamp but do not tighten the screws.
b. Be sure the relationship between the hammer, damper, ribbon guard, and core bar is correct and that all parts are clean and free of dust and burrs.
c. Rest the print mechanism in its normal position (platen lever up) and see that the bottom edges of the hammer, damper, ribbon guard, clamp and carriage are all on the same plane.
d. Loosen both shipping screws (remove the shipping blocks). Hold the carriage and move the core bar to its left or right limit and release it. It should oscillate freely. After the core bar comes to rest, center the hammers and dampers over their corresponding coils as shown in figure 5-7.
e. Carefully tighten the screws to the hammer and damper assembly working from the center toward the ends. Check to be sure the hammers and dampers are centered over their corresponding coils and the bottom edges of the clamp, ribbon guard, hammers, dampers, and carriage are all parallel and in the same plane.
f. Install the ribbon guide clamps.
g. Install the print mechanism as explained in paragraph 5-19.

5-21. Platen (figure 5-6). Remove the platen as follows:

a. Remove the print mechanism as explained in paragraph 5-19.
b. Remove the platen springs.
c. Remove the platen

Install the platen as follows:

a. Install the platen in the print mechanism but do not tighten the screws. (The round head Allen screws must be at the right end).
b. Close and adjust the platen so it is parallel to the hammers at a distance of .012 $\pm$ .002 inch (.305 $\pm$ .050 mm).
c. Install the platen springs.
d. Install the print mechanism in the printer as explained in paragraph 5-19.

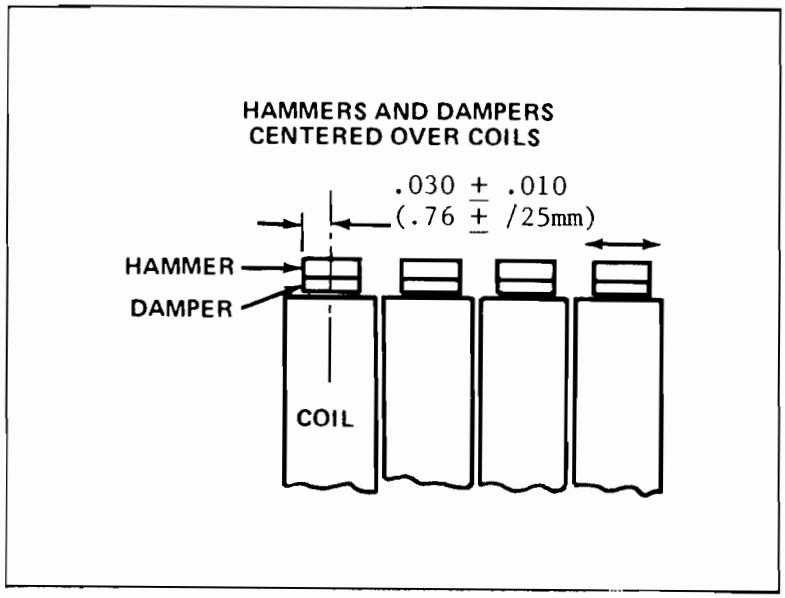


Figure 5-7. Hammer and Damper Centering.

5-22. ADJUSTMENTS.

5-23. Form Thickness Knob. The Form Thickness Knob is used to adjust platen to hammer distance for optimum print quality. The torque on its mounting locknut should be from 30 to 60 inch/ounces. The knob should be set such that the edge of the platen lever plate rides against the low point on the form thickness eccentric when the pointer on the knob is straight up.

5-24. Formscale. The formscale is mounted to two plates and the other end of these plates mount to two more plates with four screws. Loosen these four screws and adjust the formscale to just touch the paper in the printer all the way across the form. The formscale must also be adjusted such that the plane of the formscale is parallel to the plane of the paper and the line on the formscale is .010 inch (.254 mm) below the top of and parallel to the corresponding line of print (figure 5-8). To perform these adjustments, loosen the four screws in the formscale and proceed as follows:

a. Install an Exerciser circuit board (ASCII Generator) in the printer and print one line.
b. Activate the Line Feed switch six times.

CAUTION

Do not overtighten formscale screws as threads in the formscale may be damaged.

c. Set the formscale as explained above and tighten the screws.

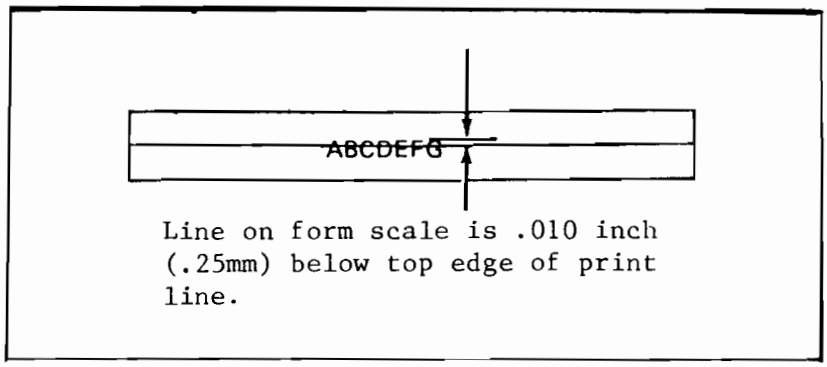


Figure 5-8. Formscale Adjustment.

5-25 VFU CLUTCH. The VFU clutch torque is determined by the quantity of Belleville washers installed in it. The slippage torque should be six inch. pounds minimum which should yield a lever closing force of 14 pounds. It is necessary to remove the paper drive shaft as explained in paragraph 5-17 to change the VFU clutch torque. With the paper drive shaft out, add or subtract Belleville washers to obtain the correct torque. There should be 10 to 12 washers when the torque is correct. When installing these washers, arrange them in groups of three facing in one direction and alternate the direction in which each group faces as they are installed on the shaft. The inboard group should contain one to three washers.

5-26. RIBBON DRIVE ASSEMBLY. Ribbon tracking is adjusted by the positioning of the left and right ribbon drive assemblies. Adjust these assemblies to obtain the following results.

* An unused portion at the top of the ribbon that is .030 to .125 inch (.76 to 3.2 mm) wide.
* A used portion that extends .188 to .344 inch (4.85 to 8.85 mm) below the unused portion.
* Be sure the ribbon does not curl over the pins in the left and right ribbon guides and that ribbon travel is otherwise unimpaired.

Adjustment of the ribbon drive assemblies is as follows:

a. Remove the right and left side panels as explained in paragraph 5-12.
b. Remove the circuit board module cover as explained in paragraph 5-11.
c. Loosen, but do not remove, the mounting screws for the right and left ribbon assemblies (figure 5-5).
d. Adjust both ribbon assemblies to obtain the results previously described and carefully tighten the mounting screws to avoid disturbing the positioning of the ribbon drive assemblies.
e. Replace the circuit board module cover as explained in paragraph 5-11.
f. Replace the right and left side panels as explained in paragraph 5-12. Be sure the blower motor grille on the left panel is properly located.

5-27. Core Bar Adjustments. If print quality is in some way unacceptable and it has been determined that core bar alignment is the cause, the core bar may be adjusted for optimum print quality while printing. Each end of the core bar may be moved four different ways in order to change the

relationship between the coils in the core bar and the hammer and damper assembly. The top part of the core bar is moved to change the hammer to coil gap and the bottom part of the core bar is moved to change the damper to coil gap. After determining which gap needs to be changed, proceed according to the instructions in figure 5-14. Be sure the nose cone is in place while printing.

5-28. Platen. Adjustment of the platen must be done with the platen in the closed position. Proceed as follows:

a. Remove the circuit board module cover as explained in paragraph 5-11.
b. Remove the side panels and nose cone as explained in paragraph 5-12.
c. Remove the right hand ribbon drive assembly as explained in paragraph 5-18.
d. Loosen the platen screws (figure 5-9) on both ends of the platen. Set the form thickness knob so the line points straight up and the dots on the eccentrics (both ends) are down.
e. Adjust the platen to meet specifications 11 and 13 in figure 5-15, then tighten the screws.
f. Reinstall the ribbon drive assembly.
g. Replace the circuit board module cover as explained in paragraph 5-11.
h. Replace the side panels and nose cone.
i. Adjust the platen eccentrics for optimum print quality.

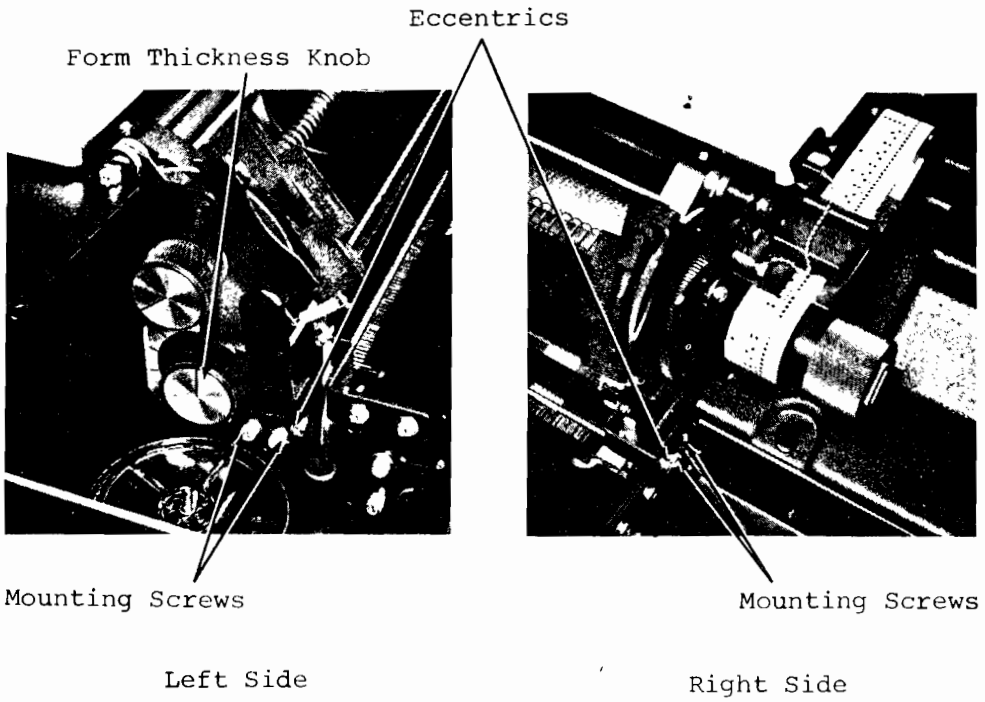


Figure 5-9. Platen Mounting

5-29. Mogator. Adjustment of the mogator assembly is as follows:

a. Remove the circuit board module cover as explained in paragraph 5-11.
b. Remove the right side panel and nose cone as explained in paragraph 5-12.
c. Mark the position of the right-hand ribbon drive assembly and remove the two mounting screws (figure 5-5). Work the assembly between the upper and lower frame on the right hand side and remove from the unit.
d. Loosen the two screws which secure the mogator clamp (figure 5-6) to the mogator motor shaft, the two screws which secure the mogator angle to the print mechanism carriage, and the two screws securing the mogator flexure to the mogator angle.
e. Align the mogator angle so that its bottom edge is parallel with the bottom edge of the print mechanism carriage and tighten the screws securing the angle to the carriage.
f. Position the flexure parallel to, but not touching, the mogator adjust plate and turn the mogator clamp to eliminate any bend in the flexure. Tighten the outboard mogator clamp screw.
g. Tap the carriage and allow it to oscillate freely and center itself Ensure that the flexure is still parallel to the adjust plate with no bend in it and the hammer centers and coil centers coincide. Tighten the inboard mogator clamp screw, the outboard flexure-to-angle screw and the inboard flexure-to-angle screw, in that order.
h. If the flexure has any twist to it with the hammers centered over their corresponding coils, loosen the four mogator assembly mounting screws and adjust the entire assembly to eliminate it. If the flexure has a permanent bend or crease, replace it.
i. Connect the printer to AC power and activate the ON switch.
j. Adjust the forward mogator stop for a clearance of .015 inch (.381 mm) between it and the adjacent surface of the mogator clamp.
k. Remove AC power from the printer and adjust the rear mogator stop for a clearance of .340 $\pm$ .010 inch (8.64 $\pm$ .25 mm) between it and the forward mogator stop.
l. Install the ribbon drive assembly and align it with the previously marked position.
m. Replace the side panel and nose cone and adjust for the best fit before tightening the corner post screws.
n. Install the circuit board module cover as explained in paragraph 5-11.

5-30. Print Mechanism Adjustment Procedures. The print mechanism specifications are illustrated in figures 5-10 through 5-15. To properly check and correct these specifications follow the procedure listed for each specification.

Specification	Figure	Procedure
1	5-10	Check with print mechanism in or out of printer Print mechanism must be out of printer to correct. To correct remove hammer and damper assembly and check for foreign particle or burr on hammer or damper assembly in area(s) of misalignment and correct. If no obvious defect, reverse position of damper and check

Specification	Figure	Procedure
		to see if specification is now met. If still out of tolerance, replace hammer and damper assembly.
2	5-10	Check and correct with print mechanism in or out of printer. To correct carefully bend pin as necessary with long nose pliers.
3	5-11	Must be checked and corrected with print mechanism out of printer. To correct loosen hammer and damper clamp and align as necessary. (See hammer and damper assembly installation instructions (paragraph 5-20) for proper installation).
4	5-11	Check and correct with print mechanism in or out of printer. If an occasional coil to hammer center does not meet this specification, the entire offending coil may be shifted slightly by inserting a knife blade between coils, moving the incorrectly centered coil as necessary and then shimming it in the new position with a paper shim.
5	5-11	Must be checked and corrected with print mechanism out of printer. See hammer and damper assembly installation instructions (paragraph 5-20) for proper installation.
6	5-11	Check and correct with print mechanism in or out of printer. Adjust clamp as necessary to meet this specification. This adjustment affects specification 10, so check specification 10 when tightening shipping screws and adjust clamps such that both specifications are met.
7	5-11	Must be checked and corrected with print mechanism out of printer. To correct, loosen its two clamping screws and adjust ribbon guide. Changing this affects specification 6 so check specification 6 whenever ribbon guide is moved.
8	5-12	Same comments as procedure one.
9	5-13	Same comments as procedure one.
10	5-12	Check and correct with print mechanism out of printer. Replace flexures if permanently bent or otherwise damaged. When replacing flexures, be sure screws are centered in holes to allow future adjustments.
11	5-13	Check and correct with print mechanism in or out of printer. Before adjusting be sure dot on eccentric is as shown in figure 5-13. Loosen platen screws and adjust platen to specifications 11 and 13 at the same time.
12	5-13	Check and correct with print mechanism out of printer. Top edge of ribbon guard should rest against platen when platen is open. When replacing or adjusting ribbon guard, remove platen and form angle.

Specification	Figure	Procedure
13	5-13	Check and correct with print mechanism in or out of printer. Loosen platen screws and perform preliminary adjustment with form thickness knob pointing up (platen lever against low point on form thickness eccentric) and eccentric shown in figure 5-13 with dot down. Adjust for specifications 11 and 13 at the same time and tighten platen screws. Then adjust two platen eccentrics for optimum print quality. Tighten screws on inside of the two eccentrics after adjusting.
14	5-14	Check with print mechanism in or out of printer Correct with print mechanism out of printer. To correct loosen hammer and ribbon guide clamps and violate specification 5 to the extent necessary to meet this specification.
15	5-15	Check and correct with print mechanism in or out of printer. This is an initial setup tolerance. Violate as necessary to improve print quality.
16	5-15	Same comments as procedure 15.

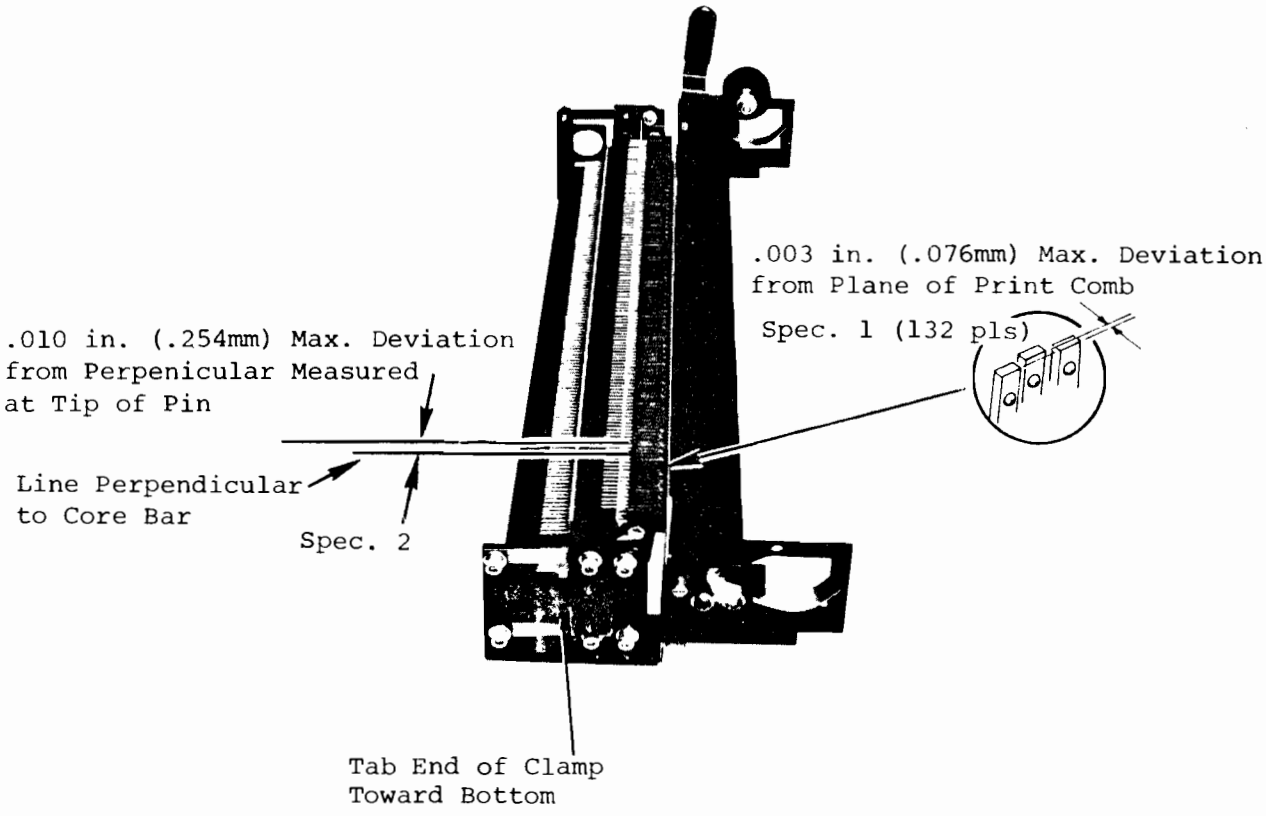


Figure 5-10. Print Mechanism Specifications

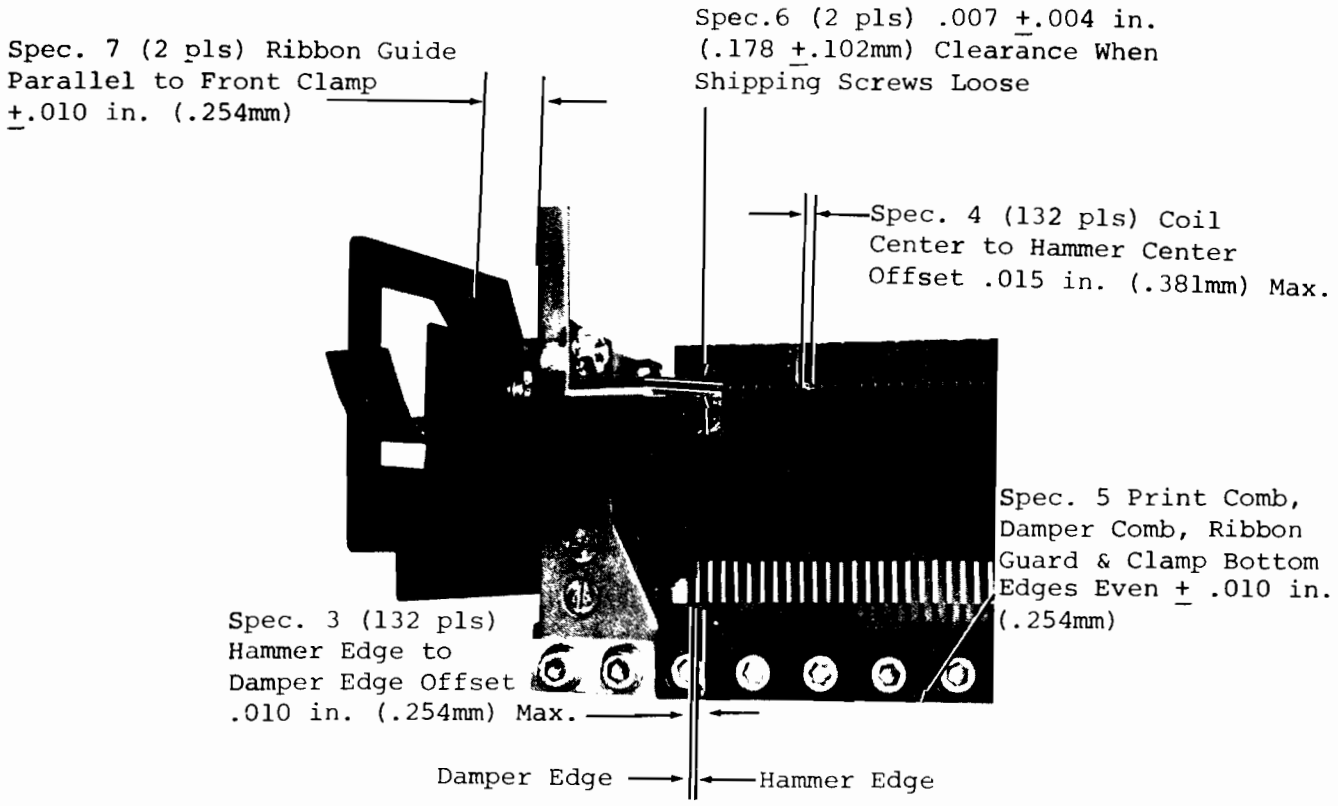


Figure 5-11. Print Mechanism Specifications

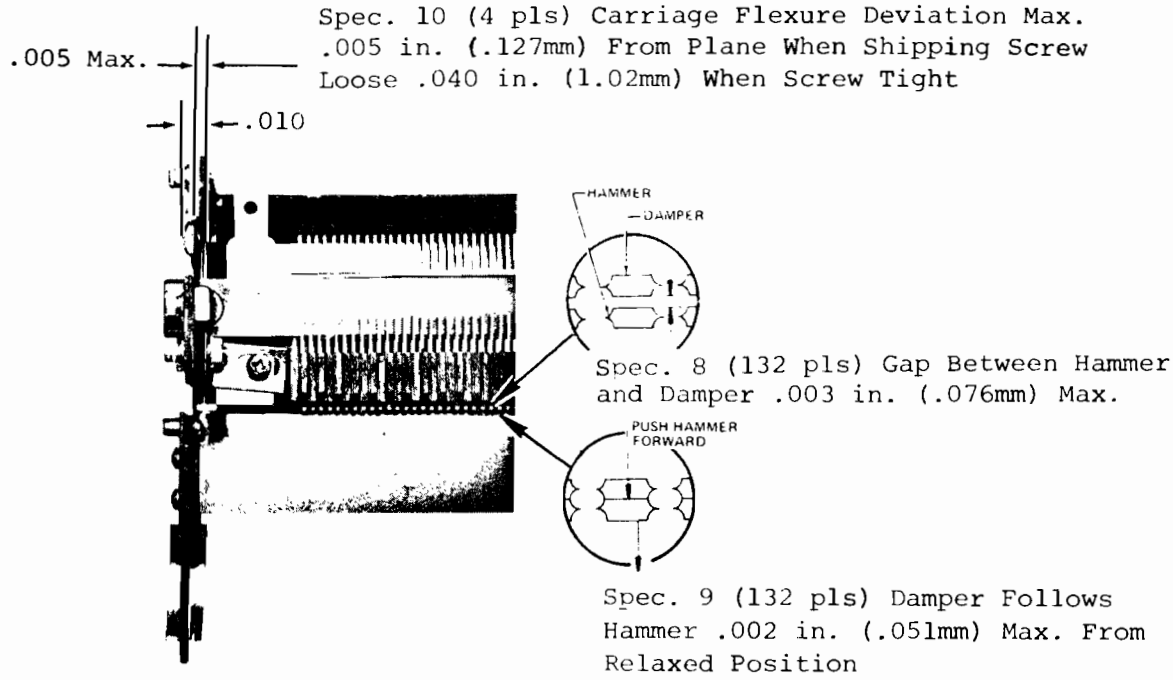


Figure 5-12. Print Mechanism Specifications

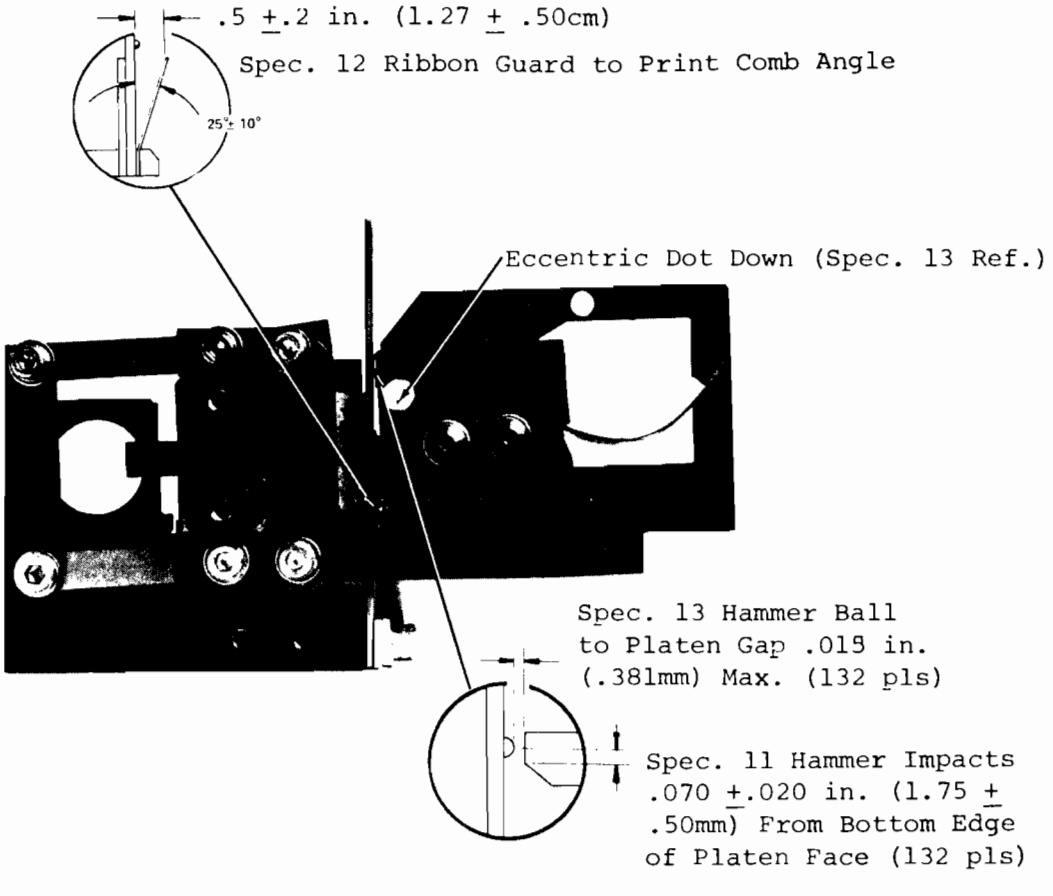


Figure 5-13. Print Mechanism Specifications

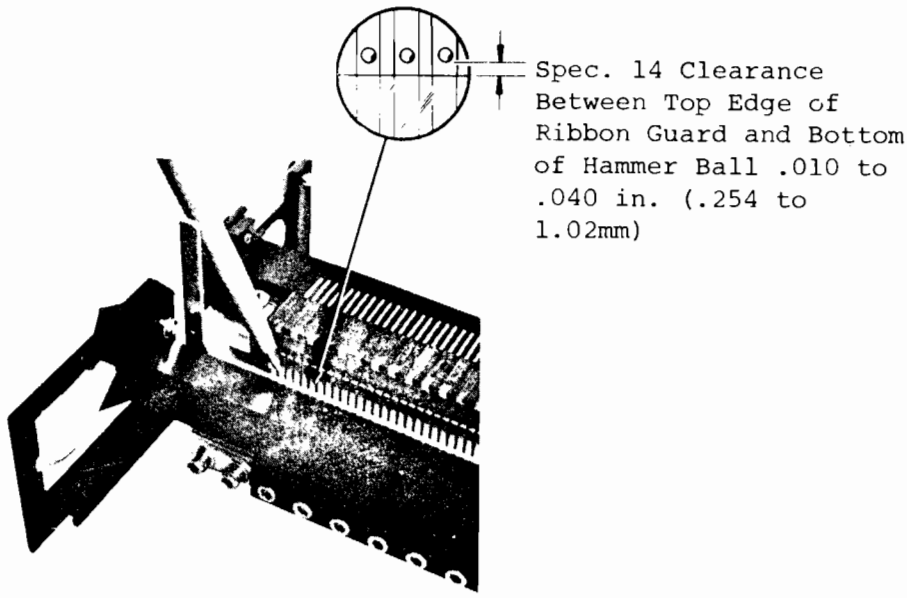
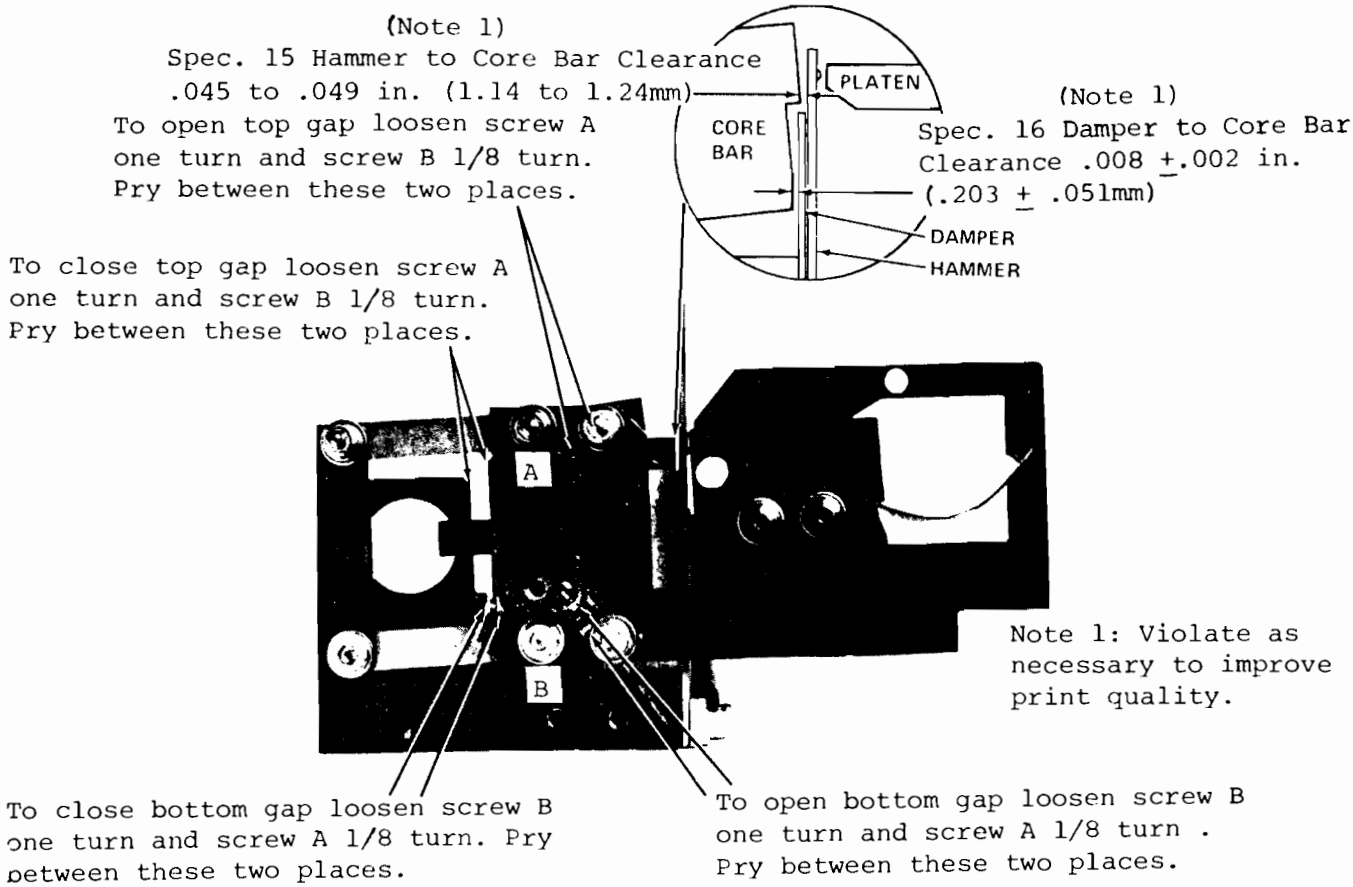


Figure 5-14. Print Mechanism Specifications



Note: To change a gap, insert screwdriver between appropriate points and carefully twist screwdriver handle to change gap. Pry points are the same at both ends of the print mechanism.

Figure 5-15. Print Mechanism Specifications

5-31. TROUBLESHOOTING.

Tables 5-2 and 5-3 are troubleshooting guides designed to aid the technician in locating the source of a problem. Refer to table 5-2 when troubleshooting the printer as a unit. If a problem is isolated to a circuit board, refer to table 5-3 for aid in determining which component(s) on the circuit board could cause the problem. Preliminary voltage checks are as follows:

TB3-7, 8	+5 Vdc ± 5% (4.75 to 5.25)
TB3-6	-18 Vdc +11%, -5% (17 to20)
TB2-6, 7	+8.3 Vdc +8%, -5% (7.9 to 9)

TABLE 5-2

PRINTER TROUBLESHOOTING

	PROBLEM	POSSIBLE CAUSE
1	Circuit breaker trips	A. Shorted hammer coil. B. Defective current sensor. C. Any Circuit board. D. Short beyond current sensor for Hammer Driver supply. E. Defective circuit breaker.
2	No line feed	A. Defective Line Feed switch. B. Defective Buffer ROM board. C. Defective Control Board.
3	Continuous form feed	A. No hole in VFU tape top of form channel. B. Defective VFU electronics. C. Defective Hammer Latch board. D. Defective Buffer ROM board. E. Defective Control board.
4	Failure to advance to top of form when Form Feed switch actuated or Form Feed command issued	A. No tape in VFU. B. VFU tape not coordinated with top of form. C. Incorrect VFU tape tension. D. Defective VFU electronics. E. Defective Buffer ROM board. F. Defective Control board. G. Defective Interface board.
5	Failure to advance paper	A. VFU clutch disengaged. B. Broken or missing pin to motor shaft or paper drive shaft coupling or gear. C. Paper drive gears out of mesh. D. Paper advance motor inoperative. E. Defective Motor Driver board. F. Defective Hammer Latch board. G. Defective Control board.
6	Failure to power up	A. Open fuse B. Open circuit breaker. C. Defective power On switch. D. No +15V. E. Defective Power Supply board.
7	Failure to power down	A. Defective power On switch. B. Defective Power Supply board.
8	Unable to load paper	A. Platen closed. B. Obstruction in paper path.

TABLE 5-2 (Continued)

9	Power On switch does not illuminate	A. Defective lamp. B. Defective switch. C. Defective Buffer ROM board.
10	Print switch does not illuminate	A. Defective lamp. B. Defective switch. C. Defective Interface board D. Defective Buffer ROM board.
11	Does not print 8LPI or does not print 6LPI	A. Defective 6/8LPI switch. B. Defective Buffer ROM board. C. Defective Control board.
12	No paper out alarm	A. Defective paper out alarm. B. Defective VFU electronics. C. Paper out switch defective or out of adjustment. D. Defective Buffer ROM board. E. Defective Hammer Latch board.
13	False paper out alarm	A. Paper out switch out of adjustment. B. Platen open. C. Platen open switch defective or out of adjustment. D. Defective Buffer ROM board.
14	Ribbon being pulled up by paper	A. Form thickness setting too tight. B. Ribbon on paper side of ribbon guard C. Ribbon tension arm springs bent for too little tension. D. Formscale out of adjustment.
15	Ribbon does not advance	A. Ribbon tension arm springs bent for too much tension. B. Defective ribbon motor or ribbon motor wiring C. Defective ribbon motor switch. D. Defective Power Supply board. E. Defective Hammer Latch board.
16	Ribbon reverses before end of reel	A. Reversing switch arm out of adjustment.
17	Ink marks on paper	A. Ribbon on paper side of ribbon guard. B. Form thickness setting too tight. C. Ink buildup on hammers and ribbon guides.
18	Short ribbon life	A. Ribbon not being turned over to use both halves. B. Ribbon motor assemblies not adjusted for proper ribbon angle. C. Wrong ribbon.

TABLE 5-2 (Continued)

19	Overheating	A. Printer being operated with nose cone removed B. Restricted air inlet to blower fan. C. Fan loose on motor shaft. D. Inoperative blower motor. E. Obstruction in cooling air path.
20	Failure to complete print cycle	A. Defective Control board. B. Defective Buffer ROM board.
21	Does not print	A. No hammer supply voltage. B. Defective current sensor for hammer supply voltage. C. Defective Interface board. D. Defective Buffer ROM board. E. Defective Hammer Latch Board. F. No ribbon. G. Platen to hammer gap too large. H. Hammer to coil gaps too large.
22	Printing wrong characters	A. Defective Interface board. B. Defective Buffer ROM board. C. Defective Hammer Latch board.
23	Printing crooked characters (vertical dots in characters "T" of "1" are not in a straight line	A. Incorrect mogator start time on Control Boa B. Mogator flexure bent or kinked. C. Restricted left-right motion of print comb. D. Carriage flexures bent or kinked.
24	Shadowed printing	A. Platen to hammer gap too tight. B. Specification 8 and/or 9 in figure 5-12 not being met. C. Specification 4 in figure 5-11 not being met.
25	Light printing in one column	A. Foreign particle or burr between hammer and damper for that column. B. Coil for that column improperly aligned.
26	Print line curved or bowed	A. Specification 5 in figure 5-11 not being met.
27	Light printing in middle of form	A. Form thickness setting too tight.
28	No printing on some part of form	A. Ribbon routed behind several hammers.
29	Left or right sides of characters "H","M","U", "W" missing or printing light	A. Mogator motor assembly out of adjustment. B. Bent or kinked mogator flexure. C. Mogator stops out of adjustment. D. Mogator motor clamp out of adjustment. E. Specification 3 or 4 in figure 5-11 not being met.

TABLE 5-2 (Continued)

30	Light printing across entire line	A. Worn ribbon. B. Incorrect form thickness setting C. Specification 13 in figure 5-13 not being met. D. Incorrect core bar adjustment.
31	Light or no printing at one end	A. Specification 13, 15 or 16 in figures 5-13, 5-15 not being met at that end.
32	Horizontal portions of characters slanted	A. Excessive lash between paper drive gears. B. Loose shaft on paper advance motor. C. Formscale not contacting paper.
33	Print appears as vertical lines instead of characters (no left-right motion of print comb).	A. Shipping screws tight. B. Mogator motor clamp loose. C. Broken mogator flexure. D. Defective mogator motor. E. Obstruction in print mechanism. F. Defective Control board.
34	No print in one column	A. Broken pin on core bar B. Open Hammer coil in core bar. C. Defective Hammer Driver board. D. Bent hammer tooth.
35	No print in every fifth column.	A. Defective Hammer Latch board. B. Defective Hammer Driver board.
36	Print in all dot positions	A. No -18V B. Defective Hammer Latch board. C. Defective Control board. D. Defective Buffer ROM board.
37	Light, broken, or missing sides (both sides of letters, flaky print).	A. Core-bar-to-hammer top gap too narrow. B. Bottom gap too wide.
38	Light print, sixth copy	A. Core-bar-to-hammer top gap too narrow. B. Bottom gap too wide.
39	Light print one side and smudges on other side	A. Platen out of adjustment.
40	Ghosting, many columns	A. Mogator out of adjustment.
41	Shakey print on both one and six part paper	A. Time slot not correct. B. Mogator stops not set properly. C. Buckled mogator flexure. D. Shipping screw brackets obstructing free movement of carriage.

TABLE 5-2 (Continued)

42	One or both sides of letters flattened out	A. Mogator stops out of adjustment. B. Carriage not moving freely.
43	Mogator steps wrong way (Power-up)	A. Body of mogator too far back. B. Hammer not centered with coils. C. Mogator defective, electronic defect.
44	Some rows of letters squashed (not columns). I.E. MARY HAD MARY HAD MARY HAD MARY HAD	A. Clutch slipping B. Excessive backlash in paper advance gears.
45	Shakey print; single part paper only	A. Formscale not against paper. B. Platen gap too loose.
46	Print very inconsistent. Flakey in places light-dark-light-dark	A. Hammers not straight.

TABLE 5-3

CIRCUIT BOARD TROUBLESHOOTING

CIRCUIT BOARD	PROBLEM	POSSIBLE CAUSE
Buffer ROM (figure 4-10, three sheets)	1. Not indicating paper out.	A. POUT flop not being steered set (SH 2). B. POUT flop defective (SH 2).
	2. Not printing.	A. Defective print latch (SH 2). B. RDY flop not setting (SH 2). C. Data not being loaded into INPUT BUFFER. (SH 1). D. Defective PRE-PRINT flop (SH 3). E. Defective COMMAND INPUT MEM (SH 3).
	3. Not printing at 6LPI or not printing at 8LPI.	A. Defective 6/8 LPI latch (SH 2).
	4. No form feed.	A. Defective form feed latch (SH 2). B. Defective MFF flop (SH 2).
	5. Form Feed does not stop.	A. Defective form feed latch (SH 2). B. Defective gate F8-10 (SH 2). C. Defective MFF flop (SH 2).
	6. No line feed.	A. Defective line feed latch (SH 2). B. Defective MLF flop (SH 2).
	7. Line feed does not stop.	A. LCOM not being detected at J3-11 (SH 2). B. Defective MLF flop (SH 2).
	8. Incorrect preconditioning of logic.	A. PORS not appearing at J3-29 (SH 2). B. Defective Schmitt trigger output UG5-6 (SH 2).
	9. Printing less than 132 characters per line.	A. Defective B1 CNTR (SH 2). B. Defective gate causing incorrect decode of B1 CNTR outputs (SH 2).
	10. Incorrect or no clock pulses being generated.	A. Defective crystal Y1 (SH 2). B. Defective oscillator circuit (SH 2). C. Defective CLOCK GENERATOR flop (SH 2). D. Defective clock output gate (SH 2).
	11. Print Indicator light does not go on	A. Defective RDY flop (SH 2). B. Defective inverter or gate to J8-W (SH 2). C. Incorrect steering to RDY flop (SH 2).
	12. On indicator light does not go on.	A. Defective ON INDICATOR latch (SH 2). B. Defective ON INDICATOR inverter (SH 2).

TABLE 5-3 (Continued)

	13. Characters not entering INPUT BUFFER	A. No BUFFER NO.1 CLOCKS (SH 3). B. Defective COMMAND INPUT MEM (SH 3). C. Defective INPUT BUFFER (SH 1).
	14. No CRST	A. Defective CRST flop (SH 3). B. Defective PRE-CRST flop (part of UC9, SH 3).
	15. No SLEW	A. Defective COMMAND INPUT MEM (SH 3). B. Defective SLEW INPUT MEM NO.2 (part of UC9, SH 3).
	16. No HDWB at J3-15	A. Defective gate to J3-15 (SH 3). B. Defective output from PRE-PRINT flop (SH 3).
	17. Incorrect characters being printed.	A. Defective INPUT BUFFER (SH 1). B. Defective PRINT BUFFER (SH 1).
	18. Incorrect character configuration (dots in wrong locations).	A. Defective ROM (SH 1). B. Defective ROM MULTIPLEXER (SH 1).
	19. Printing dots in all positions.	A. Defective ROM (SH 1). B. Defective ROM MULTIPLEXER (SH 1).
Control (figure 4-12, two sheets)	1. BUFFER 2 CNTR inoperative.	A. Defective counter (SH 1). B. Defective inverter to clock input (SH 1). C. Defective pullup inverter UG5-4 (SH 2). D. Defective gate to clear input (SH 1). E. Defective gate at counter output (SH 1).
	2. Columns printed out of sequence.	A. Defective TS CNTR (SH 1). B. Defective TS DECODER (SH 1). C. Defective TS SELECT gate (SH 2).
	3. Letter "I" is crooked.	A. Incorrect mogator start selected (SH 2). B. Defective gate at MOGATOR CNTR outputs (SH 2). C. Defective MOGATOR CNTR (SH 2).
	4. Mogator motor not stepping.	A. Defective MOGATOR CNTR (SH 2). B. Defective gate to MOGATOR CNTR enable input (SH 2). C. Defective gate at MOGATOR CNTR output (SH 2).

TABLE 5-3 (Continued)

	5. Random dots being printed during paper movement.	A.	INH HAMMERS not going active at J4-12 (SH 2)
	6. Dot row or dot column within character misplaced or missing	A.	Defective DOT COLUMN CNTR (SH 2).
		B.	Defective DOT ROW CNTR (SH 2).
		C.	DOT COLUMN or DOT ROW CNTR enabled incorrectly (SH 2).
		D.	Defective gate at output of DOT COLUMN or DOT ROW CNTR (SH 2).
	7. Incorrect paper advance after print cycle.	A.	Defective PAPER ADVANCE DISABLE chip UE3 (SH 2).
		B.	Defective gate to PA STEP at J4-21 (SH 2).
	8. Hammers firing in wrong order.	A.	Defective DOT COLUMN CNTR (SH 2).
	9. Printing random dots rather than characters.	A.	Defective TS CNTR (SH 1).
Hammer Latch (figure 4-14, two sheets)	1. Printing characters in wrong columns.	A.	Defective BUFG SELECT chip (SH 2).
		B.	Defective HAMMER SELECT chip (SH 2).
		C.	Defective MARKER COMPARATOR chip (SH 2).
		D.	Defective DUAL CLOCK CNTR (SH 2).
	2. Characters being printed in wrong locations.	A.	Defective DUAL CLOCK CNTR (SH 2).
		B.	Defective MARKER COMPARATOR chip (SH 2).
		C.	Defective gate to SRCLK signal (SH 2).
	3. SHIFT REGISTER not clearing.	A.	Defective A MEM flop (SH 2).
		B.	Defective B MEM flop (SH 2).
		C.	Incorrect steering to A MEM flop (SH 2).
	4. Missing dots.	A.	Defective MEM LATCH (SH 1).
		B.	Defective SHIFT REGISTER (SH 1).
	5. Incorrect VFU operation.	A.	Defective Schmitt trigger (SH 1).
	6. No ribbon drive or continuous drive.	A.	Defective RIBBON ADV flop (SH 2).
Hammer Driver (figure 4-16, two sheets)	1. Not printing in one character position (column).	A.	Defective transistor for that column (SH 1 and SH 2).
		B.	Defective gate for that column (SH 1 and SH 2).

TABLE 5-3 (Continued)

	2. Losing every fifth character position	A.	Defective inverter (SH 1 and SH 2).
	3. Circuit breaker trips	A.	Defective transistor (SH 1 and SH 2).
		B.	Defective gate (SH 1 and SH 2).
		C.	Defective diode (SH 1 and SH 2).
Motor Driver (figure 4-17)	1. Paper advance motor or mogator motor inoperative.	A.	Defective drive transistor
		B.	Defective pre-drive transistor
Power Supply (figure 4-6)	1. Printer does not power up.	A.	Defective relay K3.
	2. Printer does not power down.	A.	Shorted Triac Q9.
		B.	Defective K2.
	3. No ribbon drive.	A.	Defective relay K2.
		B.	Open Triac Q10.
	4. Ribbon drive not reversing.	A.	Defective relay K4.
	5. No hammer supply.	A	Defective relay K2.
		B.	Defective Triac Q10.

APPENDIX A.

A-1. INTRODUCTION.

This appendix covers pin configurations of the integrated circuits used in the HP 2607A Line Printer and basic logic information of special or complex integrated circuits.

A-2. LOGIC STATES.

Logic signals are considered in one of two states; a state one (high) or state zero (low). These states reflect relative voltage levels of the signals. A high state is more positive than a low state even if both voltage levels are negative.

The "not" bar (ie $\overline{\text{PRINT}}$) is used to indicate a signal which is active in the low state. The "not" signals also have high and low states just as do signals without the "not" bar.

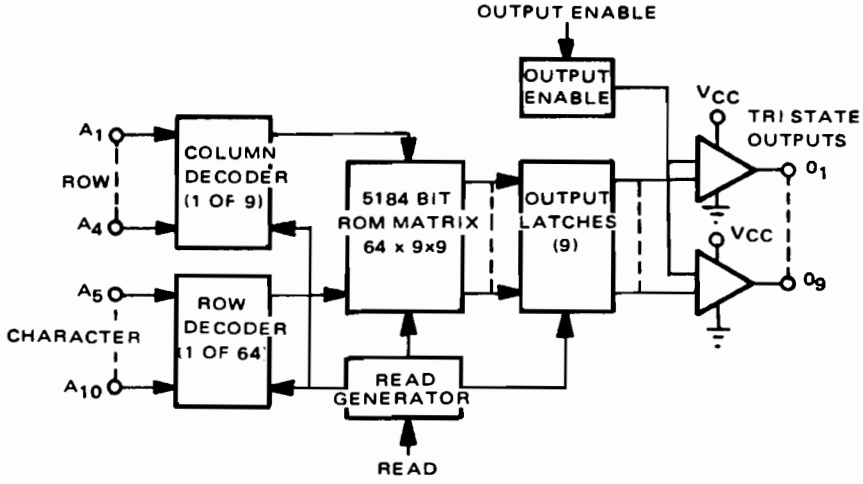
A-3. LOGIC SYMBOLOGY.

Should troubleshooting to the component level become necessary, integrated circuits having a special or complex function are described below. Each symbol has a multidigit number which identifies the type of device and an alphanumeric designator which indicates the location of the device on the printed circuit board. Pin configuration diagrams are shown in figure A-11.

A-4. Read-Only-Memory. This is a high speed 5,184 bit clocked Read-Only-Memory with 64 x 9 x 9 organization. It is addressed with both a row code (9) and a character code (64) to obtain an output code (9) from its memory which is used to determine whether or not a dot will be printed at each given dot position. The address (character code and dot row select) inputs are decoded on the leading edge of the clock and the output buffers are latched with the dot information on the trailing edge of the clock. Figure A-1 shows a block diagram and timing diagram for this device.

A-5. Four Line to Ten Line Decoder (7442). A four line to ten line decoder converts a four bit BCD (binary coded decimal) number to one of ten outputs. See figure A-2 for the logic symbol, logic diagram and truth table for this device.

BLOCK DIAGRAM



TIMING DIAGRAM

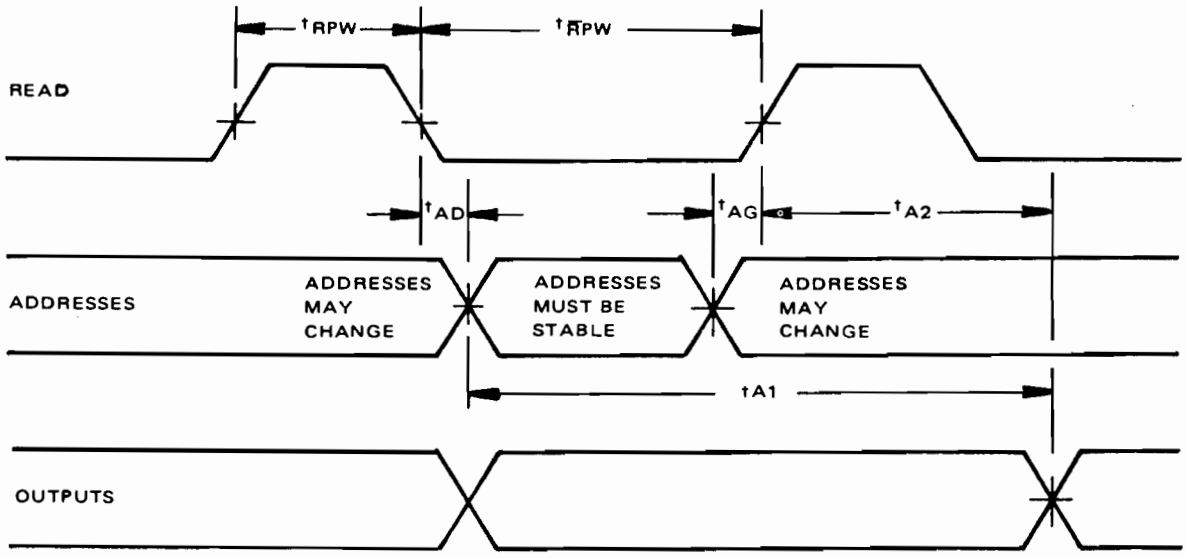
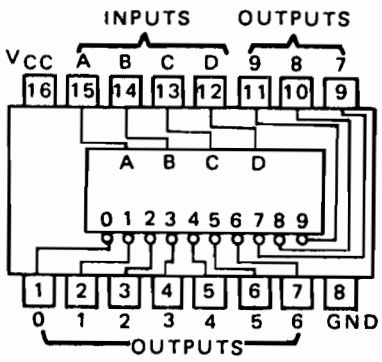
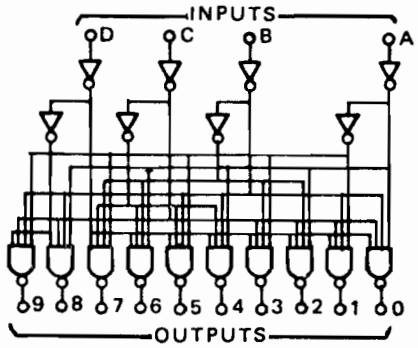


Figure A-1.
Read-Only-Memory Block Diagram and Timing Diagram.

LOGIC SYMBOL



LOGIC DIAGRAM



TRUTH TABLE

BCD INPUT				DECIMAL OUTPUT									
D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	1	1	1	1	1	1	1	1	1
0	0	0	1	1	0	1	1	1	1	1	1	1	1
0	0	1	0	1	1	0	1	1	1	1	1	1	1
0	0	1	1	1	1	1	0	1	1	1	1	1	1
0	1	0	0	1	1	1	1	0	1	1	1	1	1
0	1	0	1	1	1	1	1	1	0	1	1	1	1
0	1	1	0	1	1	1	1	1	1	0	1	1	1
0	1	1	1	1	1	1	1	1	1	1	0	1	1
1	0	0	0	1	1	1	1	1	1	1	1	0	1
1	0	0	1	1	1	1	1	1	1	1	1	1	0
1	0	1	0	1	1	1	1	1	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	0	1	1	1	1	1	1	1	1	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	1
1	1	1	0	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1

Figure A-2.
Four Line to Ten Line Decoder Logic Diagram and Truth Table.

A-6. Dual Four Input Positive NOR Gate with Strobe (7425). This device is a special NOR gate. It has four inputs plus a strobe enable. A high at G enables the function, so with G high and a high at A, B, C, or D inputs, output X will go low. See figure A-3 for a logic symbol and logic diagram for this device.

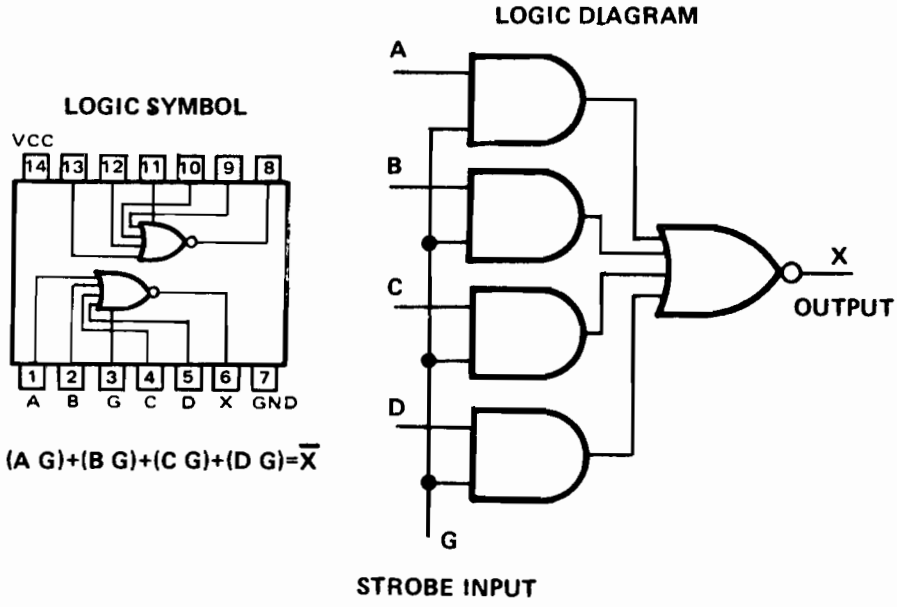


Figure A-3.
Dual Four Input Positive Nor Gate with
Strobe Logic Symbol and Logic Diagram.

A-7. Sixteen Line to One Line Data Selector/Multiplexers (74150). This device utilizes a negative strobe input for enabling and one of the sixteen inputs is selected by a BCD (binary coded decimal) which appears at the four data select inputs. This device is used in parallel-in/serial-out data conversion. It is also used as a ROM multiplexer selecting all information for a particular dot position. Figure A-4 shows a logic diagram and truth table for the device.

TRUTH TABLE

INPUTS																				OUTPUT
D	C	B	A	STROBE	$\bar{E}_0$	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}	E_{11}	E_{12}	E_{13}	E_{14}	E_{15}	W
X	X	X	X	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1
0	0	0	0	0	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1
0	0	0	0	0	1	X	1	X	X	X	X	X	X	X	X	X	X	X	X	X	0
0	0	0	1	0	0	X	X	1	X	X	X	X	X	X	X	X	X	X	X	X	1
0	0	0	1	0	1	X	X	X	1	X	X	X	X	X	X	X	X	X	X	X	0
0	0	1	0	0	0	X	X	X	X	1	X	X	X	X	X	X	X	X	X	X	1
0	0	1	0	0	1	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
0	0	1	1	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	1
0	0	1	1	0	1	X	X	X	X	X	X	X	1	X	X	X	X	X	X	X	0
0	1	0	0	0	0	X	X	X	X	X	X	X	X	1	X	X	X	X	X	X	1
0	1	0	0	0	1	X	X	X	X	X	X	X	X	0	X	X	X	X	X	X	0
0	1	0	1	0	0	X	X	X	X	X	X	X	X	X	1	X	X	X	X	X	1
0	1	0	1	0	1	X	X	X	X	X	X	X	X	X	0	X	X	X	X	X	0
0	1	1	0	0	0	X	X	X	X	X	X	X	X	X	X	1	X	X	X	X	1
0	1	1	0	0	1	X	X	X	X	X	X	X	X	X	X	0	X	X	X	X	0
0	1	1	1	0	0	X	X	X	X	X	X	X	X	X	X	X	1	X	X	X	1
0	1	1	1	0	1	X	X	X	X	X	X	X	X	X	X	X	0	X	X	X	0
1	0	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	1	X	X	1
1	0	0	0	0	1	X	X	X	X	X	X	X	X	X	X	X	X	0	X	X	0
1	0	0	1	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	1	X	1
1	0	0	1	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	0	X	0
1	0	1	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1	1
1	0	1	0	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	0
1	0	1	1	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1	1
1	0	1	1	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	0
1	1	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1
1	1	0	0	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
1	1	0	1	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1
1	1	0	1	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
1	1	1	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1
1	1	1	0	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
1	1	1	1	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1
1	1	1	1	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0

X=IRRELEVANT

LOGIC DIAGRAM

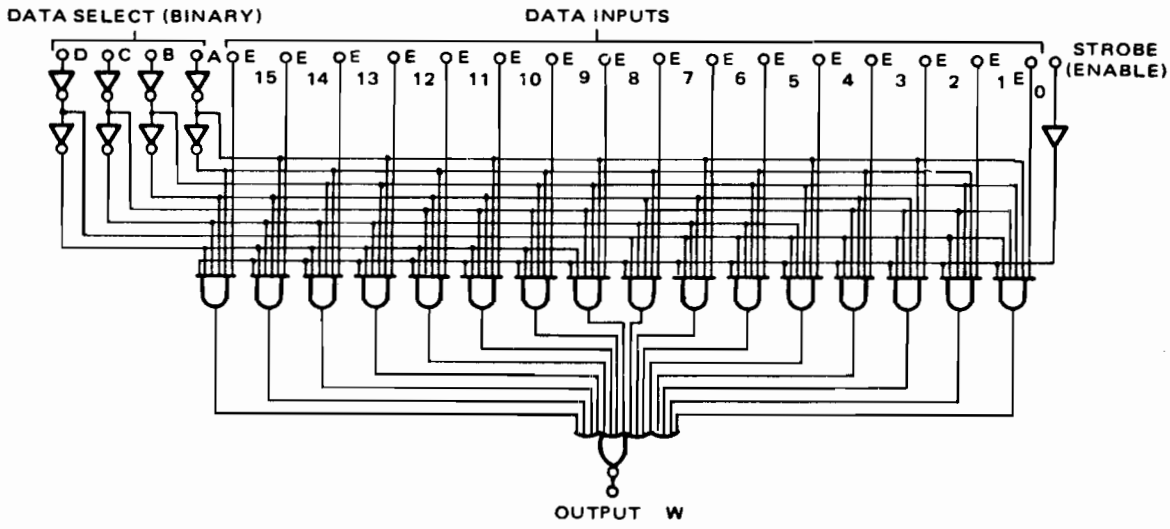


Figure A-4.

Sixteen Line to One Line Data Selector/Multiplexer.

A-8. Quad Two Lines to One Line Data Selector/multiplexers (74157). This device allows selection of four bits of either data or control from two sources and it can generate four functions of two variables with one variable common. The device is enabled by a low level enable input and utilizes a data select input to select either A or B outputs. When the select input (pin one) is low, A inputs are selected and outputed. When the select input is high, B inputs are selected and outputed. When the strobe input is high (device disabled) all outputs are low. Figure A-5 shows a quad (four in package) two line to one line data selector/ multiplexers truth table and logic diagram.

TRUTH TABLE				
INPUTS				OUTPUT Y
ENABLE	SELECT	A	B	
1	X	X	X	0
0	0	0	X	
0	0	1	X	
0	1	0	0	
0	1	1	1	

1 = High Level,
0 = Low Level,
X = Irrelevant

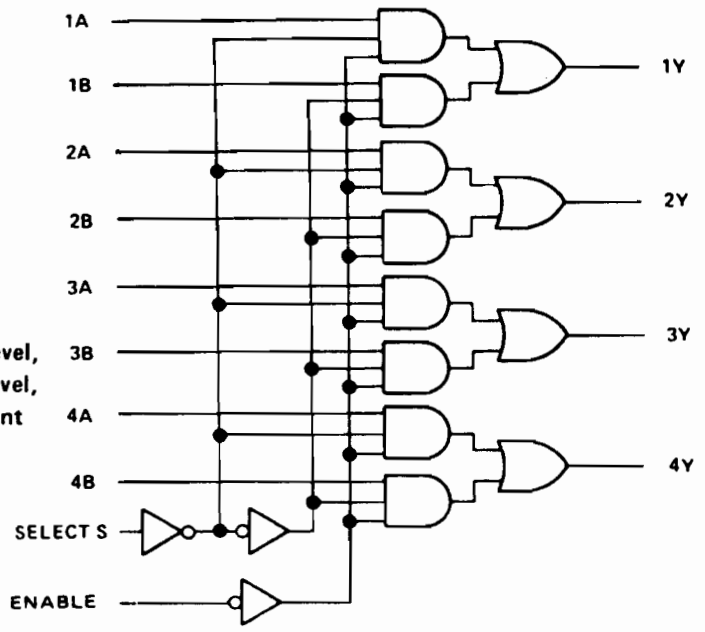


Figure A-5.
Quad Two Line to One Line Data Selector/Multiplexer
Truth Table and Logic Diagram.

A-9. Synchronous Four Bit Decade Counter (74162). This counter is used to count in tens. It produces a pulse at the carry output each time it reaches a count of ten. The BCD (binary clded decimal) output changes with each clock input. In order to count, enable inputs T and P must be high at the time a positive going clock pulse occurs. The device is cleared by placing a low at the clear input until a clock pulse occurs. It is loaded by placing a low at the load input until a clock pulse occurs. At that time data may enter the counter. Figure A-6 shows the counter logic symbol, logic diagram, and timing diagram.

A-10. Synchronous Four Bit Binary Counter (74163). This counter operates similar to the decade counter described in the previous paragraph except it is a binary rather than a decade counter. It counts to a BCD 16 before recycling. See Figure A-7 for the logic symbol, logic diagram and timing diagram for this device.

A-11. Eight Bit Parallel Out Shift Register (74164). This register is used to convert serial data to parallel data. To load a bit, A and B must be high prior to the positive edge of the clock. If a clock occurs when either A or B is low no bit will be loaded. Each clock pulse shifts the register. The device has an asynchronous (unclocked) clear caused by applying a low at the clear input. Figure A-8 shows a logic symbol, logic diagram, truth table and timing diagram for the device.

A-12. Synchronous Up/Down Counter (74191). This is a synchronous (all flip-flops simultaneously clocked), reversible, four bit binary, up/down counter. With the enable input steered low the four master-slave flip-flops will trigger when a positive going clocks pulse occurs. Counting is inhibited when the enable input is high. When the down/up input is low, the device counts up; when high, it counts down. Figure A-9 shows a logic symbol, logic diagram, and timing diagram for this device.

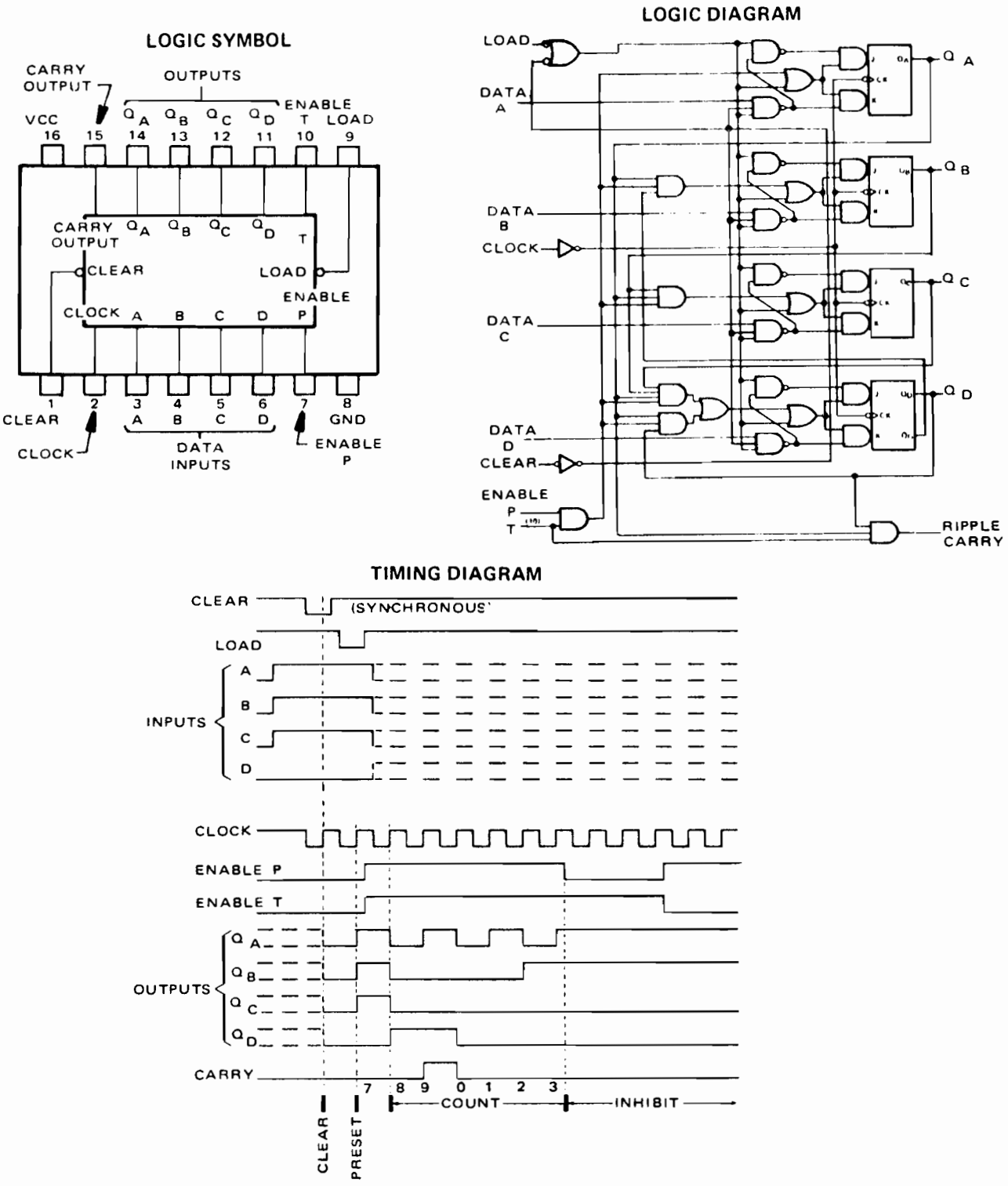


Figure A-6.
Synchronous Four Bit Decade Counter Logic Symbol,
Logic Diagram and Timing Diagram.

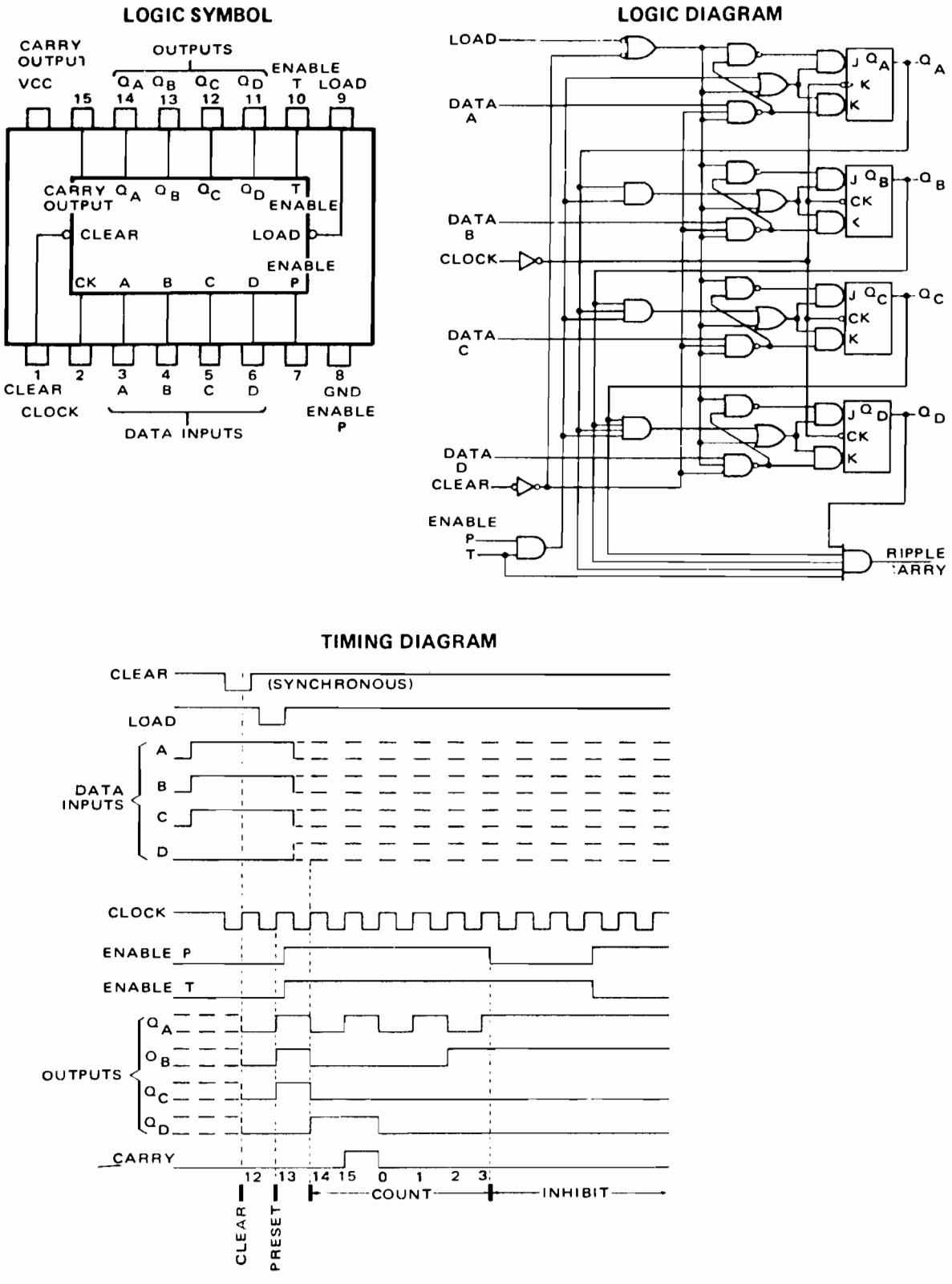
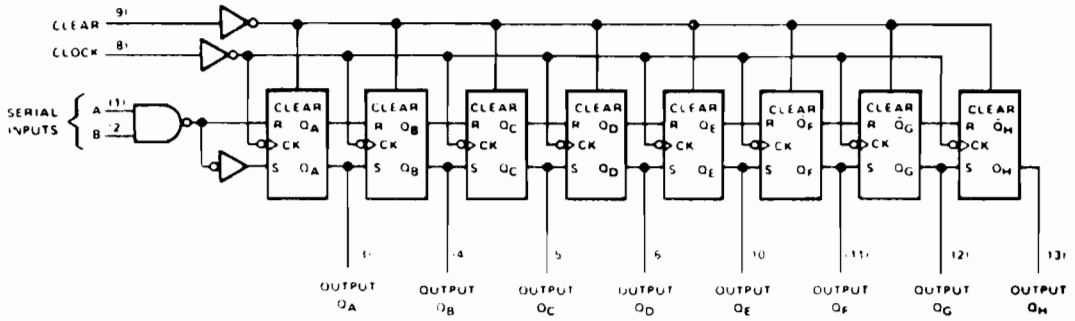
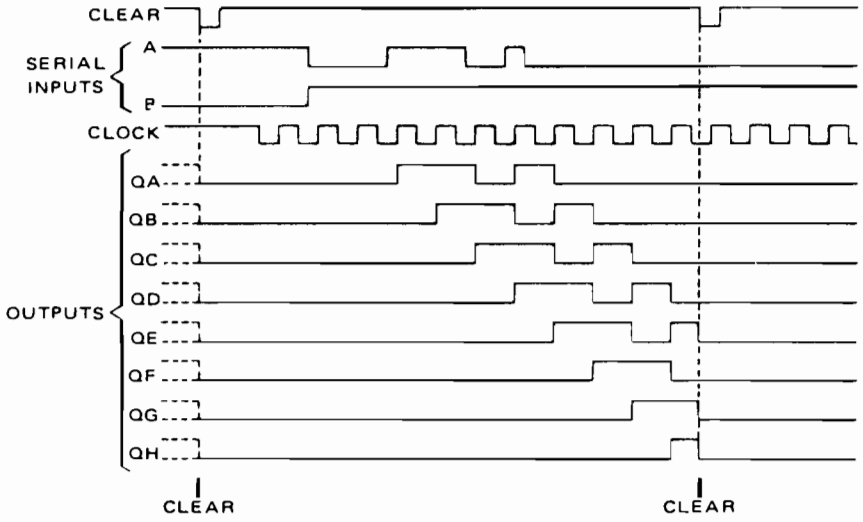


Figure A-7.
Synchronous Four Bit Binary Counter Logic Symbol,
Logic Diagram and Timing Diagram.

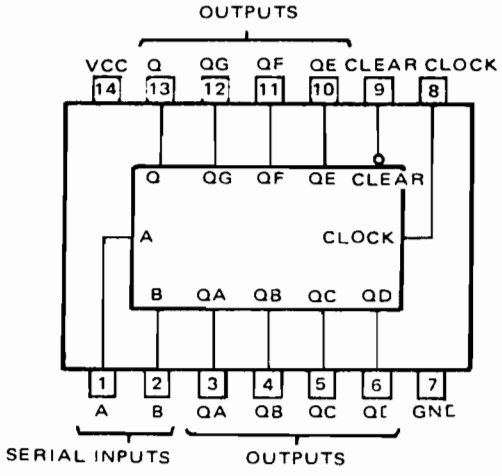
LOGIC DIAGRAM



TIMING DIAGRAM (TYPICAL)



LOGIC SYMBOL



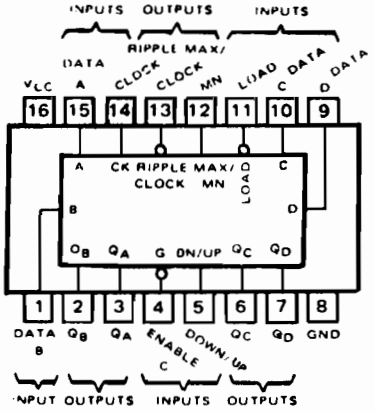
TRUTH TABLE

SERIAL INPUTS A AND B

INPUTS $AT t_n$		OUTPUTS $AT t_n+1$
A	B	QA
1	1	1
0	1	0
1	0	0
0	0	0

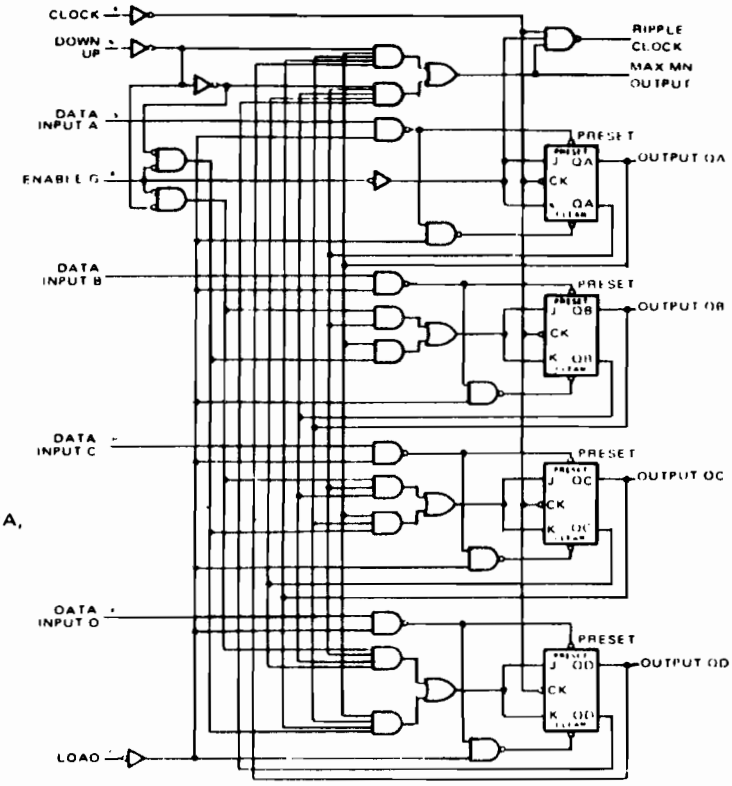
Figure A-8.
Eight Bit Parallel Out Serial Shift Register Logic Symbol, Logic Diagram, Truth Table and Timing Diagram.

LOGIC SYMBOL



asynchronous inputs: Low input to load sets Q_A=A, Q_B=B, Q_C=C, and Q_D=D

LOGIC DIAGRAM



TIMING DIAGRAM

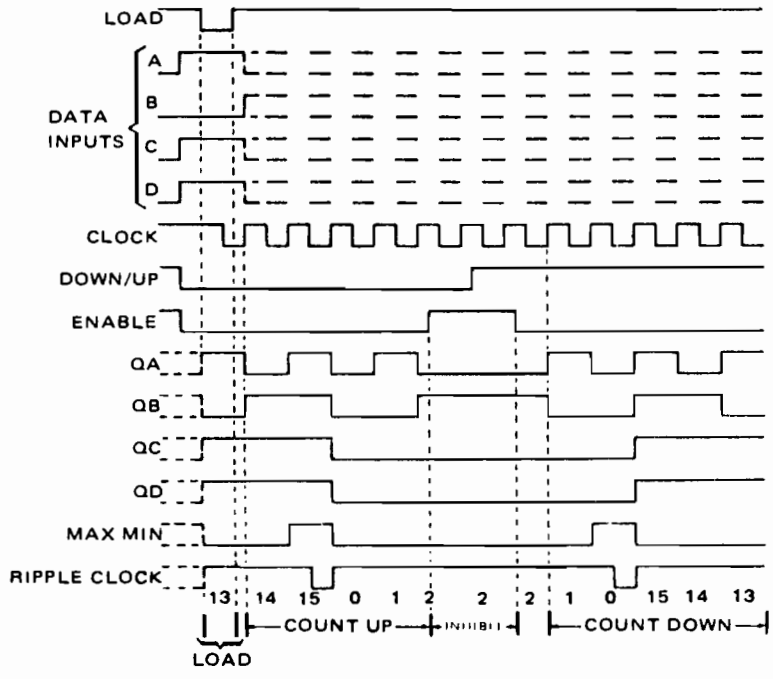


Figure A-9.
Synchronous Up/Down Counter Logic Symbol, Logic Diagram and Timing Diagram

A-13. Dual 133 Bit Shift Register (TMS3113). The two static shift registers in this device are independent of each other although they use two common internal clocks and one common external clock for timing. Each 133 bit shift register is used for storage or recirculating information. Data is transferred into the register when the clock and recirculate control are low. The clock is held high for long term storage of data. The output data appears upon a positive going clock pulse. Data is recirculated when the recirculate control is high. See figure A-10 for a logic diagram for this device.

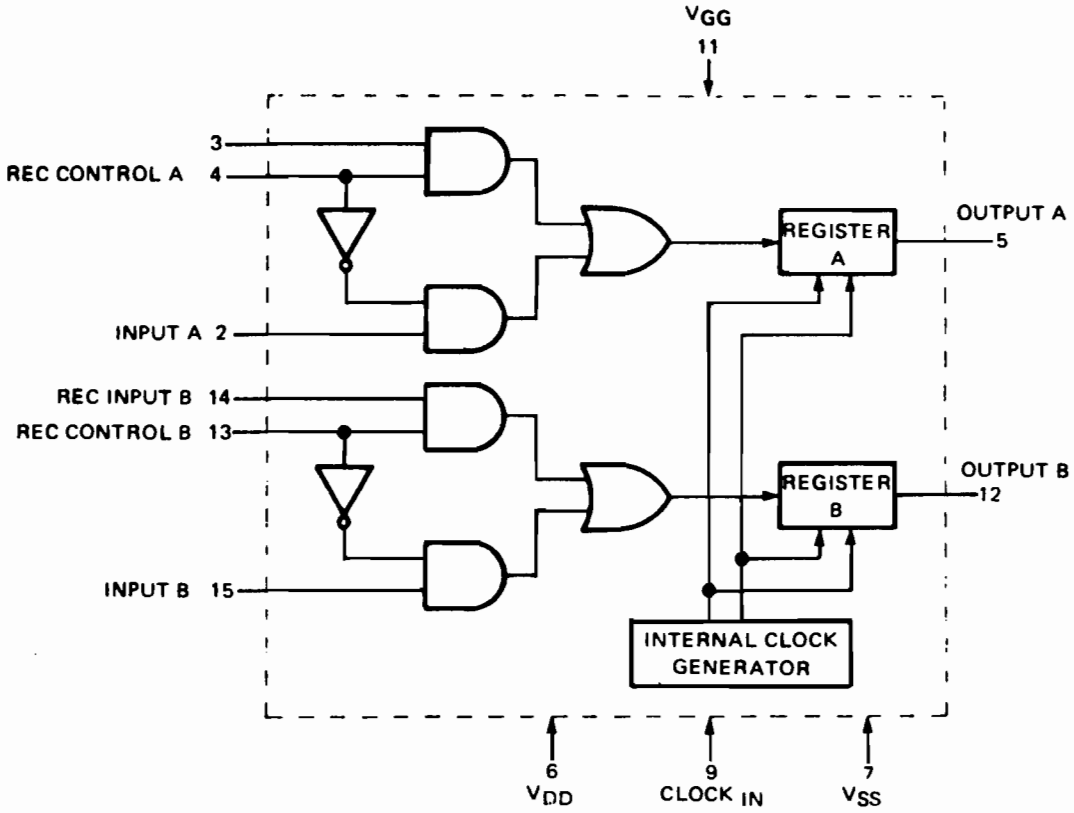
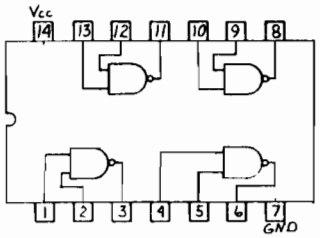
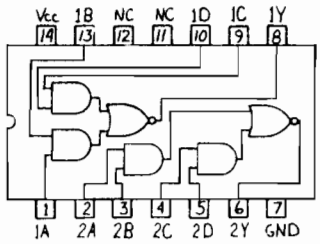


Figure A-10.

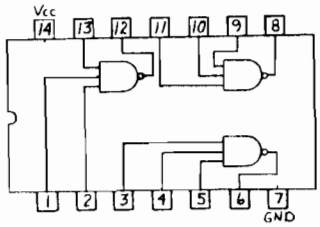
Dual 133 Bit Shift Register Logic Diagram.



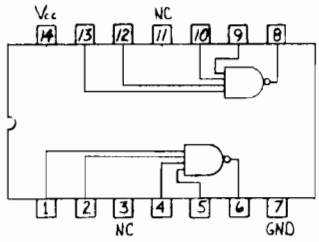
1820-0054 (7400)
1820-0539 (7437)



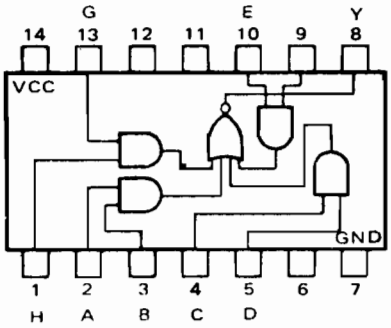
1820-0063 (7451)



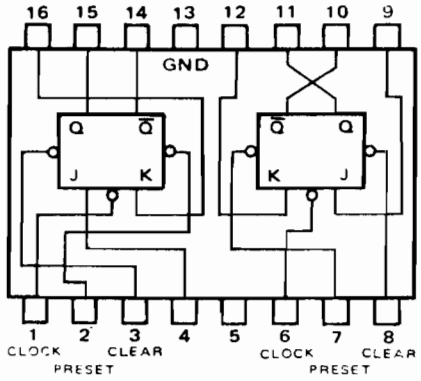
1820-0068 (7410)



1820-0069 (7420)

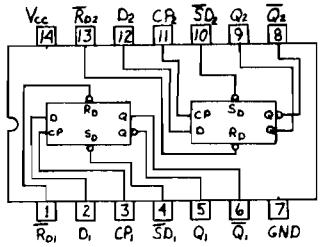


1820-0074 (7454)

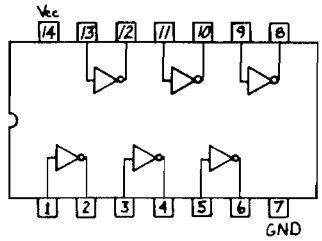


1820-0076 (7476)

Figure A-11. Pin Configurations
(Sheet 1 of 5)



1820-0077 (7474)



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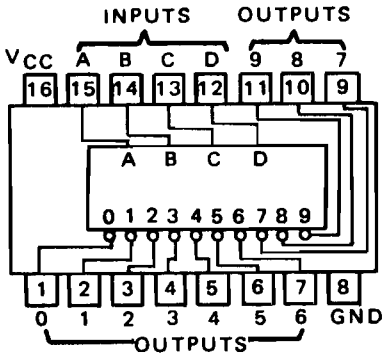
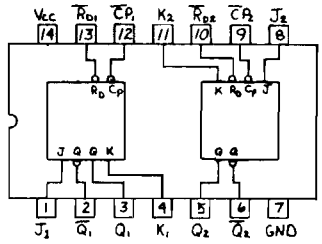
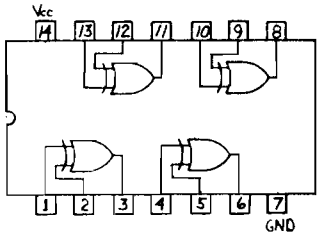
1820-0471 (7406)



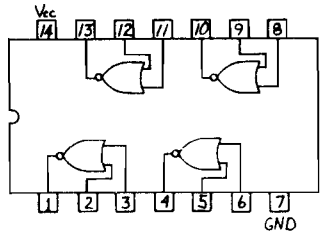
1820-0214 (7442)



1820-0281 (74107)

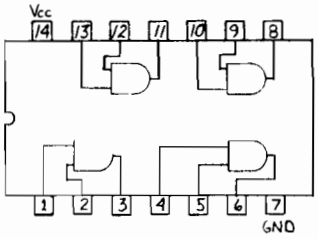


1820-0282 (7486)

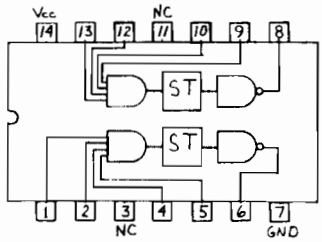


1820-0328 (7402)
1820-1184 (7428)

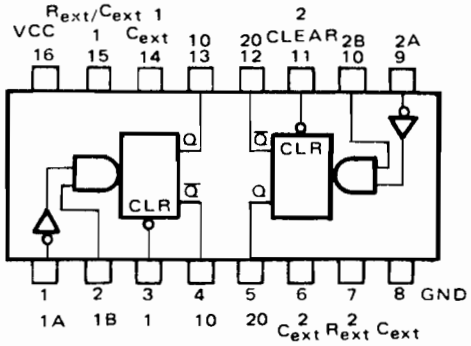
Figure A-11. Pin Configurations
(Sheet 2 of 5)



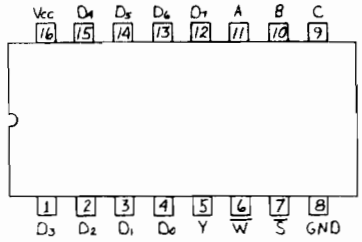
1820-0511 (7408)



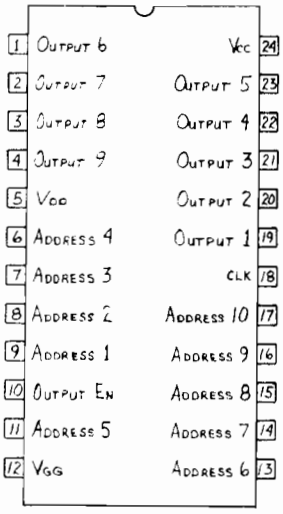
1820-0537 (7413)



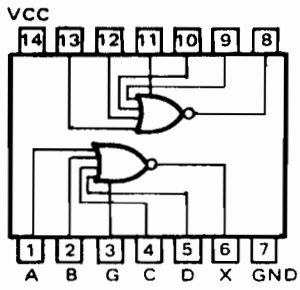
1820-0579 (74123)



1820-0622 (74151)

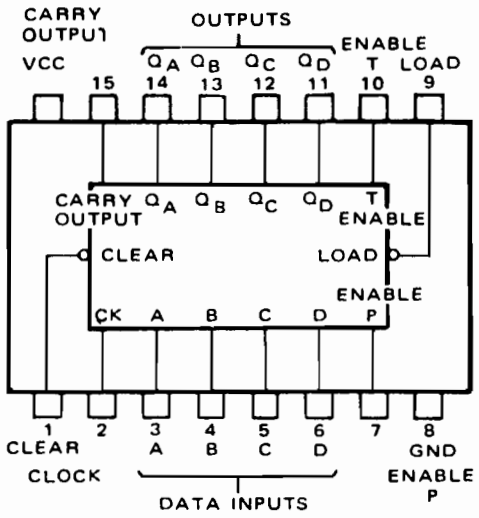


1820-0640 (74150)

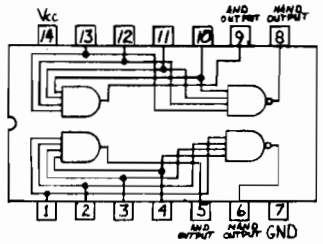


1820-0655 (7425)

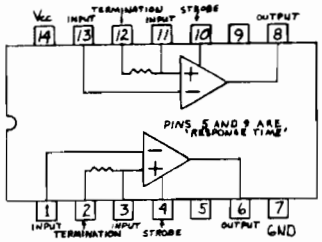
Figure A-11. Pin Configurations
(Sheet 3 of 5)



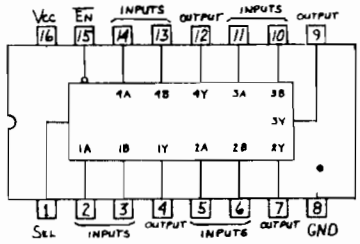
1820-0713 (74163)



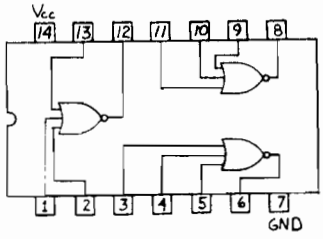
1820-0720 (DM8830)



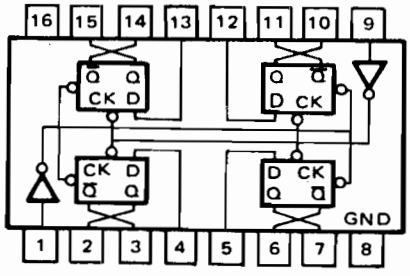
1820-0721 (DM8820A)



1820-0762 (74157)

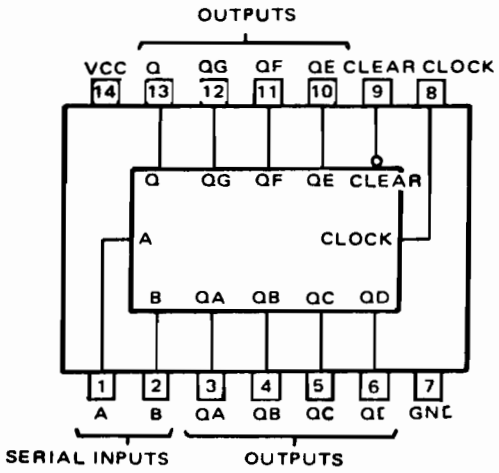


1820-0782 (7427)

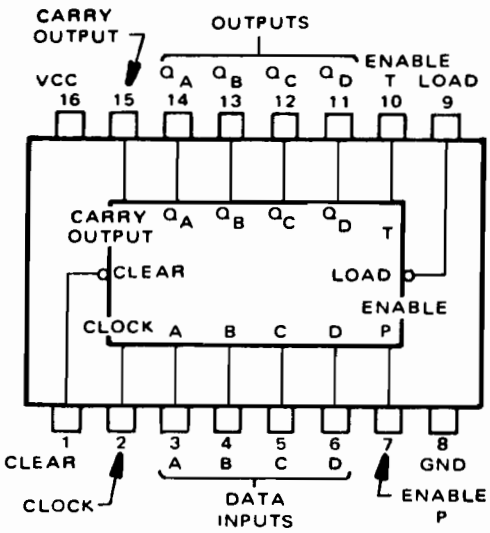


1820-0839 (74175)

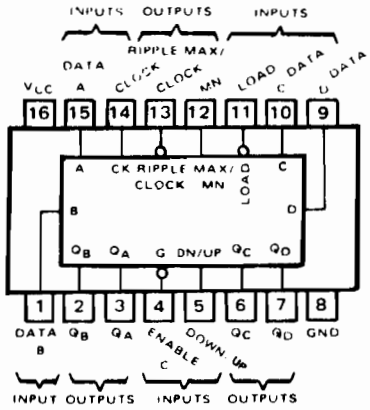
Figure A-11. Pin Configurations
(Sheet 4 of 5)



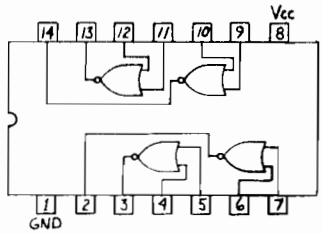
1820-1064 (74164)



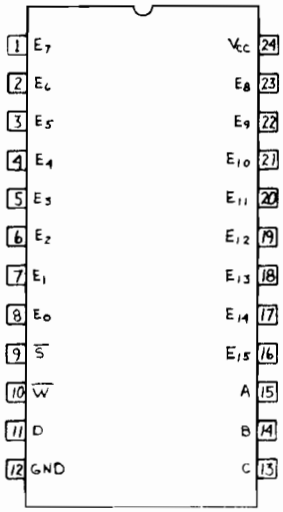
1820-1185 (74162)



1820-1186 (74191)



1820-1187 (SP380)



02607-60017
1816-0349 (CM8050N)
1818-0092 (CM6580)
1818-0125 (CM8630)
1818-0152 (CM9390)
1820-1351 (CM6650)
1820-1352 (CM6660)

Figure A-11. Pin Configurations
(Sheet 5 of 5)

APPENDIX B.

B-1. INTRODUCTION.

The Exerciser board (USASCII Generator) is designed to test the HP 2607A Line Printer excluding external equipment. This printed circuit board is substituted for the I/O Interface board in the circuit board module to provide printout of all upper case only (HP and Tally made boards) or upper and lower case (HP only) characters. Each character is printed at each position to ensure full operation of print and buffer locations.

B-2. CONTROLS.

The controls on the Exerciser board are separated to describe both the Hewlett-Packard and Tally versions of the test board.

TALLY CONTROL PANEL (figure B-1)

PRINT ON/OFF. When set to ON, this switch enables the Exerciser board. The Print switch on the printer must be on to start printing. When set to OFF, the Exerciser is disabled and cleared without affecting the printer logic.

LINE FEED ON/OFF. When set to ON the Number of Lines switch is enabled. In the OFF position, single line spacing occurs.

NUMBER OF LINES. When activiated by the Line Feed On/Off switch, this switch selects spacing between lines of print at 1, 2, 4 or 8 spaces.

DENSITY.

50% - This switch position allows every other character in a line to be printed. Print Density is 66 characters per line.

FULL- Characters are printed in sequential order. Print Density is 132 characters per line

64/64-This position allows 64 sequential characters to be printed followed by 64 black spaces. The remainder of the line is filled with characters. Print Density is 66-68 characters per line. Each printed line will be offset by four characters from the preceding line.

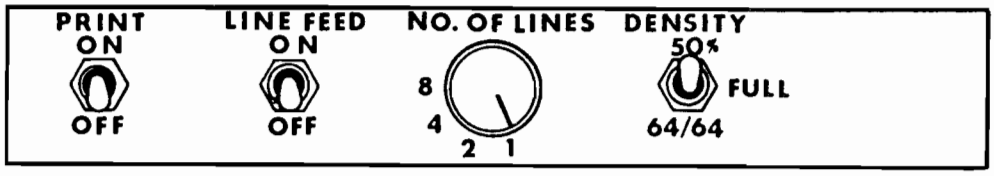


Figure B-1.
Tally Exerciser Control Panel.

HEWLETT-PACKARD CONTROL PANEL (figure B-2)

PRINT ON/OFF. When set to ON, this switch enables the Exerciser board. The Print switch on the printer must be on to start printing. The printer will execute a ripple test printing all characters in sequential order with each line being offset by one character from the preceding line.

SPEC CHAR ON/OFF. When in the On position the "H" test or the "I" test is executed as determined by the setting of the Character switch.

CHARACTER I/H. This switch selects a printout of all H's or all I's when the Spec. Char switch is on. These tests check all dot positions for print quality.

CASE-UPPER ONLY, UPPER/LOWER. The Upper Only position causes the printer to print the 64 upper case USASCII characters. In the Upper/Lower position 128 upper and lower case USASCII characters will be printed provided the lower case option ROM is installed in the printer Buffer ROM PCA.

LINE FEED ON/OFF. When in the ON position, this switch enables the Line Space switch.

LINE SPACE SINGLE/DOUBLE. In the Single position, one blank line is left between lines of print. The Double position causes the printer to leave two blank lines between lines of print.

B-3. ELECTRICAL OPERATION.

TALLY Made Exerciser PCA (figure B-5). The Reset Clamp (B1-6) is released when the Print switch is placed in the ON position and a REDY status signal is received from the printer (printer Print switch on) at J2-25. The next CLØ3 clock pulse at J2-16 sets the Generator Counter (B4 and5) through B1-8 and the Strobe FF (A3-12). The Generator Counter is now inhibited from advancing until a CSCD is issued and a CRST signal is returned. On the next CLØ3 the Strobe FF clears and the Gen Cntr is allowed to clock again. The counter continues to advance on each pulse, producing the sequential USASCII code. When data completely fills the Input Buffer of the printer, the printer issues a BUFF signal which sets the Buffer Full FF (BUFF) providing a PCMD at J2-13 and inhibits the counter.

With the Line Feed switch off, the CRST signal (J2-7) clears Buff FF (A3-11) to allow the counter to clock again. If the Line Feed switch is on, then PCMD sets the Slew FF (A4-1) and when HDWB (J2-15) goes low, the Slew line (J2-8) goes high. The counter is prevented from advancing while the Line Feed Counter (LF Cntr, B6) counts on each LCOM (J2-11) until the count at select switch S2 has been completed.

The other two modes of operation provide horizontal line spacing. The 64/64 mode prints 64 characters then 64 spaces. When the Density switch is set to 64/64 it enables the 64/64 FF (C4-1). The first count sequence through the Exerciser enables the 64/64 FF which encodes only spaces for the second count sequence. At the end of the second sequence the 64/64 FF is cleared, again enabling data. The 50% mode provides a space between each data character. With the Density switch set to 50% the 50% FF (C4-8)

is enabled. This FF is set and cleared by every other clock pulse through the Strobe FF. The Exerciser alternately is inhibited, loads a space, then continues to the next character. When the Print switch is released the Reset Clamp (B1-6) clears the Exerciser.

HP Made Exerciser PCA (figure B-3). The clear on the Exerciser logic is removed when the Print switch is placed in the ON position and a REDY status signal is received from the printer (printer Print switch on) causing U6-11 to go high. The Character Generator (U3 and 4) will now output character codes to the Exerciser DATA outputs. This is accomplished as follows: Since BUFF at J2-14 from the printer is currently low, the Strobe FF (U1-1) is steered set. It sets on the next CLØ3 enabling CSCD at J2-10. When CSCD is received and implemented by the printer, a CRST signal is returned to the Exerciser at J2-7. CRST causes the Strobe FF to clear on the next CLØ3 which removes the CSCD signal and increments the Character Generator by a count of one. This cycle continues, producing the sequential USASCII code,until 132 characters have been received by the printer.

At this time a BUFF signal (J2-14) is issued by the printer which clears the Strobe FF and removes CSCD. The fact that the Slew A FF (U5-2, high) is clear and HDWB, J2-15, is low cause U6-3 to go high enabling the J input to the Buff FF (U5-8) and generating PCMD. Upon receipt of PCMD the printer will commence the print cycle for that line of print and activate HDWB. When HDWB goes active (high) it removes the set steering to Buff and on the next CLØ3, PCMD goes low. After data in the printer Input Buffer is transferred to the Print Buffer the BUFF signal goes low and the Character Generator resumes the counting and outputting character codes.

The control switches on the Exerciser provide optional tests and printouts. If the Special Character switch (S2) is in the ON position, the load inputs of the Character Generator are low, allowing the outputs to follow the data inputs. Depending on the position of the Character switch (S3), only the USASCII code for an "I" or "H" will be entered into the Character Generator causing I or H tests to be printed. Provided the printer has the lower case character option installed, the Case switch (S4) will lengthen the count of the Character Generator allowing all upper and lower case characters to be printed (Spec Char switch must be off).

Vertical line density is selectable by use of the Line Feed switch (S5). With S5 in the ON position and PCMD active (high), U6-6 steers the Slew FF (U5-1) set. It sets on the next CLØ3 steering Slew B (U1-8) set. At the completion of the current print cycle, HDWB will go low clocking Slew B set and generating SLEW at J2-8. SLEW will remain active until an LCOM (J2-11) is received from the printer. After one line of advance without printing, LCOM clocks the LF CNTR A set, resulting in U7-3 going high. If the Line Space switch (S6) is placed at DOUBLE, the LCOM signal associated with the second line of advance (non-printing) clears LF CNTR A and sets LF CNTR B. The resulting high at Slew A (U5-4) steers the FF clear and it clears on the next CLØ3. When Slew A clears, the low at its Q output appears at the clear input of Slew B. Slew B will clear, disabling the SLEW signal and the paper will cease advancing.

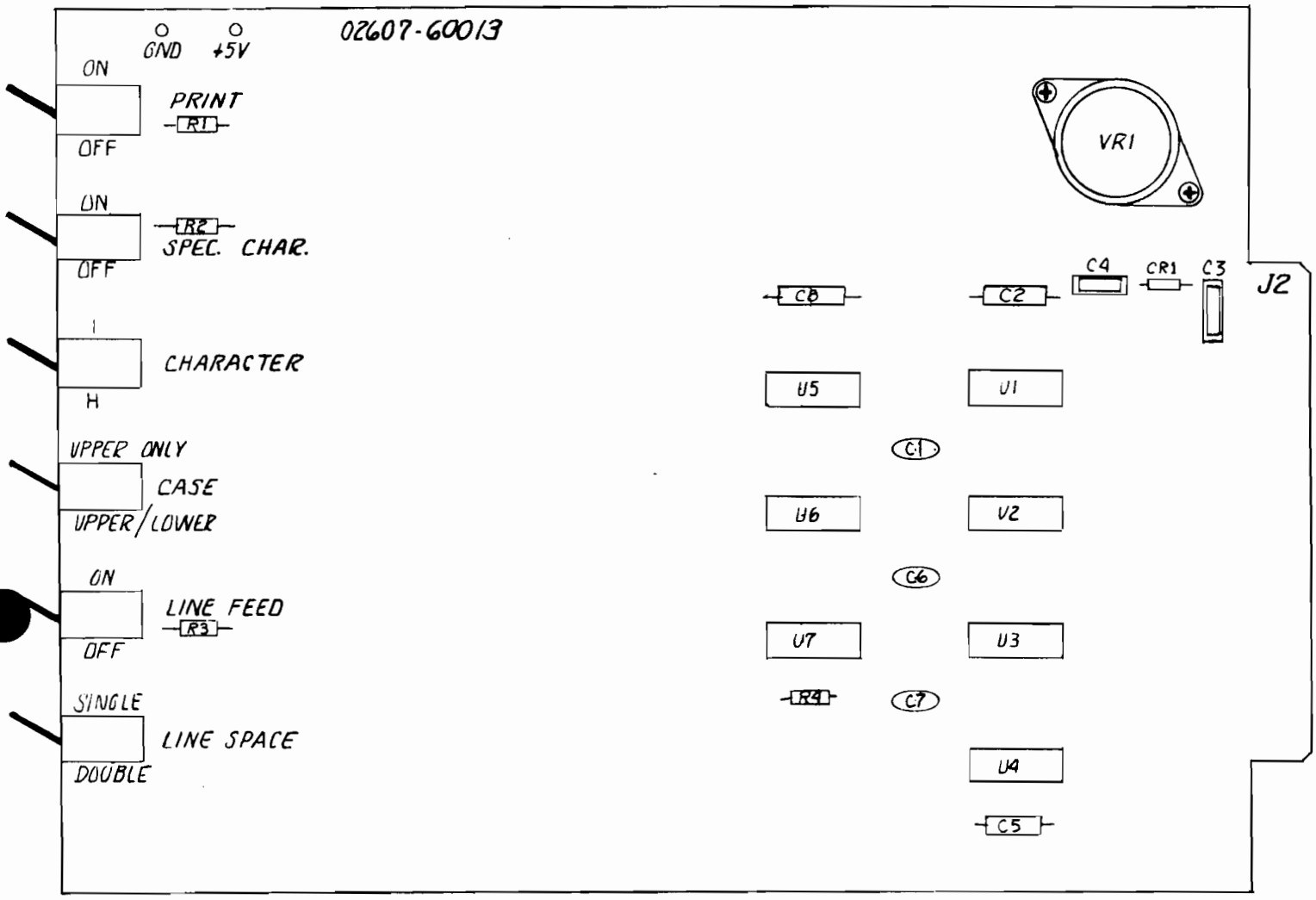

02607-60013
GND
+5V
ON
PRINT
R1
OFF
ON
R2
SPEC. CHAR.
OFF
I
CHARACTER
H
UPPER ONLY
CASE
UPPER/LOWER
ON
LINE FEED
R3
OFF
SINGLE
LINE SPACE
DOUBLE
VR1
C8
C2
C4
CR1
C3
J2
U5
U1
C1
U6
U2
C6
U7
U3
R4
C7
U4
C5

Table B-1. Exerciser PCA(HP made) 02607-60013

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
C1, 6, 7	0160-2055	3	C:FXD .01 ufd 100V	400527-02
C2, 5, 8	0180-0228	3	C:FXD 22 ufd 15Vdc	400342-12
C3,4	0160-0263	2	C:FXD .22 ufd 50V	400955-01
CR1	1901-0711	1	Diode	400698-01
R1-4	0757-0280	4	R:FXD 1K 1% 1/8w	
S1-6	3101-1213	6	Switch, TGL DPST	
U1, 5, 7	1820-0281	3	IC:Digital FF 74107	400195-01
U2	1820-0174	1	IC:Digital INU 7404	400194-01
U3, 4	1820-0765	2	IC:Digital SN 74197	
U6	1820-0511	1	IC:Digital Gate 7408	400190-01
VR1	1820-0430	1	IC:LIN: V. Regulator	400522-01
40	2360-0117	2	Screw: 6-32 .375 Pan	
41	2420-0001	2	Nut: Hex 6-32	
42	3050-0227	2	Washer: Flat .149	
43	0360-0535	2	Pin: Test Pt	
44	0340-0458	1	Insulation: XSTR	
	7124-2099	1	Label	
	02607-80013	1	PCB: Exercisor	

Figure B-2. Exerciser Assembly (HP made)
02607-60013 Parts Location Diagram

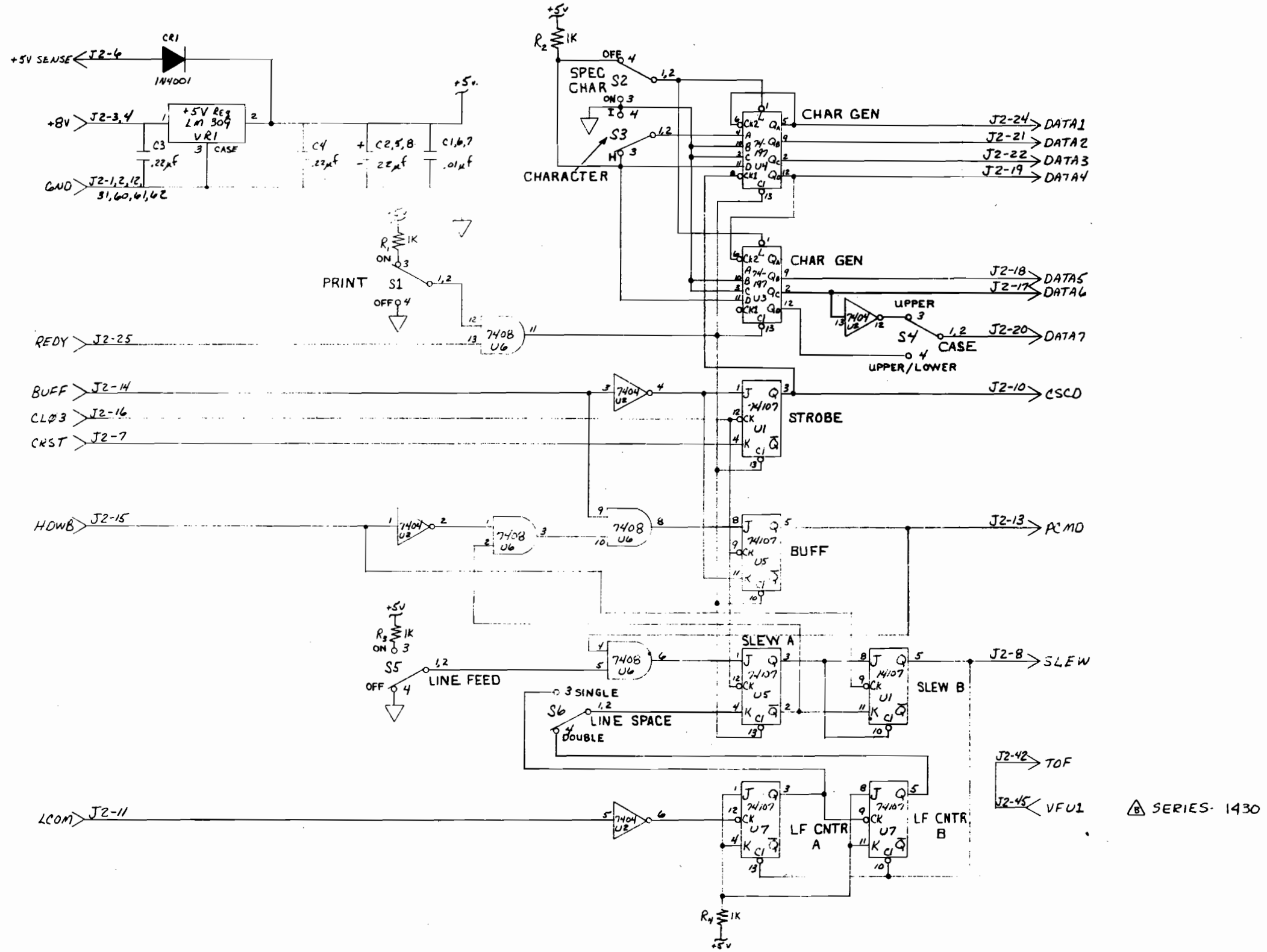


Figure B-3. Exerciser Assembly (HP made)
02607-60013 Logic Diagram

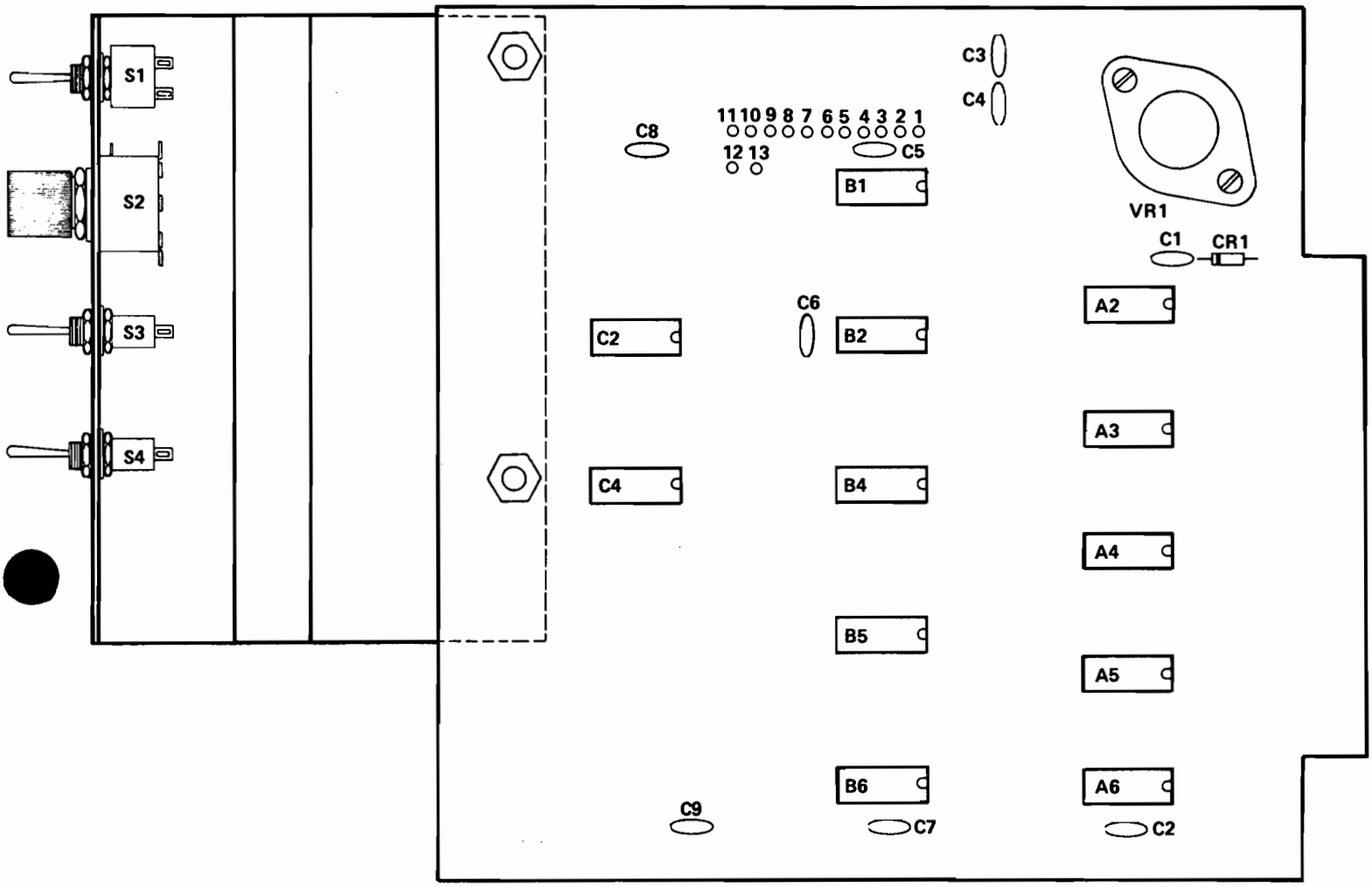

S1
S2
S3
S4
C8
11 10 9 8 7 6 5 4 3 2 1
12 13
C5
C3
C4
VR1
C1
CR1
C6
C2
B1
B2
B4
B5
B6
A2
A3
A4
A5
A6
C4
C9
C7
C2

Table B-2. Exerciser PCA(Tally made) 603865

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
		1	Bracket, Control	603680-1
C2		1	IC: 7400	400106-01
B2		1	IC: 7404	400194-01
A5, 6		2	IC: 7408	400190-01
B1		1	IC: 7410	400173-01
A2		1	IC: 7427	400929-01
B4, 6		2	IC: 7493	400390-01
A3, 4, B5, C4		4	IC: 74107	400195-01
C1, 7, 8		3	C: 0.01 ufd	400527-02
C2, 5, 9		3	C: 22 ufd	400342-12
C3, 4		2	C: 0.22 ufd	400955-01
C6		1	C: 1.5 ufd	400342-21
VR1		1	Regulator, LM 309	400522-01
CR1		1	Diode, 1N4001	400698-01
S1		1	Switch, Toggle	400354-20
S2		1	Switch, Rotary	400570-03
		1	Knob	400571-03
S3, 4		2	Switch, Toggle	400354-09

Figure B-4. Exerciser Assembly (Tally made) 603865 Parts Location Diagram

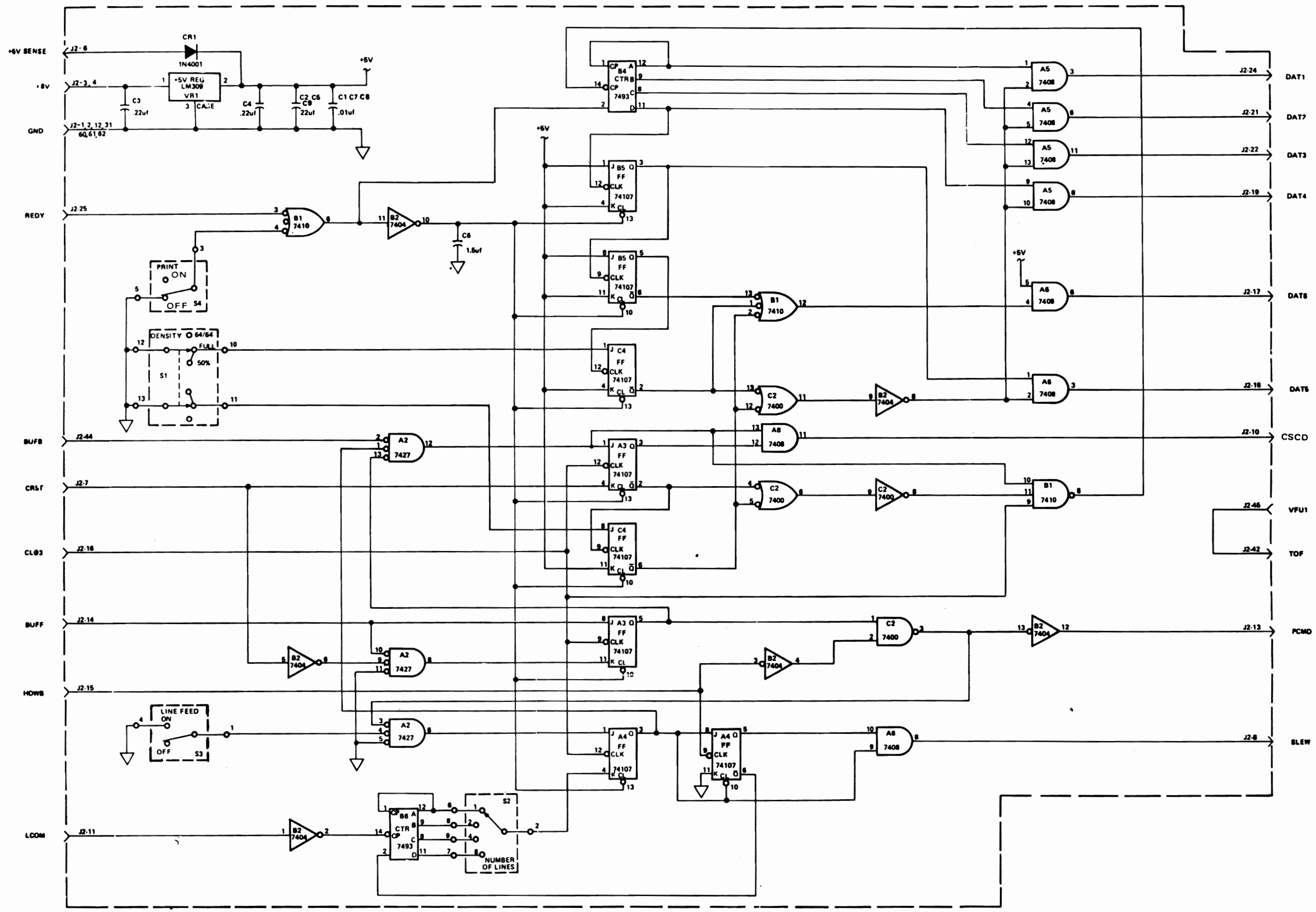


Figure B-5. Exerciser Assembly (Tally made)
603865 Logic Diagram

Change 1
JUL 1975

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change corrects errors in the manual. The line printer prefix serial numbers do not change.

CHANGE INSTRUCTIONS:

1 Page 4-69/4-70, figure 4-24, sheet 1. The output of TB3-7B (zone 7-A) is J27-4; should be J27-14.

2 Page 4-71/4-72, figure 4-24, sheet 2. On the Paper Out switch (S4; zone 4-D) delete "NO" designation and on Platen switch (S12) delete "NC" designation. Add note one: "S4 shown with no paper installed and S12 with platen lever closed,"

3 Page 4-77, table 4-12. Item #65 HP part no. should be 3101-0690 for all serial numbers prefixed prior to 1529.

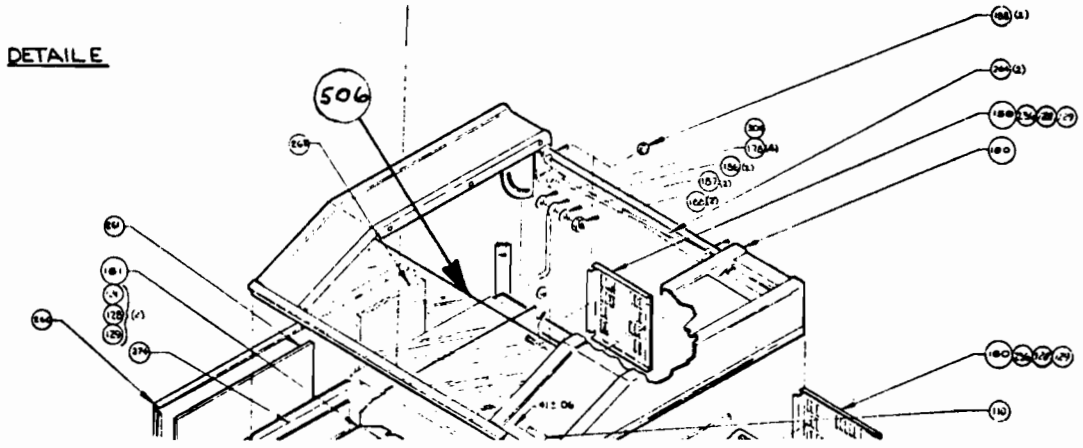
4 Page 4-79, table 4-12. Change quantity of item #235 from 8 to 9. Change quantity of item #236 from 3 to 2.

5 Page 4-87/4-88, figure 4-25, sheet 1. Under item #181 (Power Supply Cover) change item #236 to #235.

6 Page 4-82, table 4-12. Add the following entry.

506	02607-20045	1	Window, plexiglass (Series 1519 and up)	

7 Page 4-87/4-88, figure 4-25, sheet 3. Add reference designation #506 as shown below.



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8 Page 5-15, paragraph 5-28. Add step "j." as follows: "Ensure that the screws holding the eccentrics are re-tightened following any adjustment of the eccentrics."

Change 2
JUL 1975

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

The actuator arm on the Paper Out switch will occasionally get caught in the paper guide or the mylar ribbon guard during operation causing the switch to deactivate. This change to the manual reflects the change to alleviate the problem.

The line printer serial number prefix changes from 1528 to 1529

CHANGE INSTRUCTIONS:

1 Page 4-77, table 4-12. Delete item #59. Change item #65 HP part no. to 3101-2054. Change item #66 HP part no. to 02607-00138. Delete the manufacturer part nos. for items #65 and #66.

2 Page 4-85/4-86, figure 4-25, sheet 2. Delete item #59 (near Paper Out switch).

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Change 3
AUG 1975

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

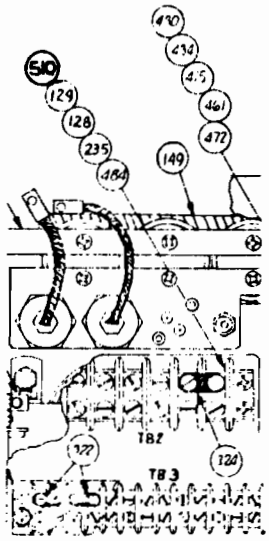
Terminal block TB2 has an open back. Since it mounts to a metal bracket, an insulating strip is required to prevent a long screw from shorting a terminal to the bracket. All HP 2607A Line Printers in the field do have insulating strips installed. This change to the manual assigns a part number to the insulator. The line printer prefix serial numbers do not change.

CHANGE INSTRUCTIONS:

1 Page 4-82, table 4-12. Add the following entry:

510	02607-00141	1	Insulator, terminal block	

2 Page 4-83/4-84, figure 4-25, sheet 1. Add reference designation #510 as shown below.



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Change 4
AUG 1975

Manual Part No.: 02607-90901
Print Date: MAY 1975

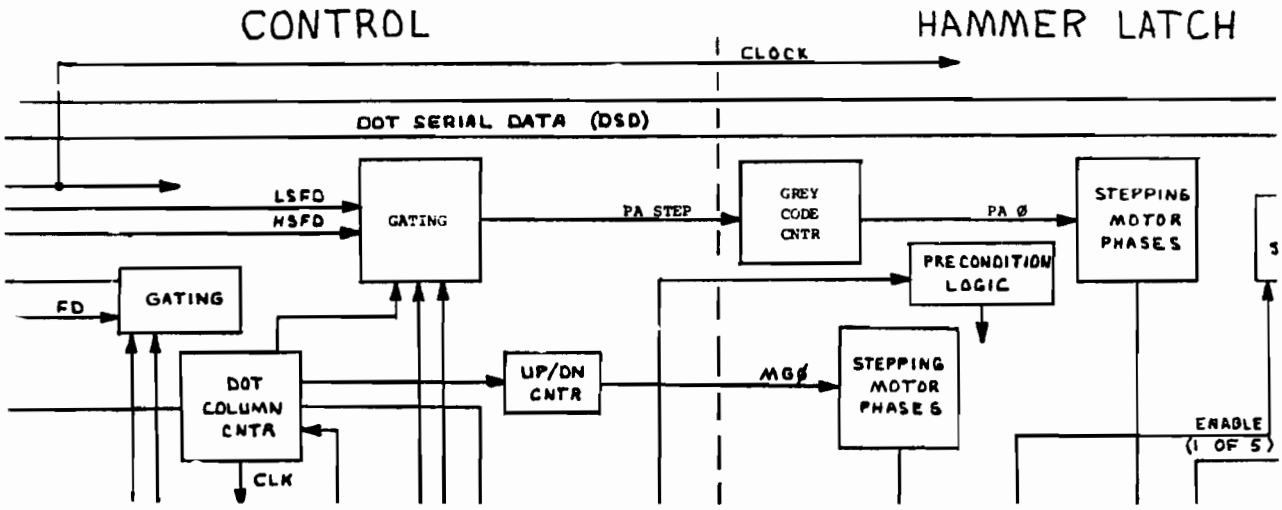
CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: This change corrects errors to the block diagram. The line printer prefix serial numbers do not change.

CHANGE INSTRUCTIONS:

1 Page 4-11/4-12, figure 4-1. Change the block diagram as shown below.



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Change 5
SEP 1975

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: The Motor Driver PCA uses eight Darlington transistors which are mounted with mica washers. These washers were sent with the transistors, but are now purchased separately and require a part number. This change also adds the screws and washers used to hold the heat sink at both ends. The line printer prefix serial numbers do not change.

CHANGE INSTRUCTIONS: Page 4-55/4-56, table 4-10. Add the following entries to the parts list.

2510-0103	2	Screw: 8-32 x 5/16
0340-0450	8	Washer: Mica
2190-0012	2	Washer: Star

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Change 6
OCT 1975

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: This change corrects errors in the manual.

CHANGE INSTRUCTIONS:

1 Page 4-47/4-48, figure 4-14, sheet 2. Connector information at J5-5 (zone C-4) is, "FROM TB3-6, FIG. 4-24, SH. 1". Change to read, "FROM F3-2, FIG. 4-24, SH. 2".

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Change 7
JAN 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change corrects errors in the manual.

CHANGE INSTRUCTIONS:

1 Page 4-57/4-58, figure 4-18. Connector information on pin 16 of the Switch PCB reads: "TO J17-A, figure 4-14, SH. 1" Should read: "TO J17-A, figure 4-6".

2 Page 4-89/4-90, figure 4-26, sheet 1 of 2. Change callout number 29 to 23.

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Change 8
FEB 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: This change corrects errors in the manual.

CHANGE INSTRUCTIONS:

1. Page 4-65, figure 4-22. Reverse the designations for transformers T1 and T3.

2. Page 4-65, figure 4-22. Reverse the order of the pin numbers for TB3. Pin 1 should be pin 14, pin 2 should be 13, etc.

3. Page 4-83, figure 4-25, sheet 1. Reverse the designations for transformers T1 and T3. Index number 481 should be labeled T3, and index number 409 should be labeled T1.

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Change 9
MAR 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change to the manual reflects a change incorporated in the power supply PCA (02607-60008) to improve performance of the +5 volt short-circuit protect circuitry.

The following assembly series number changes:

02607-60008 from 1445 to 1608

The unit serial number prefix changes from 1529 to 1608

CHANGE INSTRUCTIONS:

1 Title page. Add series 1529 and 1608 to the serial number prefix list.

2 Page 4-20, table 4-4. Add series 1608 to the title block. Add (Note 7) by the entry for R11 and R21; at the end of the parts list, add note 7 as follows: "NOTE 7. On PCA's series 1608 or higher, the value of R21 is 3.3K ohms, part number 0683-3325."

3 Page 4-21, figure 4-6. Add series 1608 to the page title block. Near R21 (zone C7) add note 4. At the bottom of the page, add note 4 as follows: "Note 4: For assemblies having a series code of 1608 or higher, the value of R21 is 3.3K ohms."

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Change 10
APR 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: This change notice reflects errors in the manual and additional parts usages for improved reliability.

CHANGE INSTRUCTIONS:

1 Page 4-20, table 4-4. Insert item #44 in the appropriate location in the parts list as shown below.

2 Page 4-55, table 4-10. Insert item #22 in the appropriate location in the parts list as shown below.

3 Page 4-89, table 4-13. Change the part number for item #57 from 02607-20012 to 1530-1877 and change the description to read: "Eccentric, left-hand".

4 Page 4-89. Beside item #57, add "Note 1". In any available space on the page add note 1 as follows: "Note 1: When replacing a left-hand eccentric that has been rivet-mounted, items number 58, 59, and 61 must also be installed."

5 Page 5-5. Delete paragraphs 5-7 and 5-8. Insert new paragraph 5-7 as shown below. There is no replacement for paragraph 5-8.

44	3050-0300	1	Washer, Flat, #4, nylon (attaches Q9)
22	3050-0300	8	Washer, Flat, #4, nylon (attaches Q9-Q16)

5-7. As Required. When print quality deteriorates beyond an acceptable level and can no longer be adjusted or field repaired, replace the print mechanism as explained in paragraph 5-19.

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Change 11
MAY 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change to the manual refects improvements incorporated into the printer for improved reliability.

The following assembly series number changes:

02607-60008 from 1608 to 1622

The unit serial number prefix changes from 1608 to 1622

CHANGE INSTRUCTIONS:

1	Title page. Add "1622" to the list of serial number prefixes.
2	Page 4-19, figure 4-5. Add series 1608 and 1622 to the title blocks at the top and bottom of the page.
3	Page 4-20, table 4-4. Add (Note 8) by the entry for C9 and C10; at the end of the parts list, add note 8 as follows: "Note 8. On PCA's series 1622 or higher, the part number of C9 and C10 is 0160-4323 and the voltage rating is 250 VAC." Delete the manufacturer's part number.
4	Page 4-21, figure 4-6. Add series 1622 to the page title block. Near C9 and C10 (zone B2) delete the voltage ratings of 600V.

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Change 12
JUN 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change to the manual reflects a component change for improved performance of the printer.

The following assembly series numbers change:

02607-60005 from 1417 to 1623
02607-60006 from 1417 to 1623
02607-60008 from 1622 to 1623

The unit serial number prefix does not change.

CHANGE INSTRUCTIONS:

1 Page 4-19, figure 4-5. Add series 1623 to the title blocks at the top and bottom of the page.

2 Page 4-20, table 4-4. Add series 1622 and 1623 to the title blocks at the top of the page. By the entry for Q6, add (NOTE 9) and at the end of the parts list, add note 9 as follows: "NOTE 9. Series 1623 or higher, the Q6 part number is 1854-0626."

3 Page 4-21, figure 4-6. Add series 1623 to the title block.

4 Page 4-49, table 4-9. Add series 1623 to the title blocks (3 places). Add (NOTE 1) by the entry for Q1-132. Insert note 1 on the page as follows: "NOTE 1. Series 1623 or higher, the Q1-132 part number is 1854-0626."

5 Pages 4-51 and 4-53, figure 4-16. Add series 1623 to the page title blocks.

6 Page 4-55, table 4-10. Add series 1623 to all title blocks (3 places). Add (NOTE 1) by the entry for Q1-8. Insert note 1 on the page as follows: "NOTE 1. Series 1623 or higher, the Q1-8 part number is 1854-0626."

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Change 13
JUN 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change to the manual describes the addition of wiring added to the switch assembly for improved performance of the printer.

The following assembly series number changes:

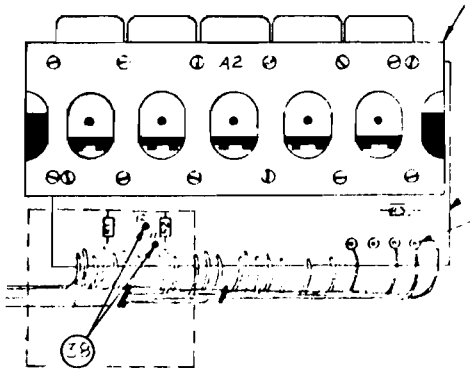
02607-60120 from 1417 to 1624

The unit serial number prefix changes from 1622 to 1627

CHANGE INSTRUCTIONS:

1 Title page. Add 1627 to the list of serial number prefixes.

2 Page 4-57, figure 4-18. On the schematic by pin 12 (PRINT) add: "TO J2-33, FIG. 4-24, SH. 3". By pin 11 on the schematic add: "TO J2-35, FIG. 4-24, SH. 3". On the parts location diagram add the terminals and callouts as shown below.



3 Page 4-57, table 4-11. Add the following entry to the parts list:

38	0360-1813	2	Terminal, Stud		

4 Page 4-73, figure 4-24, sheet 3. Add connections from A2-12 to J2-33(Motherboard) and from A2-11 to J2-35 (Motherboard).

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Change 14
AUG 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: This change to the manual reflects a component change incorporated into the printer for improved reliability. The unit serial number prefix does not change.

The following assembly series number changes:

02607-60008 from 1623 to 1632

CHANGE INSTRUCTIONS:

1. Page 4-19, figure 4-5. Add series 1632 to the upper and lower page titles.

2. Page 4-20, table 4-4. Add series 1632 to the title of the parts list. Add (Note 8) by the entry for C9 and C10; at the end of the parts list, add note 8 as follows: "Note 8. On PCA's series 1632 and higher, the part number of C9 and C10 is 0160-4482 and the voltage rating is 300 VAC."

3. Page 4-21, figure 4-6. Add series 1622 to the page title block.

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Change 15
AUG 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change to the manual reflects component changes incorporated into the printer for improved reliability. The unit serial number prefix does not change.

The following assembly series number changes:

02607-60008 from 1632 to 1634

CHANGE INSTRUCTIONS:

1 Page 4-19, figure 4-5. Add series 1634 to the upper and lower page titles.

2 Page 4-20, table 4-4. Add series 1634 to the title of the parts list. Add (Note 11) by the entries for R15 and R19; at the end of the parts list, add note 11 as follows: "Note 11. On PCA's series 1634 and higher, the value of R15 is 2.4K, HP part number 0683-2425, and the value of R19 is 1.2K, HP part number 0683-1225."

3 Page 4-21, figure 4-6. Add series 1634 to the page title block. Add (Note 5) by R15 and R19 (zone D7). At the bottom of the page, add note 5 as follows: "Note 5. For assemblies having a series code of 1634 or higher, the value of R15 is 2.4K ohm and the value of R19 is 1.2K ohm."

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Change 16
SEP 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

Changes 1, 3-7, 9-11, 14, and 18 are corrections for errata in the manual. Changes 2 and 12 reflect the addition of parts to improve reliability of the printer, and changes 8, 11, 13, 15, 16, and 17 are part number changes brought about by the use of different vendors as suppliers of those parts. The unit serial number prefix does not change.

CHANGE INSTRUCTIONS:

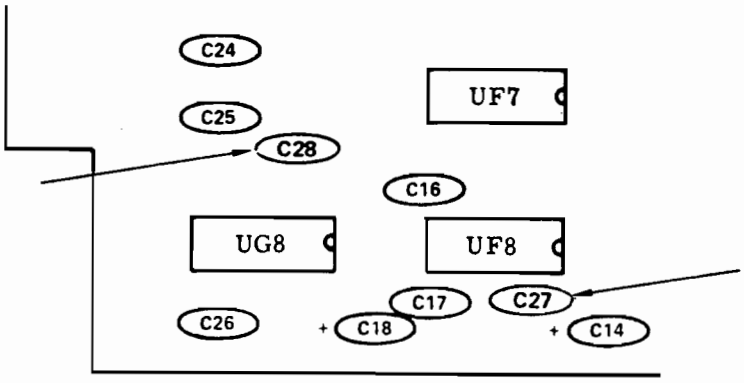
1 Page 4-19, figure 4-5. Delete VR2 from the parts location diagram.

2 Page 4-20, table 4-4. Add the following item to the parts list:

44	0350-0300	1	Washer, Nylon #4 (attaches Q6)

3 Page 4-23, figure 4-7. In the upper-left corner of the parts location diagram there are two capacitors marked C15. Change the capacitor on the right (located nearest R2 and UE1) to C13. Change the polarity marking on C15 to the opposite end.

4 Page 4-23, figure 4-7. Add capacitors C27 and C28 to the parts location diagram as shown below:



5 Page 4-27, figure 4-8B. Reverse the designations for pins 5 and 6 on UE2 (zone C2). The designation on the inverter located between UE2 and UF2 (zone C1) is UF6.

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6 Page 4-29, figure 4-9. Replace this page with page 4-29 marked "Changed 1 August 1976", which is provided with this change notice.

7 Page 4-33, figure 4-10, sheet 2. The bottom connector on the left side of the page is unmarked; it should be marked "J3".

8 Page 4-37, table 4-7. Change the part number of the last entry in the parts list (Jumper: Plug) from 5040-1485 to 0960-0411.

9 Page 4-43, figure 4-13. Replace this page with page 4-43 marked "Changed 1 August 1976", which is provided with this change notice.

10 Page 4-45, figure 4-14, sheet 1. CB TRIP located at J5-33 (zone B1) should be CB TRIP. The output pin of UF8 (zone D2) which is the input to UA8-13 (zone D1) should be labeled pin "8".

11 Page 4-49, table 4-9. Change the part number of J9 from 1251-3903 to 1251-3909. Change the part number of item #38 from 1251-3340 to 1251-4129.

12 Page 4-55, table 4-10. Add the following item to the parts list:

3050-0300	8	Washer, Nylon #4 (attaches Q9-16)	

13 Page 4-57, table 4-11. Change the part number of item #31 from 1251-3340 to 1251-4129.

14 Page 4-75, figure 4-24, sheet 4. Delete the wire from J21-A3 (VFU MODULE, zone C2) to J26-4 (CURRENT SENSOR ASSY, zone B2). This wire is unused.

15 Page 4-79, table 4-12. Change the part number of item #181 from 02607-40043 to 4040-0647. Change the part number of item #224 from 0362-0407 to 0362-0393.

16 Page 4-81, table 4-12. Change the part number of item #423 from 0362-0333 to 0360-0022.

17 Page 4-99, table 4-17. Change the part number of the twin leaf connector from 1251-3340 to 1251-4129.

18 Page 4-45, figure 4-14, sheet 1. Delete the connection between R19 (zone B4) and J9-T. R19 should be shown connected to +5V; CR4 remains connected to J9-T.

Table 4-8. Hammer Latch PCA 02607-60004 (Series 1415, 1417, 1431, 1435)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
UA4	1820-0579	1	IC:Digital, MV 74123	401003-01
UA5, UB6	1820-0068	2	IC:Digital, Gate 7410	400173-01
UA6,UB4,7,UC2	1820-0054	4	IC:Digital, Gate 7400	400106-01
UA7,8,UB8,	1820-0174	5	IC:Digital, INU 7404	400194-01
UC3, UD5				
UB1, UF5	1820-0076	2	IC:Digital, FF 7476	400812-01
UB2	1820-0328	1	IC:Digital, Gate 7402	400192-01
UB3	1820-1185	1	IC:Decade, 74162	400927-01
UB5	1820-0077	1	IC: Digital, FF 7474	400059-01
UC1	1820-0782	1	IC: Digital, Gate 7427	400929-01
UC4	1820-0074	1	IC: Digital, Gate 7454	400920-01
UC5, 6	1820-0762	2	IC: Digital, MX 74157	400948-01
UC7, UD6	1820-0471	2	IC: Digital, INU 7406	400459-01
UC8, UD8, UE8	1820-0537	5	IC: Digital, 7413	400924-01
UF6, 8				
UD1-4	1820-1064	4	IC:Digital, 74164	400921-01
UE1-6,UF1,	1820-0839	7	IC:Digital, FF 74175	400923-01
C1, 2	0160-0263	2	Capacitor: FXD .22uf 50V	400955-01
C3,5-15	0180-0228	12	Capacitor: FXD 22uf 15VDC	400342-12
C4	0180-0309	1	Capacitor: FXD 4.7uf 10 VDC	400342-24
C16	0180-0375	1	Capacitor: FXD 68 uf 20VDC	400342-32
C17, 18	0160-2640	2	Capacitor: FXD .01uf 50 V	400527-02
CR1	1901-0194	1	Diode, PWR 1N4001	400698-01
CR2	1902-0036	1	Diode ZNR 6.19V	400093-40
CR3	1902-3138	1	Diode, ZNR,1N746 (Note 1)	400377-01
CR3	1902-3139	1	Diode, ZNR,1N756 (Note 2)	
CR4	1901-0703	1	Diode, Switching	400860-01
Q1	1854-0215	1	Transistor: NPN Silicon	
Q2	1854-0456	1	Transistor: NPN Silicon	400101-01
R1	0683-3935	1	Resistor: FXD 39K 5% 1/4w	400071-20
R2	0683-1055	1	Resistor: FXD 1M 5% 1/4w	400071-41
R3-6,8,21,22	0683-1025	7	Resistor: FXD 1K, 5% 1/4w cc	400071-01
R7	0686-4715	1	Resistor: FXD 470 ohm 5% 1/2w	400050-42
R9-17	0683-4725	9	Resistor: FXD 4.7K 5% 1/4w	400071-09
R18	0689-4715	1	Resistor: FXD 470 ohm 5% 1w cc	400525-21
R19	0686-1035	1	Resistor:FXD 10K 1/2w	400051-13
R20	0686-3925	1	Resistor:FXD 3.9K 5% 1/2w	400051-08
R23, 25	0683-3025	2	Resistor:FXD 3K 1/4w	
R24, 26	0683-1005	2	Resistor: FXD 10 ohm 5% 1/4w	400070-25
VR1	1820-0430	1	IC, LIN, V. Regulator	400522-01
7	02607-80004	1	PCB: Hammer Latch	602663-1
58	1205-0057	1	Heat Dissipator: TO-3	401039-01
60	2200-0769	1	Screw: 4-40 x 3/8 Pan	400013-08
61	2360-0119	2	Screw: 6-32	400016-05
63	3050-0229	1	Washer: Flat #4	400216-08
64	3050-0227	2	Washer: Flat .149	
66	2260-0009	1	Nut: Hex 4-40	400783-01
67	2420-0001	2	Nut: Hex 6-32	400783-05
70	0360-0535	15	Pin: Test Point	
	8500-0059	0	Chem: Misc	400507-1

NOTE 1. Series codes below 1435.
NOTE 2. Series codes 1435

Figure 4-13. Hammer Latch Assembly 02607-60004 Parts Location Diagram (Series 1415, 1417, 1431, 1435)

Change 17
NOV 1976

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change notice reflects the addition of a new I/O Interface board for improved performance of the printer. Also, corrections for errata are included.

The line printer serial number prefix changes from 1627 to 1648

CHANGE INSTRUCTIONS:

1. Pages v, vi, and vii. Remove these pages from the manual and replace with the changed pages supplied with this notice.

2. Insert pages 4-28A and 4-28B, supplied with this notice, into the appropriate location in the manual. Do not remove any adjoing pages.

3. Page 4-89, table 4-13. Change the part number of item #58 from 2200-0736 to 3030-0208. In the description column, delete the word "Pan" and insert the word "Hex".

4. Page 5-15, paragraph 5-28, step e. Change the reference to the figure number from 5-15 to 5-13.

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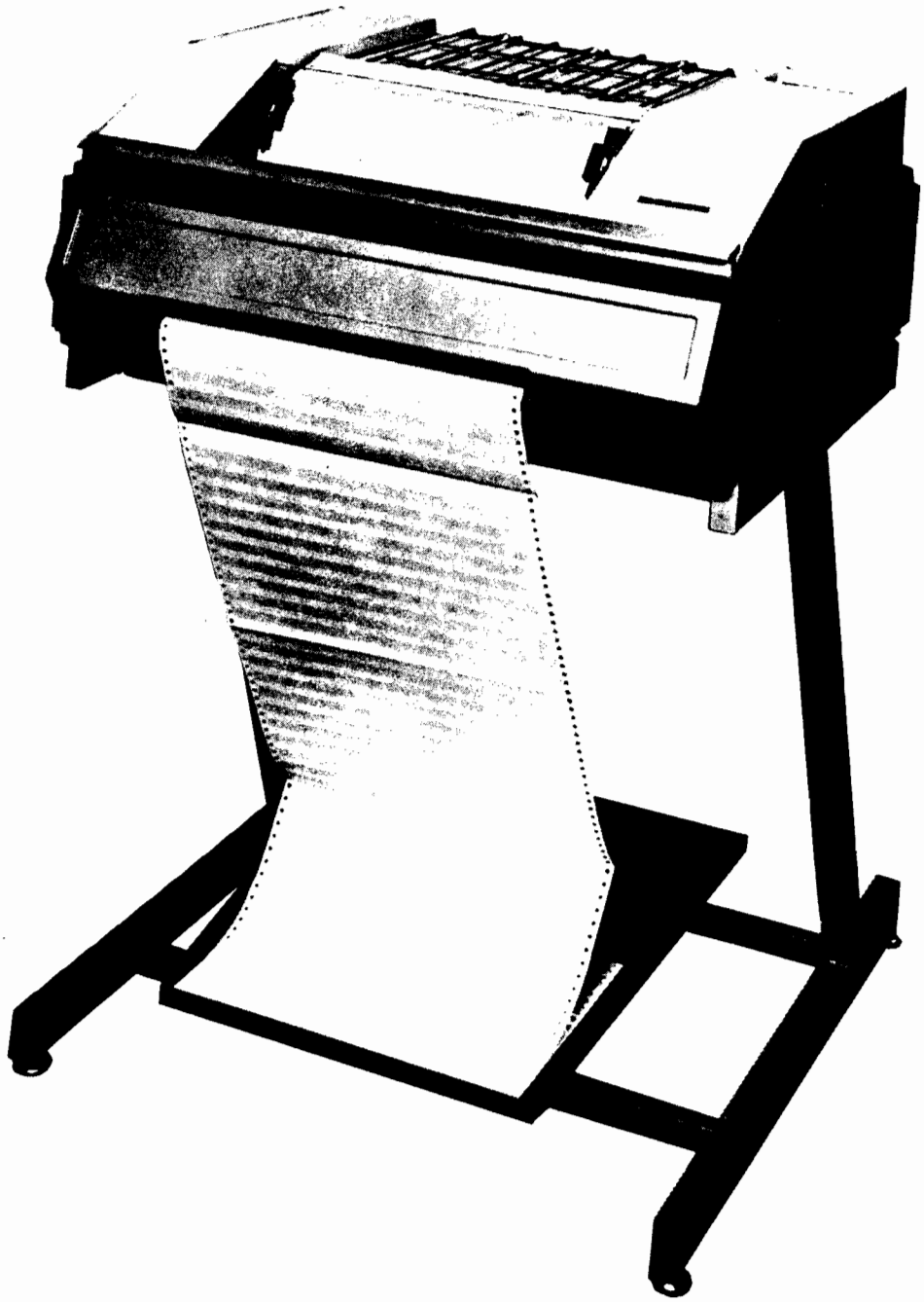


Figure 1-1. HP 2607A Line Printer

Table 4-5A. Interface PCA 02607-60344 (Series 1635)

REF. DES./ INDEX NO.	HP PART NO.	DESCRIPTION
C1-4	0180-0228	CAPACITOR: fxd, 22uf, 15VDC
C5-29,C45-52	0160-2055	CAPACITOR: fxd, .01uf, 100V
C30-34	0160-0263	CAPACITOR: fxd, .22uf, 50V
C35-44	0160-2204	CAPACITOR: fxd, 100 pf, 300V
CR1	1901-0194	DIODE: Power, 1N4001
R1-4	0683-1025	RESISTOR: fxd, 1K, 5%, .25W
UA1-UA5	1820-0721	IC: Digital, DM8820AN
UA6,UA7	1820-0720	IC: Digital, DM8830N
UB1	1820-0545	IC: Digital, Counter, 74191
UB2,UB3,UH5	1820-0839	IC: Digital, FF, 74175
UB4,UC4,UC5, UD4,UE4	1820-0281	IC: Digital, FF, 74107
UB5,UF5,UH7	1820-0328	IC: Digital, Gate, 7402
UB6,UE2,UF3	1820-0174	IC: Digital, Inv, 7404
UC1,UD6,UF1, UF2,UF6	1820-0511	IC; Digital, Gate, 7408
UC2	1820-0205	IC: Digital, MC3003P
UC3	1820-0055	IC: Digital, SN7490N
UC4,UH3,UH4	1820-0076	IC: Digital, FF, 7476
UC6	1820-0068	IC: Digital, Gate, 7410
UD1,UE5	1820-0782	IC: Digital, Gate, 7427
UD2,UD3	1820-0054	IC: Digital, Gate, 7400
UD5	1820-1066	IC: Digital, Gate, 7411
UE1	1820-0063	IC: Digital, Gate, 7451
UE3	1820-0539	IC: Digital, Buff, 7437
UE6	1820-0077	IC: Digital, FF, 7474
UH6	1820-0622	IC: Digital,74151
VR1	1820-0430	IC: Linear, V. Regulator
1	02607-80344	PCB: Interface
2	1205-0057	Heat Dissipator: TO-3
3	2360-0119	Screw: 6-32
4	2420-0001	Nut: Hex, 6-32
5	3050-0227	Washer: Flat, .149
6	8151-0014	Wire: Elec, 24 AWG
	0360-0535	Pin: Test Point
	7124-2099	Label

Figure 4-8C. Interface Assembly 02607-60344
Parts Location Diagram (Series 1635)

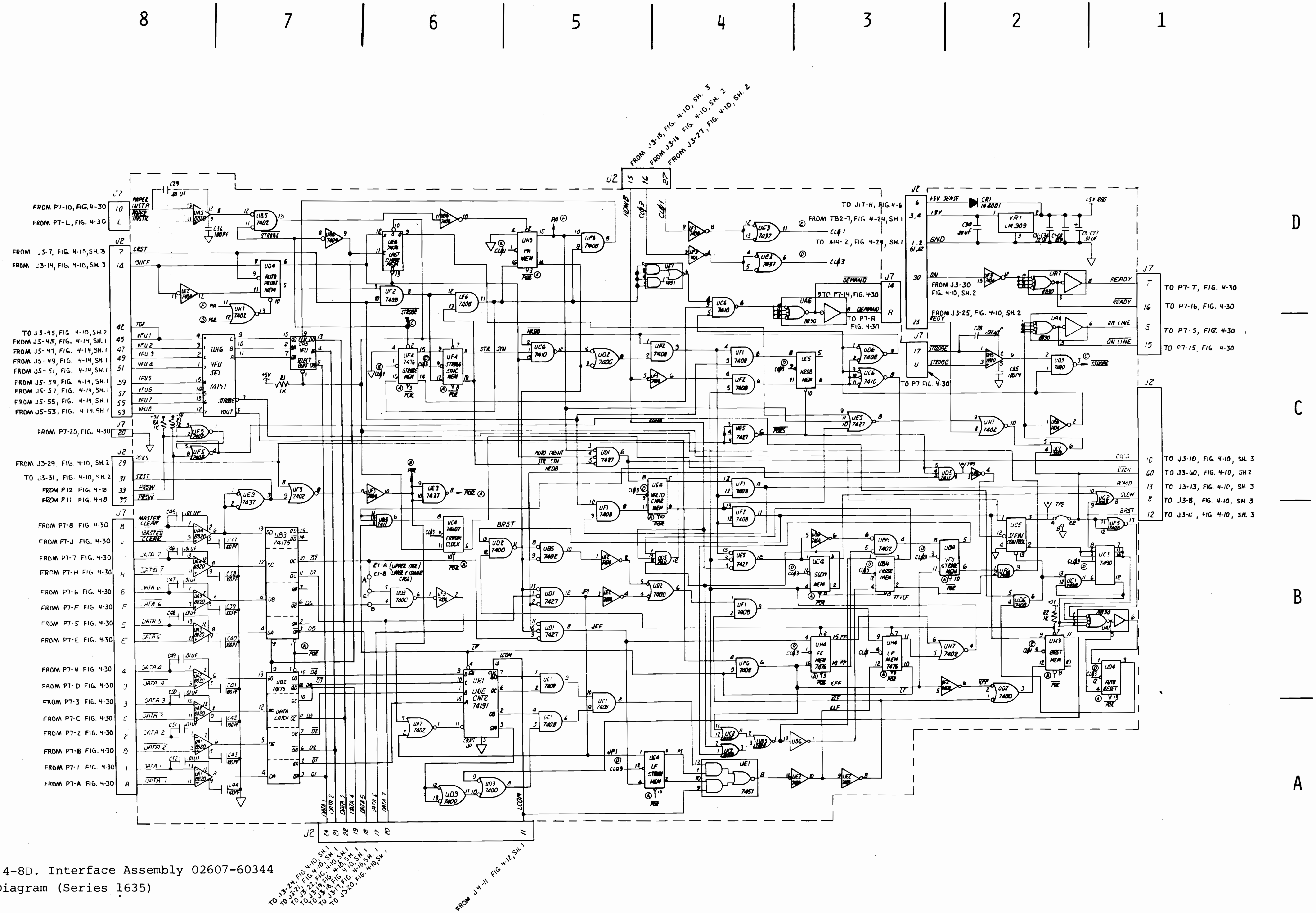
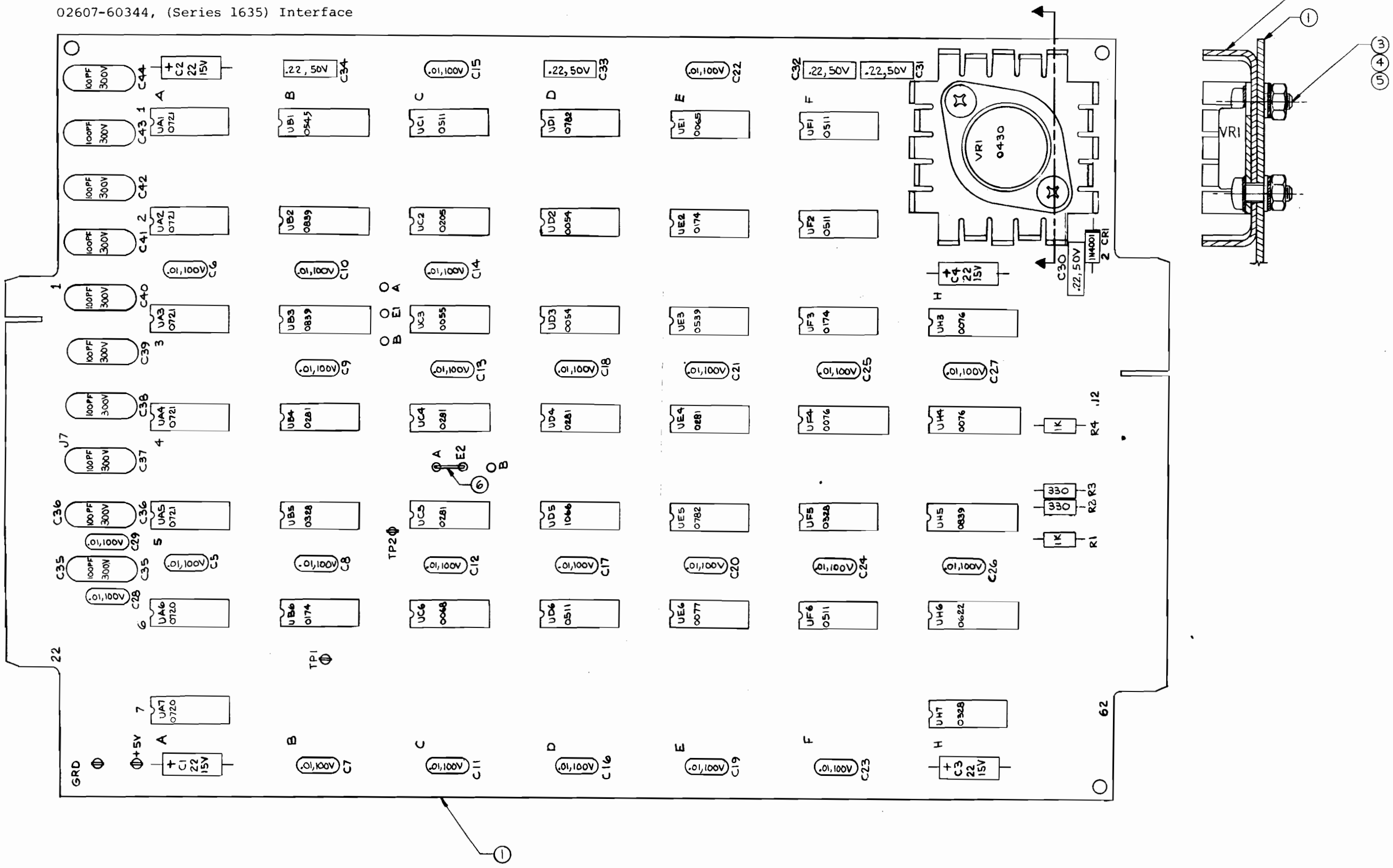


Figure 4-8D. Interface Assembly 02607-60344
Logic Diagram (Series 1635)
4-28B

Added 18 October 1976

02607-60344, (Series 1635) Interface



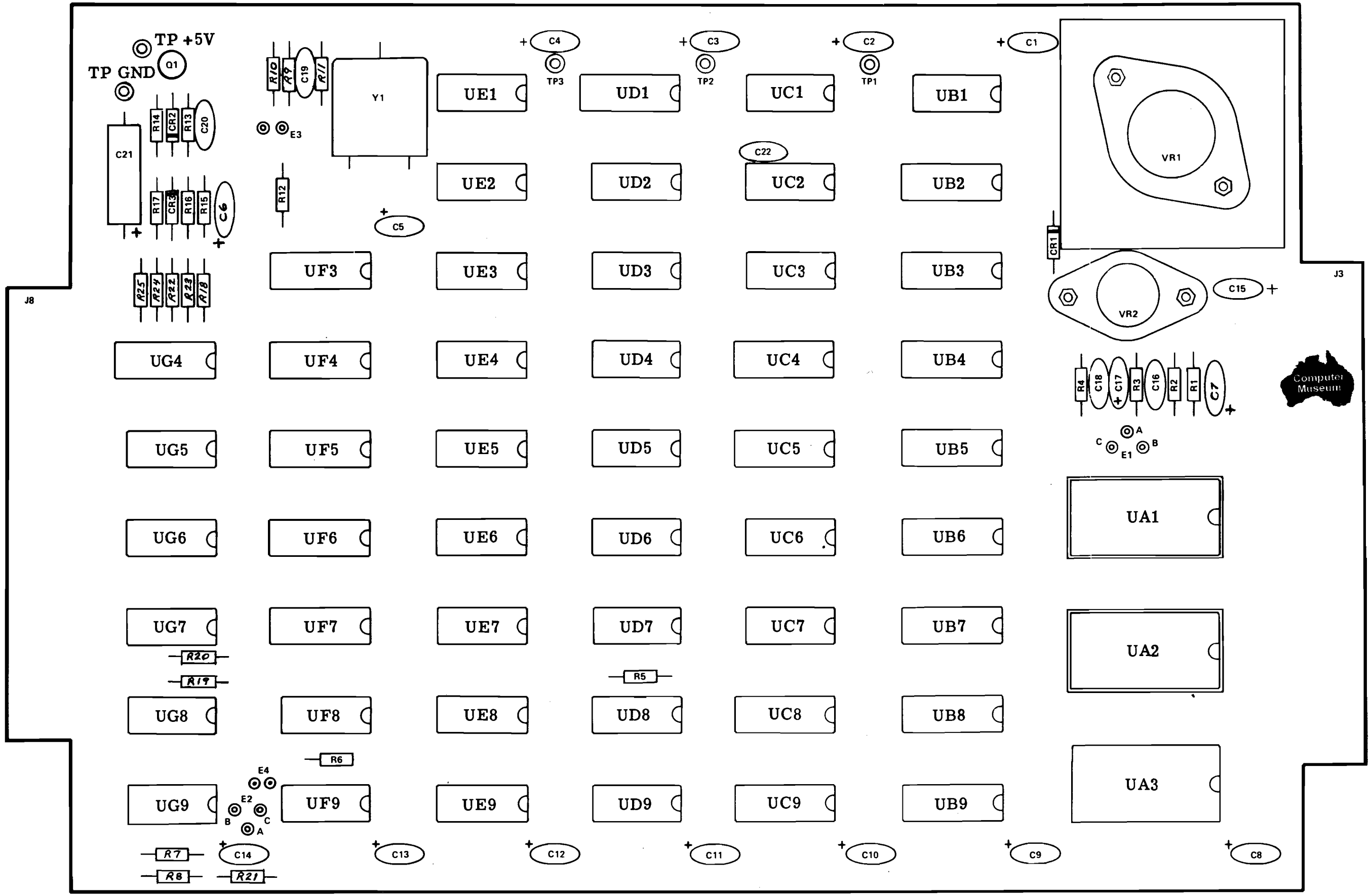


Figure 4-9. Buffer ROM Assembly 02607-60002, 02607-60015, 02607-60337
02607-60338, Parts Location Diagram (Series 1415, 1417, 1446, 1528)

Table 4-6. Buffer ROM PCA 02607-60002, 02607-60015, 02607-60337, 02607-60338 (Series 1415, 1417, 1446, 1528)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
UA1	SEE BELOW		SEE BELOW	
UA2	SEE BELOW		SEE BELOW	
UA3	1820-0640	1	IC: DGTL: MUX 74150	400922-01
A1S, A2S	1200-0433	2	Socket, Elec. IC	401038-01
UB1	1820-0282	1	IC: Digital, Gate 7486	400396-01
UB2-9	1820-1186	8	IC: DGTL, TMS 3113	400925-01
UC1,7, UD2, UE6, 7, UF8	1820-0328	6	IC: DGTL, Gate 7402	400192-01
UC2, UD5, UE4, UE9,UG6	1820-0174	5	IC: DGTL, Gate 7404	400194-01
UC3, 6, UD8 UE2,5,UG4,8	1820-0054	7	IC: DGTL, Gate 7400	400106-01
UC4,5,	1820-0713	2	IC: DGTL, CNTR 74163	400927-01
UC8,9	1820-0839	2	IC: DGTL FF 74175	400923-01
UD1, UF3-7	1820-0076	6	IC: DGTL, FF 7476	400812-01
UD3,9, UG9	1820-0068	3	IC: DGTL, Gate 7410	400173-01
UD4	1820-0069	1	IC: DGTL, Gate 7420	400488-01
UD6	1820-0655	1	IC: DGTL, Gate 7425	400930-01
UD7	1820-0077	1	IC: DGTL, FF 7474	400059-01
UE1	1820-1187	1	IC: DGTL, SP 380	400531-01
UE3, 8	1820-0782	2	IC: DGTL, Gate 7427	400929-01
UF9, UG7	1820-0471	2	IC: DGTL, INU 7406	400459-01
UG5	1820-0537	1	IC: DGTL 7413	400924-01
C1-14	0180-0228	14	Capacitor: FXD 22 ufd 15 Vdc	400342-12
C15	0160-0263	1	Capacitor: FXD .22ufd 50 Vdc	400955-01
C16, 22	0160-4180	2	Capacitor: FXD 1200pfd 100Vdc	400165-01
C17	0180-0499	1	Capacitor: FXD 10 ufd 20 Vdc	400342-04
C18	0160-3667	1	Capacitor: FXD .15 ufd 50 Vdc	400955-03
C19,20	0160-3914	2	Capacitor: FXD .01 ufd 100Vdc	400527-02
C21	0180-0300	1	Capacitor: FXD 20 ufd 16 Vdc	400526-01
CR1, 3	1901-0194	2	Diode: PWR 1N4001	400698-01
CR2	1901-0703	1	Diode: Switching	400860-01
Q1	1854-0215	1	Transistor: NPN Silicon	
R1	0683-6825	1	Resistor: FXD 6.8K 5% 1/4w	400073-21
R2	0757-0758	1	Resistor: FXD 16.2K 1% 1/4w	400665-309
R3	0698-8369	1	Resistor: FXD 2.7 ohm 5% 1/8w	400072-35
R4-6, 11, 12, 16	0683-1025	6	Resistor: FXD 1K 5% 1/4w CC	400071-01
R7,8,13-15 18-25	0683-3315	13	Resistor: FXD 330 ohm 5% 1/4w	400070-43
R9, 10, 17	0683-1035	3	Resistor: FXD 10K 5% 1/4 w	400071-13
VR1	1826-0430	1	IC: LIN: V Regulator	400522-01
VR2	1826-0032	1	IC: LIN: V Regulator	400931-01
Y1	0410-0557	1	Crystal: 1.2288 MHZ	400932-01
24	02607-80002	1	PCB: Buffer ROM	602660-1

Table 4-6(Continued). Buffer ROM PCA 02607-60002, 02607-60015, 02607-60337, 02607-60338 (Series 1415, 1417, 1446, 1528)

REFERENCE DESIGNATION	HP PART NO.	QTY	DESCRIPTION	MFR. PART NO.
43	2200-0141	2	Screw: 4-40 .312 Pan	
44	2260-0009	2	Nut: Hex 4-40	400783-01
51	3050-0227	2	Washer: Flat .149	
53	1205-0057	1	Heat Dissipator: TO-3	401039-01
57	2360-0119	2	Screw: 6-32	400016-05
58	2420-0001	2	Nut: Hex 6-32	400783-05
60	3050-0300	2	Washer: #4 Nylon Flat	
61	0360-0535	5	Pin: Test Point	

SERIES CODE & REF. DES.	ASSEMBLY NUMBER			
	02607-60002	02607-60015	02607-60337	02607-60338
UA1 (All Series)	02607-60017	1816-0349 (CM8050N)	02607-60017	1820-1352 (CM 6660)
UA2(Series Below 1446)	1818-0092 (CM6580)	1818-0092 (CM6580)	1820-1351 (CM6650)	1820-1351 (CM6650)
UA2(Series 1446)	1818-0125 (CM8630)	1818-0125 (CM8630)	1820-1351 (CM6650)	1820-1351 (CM6650)
UA2(Series 1528)	1818-0152 (CM9390)	1818-0152 (CM9390)	1820-1351 (CM6650)	1820-1351 (CM6650)

Change 18
JAN 1977

Manual Part No.: 02607-90901
Print Date: JUN 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

The procedures which accompany this change notice provide improved and simplified instructions for adjustment of the mogator assembly and the platen.

CHANGE INSTRUCTIONS:

1 Use the accompanying Mogator Adjustment Procedure in place of the procedure given in paragraph 5-29, page 5-16.

2 Use the accompanying Platen Adjustment Procedure in place of the procedure given in paragraph 5-28, page 5-15.

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GENERAL INFORMATION

The two mechanical adjustments to the 2607A print mechanism that most seriously affect print quality and paper handling are the mogator and platen adjustments. In the past these adjustments have been almost impossible to do because of inadequate service documentation. The following adjustment procedures should now be used. Note there are two platen adjustment procedures. The HP manufactured print mechanism has adjustment eccentrics on both ends of the platen and the Tally manufactured print mechanism has only one adjustment eccentric on the right side.

MOGATOR ADJUSTMENT PROCEDURE

To prepare the 2607A Line Printer for mogator adjustment, access to these adjustments must be obtained by removing the following items in the order listed: right front corner post, right side panel, right rear panel, right ribbon drive assembly, card cage cover, and card cage. Detailed instructions for removal of these items are given in the 2607A Service Manual (HP part no. 02607-90901). After removal of the card cage, insert an Exerciser printed-circuit assembly (PCA) into the card cage slot normally occupied by the I/O Interface PCA.

If a new mogator assembly is to be installed, attach it as shown in figure 1. Begin the adjustment procedure by loosening the following screws:

Angle screws A and clamp screws B.

Mogator Assembly bracket screws C and N.

Mogator Motor mounting screws E and L.

Mogator rubber bumper screws G and J.

Mogator Motor shaft clamp screw F.

Flexure clamp screw H.

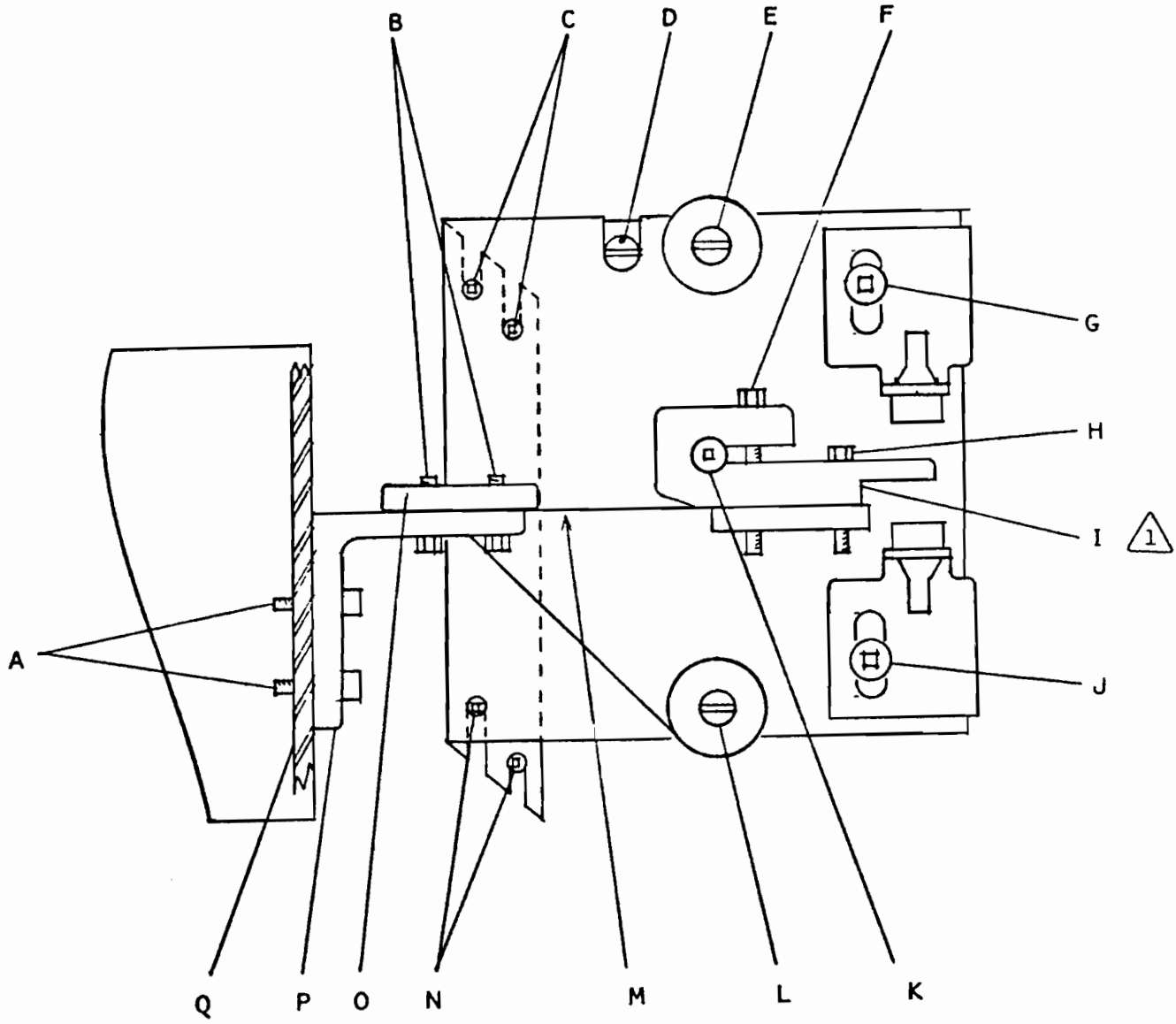
1. Adjust Mogator eccentric D so the dot on the eccentric is pointed directly toward the back of the machine as shown in figure 1.

2. Tighten the Mogator motor mounting screws E and L.

3. Raise Mogator angle bracket P as high as possible on the carriage Q.

4. Tighten Mogator angle screws A only. (Raising angle bracket P in this manner will help provide a little more clearance between it and the top of the Mogator Assembly bracket.)

5. Move the Mogator Assembly forward or backwards as required to ensure Mogator flexure M is straight and sits at a right angle with carriage Q. Tighten Mogator Motor bracket screws C and N.



1 "M" flush to this surface as described in step #6.

Figure 1

6. Slide flexure M left and right as required between the two clamps so that the right side edge of the flexure is flush with surface I of the Mogator Motor shaft clamp. (Refer to figure 1, note 1).

7. Tighten flexure clamp screw H. Ensure that Mogator Motor shaft clamp I clears the top of the Mogator Assembly bracket enough to prevent rubbing during operation.

8. While holding Mogator Motor shaft clamp I stationary with the right hand so that flexure M is straight, move the carriage right or left, as required, with the left hand until the centers of the hammers are aligned with the centers of their corresponding coils (refer to figure 2).

9. Tighten angle clamp screws B. Ensure that clamp 0 clears the top of the Mogator Assembly enough to prevent rubbing during operation.

10. Apply power to the printer. The Mogator Motor shaft K should rotate clockwise to dot column position one. Move the carriage left or right, as required, to align the left side of the hammers with the left sides of their corresponding coils (refer to figure 3). Tighten Mogator Motor shaft clamp screw F.

11. Adjust the front rubber bumper roughly .032 in (.81 mm) from the Mogator Motor shaft clamp I end stop and tighten the front rubber bumper screw J. Remove power from the printer.

12. Ensure that the Exerciser PCA has been installed, then remount the right side ribbon drive assembly, install the ribbon, and replace the nose cone. Load the printer with single-part paper. Press the POWER switch and the PRINT switch on the printer. On the Exerciser PCA set the PRINT switch to ON and the CHARACTER switch to H. Test condition: The carriage assembly shall be mogating and printing H's.

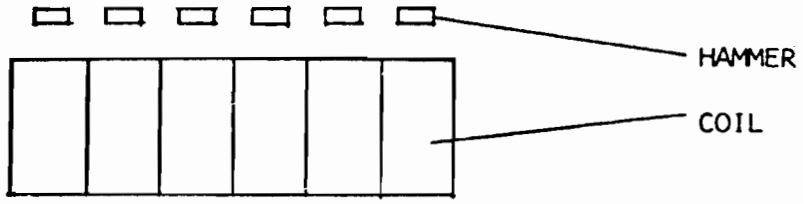
13. Adjust the rear rubber bumper forward or backward as required until the vertical dots in the right side of the character H become straight, then tighten rear rubber bumper screw G. The front bumper controls the straightness of the vertical dots in the left side of the character H. Be careful not to over-adjust the bumpers as this will give the characters a "squashed" or very narrow appearance.

14. Check the printed H's. H's with weak or missing left sides indicate the hammers are sitting too far to the left with respect to their corresponding coils. Loosen mogator mounting screws E and L and turn eccentric D clockwise up to 90 degrees to move the hammers slightly to the right. H's with weak or missing right sides indicate the hammers are sitting too far to the right, in which case eccentric D should be turned counterclockwise up to 90 degrees to move the hammers slightly to the left. Be sure to tighten mogator mounting screws E and L after adjusting eccentric D.

The eccentric adjustment is a fine adjustment. If eccentric D does not provide enough adjustment to bring in weak or missing sides of H's, return it to its original position (dot toward the back of printer) and tighten mogator mounting screws E and L. Set the PRINT switch on the Exerciser PCA to OFF and the PRINT switch on the printer should be off. Loosen clamp screws B. With power applied to the printer (not printing; mogator motor shaft in dot column position one) move the carriage left or right as required to correct for the weak or missing sides of H's. Tighten clamp screws B, being sure enough clearance is provided between the clamp and the top of the mogator assembly bracket. Repeat steps 13 and 14.

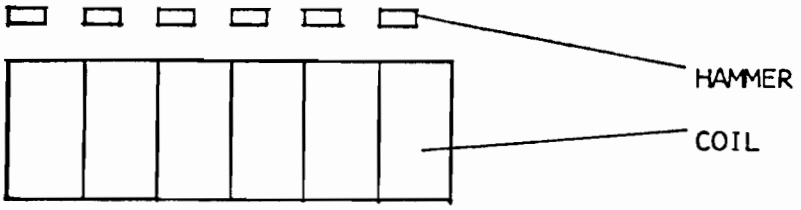
15. With power applied to the printer, set the PRINT switch on both the line printer and the Exerciser PCA to ON. Set the CHARACTER switch on the Exerciser PCA to I. The vertical dots of the character I should be straight and centered; if not, change the jumper(s) (TSA, TSB, or TSC) on the control PCA (HP part No. 02607-60003) to change to mogator timing and straighten the characters (normal: TSB jumpered).

    Ensure that all mogator assembly screws are tightened securely, then reassemble the printer.



CENTERS OF HAMMERS ALIGNED WITH CENTERS OF COILS

Figure 2



LEFT SIDES OF HAMMERS ALIGNED WITH LEFT SIDES OF COILS

Figure 3

PLATEN ADJUSTMENT PROCEDURE
(ADJUSTMENT ECCENTRIC ON BOTH ENDS OF PLATEN)

When deteriorating print quality, characterized by portions of characters dropping out or by hammer drag, indicates platen adjustment is necessary, the following steps should be followed to correct the problem. Before commencing adjustment, the two front corner posts and both side panels must be removed.

1. Set the Forms Thickness Knob to its minimum open position (platen lever in rearmost position, indicator at approximately zero). Using a flat-bladed screwdriver, rotate the eccentrics at both ends of the platen until the dots are pointing downward.

2. Adjust the eccentrics as required on both ends of the platen to obtain a .013 inch (.33 mm) gap between the hammer balls and platen along the entire length of the print mechanism.

3. Install a new ribbon on the printer and insert 15-pound one-part continuous feed paper. While holding down the FORM FEED switch to ensure continuous slewing of the paper, examine the paper for any vertical lines caused by hammer balls dragging. If hammer drag appears only on one side of the paper, adjust the eccentric on the same side as the dragging occurs until it just disappears. If hammer drag appears on both sides, the initial platen gap was set too tight (step #2), or 15-pound one-part paper is not being used.

4. Remove the one-part paper and insert 11-pound six-part paper. Set the Forms Thickness Knob to its maximum open position. (Platen lever in foreward most position.) Hold down the FORM FEED switch to cause continuous slewing. Slowly rotate the Forms Thickness Knob back toward zero until hammer drag appears on one side of the paper. Remember which side hammer drag first appeared and continue rotating the Forms Thickness Knob until hammer drag just appears on the opposite side. Adjust the eccentric on the side that hammer drag <u>first</u> appeared until it disappears, or is equal to, the opposite side.

5. Examine a sample of the six-part paper for print quality improvement. Remove the six-part paper and re-insert one-part paper. Adjust the Forms Thickness Knob to its minimum open position (platen lever in rearmost position), take another print sample and examine it. No further adjustment should be necessary.

6. Hold the eccentrics to keep them from moving, and tighten the screws which mount the eccentrics. Replace the side panels and front corner posts.

PLATEN ADJUSTMENT PROCEDURE
(ADJUSTMENT ECCENTRIC ON RIGHT END OF PLATEN ONLY)

1. Watch the platen lever and adjust the forms thickness knob until the platen lever is in the rearmost position. (The indicator should indicate approximately zero.)

2. Turn the platen eccentric until the dot on the eccentric is pointed down toward the base of the machine.

3. Loosen the platen mounting screws and set the gap from the hammer balls to the platen to .013 inch across the entire platen.

4. Final one part adjustment to the platen is performed with 15 pound one-part paper and a new ribbon installed. Hold the form feed switch down to cause a continuous paper slew. If any hammer balls are dragging, a vertical line will appear on the paper. If there is hammer drag on the left, go back to step 3 as the initial .013 inch gap was probably set too tight. If there is hammer drag on the right, turn the platen eccentric counterclockwise up to 90 degrees until hammer drag just disappears.

5. To further fine adjust the platen, load 11 pound six-part paper. Set the forms thickness knob to its maximum open setting. Again cause the paper to slew by holding the form feed switch down. Slowly turn the forms thickness knob back toward zero, and watch for hammer drag to appear on the left. As soon as hammer drag starts to appear on the left, stop turning the forms thickness knob. If hammer drag first appeared on the right, the platen eccentric should be turned counterclockwise until hammer drag matches the left. If hammer drag has not yet appeared on the right, the platen eccentric should be turned clockwise until hammer drag matches the left.

6. Take a six-part print sample and examine it for print quality. Reload one-part paper and adjust the forms thickness knob until the platen is at its maximum closed position. The indicator should indicate approximately zero. Take a print sample and examine it for print quality. No further adjustment should be necessary.

7. The final step is to tighten the platen eccentric locking screw. The eccentric should be held in position while the locking screw is tightened to prevent the eccentric from moving.

Change 19
JAN 1977

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: This change to the manual reflects a design improvement to the Power Supply printed-circuit assembly to provide better short-circuit protection for the printer.

The line printer serial number prefix changes from 1648 to 1705

CHANGE INSTRUCTIONS:

1 Insert the pages provided with this change notice into the manual. The original pages, v, vi, vii, and 1-0, should be discarded. The pages included with this change notice are as follows:

v, vi, vii, 1-0, 4-22A, and 4-22B.

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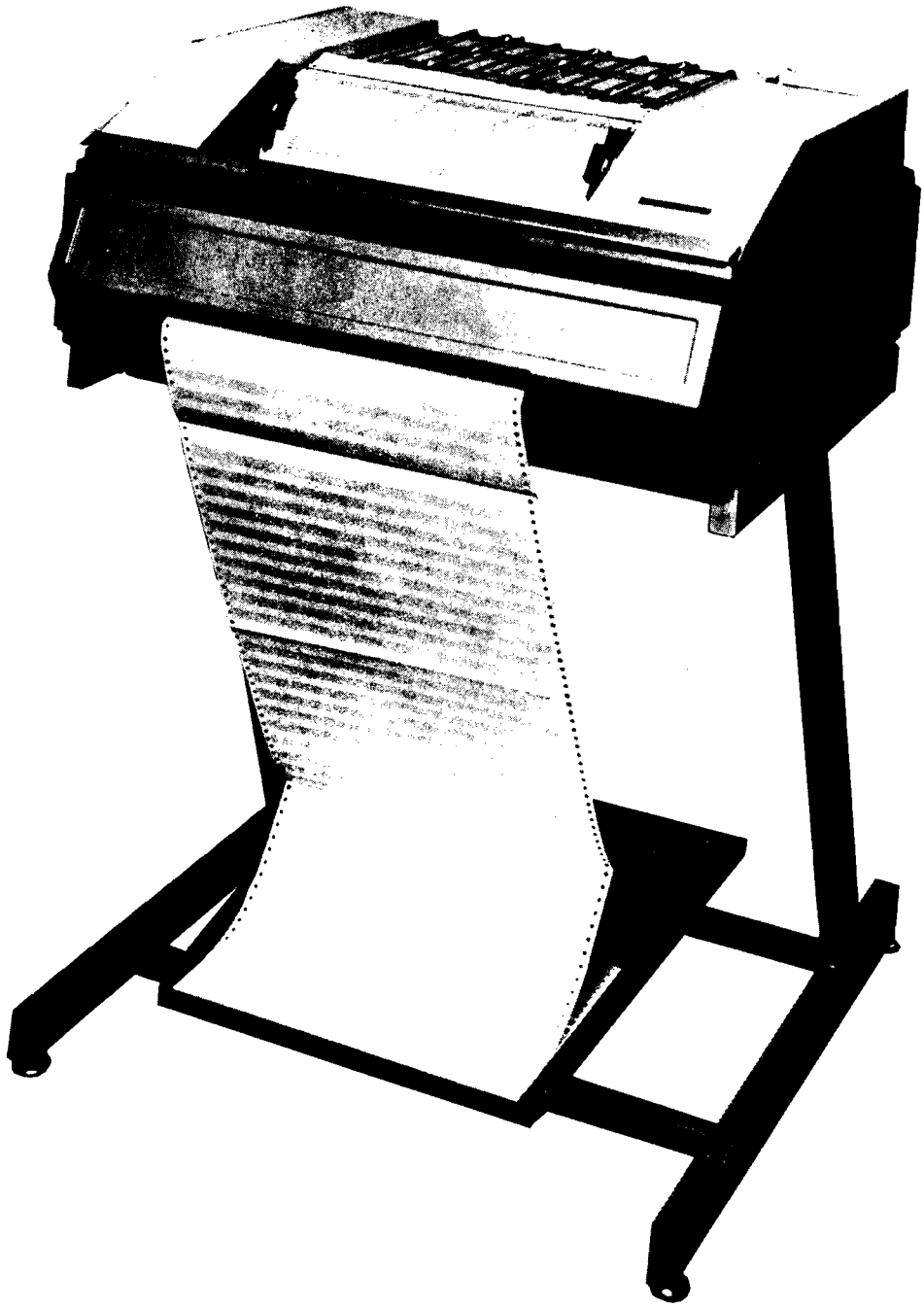

Figure 1-1. HP 2607A Line Printer

Table 4-4A. Power Supply PCA 02607-60008 (Series 1705)

REF. DES./ INDEX NO.	HP PART NO.	DESCRIPTION
C1	0180-0375	CAPACITOR, fxd, 68uf, 35Vdc
C3	0180-2207	CAPACITOR, fxd, 100uf, 10%
C4	0180-0498	CAPACITOR, fxd, 500uf, 50Vdc
C5	0180-0097	CAPACITOR, fxd, 47uf, 35Vdc
C6-8	0160-0263	CAPACITOR, fxd, .22uf, 50V
C9,10	0160-4482	CAPACITOR, fxd, .047uf, 20%
C11-13	0160-4181	CAPACITOR, fxd, .56uf, 600Vdc
CR1,3,7-9, 15,17-20	1901-0704	DIODE, Power, 1N4002
CR2	1902-3002	DIODE, Zener, 2.37V
CR12	1902-1299	DIODE, Zener, 1N4728
J18	1251-2513	CONNECTOR, 12-Contact
J19	1251-2096	CONNECTOR, 15-Contact
K1-4	0490-0560	RELAY
Q1,2,11	1853-0058	TRANSISTOR, PNP, Si, 2N3644
Q4,5,7,8	1854-0246	TRANSISTOR, 2N3643, PL5
Q6	1854-0626	TRANSISTOR, Darlington
Q9	1884-0236	TRIAC, 10A 2N6156
Q10	1884-0237	TRIAC, 30A, 2N6162
R1	0757-0465	RESISTOR, fxd, 100K, 1%, .125W
R2,20	0683-1015	RESISTOR, fxd, 100, 5%, .25W
R3,8,19, 24,25	0683-1225	RESISTOR, fxd, 1.2K, 5%, .25W
R4,16,17	0683-1035	RESISTOR, fxd, 10K, 5%, .25W
R5	0698-3161	RESISTOR, fxd, 38.3K, 1%, .125W
R6	0683-5115	RESISTOR, fxd, 510, 5%, .25W
R9	0683-2225	RESISTOR, fxd, 2.2K, 5%, .25W
R10	0683-2235	RESISTOR, fxd, 22K, 5%, .25W
R11	0683-8225	RESISTOR, fxd, 8.2K, 5%, .25W
R12,21,26	0683-3325	RESISTOR, fxd, 3.3K, 5%, .25W
R14	0698-3136	RESISTOR, fxd, 17.8K, 1%, .125W
R15	0683-2425	RESISTOR, fxd, 2.4K, 5%, .25W
R18	0811-1675	RESISTOR, fxd, 5.6, 5%, 2W
R22	0683-4725	RESISTOR, fxd, 4.7K, 5%, .25W
R28	0811-1764	RESISTOR, fxd, 390, 5%, 2W
R29,32	0686-3915	RESISTOR, fxd, 390, 5%, .5W
R30,31, 33-35	0686-1005	RESISTOR, fxd, 10, 5%, .5W
VR1	1826-0181	REGULATOR, +5V
7	02607-80008	PCB, Power Supply
10	0490-0539	SOCKET, Relay
24	1205-0219	HEAT DISSIPATOR, Shunt
25	1205-0057	HEAT DISSIPATOR, TO-3
26	1205-0288	HEAT SINK
41	2200-0143	SCREW, 4-40, .375 Pan
42	2260-0009	NUT, Lock, 4-40
43	3050-0222	WASHER, Flat, #4
44	3050-0300	WASHER, Flat, 1/4
61	2360-0199	SCREW, 6-32, .438 Pan
63	2420-0001	NUT, Hex, 6-32
77	2950-0135	NUT, Hex, 1/4
78	2190-0421	WASHER, Flat, 1/4
79	2190-0388	WASHER, Lock, 1/4

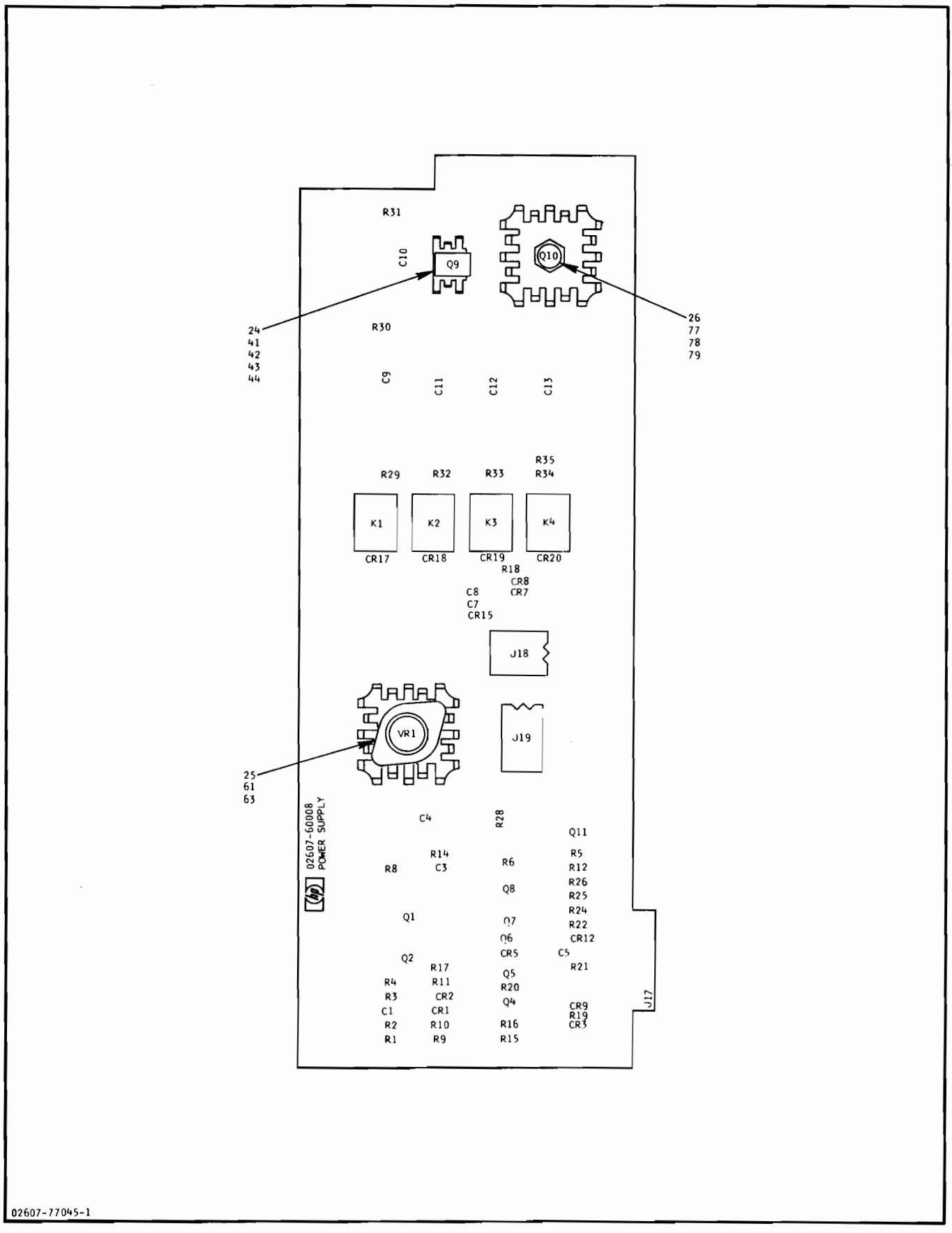

Figure 4-6A. Power Supply Assembly 02607-60008
Parts Location Diagram (Series 1705)

Change 20
FEB 1977

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change to the manual is necessary to point out wiring changes made to the printer when the 02607-60351 series 1705 Power Supply Board is used. The serial prefix of the printer does not change.

CHANGE INSTRUCTIONS:

1 Page 4-69, figure 4-24, sheet 1. On the CAPACITOR BANK ASSY, delete the connection from pin 4 on the A-12 Buss Bar (zone B2) to the ORN/WHT wire, and connect the ORN/WHT wire to pin 4 on the Ø Volt Buss.

2 Page 4-71, figure 4-24, sheet 2. On the POWER SUPPLY BOARD connector P17 (zone C2), change pin 2 (CB TRIP, wht/red wire) to pin 3. At the circuit breaker pin 6 (zone D7), change the output information from A12 C4 to A14 C4.

3 Pages 4-22A and 4-22B. Delete all references to the 02607-60008 assembly number and change the assembly number to 02607-60351. These references are located in the title block and the figure for Figure 4-6A, the title block of the parts list, and the title block of Figure 4-6B.

4 Page v, List of Illustrations. Change the assembly part number in the entries for figures 4-6A and 4-6B from 02607-60008 to 02607-60351.

5 Page vii, List of Tables. Change the assembly part number in the entry for table 4-4A from 02607-60008 to 02607-60351.

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Change 21
MAR 1977

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change to the manual reflects a component change to correct a circuit malfunction which occurs at elevated operating temperatures.

The following assembly series number changes:

02607-60351 from 1705 to 1711

CHANGE INSTRUCTIONS:

1. Page 4-22A. Add series 1711 to the titles for figure 4-6A and table 4-4A. Place an asterisk (*) by the entry for CR1,3,7-9 and add a note at the bottom of the page: On series 1711, CR3 part number is 1901-0734 (1N5818).

2. Page 4-22B. Add series 1711 to the title block and delete the 1N4002 number by CR3 on the schematic.

3. Page v. Add series 1711 to the entries for figures 4-6A and 4-6B.

4. Page vii. Add series 1711 to the entry for table 4-4A.

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Change 22
MAY 1977

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION:

This change to the manual reflects component changes for improved reliability of the printer.

The following assembly series code changes:

02607-60351 from 1711 to 1715

The unit serial number prefix changes from 1705 to 1715

CHANGE INSTRUCTIONS:

1 Page 4-22A. Change the series codes of the titles for figure 4-6A and table 4-4A to 1715. In table 4-4A, reverse the reference designators for R15 and R19 (was R15, should be R19; was R19, should be R15). Change the following entries as indicated:

C3	0180-1714	CAPACITOR, fxd, 330 ufd, 6Vdc
R5	0698-3160	RESISTOR, fxd, 31.6K, 1%, .125W
R14	0757-0442	RESISTOR, fxd, 10K, 1%, .125W

2 Page 4-22B, figure 4-6B. Change the title block to series 1715. Change the following values in the schematic diagram:

COMPONENT	WAS	IS
R19	1.2K	2.4K
R15	2.4K	1.2K
R5	38.3K	31.6K
R14	17.8K	10K
C3	100 MFD, 10V	330 MFD, 6V

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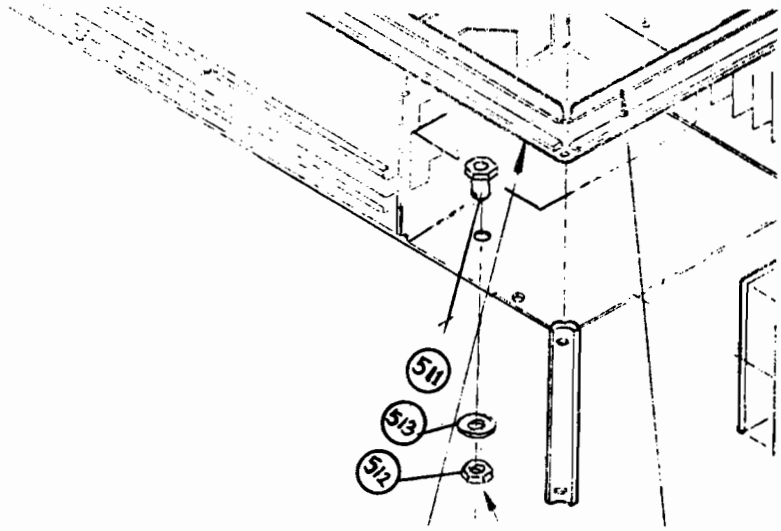
4. Page 4-82, table 4-12. Add the following reference designations:

511	0403-0257	4	Foot
512	2950-0175	4	Hex, Nut
513	2190-0120	4	Washer, Int. Lk.

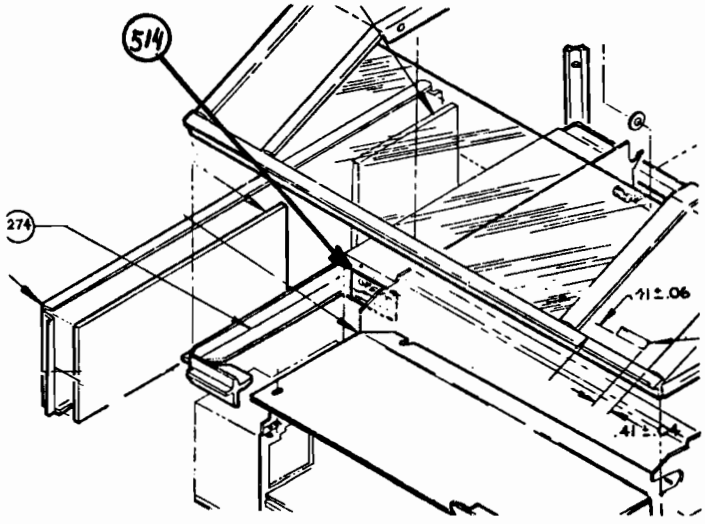
5. Page 4-87/4-88, figure 4-25. Add the reference designations as shown.



6. Page 4-82, table 4-12. Add the following entry:

514	7120-6252	1	Label, Operators

7. Page 4-87, figure 4-25. Add the reference designation as shown below.



Change 23
JUL 1977

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:

HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: This change documents parts and instructions necessary to update the line printer to current standards.

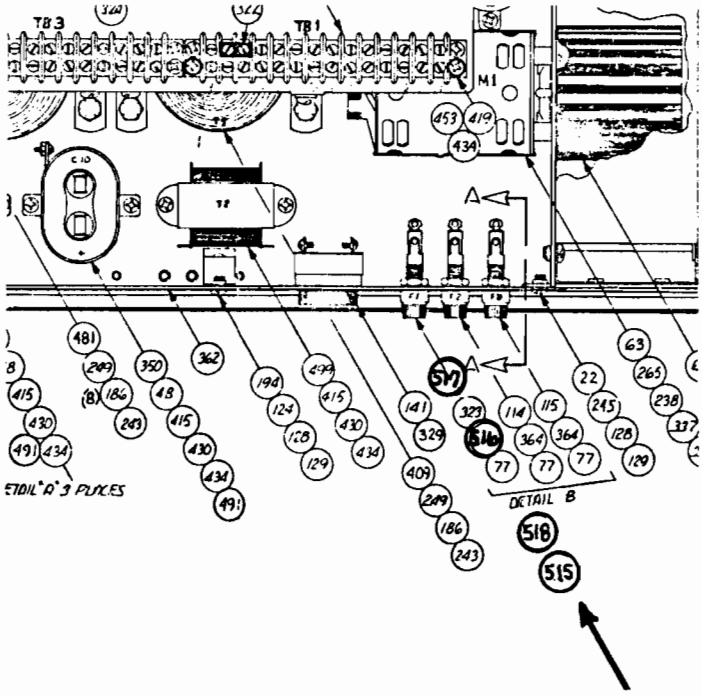
CHANGE INSTRUCTIONS:

1. Page 4-81, table 4-12. Change the quantity of reference designation No. 364 from 3 to 2.

2. Page 4-82, table 4-12. Add the following entries:

515	2110-0465	1	Fuse Holder, Cap
516	2110-0466	1	Washer, Neoprene
517	2110-0467	1	Nut, Hex 1/2x28
518	2110-0470	1	Fuse Holder, Extr. Post

3. Page 4-83/4-84, figure 4-25. Add reference designations as indicated below.



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Printed in U.S.A.

Change 24
OCT 1977

Manual Part No.: 02607-90901
Print Date: MAY 1975

CHANGE TO:
HP 2607A Line Printer
Service Manual

CHANGE DESCRIPTION: This change to the manual reflects component changes for improved performance of the printer.

CHANGE INSTRUCTIONS:

1. Page 4-77 thru 4-81, Table 4-12 General Assembly Parts Lists 2607A. Delete the following entries:

Ref. Des.	HP Part No.	Quant.	Description
2	0400-0065	0	GROM: .125x.250
502	1400-0571	1	CLAMP, Cable 5
231	2200-0155	2	SCREW, 4-40xL Pan
318	2200-0174	5	SCREW, 4-40xL
247	2360-0354	4	SCREW, 6-32x.375 Pan
197	2510-0099	2	SCREW, 8-32x.25 Pan
185	3050-0628	4	WASHER, Flat #4
491	2420-0002		NUT, Hex 6-32

2. Remove the following reference designations and associated parts from Figure 4-25 General Assembly page 4-83/4-84 and 4-85/4-86 - 2, 502, 231, 247 and 491.

3. Page 4-82, Table 4-12 General Assembly Parts List, add the following entries:

Ref. Des	HP Part No.	Quant.	Description
521	2360-0195	4	SCREW, Pan 6-32x.312
522	2190-0011	2	WASHER, Int #10
523	2680-0101	2	SCREW, 10-32x.438

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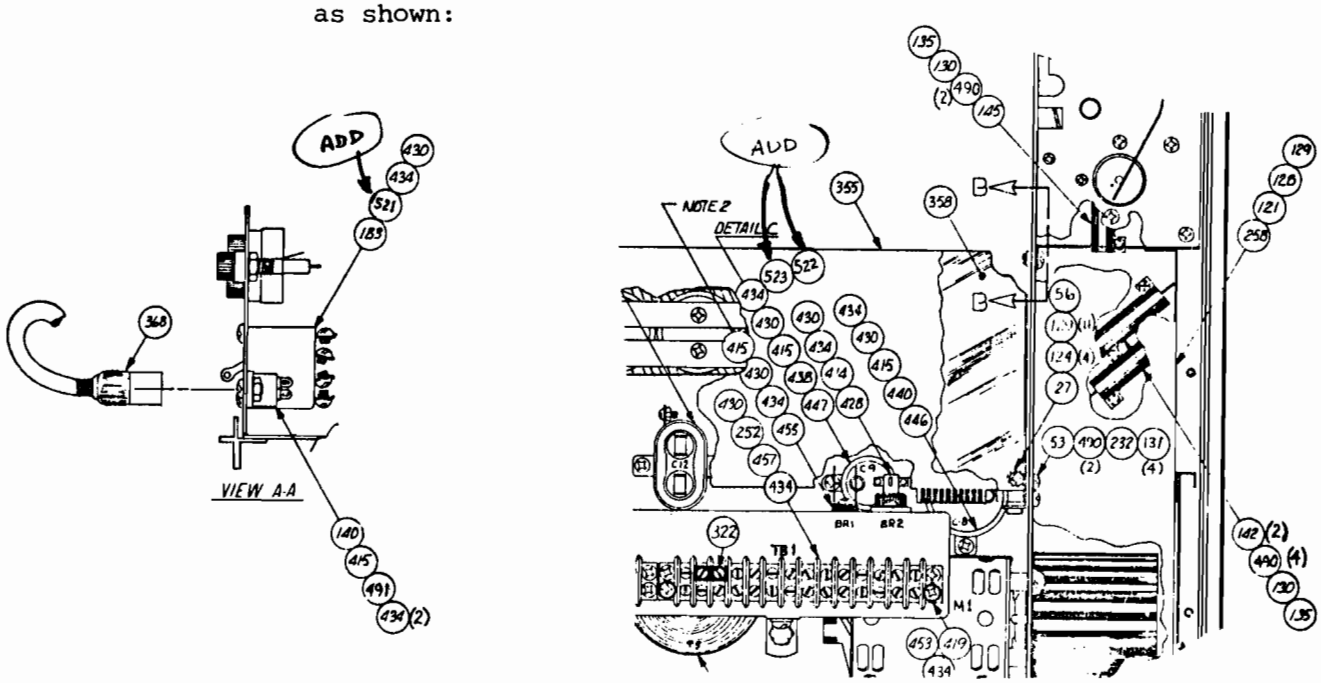
Manual Part No.: 02607-90901
Print Date: MAY 1975

4. Page 4-83/4-84 General Assembly (Sheet 1 of 3), add the reference designators 521, 522, and 523 as shown:



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