

HP 13255

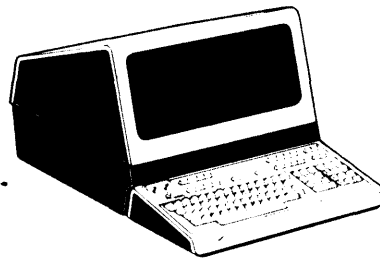
POWER SUPPLY MODULE

Manual Part No. 13255-91004

PRINTED

AUG-01-76

DATA TERMINAL
TECHNICAL INFORMATION



HEWLETT  PACKARD

1.0 INTRODUCTION.

The Power Supply Module generates the following required voltages for the 264XX Data Terminal Product Line: +5 volts at 6 amperes, +12 volts at 1.5 amperes, -12 volts at 1.5 amperes, and -42 volts at 0.6 amperes. Either one of the 12-volt supplies may be loaded to 2 amperes continuously, as long as the other 12-volt supply current is reduced so that the total current from both supplies does not exceed 3 amperes. Parts lists for 02640-60052 and 02640-60003 are contained in module section 13255-91001.

2.0 OPERATING PARAMETERS.

A summary of operating parameters for the Power Supply Module is contained in tables 1.0 through 3.1.

Table 1.0 Physical Parameters

Part Number	Nomenclature	Size (L x W x D) +/-0.100 Inches	Weight (Pounds)
02640-60004	Power Supply PCA	13.4 x 5.8 x 3.6	5.25
02640-60027	Rear Panel Assembly	N/A	N/A
02640-60029	Power Supply Control PCA	3.9 x 3.6 x 1.0	0.25
02640-60052	Mainframe Assembly	N/A	N/A
02640-60083	Cable Assembly	N/A	N/A
02644-60003	Mainframe Assembly	N/A	N/A
Number of Backplane Slots Required: NOT APPLICABLE			

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NOTE: This document is part of the 264XX DATA TERMINAL product series Technical Information Package (HP 13255).

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02640-60083	Cable Assembly	N/A	N/A
02644-60003	Mainframe Assembly	N/A	N/A
Number of Backplane Slots Required: NOT APPLICABLE			

Table 2.0 Reliability and Environmental Information

Environmental: (X) HP Class B () Other:
Restrictions: Type tested at product level
Failure Rate: 1.552 (percent per 1000 hours)

Table 3.0 Connector Information - Power Supply PCA

Connector and Pin No.	Signal Name	Signal Description	
J1&J6, Pin 1	-42V	} Power Connection to Sweep Cable Assembly	
-2	+5V		
-3		} Not Used	
-4	-12V	} Power Connection to Sweep Cable Assembly	
-5	GND		
J2, Pin 1	+5V	} Power Connection to Backplane	
-2	+5V		
-3	GND		
-4	GND		
-5	+12V		
-6	SYS CLK		
-7	-12V		
-8	PWR ON		
-9			} Not Used
-10	GND		
J3, Pin 1	115V LINE	} Connection to Auxilliary Cable Assembly	
-2	NEUTRAL		
-3	GND		
-4	LINE		
J4, Pin 1	LINE	} Power Connection From Rear Panel Assembly	
-2		} Not Used	
-3		} Used	
-4	NEUTRAL	} Power Connection From Rear Panel Assembly	
-5		} Not Used	
-6	RETURN	} Power Connection From Rear Panel Assembly	

Table 3.0 Connector Information - Power Supply PCA (Cont'd.)

J5, Pin 1	GND	Ground
-2		Not Used
-3	+5V	Sense Line From Backplane +5V Output
Pin -4 through Pin -6		} } Not Used }
-7	LOGIC +5V	Power Supply Which Runs Main Supply Logic
Pin -8 through Pin -12		} } Not Used }
-13	SYS CLK	System Clock 4.915 MHz
-14	PWR ON	System Power On
-15	CURRENT SENSE	Sense Line From Primary Current Measuring Transformer
J5, Pin A	+16V	Unregulated Power From Auxillary Supply
Pin -R through Pin -P		} } Not Used }
-R	BASE DR 1	} Outputs Which Run Main
-S	BASE DR 2	} Supply Transistors

Table 3.1 Connector Information - Power Supply Control PCA

Connector and Pin No.	Signal Name	Signal Description
P1, Pin 1	GND	To Power Supply PCA
-2		Not Used
-3	+5V	To Power Supply PCA
Pin -4 through Pin -6		} } Not Used }
-7	LOGIC +5V	To Power Supply PCA
Pin -8 through Pin -12		} } Not Used }
-13	SYS CLK	} }
-14	PWR ON	} To Power Supply PCA }
-15	CURRENT SENSE	} }
P1, Pin A	+16V	To Power Supply PCA
Pin -R through Pin -P		} } Not Used }
-R	BASE DR 1	} } To Power Supply PCA }
-S	BASE DR 2	} }

- 3.0 FUNCTIONAL DESCRIPTION. Refer to the module block diagram (figure 1), schematic diagrams (figures 2 and 3), timing diagram (figure 4), component location diagrams (figures 5 and 6), and parts lists (02640-60004, 02640-60027, 02640-60029, and 02640-60083) located in the appendix.

As shown in the block diagram, the Power Supply Module consists of two printed-circuit assemblies, the Power Supply PCA and the Power Supply Control PCA.

3.1 POWER SUPPLY PCA.

The Power Supply PCA contains all of the high-level electronics of the power supply. This assembly connects to the power line through the terminal Rear Panel Assembly and supplies power to the terminal data bus and Sweep PCA.

3.1.1 Line Rectifier.

The line rectifier block connects to the power line and rectifies and filters the incoming ac power. The Line Voltage Select Switch (S1B) configures the rectifier either as a voltage doubler (115-volt operation) or as a bridge rectifier (230-volt operation).

3.1.2 Logic Power Supply.

The logic power supply block also connects directly to the power line. Its function is to provide power to the Power Supply Control PCA and driver transistors in the chopper block. The logic power supply has two outputs, +16 volts unregulated and +5 volts regulated.

3.1.3 Chopper.

The chopper block contains two power transistors (01,02) and two driver transistors (03,04). The driver transistors are driven by alternating pulses which come from the Power Supply Control PCA. The function of the chopper block is to chop the dc output from the line rectifier block and apply the chopped signal to the power supply main transformer (T2). The basic power supply regulation takes place during this chopping operation as the average output voltage is proportional to the width of the alternating pulses applied to the chopper. Current sensing also takes place in this block and is applied to a current limit circuit on the Power Supply Control PCA.

3.1.4 Choke Input Power Supplies.

This block contains four independent choke input power supplies. In each, the pulse output of the power transformer is rectified and applied to a filter choke and then to a filter capacitor. The output voltages are as shown on the block diagram in figure 1. Note that only the +5 volt supply is sensed and regulated by the Power Supply Control PCA. The other voltages track the sensed supply and are kept within their accuracy tolerances without actually being sensed and regulated independently.

3.2 POWER SUPPLY CONTROL PCA.

The Power Supply Control PCA contains the low-level logic of the power supply. It generates the System Clock (SYS CLK) signal, senses and regulates the +5 volt power supply output, limits the power supply primary current, and shuts down the supply if the power line voltage drops below the minimum line voltage specification (86.5 V).

3.2.1 Low Line Detector.

The low line detector senses the power line voltage by sensing the +16 volt supply which is proportional to the line voltage. If this voltage drops below +11 volts (line voltage of 86 volts) the low line detector shuts off the circuit that drives the chopper on the Power Supply PCA and therefore shuts down the power supply.

3.2.2 Current Limit.

The current limit block senses primary current of the main power transformer and shuts off the chopper if the current becomes excessive. Both the current limit and low line detector include a timer which attempts to restart the power supply once per second so that the power supply will restart itself if the fault condition is corrected.

3.2.3 Base Drive Steering.

This block takes the output pulses from the voltage variable one-shot and causes them to alternate between the two drive lines which go to the chopper. These signals cause the chopper transistors to be alternately turned on. The base drive steering circuit is also designed to

guarantee that both the chopper transistors can never be turned on at the same time, and in fact, guarantees a delay of 2 microseconds between one turning off and the next one turning on.

3.2.4 Voltage Variable One-Shot.

This block accepts the error correction voltage from the regulator block and outputs a pulse which varies from about 5 microseconds to 18 microseconds depending on the value of the correction voltage. The repetition rate of the pulse is 50 KHZ and is triggered by the output of the divide-by-100 block.

3.2.5 Regulator and Power On Reset.

This block senses the +5 volt supply on the Power Supply PCA and generates a correction voltage which is applied to the voltage variable one-shot block. The control which adjusts the output voltage of the supply is located in this block. The Power On (PWR ON) signal is a logic line that is held low until about 100 milliseconds after the +5 volt supply comes up. Power on reset will occur whenever the +5 volt supply goes low and then recovers (e.g. after a current limit condition).

3.2.6 4.915 MHz Oscillator.

The 4.915 MHz oscillator is a crystal oscillator which generates the System Clock (SYS CLK) signal that is buffered by a driver gate and applied to the logic bus.

3.2.7 Divide-By-100.

This block divides the System Clock signal by 100 in order to make a usable clock rate for the power supply.

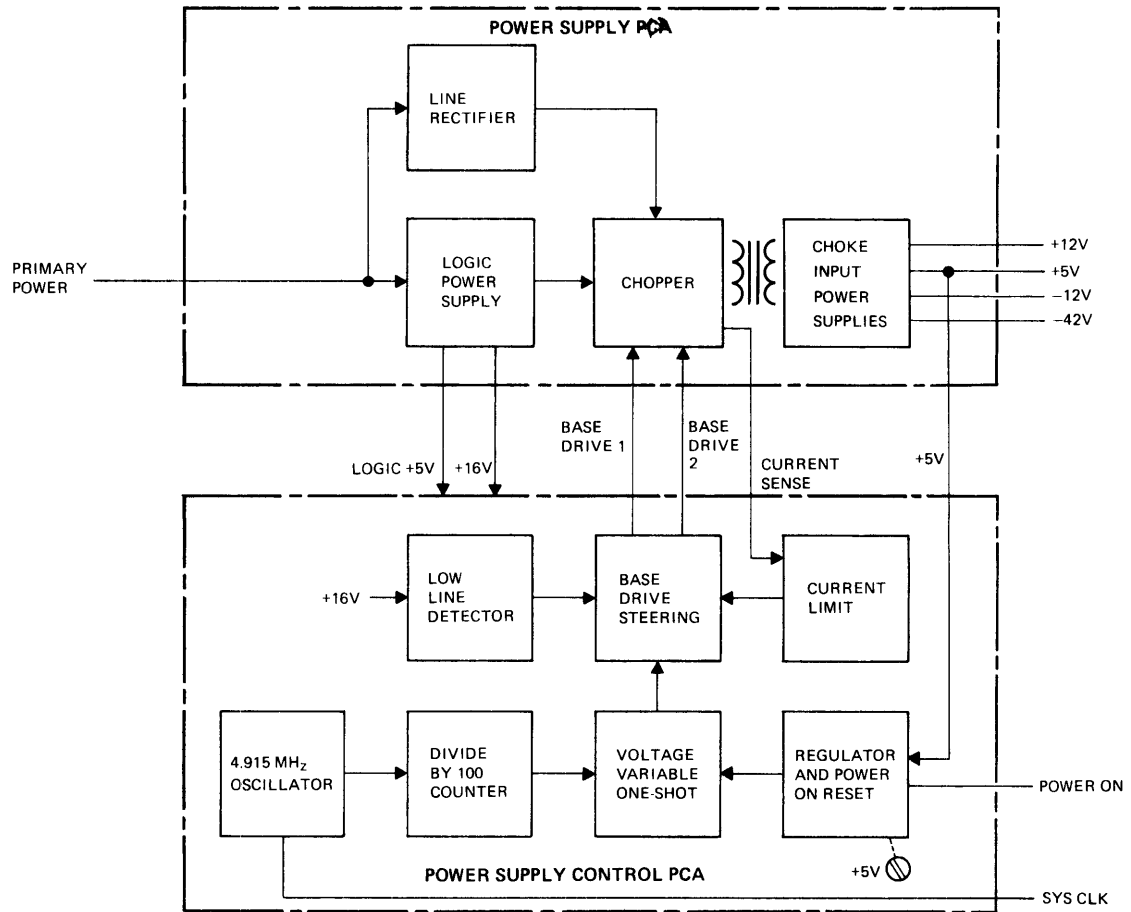


Figure 1
 Power Supply Module Block Diagram
 AUG-01-76 13255-91004

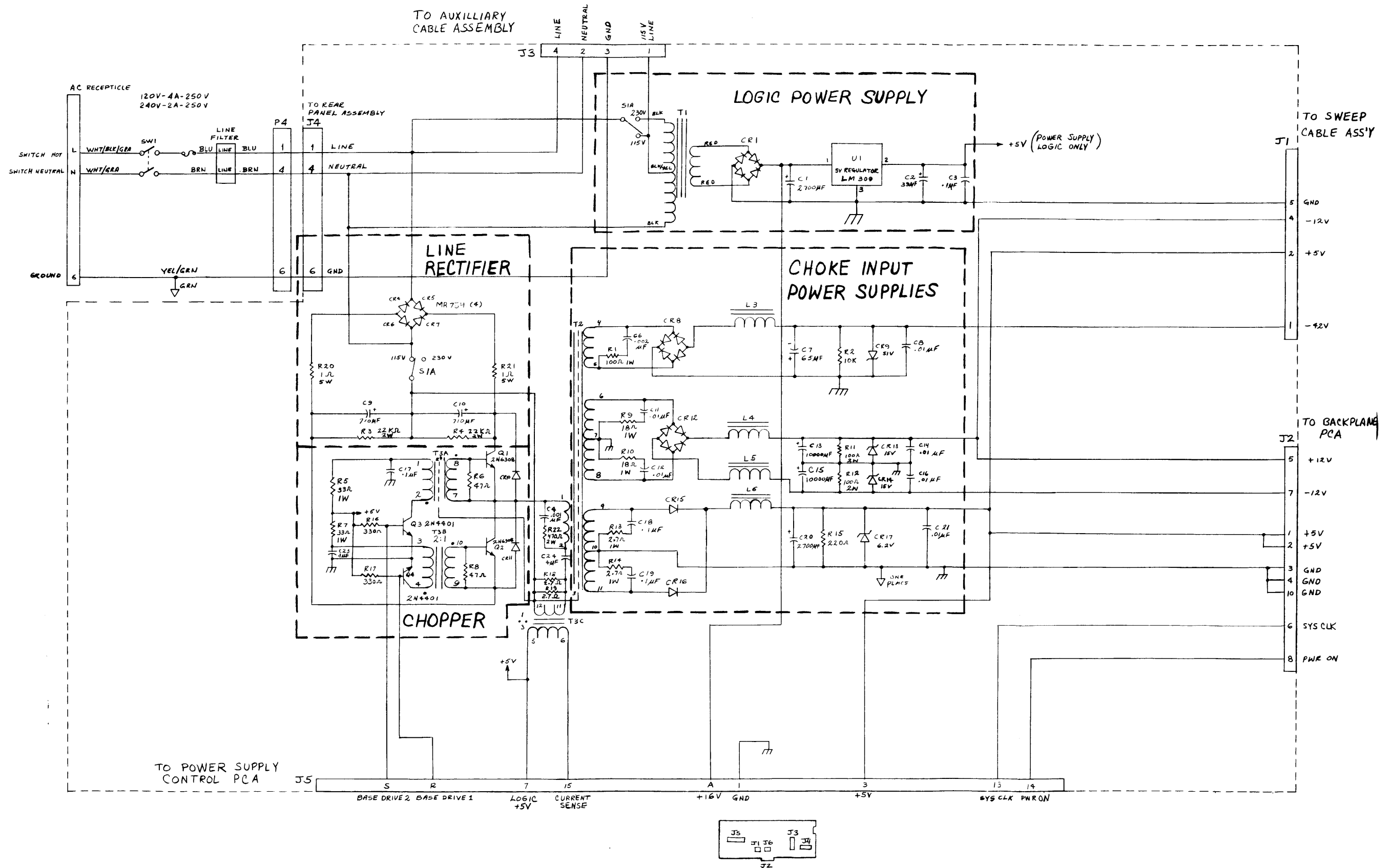


Figure 2
 Power Supply PCA Schematic Diagram
 AUG-01-76 13255-91004

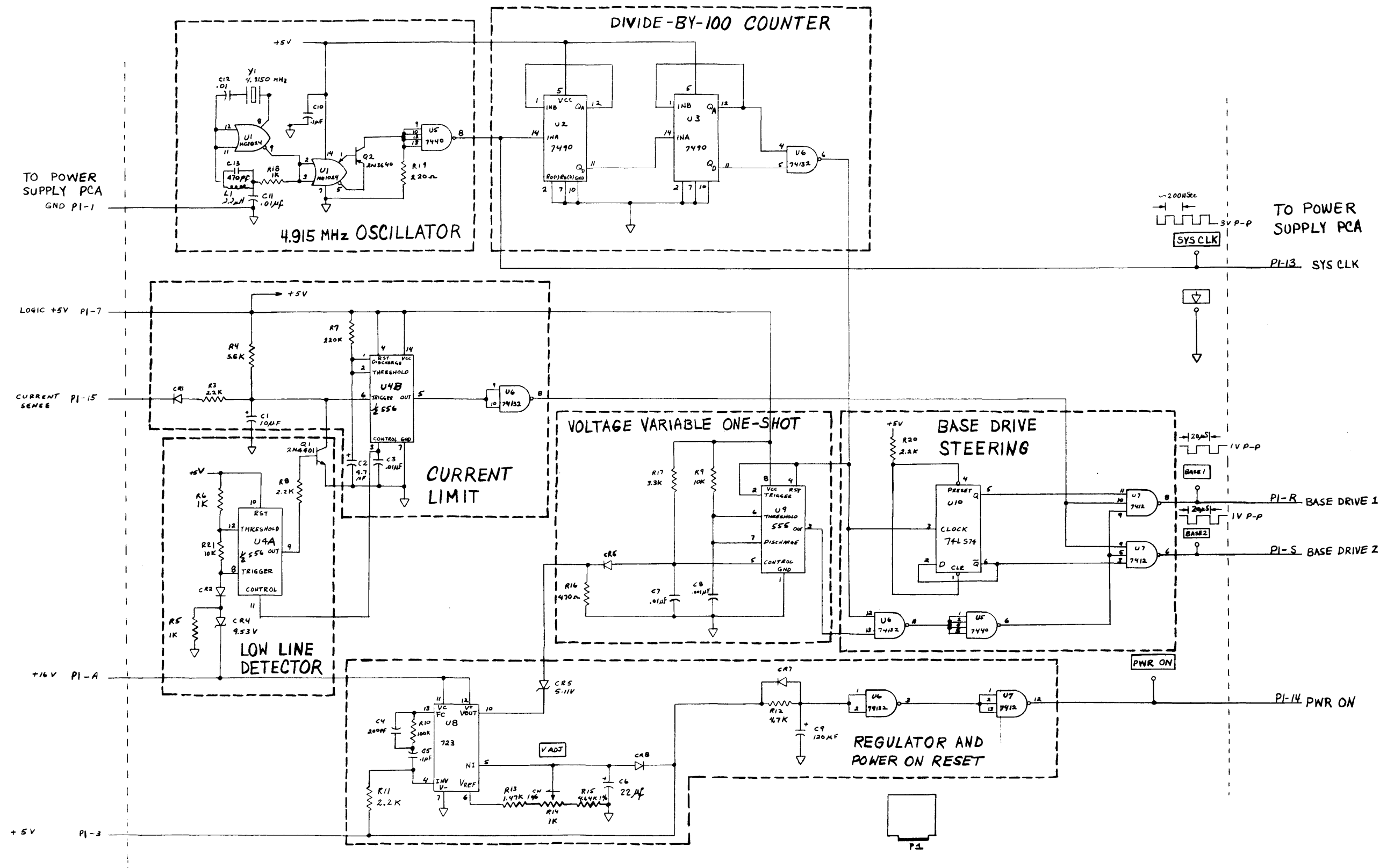


Figure 3
 Power Supply Control PCA Schematic Diagram
 AUG-01-76 13255-91004

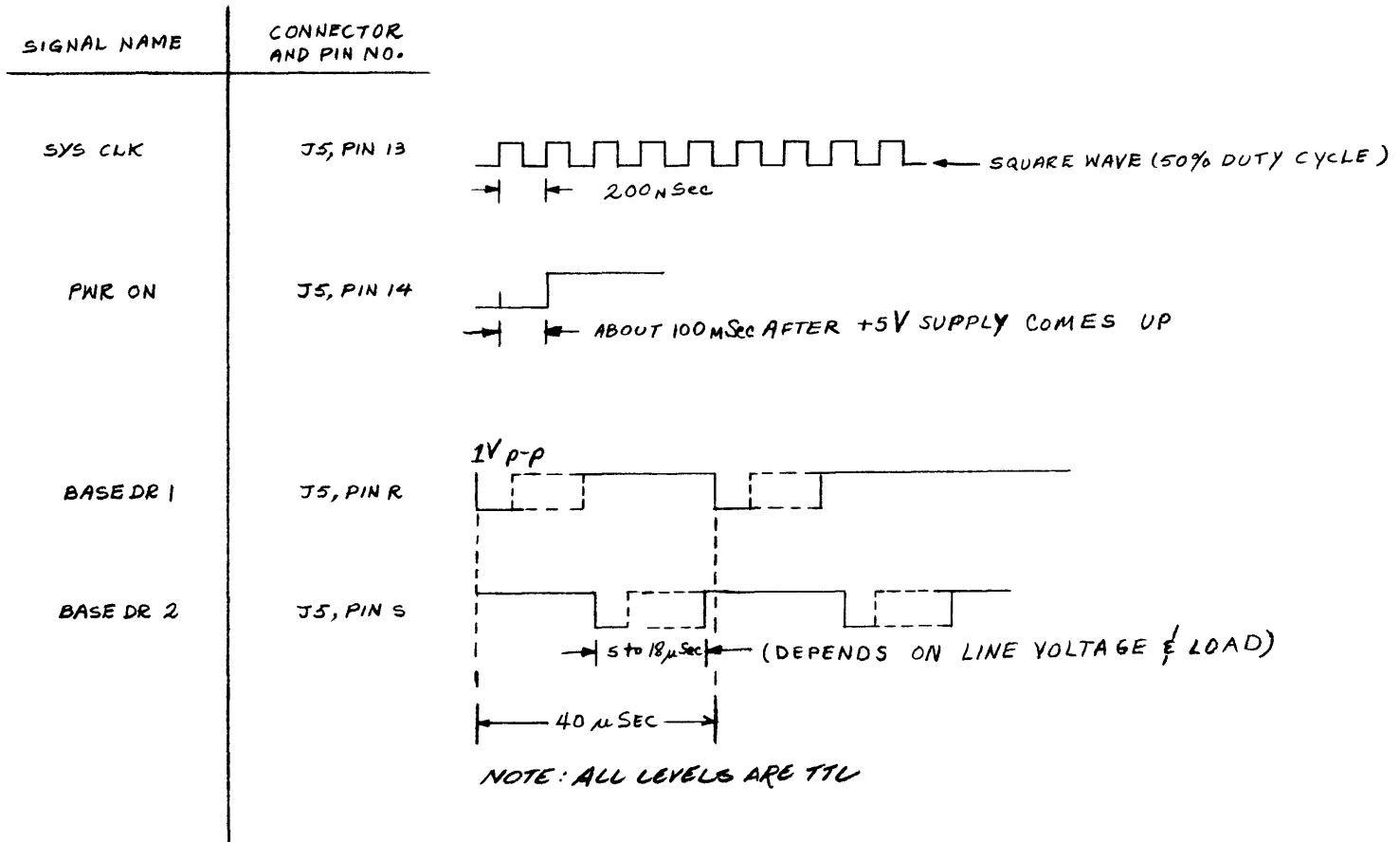


Figure 4
 Power Supply Timing Diagram
 AUG-01-76 13255-91004

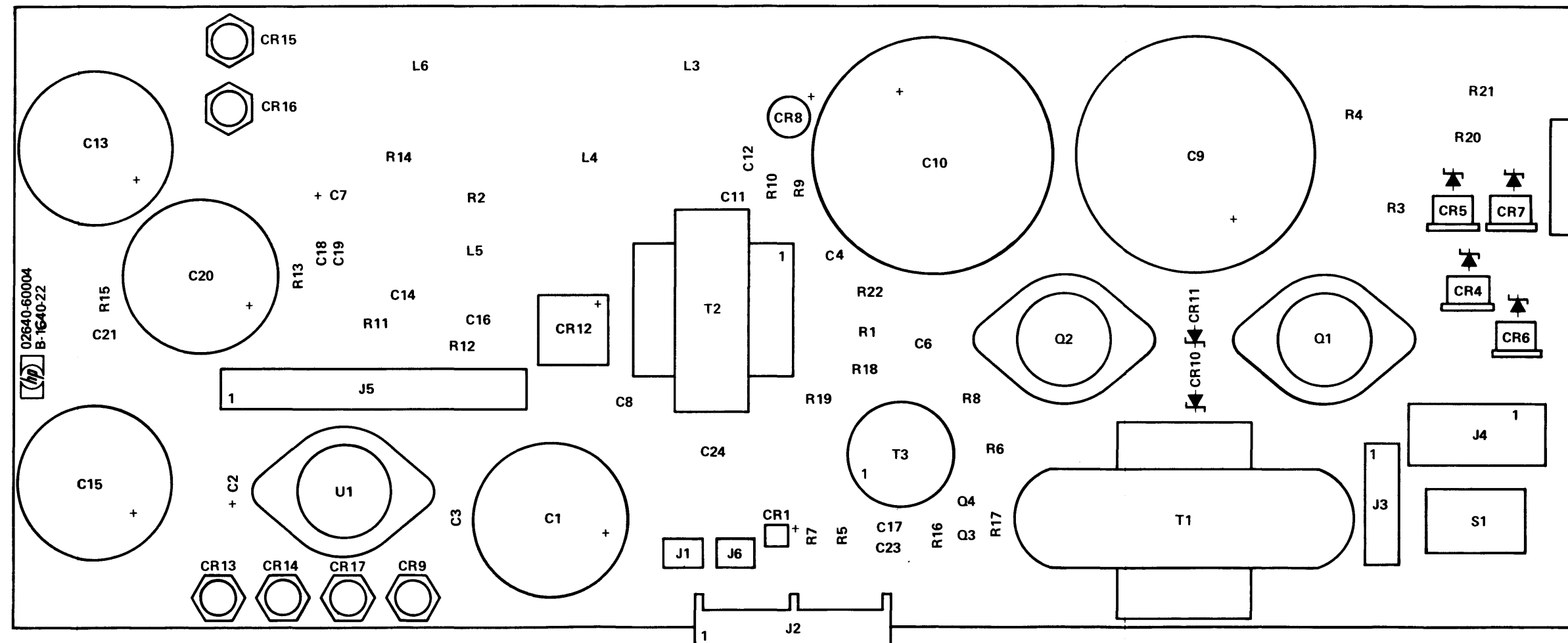


Figure 5
 Power Supply PCA Component Location Diagram
 AUG-01-76 13255-91004

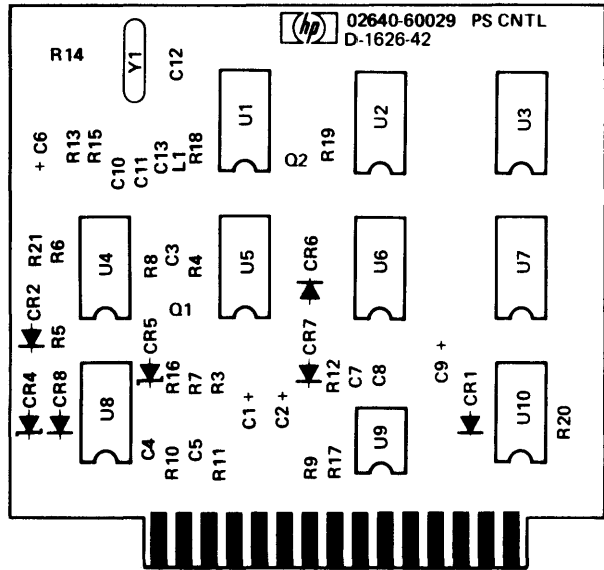


Figure 6
 Power Supply Control PCA Component Location Diagram
 AUG-01-76 13255-91004

Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60004	1	ASSEMBLY, POWER SUPPLY DATE CODE: B-1640-22 REVISION DATE: 08-21-76	28480	02640-60004
C1	01E0-2290	2	CAPACITOR-FXD 2700UF+75-10% 25VDC AL	56289	360272G025AA2A
C2	01E0-0593	1	CAPACITOR-FXD 39UF+-10% 10VDC 1A	56289	1500396X9010B2
C3	0150-0121	5	CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C4	01E0-3456	1	CAPACITOR-FXD 1000PF +-10% 1000WVDC CER	28480	0160-3456
C6	0160-3449	1	CAPACITOR-FXD 2000PF +-10% 250WVDC CER	28480	0160-3449
C7	01E0-0149	1	CAPACITOR-FXD 65UF+100-10% 60VDC AL	28480	0180-0149
C8	0160-2055	6	CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C9	01E0-0647	2	CAPACITOR-FXD 710UF+75-10% 200VDC AL	28480	0180-0647
C10	01E0-0647		CAPACITOR-FXD 710UF+75-10% 200VDC AL	28480	0180-0647
C11	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C12	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C13	01E0-2326	2	CAPACITOR-FXD .01F+75-10% 15VDC AL	90201	CGS103UD158D3L
C14	01E0-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C15	01E0-2326		CAPACITOR-FXD .01F+75-10% 15VDC AL	90201	CGS103UD158D3L
C16	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C17	0150-0121		CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C18	0150-0121		CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C19	0150-0121		CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C20	01E0-2290		CAPACITOR-FXD 2700UF+75-10% 25VDC AL	56289	360272G025AA2A
C21	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C23	0150-0121		CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C24	0160-4242	1	CAPACITOR-FXD 4UF +-10% 200WVDC MET	28480	0160-4242
CR1	19C1-0364	1	DIODE-FW BRDG 200V 1A	04713	SDA 10185-4
CR4	19C1-0718	4	DIODE-SILICON		
CR5	19C1-0718		DIODE-SILICON		
CR6	19C1-0718		DIODE-SILICON		
CR7	19C1-0718		DIODE-SILICON		
CR8	19C6-0051	1	DIODE-FW BRDG 100V 1A	28480	1906-0051
CR9	19C2-0645	1	DIODE-ZNR 1N2997BR 51V 5% DO-4 PD=10W	28480	1902-0649
CR10	19C1-1065	2	DIODE-PWR RECT 1N4936 400V 1A 100NS	04713	MR886
CR11	19C1-1065		DIODE-PWR RECT 1N4936 400V 1A 100NS	04713	MR886
CR12	19C6-0053	1	DIODE-FW BRDG 100V 5A	28480	1906-0053
CR13	19C2-0643	1	DIODE-ZNR 1N2979B 15V 5% DO-4 PD=10W	28480	1902-0644
CR14	19C2-1205	1	DIODE-ZNR 1N2979B 15V 5% DO-4 PD=10W	12954	1N2979B
CR15	19C1-0735	2	DIODE-PWR RECT 50V 12A 200NS DC-4	28480	1901-0735
CR16	19C1-0735		DIODE-PWR RECT 50V 12A 200NS DC-4	28480	1901-0735
CR17	19C2-1217	1	DIODE-ZNR 6.2V 5% DO-4 PD=10W TC=+.035%	04713	S211746
J1	1251-3618	2	CONNECTOR 2-PIN M POST TYPE	27264	09-60-1021
J2	1251-3361	1	CONNECTOR 10-PIN F POST TYPE	27264	09-52-3102
J3	1251-3837	1	CONNECTOR 4-PIN M UTILITY	28480	1251-3837
J4	1251-3819	1	CONNECTOR 6-PIN M UTILITY	28480	1251-3819
J5	1251-2035	1	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	71785	252-15-30-300
J6	1251-3618		CONNECTOR 2-PIN M POST TYPE	27264	09-60-1021
L3	9100-3585	1	COIL 12MH 2.19LG	28480	9100-3585
L4	9100-3586	2	COIL 1.2MH 2.19LG	28480	9100-3586
L5	9100-3586		COIL 1.2MH 2.19LG	28480	9100-3586
L6	9100-3587	1	COIL 100UH 2.4LG	28480	9100-3587
Q1	1854-0624	2	TRANSISTOR NPN 2N6308 SI TU-3 PD=125W	04713	2N6308
Q2	1854-0624		TRANSISTOR NPN 2N6308 SI TU-3 PD=125W	04713	2N6308
Q3	1854-0467	2	TRANSISTOR NPN 2N4401 SI TO-92 PD=310MW	04713	2N4401
Q4	1854-0467		TRANSISTOR NPN 2N4401 SI TO-92 PD=310MW	04713	2N4401
R1	0650-1011	1	RESISTOR 100 10% 1W CC TC=0+529	01121	G81011
R2	06E3-1035	1	RESISTOR 10K 5% .25W FC TC=-400/+700	01121	C81035
R3	0653-2231	2	RESISTOR 22K 10% 2W CC TC=0+765	01121	H82231
R4	0653-2231		RESISTOR 22K 10% 2W CC TC=0+765	01121	H82231
R5	06E9-3305	2	RESISTOR 33 5% 1W CC TC=0+412	01121	G83305
R6	06E3-4705	2	RESISTOR 47 5% .25W FC TC=-400/+500	01121	C84705
R7	06E9-3305		RESISTOR 33 5% 1W CC TC=0+412	01121	G83305
R8	06E3-4705		RESISTOR 47 5% .25W FC TC=-400/+500	01121	C84705
R9	0650-1801	2	RESISTOR 18 10% 1W CC TC=0+412	01121	G81801
R10	0650-1801		RESISTOR 18 10% 1W CC TC=0+412	01121	G81801
R11	0652-1015	2	RESISTOR 100 5% 2W CC TC=0+529	01121	H81015
R12	0652-1015		RESISTOR 100 5% 2W CC TC=0+529	01121	H81015
R13	06E9-0275	4	RESISTOR 2.7 5% 1W CC TC=0+412	01121	G82765
R14	06E9-0275		RESISTOR 2.7 5% 1W CC TC=0+412	01121	G82765
R15	06E3-2215	1	RESISTOR 220 5% .25W FC TC=-400/+600	01121	C82215
R16	06E3-3315	2	RESISTOR 330 5% .25W FC TC=-400/+600	01121	C83315
R17	06E3-3315		RESISTOR 330 5% .25W FC TC=-400/+600	01121	C83315
R18	06E9-0275		RESISTOR 2.7 5% 1W CC TC=0+412	01121	G82765
R19	06E9-0275		RESISTOR 2.7 5% 1W CC TC=0+412	01121	G82765
R20	0811-1340	2	RESISTOR 1 5% 5W PW TC=0+50	91637	RS-5

Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
R21 R22	0811-1340 0652-4715	1	POWER SUPPLY ASSEMBLY, CONT'D. RESISTOR 1 5% 5W PM TC=0+-50 RESISTOR 470 5% 2W CC TC=0+529	91637 01121	RS-5 HB4715
S1	31C1-0537	1	SWITCH-SL DPDT-NS STD 1.5A 250VAC PC	28480	3101-0537
T1	91C0-3582	1	TRANSFORMER, POWER 50/60 HZ 230V	05216	PX3771
T2	91C0-3583	1	TRANSFORMER, SNG 25 KHZ	01961	PX3768
T3	91C0-3584	1	TRANSFORMER, PULSE	01961	PE50349
U1	1620-0430	1	IC LM 309 V RGLTR	27014	LM309K
			MISCELLANEOUS		
	0340-1362	2	TERMINAL-SLDR LUG PL-MTG FOR-#10-SCR	79963	29A .196H
	0341-0146	5	RIVET:SEMITUBULAR 1/8 X 1/4"	00000	08D
	0340-0383	4	STANDOFF-RVT-ON .125LG 6-32THD .250D BRS	28480	0380-0383
	0470-0231		COMPOUND:NUT LOCKING	28480	0470-0231
	0850-0201		TUBING-FLEX .072-ID PVC .016-WALL	96904	400/461 FR-1
	12C0-0080	4	INSULATOR-XSTR ALUMINUM	28480	1200-0080
	12C5-0289	2	HEAT SINK TD-3-PKG	28480	1205-0289
	2150-0004	2	WASHER-LK INTL T NO.-4 .115-IN-ID	0G791	418-BC EVERLOCK WASHER
	2150-0007	2	WASHER-LK INTL T NO.-6 .141-IN-ID	78189	1906-00
	2150-0011	16	WASHER-LK INTL T NO.-10 .195-IN-ID	0G791	1022
	2150-0016	2	WASHER-LK INTL T NO.-3/8 .377-IN-ID	28480	2190-0016
	2150-0034	2	WASHER-LK HLCL NO.-10 .194-IN-ID	28480	2190-0034
	2150-0851	12	WASHER-LK HLCL NC.-6 .141-IN-ID	28480	2190-0851
	22C0-0141	2	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	28480	2200-0141
	2340-0117	4	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	28480	2360-0117
	2340-0195	8	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	28480	2360-0195
	2340-0197	2	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	28480	2360-0197
	2340-0201	2	SCREW-MACH 6-32 .5-IN-LG PAN-HD-POZI	28480	2360-0201
	2420-0003	12	NUT-HEX-DBL-CHAM 6-32-THD .094-THK	28480	2420-0004
	2640-0129	12	SCREW-MACH 10-32 .312-IN-LG PAN-HD-POZI	28480	2680-0129
	2740-0002	6	NUT-HEX-DBL-CHAM 10-32-THD .125-THK	28480	2740-0009
	3050-0226	2	WASHER-FL MLC NO.-10 .203-IN-ID	80120	AN960C10L
	3050-0247	2	WASHER-FL NM NO.-6 .141-IN-ID .375-IN-OD	73734	NO. 1471 (FUNGUS PROOFED)
	6040-0239		GREASE:SILICONE COMPOUND	05820	120-5GM
	8150-1542		WIRE 22AWG R 300V PVC 7X30 80C	28480	8150-1542
	8150-1547		WIRE 22AWG V 300V PVC 7X30 80C	28480	8150-1547
	8150-1552		WIRE 22AWG W/R 300V PVC 7X30 80C	28480	8150-1552
	8150-1557		WIRE 22AWG W/V 300V PVC 7X30 80C	28480	8150-1557
	8150-2464		WIRE 14AWG R 600V PVC 41X30 105C	28480	8150-2464
	8151-0010		WIRE 16AWG 1X16	28480	8151-0013
	5040-0170	2	GUIDE:PLUG-IN PC BOARD	28480	5040-0170
	02440-00006	1	HEAT SINK, LEFT	28480	02440-00006
	02440-00007	1	HEAT SINK, RIGHT	28480	02440-00007
	0535 - 0001	2	NUT HEX SGL CHAM		

Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60029	1	POWER SUPPLY CONTROL ASSEMBLY DATE CODE: D-1626-42 REVISION DATE: 06-19-76	28480	02640-60029
C1	0160-0374	1	CAPACITOR-FXD 10UF+-10% 20VDC TA	56289	1500106X902082
C2	0160-1731	1	CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	1500475X905082
C3	0160-2055	4	CAPACITOR-FXD .01UF +80-20% 100MVDC CER	28480	0160-2055
C4	0140-0198	1	CAPACITOR-FXD 200PF +-5% 300VDC MICA	72136	DM15F201J0300HV1CR
C5	0150-0121	2	CAPACITOR-FXD .1UF +80-20% 50MVDC CER	28480	0150-0121
C6	0160-0228	1	CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	1500226X901582
C7	0160-2055	1	CAPACITOR-FXD .01UF +80-20% 100MVDC CER	28480	0160-2055
C8	0160-0938	1	CAPACITOR-FXD 1000PF +-5% 100VDC MICA	28480	0160-0938
C9	0160-2145	1	CAPACITOR-FXD 120UF+-10% 10VDC TA	56289	1500127X9010R2
C10	0150-0121	1	CAPACITOR-FXD .1UF +80-20% 50MVDC CER	28480	0150-0121
C11	0160-2055	1	CAPACITOR-FXD .01UF +80-20% 100MVDC CER	28480	0160-2055
C12	0160-2055	1	CAPACITOR-FXD .01UF +80-20% 100MVDC CER	28480	0160-2055
C13	0160-3533	1	CAPACITOR-FXD 470PF +-5% 100VDC MICA	28480	0160-3533
CR1	19C1-0040	5	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
CR2	19C1-0040	5	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
CR4	19C2-3155	1	DIODE-ZNR 9.53V 2% DO-7 PD=.4W TC=+.059%	28480	1902-3155
CR5	19C2-0041	1	DIODE-ZNR 5.11V 5% DO-7 PD=.4W TC=-.009%	15818	CD 35622
CR6	1901-0040	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
CR7	19C1-0040	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
CR8	19C1-0040	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
E1	0360-0124	5	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
E2	0360-0124	5	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
E3	0360-0124	5	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
E4	0360-0124	5	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
E5	0360-0124	5	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
L1	9140-0142	1	COIL-MLD 2.2UH 10% Q=32 .095DX.25LG	99800	1025-28
Q1	1854-0467	1	TRANSISTOR NPN 2N4401 SI TO-92 PD=310MW	04713	2N4401
Q2	1853-0015	1	TRANSISTOR PNP SI PD=200MW FT=500MHZ	28480	1853-0015
R3	0663-2225	4	RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
R4	0663-5625	1	RESISTOR 5.6K 5% .25W FC TC=-400/+700	01121	CB5625
R5	0663-1025	3	RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R6	0663-1025	3	RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R7	0663-2245	1	RESISTOR 220K 5% .25W FC TC=-800/+900	01121	CB2245
R8	0663-2225	1	RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
R9	0663-1035	2	RESISTOR 10K 5% .25W FC TC=-400/+700	01121	CB1035
R10	0663-1045	1	RESISTOR 100K 5% .25W FC TC=-400/+800	01121	CB1045
R11	0663-2225	1	RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
R12	0663-4725	1	RESISTOR 4.7K 5% .25W FC TC=-400/+700	01121	CB4725
R13	0757-1094	1	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
R14	2100-3352	1	RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	73138	72-143-0
R15	0658-3155	1	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
R16	0663-4715	1	RESISTOR 470 5% .25W FC TC=-400/+600	01121	CB4715
R17	0663-3325	1	RESISTOR 3.3K 5% .25W FC TC=-400/+700	01121	CB3325
R18	0663-1025	1	RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R19	0663-2215	1	RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R20	0663-2225	1	RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
R21	0663-1035	1	RESISTOR 10K 5% .25W FC TC=-400/+700	01121	CB1035
U1	1820-0578	1	IC-DIGITAL MC1024P ECL DUAL 2 CR-NOR	04713	MC1024P
U2	1820-0055	2	IC-DIGITAL SN7490N TTL DECD SYNCHRO	01295	SN7490N
U3	1820-0055	2	IC-DIGITAL SN7490N TTL DECD SYNCHRO	01295	SN7490N
U4	1826-0205	1	IC NE 556 TIMER	18324	NE556A
U5	1820-0071	1	IC-DIGITAL SN7440N TTL DUAL 4 NAND	01295	SN7440N
U6	1820-1056	1	IC-DIGITAL SN74132N TTL QUAD 2 NAND	01295	SN74132N
U7	1820-0907	1	IC-DIGITAL SN7412N TTL TPL 3 NAND	01295	SN7412N
U8	1826-0049	1	IC UA 723C V RGLTR	07263	723DC
U9	1826-0373	1	IC 555 TIMER	27014	LM555CN
U10	1820-1112	1	IC-DIGITAL SN74LS74N TTL LS DUAL	01295	SN74LS74N
Y1	0410-0585	1	CRYSTAL, QUARTZ 4.915 MHZ .01% MISCELLANEOUS	23875	A-0410-0585-1
	0360-0474	2	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0474

Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60027	1	REAR PANEL ASSEMBLY REVISION DATE: 05-26-76	28480	02640-60027
	0362-0321	3	TERMINAL-CRIMP TNG-R #6 22-18-AWG RED	98410	AA-532-06-T
	0400-0082		GROMMET:CHANNEL	03296	G-51M-8
	0570-0528	2	STUD, PRESS-IN 5/16"	00000	08D
	0550-0012	1	NUT-KNRLD-R 15/32-32-THD .062-THK .6-A/F	04009	8991-3
	0850-0006	1	TUBING-FLEX .204-ID PVC .02-WALL	96904	400/461 FR-1
	1251-3817	1	CONNECTOR 6-PIN UTILITY	28480	1251-3817
	1251-3911	3	CONTACT-CONN U/W-UTIL FEM CRP	28480	1251-3911
	1400-0090	1	WASHER-RUBBER 5/8" OD	00000	08D
	2110-0365	1	FUSE 4A 250V SLO-BLD 1.25X.25 UL IEC	71400	MDA-4AMP
	2110-0464	1	FUSEHOLDER-EXTR POST 20A 300V UL/IEC	75915	345802-010
	2110-0465	1	FUSEHOLDER-EXTR POST UL/IEC .25X1.25FUSE	28480	2110-0465
	2150-0008	3	WASHER-LK EXT T NO.-6 .141-IN-ID	78189	1806-00
	2150-0037	1	WASHER-LK INTL T NO.-1/2 .512-IN-ID	78189	1224-08
	2150-0102	1	WASHER-LK INTL T NO.-7/16 .472-IN-ID	78189	1922-01
	2150-0918	3	WASHER-LK MLCL NO.-6 .141-IN-ID	28480	2190-0918
	2420-0002	2	NUT-HEX-DBL-CHAM 6-32-THD .109-THK	28480	2420-0003
	2420-0003	3	NUT-HEX-DBL-CHAM 6-32-THD .094-THK	28480	2420-0004
	2950-0035	1	NUT-HEX-DBL-CHAM 15/32-32-THD .078-THK	28480	2950-0039
	2950-0054	1	NUT-HEX-DBL-CHAM 1/2-28-THD .125-THK	28480	2950-0072
	3101-0646	1	SWITCH-T6L BASIC DPST NS 10A 250VAC	28480	3101-0646
	7120-3528	1	WARNING LABEL .6-IN-WD 1.8-IN-LG VINYL	28480	7120-3528
	8150-2651		WIRE 18AWG W/BR/GY 600V PVC 19X30 105C	28480	8150-2651
	8150-2660		WIRE 18AWG W/GY 600V PVC 19X30 105C	28480	8150-2660
	8150-2919		WIRE 18AWG G/Y 600V PVC 19X30 105C	28480	8150-2919
	8150-2920		WIRE 18AWG W/8K/GY 600V PVC 19X30 105C	28480	8150-2920
	9135-0028	1	FILTER-LINE WIRE LEAD-TERMS	28480	9135-0028
	02640-00042	1	PANEL, REAR	28480	02640-00042
	02640-20009	2	SPACER	28480	02640-28009
	02640-60083	1	CABLE ASSY	28480	02640-60083

Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60083	1	CABLE ASSEMBLY REVISION DATE: 03-13-76	28480	02640-60083
	0362-0332 1251-4018 8150-1540	1 1	TERMINAL-CRIMP TNG-R #6 22-18-AWG RED CONNECTOR-SGL CONT PIN .08-IN-BSC-SZ RND WIRE 22AWG BK 300V PVC 7X30 80C	98410 14970 28480	AVIKRIMR AA-532-06 105-0774-001 8150-1540