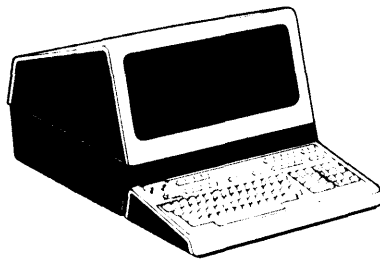


HP 13255  
POWER SUPPLY MODULE  
Manual Part No. 13255-91142  
REVISED  
SEP-06-77

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***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 12 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 3 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. The maximum total power of all voltage outputs must not exceed 110 Watts. Parts list for 02640-60083 is contained in module section 13255-91004.

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)
02640-60083	Cable Assembly	N/A	N/A
02640-60169	Power Supply Control PCA	3.9 x 3.6 x 1.0	0.3
02640-60130	Power Supply PCA	15.3 x 6.4 x 4.5	8.0
02640-60142	Power Supply Assembly	N/A	N/A
02640-60148	Cable Assembly	N/A	N/A
Number of Backplane Slots Required: NOT APPLICABLE			

HP 13255  
POWER SUPPLY MODULE  
Manual Part No. 13255-91142

REVISED  
SEP-06-77

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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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02640-60142	Power Supply Assembly	N/A	N/A
02640-60148	Cable 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, Pin -1		Not Used
-2	+5V	Power Connection To Backplane
-3	+5V	
-4	+5V	
-5	+5V	
-6	GND	
-7	GND	
-8	GND	
-9	GND	
-10	+12V	
-11	+12V	
-12	-12V	
-13	-12V	
-14		
-15		Used
J2, Pin -1	GND	Ground
-2	GND	Ground
-3	+5V	Sense Line From Backplane +5V Output
Pin -4 through Pin -6		Not Used
-7	+5C	Power Supply which Runs Main Supply Logic
-8	+5C	
-9	+5C	
-10	+5C	
-11	+5C	
-12	SENSE RETURN	Sense Line From Primary Current Measuring Transformer
-13		Not Used
-14		Used
-15	CURRENT SENSE	Sense Line From Primary Current Measuring Transformer

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

Connector and Pin No.	Signal Name	Signal Description
J2, Pin -A	+16V	Unregulated Power From Auxillary Supply
Pin -B through Pin -F		) ) Not Used )
-H	+5C	Power Supply Which Runs Main Supply Logic
-J		)
-K		) Not Used
-L		)
-M	-42V	) Power Supply Outputs
-N	-12V	) Used for Test Purposes
-P	+12V	)
-R	BASE DRIVE 1	) Outputs Which Run Main
-S	BASE DRIVE 2	) Supply Transistors
J3, Pin -1	-42V	) Power Connection to
-2	+5V	) Sweep Cable Assembly
-3		) Not Used
-4	+12V	) Power Connection to
-5	GND	) Sweep Cable Assembly
J4, Pin -1	115V	)
-2	NEUTRAL	) Connection to
-3	GND	) Line
-4	LINE	)
J5, Pin -1	115V	)
-2	NEUTRAL	) Power Connection To
-3	GND	) Auxilliary Cable Assembly
-4	LINE	)

Table 3.1 Connector Information - Power Supply Control PCA

Connector and Pin No.	Signal Name	Signal Description
J1, Pin -1	-42V	}
-2	PWR ON	} To
-3	BASE DRIVE 1	} Backplane
-4	BASE DRIVE 2	}
-5		} Not Used
-6	+16V	}
-7	+5C	} To
-8	SYS CLK	} Backplane
-9	GND	}
-10		} Not Used
P1, Pin -1	GND	}
-2	GND	} To Power Supply PCA
-3	+5V	}
Pin -4 through Pin -6		} Not Used
-7	+5C	} To Power Supply PCA
Pin -8 through Pin -11		} Not Used
-12	SENSE RETURN	}
-13	SYS CLK	} To Power Supply PCA
-14	PWR ON	}
-15	CURRENT SENSE	}



Table 3.1 Connector Information - Power Supply Control PCA (Cont'd.)

Connector and Pin No.	Signal Name	Signal Description
P1, Pin -A	+16V	To Power Supply PCA
Pin -B		} Not Used
through Pin -L		} Not Used
-M	-42V	To Power Supply PCA
-N		} Not Used
-P		} Not Used
-R	BASE DRIVE 1	} To Power Supply PCA
-S	BASE DRIVE 2	} To Power Supply PCA

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 (02640-60169, 02640-60130, 02640-60142, and 02640-60148) 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 and supplies power to the terminal data bus and Sweep Module.

#### 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 switching is done by fuse location and 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 (+5C).

#### 3.1.3 Chopper.

The chopper block contains two power transistors (Q3,Q4) in the primary circuitry and two driver transistors (Q1,Q2). 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 pulses applied to the chopper. Current sensing 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 (88.5 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 88 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 use a timer in this block 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.

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.

#### 3.2.6 Power On Reset.

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).

#### 3.2.7 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.

#### 3.2.8 Divide-By-100 Counter.

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

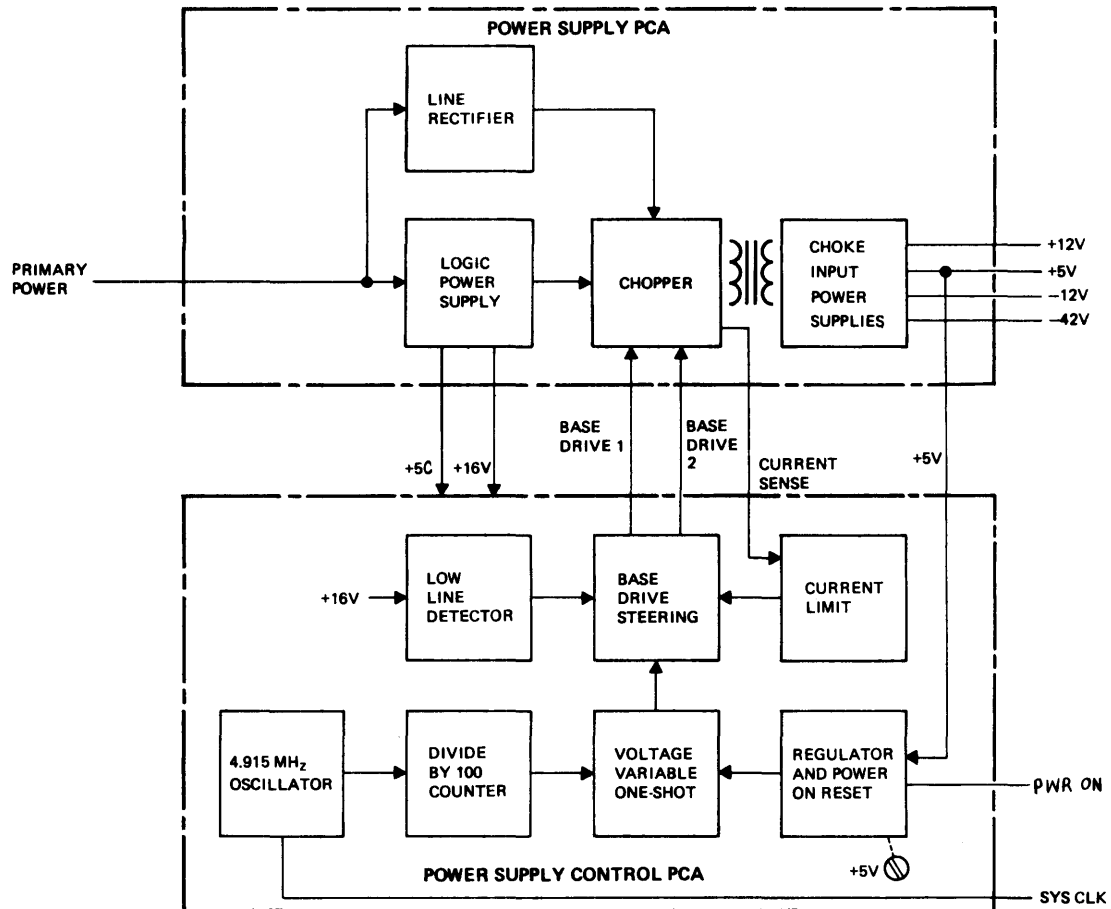


Figure 1  
 Power Supply Module Block Diagram  
 SEP-06-77 13255-91142

1826-0049: U27A3 = U31  
 1826-0373 = NE555 = U21

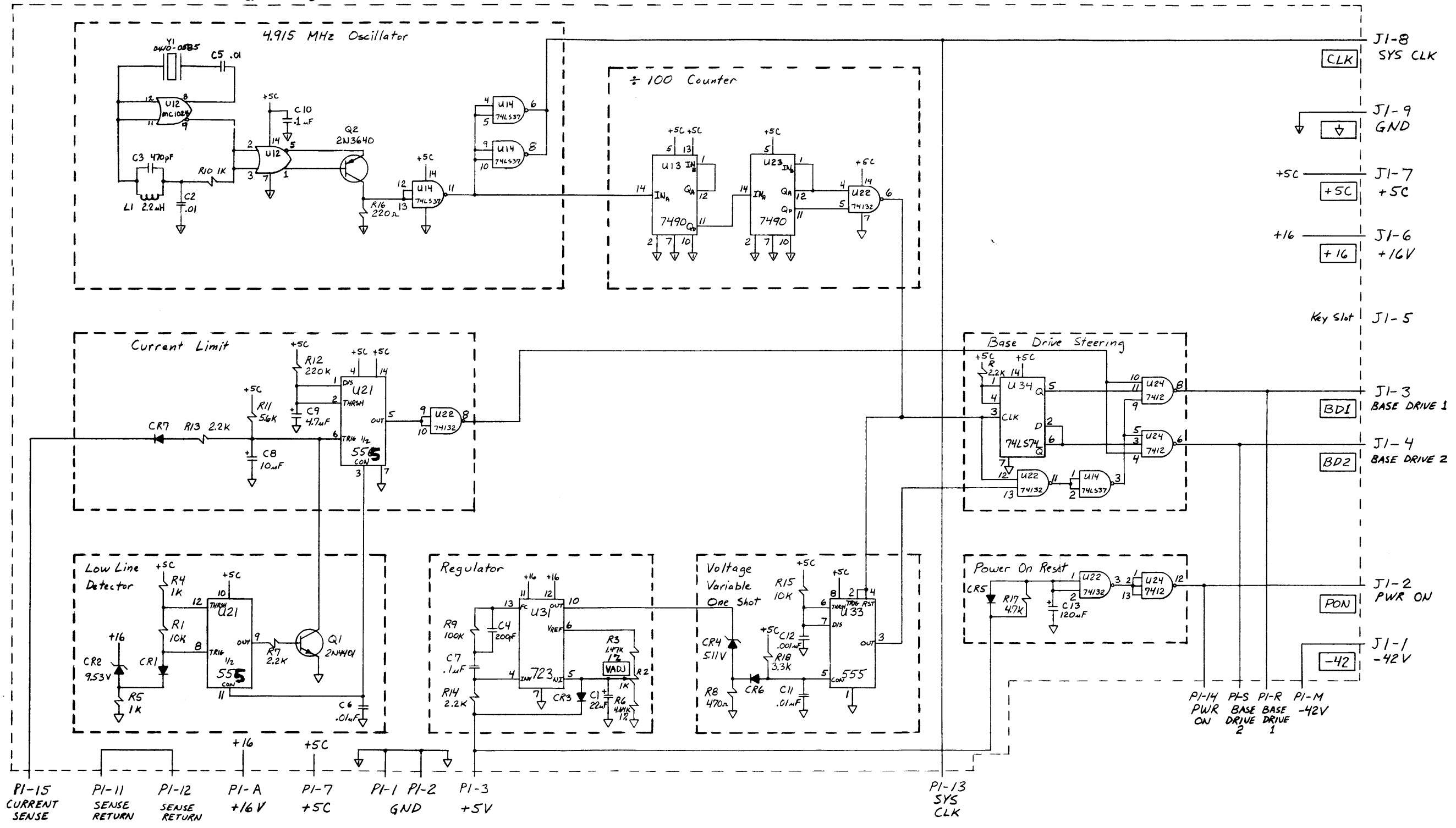


Figure 2  
 Power Supply Control PCA Schematic Diagram  
 SEP-06-77 13255-91142

FOR 115 VAC OPERATION F4 = .25AT, F3 = 4AT  
 FOR 230 " " F2 = 0.25A, F1 = 2AT

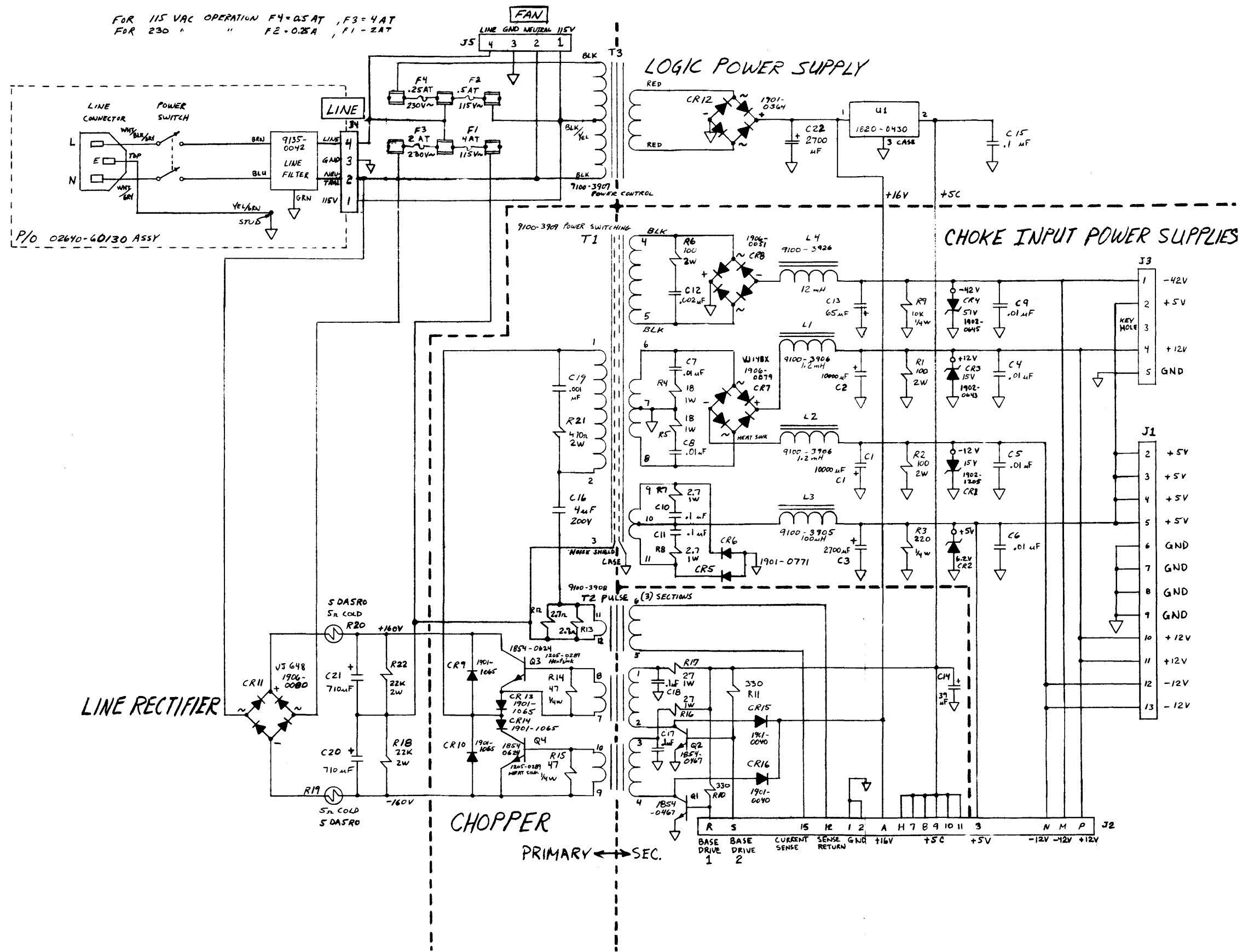


Figure 3  
 Power Supply PCA Schematic Diagram  
 SEP-06-77 13255-91142

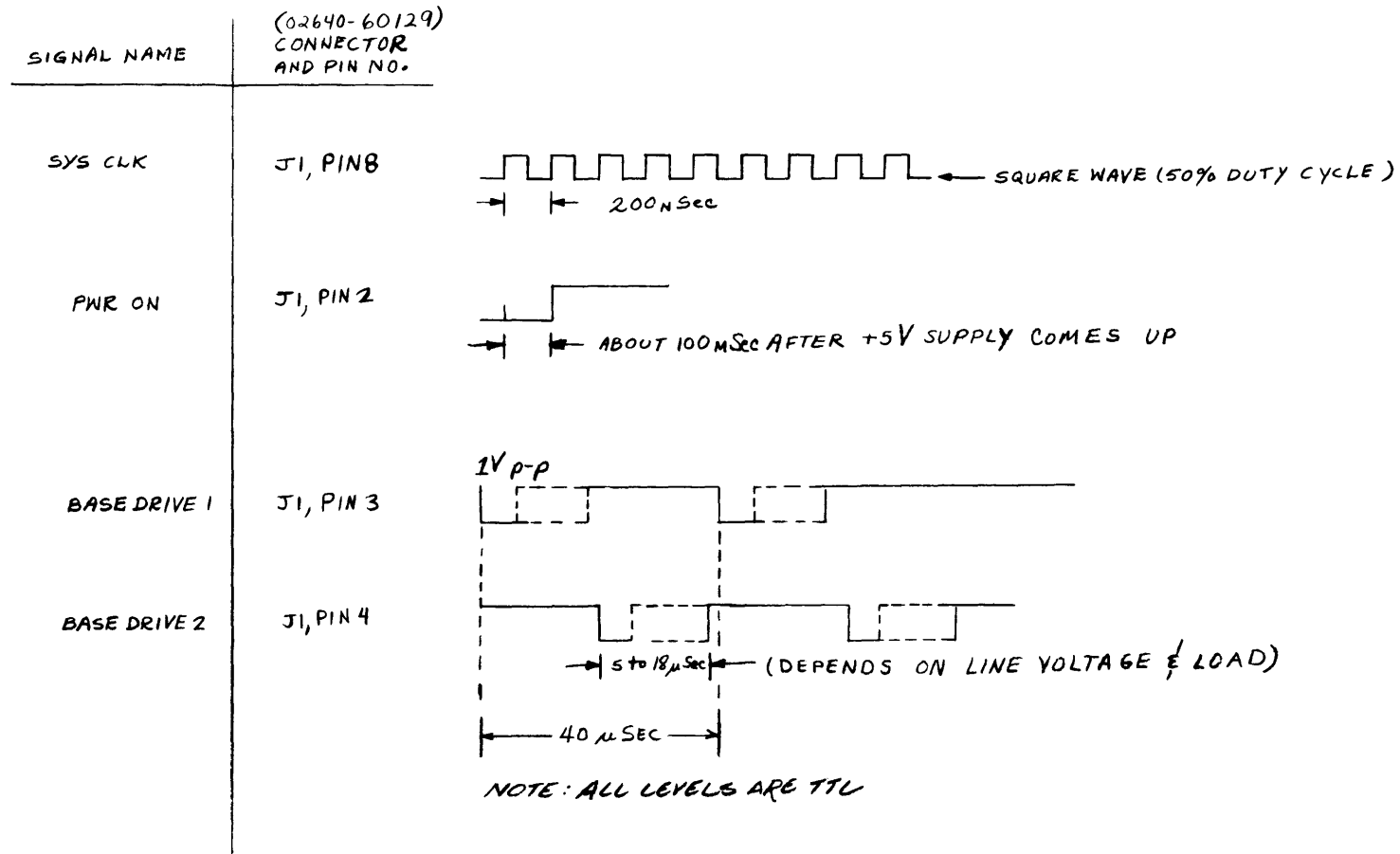


Figure 4  
Power Supply Timing Diagram  
SEP-06-77 13255-91142



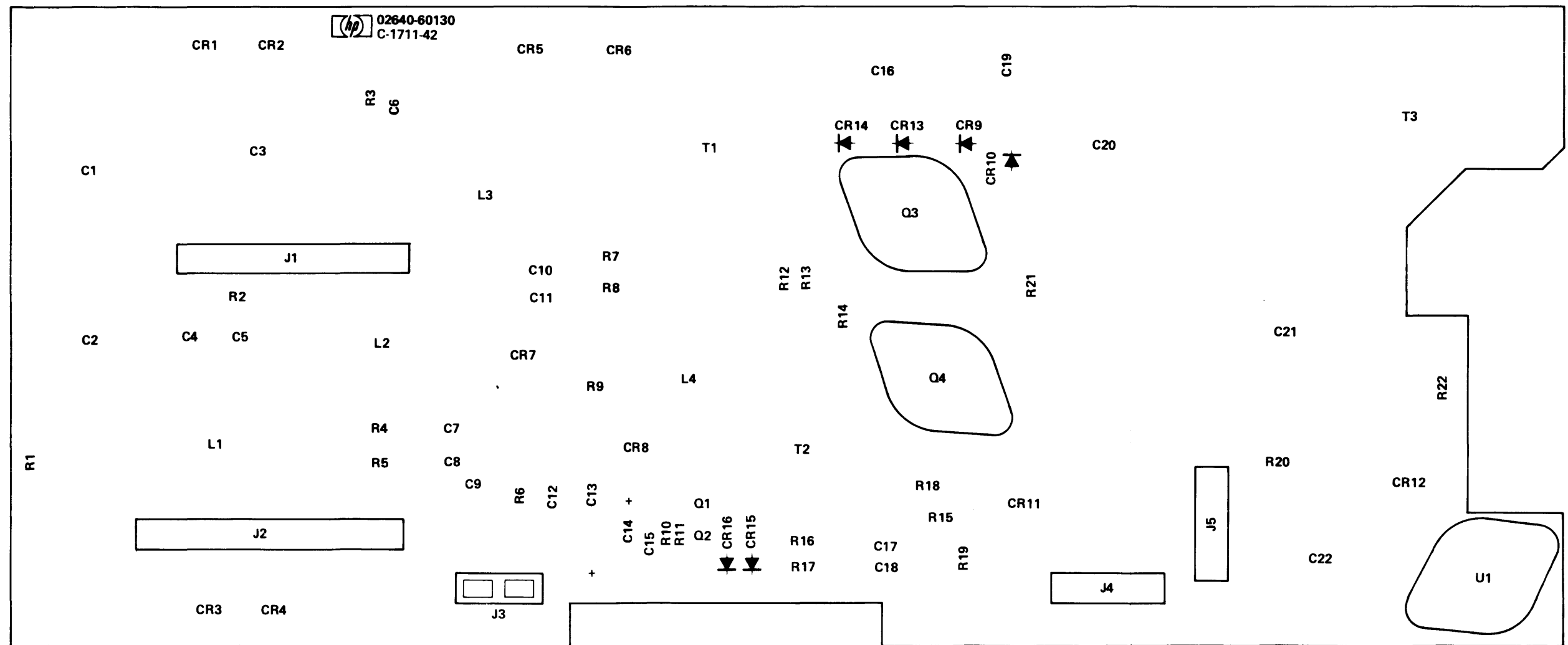


Figure 5  
Power Supply PCA Component Location Diagram  
SEP-06-77 13255-91142

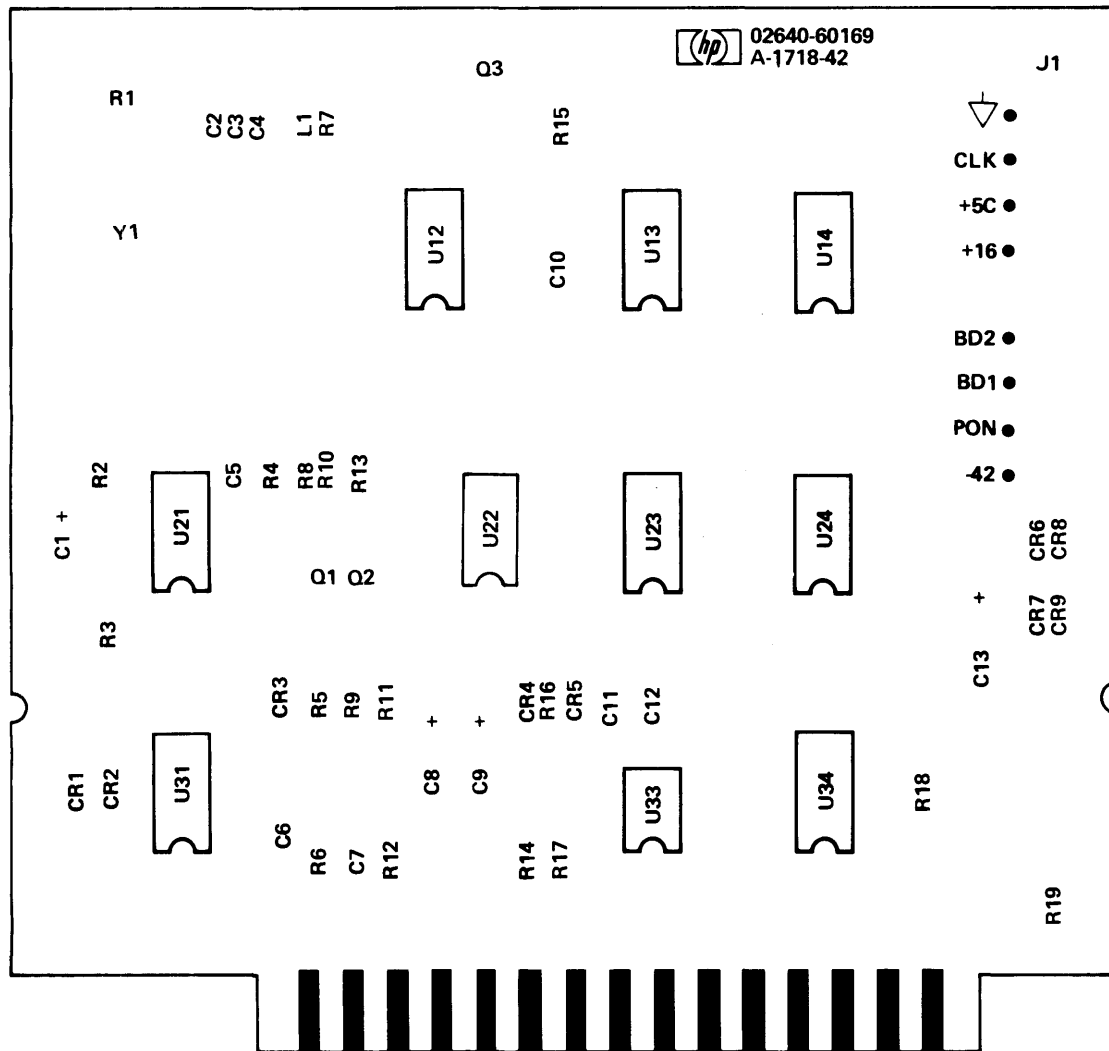


Figure 6  
Power Supply Control PCA Component Location Diagram  
SEP-06-77 13255-91142

*Replaceable Parts*

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60130	1	POWER SUPPLY ASSEMBLY REVISION DATE: 07-15-77 DATE CODE: C-1711-42	28480	02640-60130
C1	0160-2326	2	CAPACITOR-FXC .01F+75-10% 15VDC AL	90201	CGS1030D158D3L
C2	0160-2326	2	CAPACITOR-FXC .01F+75-10% 15VDC AL	90201	CGS1030D158D3L
C3	0160-2290	2	CAPACITOR-FXC 2700UF+75-10% 25VDC AL	56289	360272G025AA2A
C4	0160-2055	6	CAPACITOR-FXC .01UF +80-20% 100WVDC CER	28480	0160-2055
C5	0160-2055	6	CAPACITOR-FXC .01UF +80-20% 100WVDC CER	28480	0160-2055
C6	0160-2055	6	CAPACITOR-FXC .01UF +80-20% 100WVDC CER	28480	0160-2055
C7	0160-2055	6	CAPACITOR-FXC .01UF +80-20% 100WVDC CER	28480	0160-2055
C8	0160-2055	6	CAPACITOR-FXC .01UF +80-20% 100WVDC CER	28480	0160-2055
C9	0160-2055	6	CAPACITOR-FXC .01UF +80-20% 100WVDC CER	28480	0160-2055
C10	0150-0121	5	CAPACITOR-FXC .1UF +80-20% 50WVDC CER	28480	0150-0121
C11	0150-0121	5	CAPACITOR-FXC .1UF +80-20% 50WVDC CER	28480	0150-0121
C12	0160-3449	1	CAPACITOR-FXC 2000PF +-10% 250WVDC CER	28480	0160-3449
C13	0160-0149	1	CAPACITOR-FXC 65UF+100-10% 60VDC AL	28480	0180-0149
C14	0160-0393	1	CAPACITOR-FXC 39UF+-10% 10VDC TA	56289	1500396X901082
C15	0150-0121	1	CAPACITOR-FXC .1UF +80-20% 50WVDC CER	28480	0150-0121
C16	0160-4242	1	CAPACITOR-FXD 4UF +-10% 200WVDC MET	28480	0160-4242
C17	0150-0121	1	CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C18	0150-0121	1	CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C19	0160-3456	1	CAPACITOR-FXD 1000PF +-10% 100CWVDC CER	28480	0160-3456
C20	0160-0647	2	CAPACITOR-FXD 710UF+75-10% 200VDC AL	28480	0180-0647
C21	0160-0647	2	CAPACITOR-FXD 710UF+75-10% 200VDC AL	28480	0180-0647
C22	0160-2290	1	CAPACITOR-FXD 2700UF+75-10% 25VDC AL	56289	360272G025AA2A
CR1	19C2-1205	1	DIODE-ZNR 1N2979R8 15V 5% DO-4 PD=10W	12954	1N2979R8
CR2	19C2-1217	1	DIODE-ZNR 6.2V 5% DO-4 PD=10W IC=+.035%	04713	SZ11746
CR3	19C2-0643	1	DIODE-ZNR 1N2979B 15V 5% DO-4 PD=10W	28480	1902-0644
CR4	19C2-0645	1	DIODE-ZNR 1N2979B 15V 5% DO-4 PD=10W	28480	1902-0649
CR5	19C1-0771	2	DIODE-PWR RECT 50V 30A DO-5	28480	1901-0771
CR6	19C1-0771	2	DIODE-PWR RECT 50V 30A DO-5	28480	1901-0771
CR7	19C6-0079	1	RECTIFIER	28480	1906-0079
CR8	19C6-0051	1	DIODE-FW BRDG 100V 1A	28480	1906-0051
CR11	19C6-0080	1	RECTIFIER	28480	1906-0080
CR9	19C1-1065	4	DIODE-PWR RECT 1N4936 400V 1A 100NS	04713	MR886
CR10	19C1-1065	4	DIODE-PWR RECT 1N4936 400V 1A 100NS	04713	MR886
CR12	19C1-0364	1	DIODE-FW BRDG 200V 1A	04713	SDA 10185-4
CR 13	1901-1065	1	DIODE-PWR RECT 1N4936 400V 1A 100NS	04713	MR886
CR 14	1901-1065	1	DIODE-PWR RECT 1N4936 400V 1A 100NS	04713	MR886
J2	1251-2035	1	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	71785	252-15-30-300
J3	1251-3618	2	CONNECTOR 2-PIN M POST TYPE	27264	09-60-1021
J4	1251-3837	2	CONNECTOR 4-PIN M UTILITY	28480	1251-3837
J5	1251-3837	2	CONNECTOR 4-PIN M UTILITY	28480	1251-3837
J1	1251-3197	1	12-PIN M		
J7	1251-3618	2	CONNECTOR 2-PIN M POST TYPE	27264	09-60-1021
L1	91C0-3906	2	COIL, FXD	28480	9100-3906
L2	91C0-3906	2	COIL, FXD	28480	9100-3906
L3	91C0-3905	1	COIL, FXD	28480	9100-3905
L4	91C0-3926	1	COIL, INDUCTOR	28480	9100-3926
Q1	1854-0467	2	TRANSISTOR NPN 2N4401 SI TO-92 PD=310MW	04713	2N4401
Q2	1854-0467	2	TRANSISTOR NPN 2N4401 SI TO-92 PD=310MW	04713	2N4401
Q3	1854-0624	2	TRANSISTOR NPN 2N6308 SI TO-3 PD=125W	04713	2N6308
Q4	1854-0624	2	TRANSISTOR NPN 2N6308 SI TO-3 PD=125W	04713	2N6308
R1	0652-1015	3	RESISTOR 100 5% 2W CC TC=0+529	01121	H81015
R2	0652-1015	3	RESISTOR 100 5% 2W CC TC=0+529	01121	H81015
R3	0663-2215	1	RESISTOR 220 5% .25W FC TC=-400/+600	01121	C82215
R4	0650-1801	2	RESISTOR 18 10% 1W CC TC=0+412	01121	G81801
R5	0650-1801	2	RESISTOR 18 10% 1W CC TC=0+412	01121	G81801
R6	0652-1015	3	RESISTOR 100 5% 2W CC TC=0+529	01121	H81015
R7	0669-0275	4	RESISTOR 2.7 5% 1W CC TC=0+412	01121	G82765
R8	0669-0275	4	RESISTOR 2.7 5% 1W CC TC=0+412	01121	G82765
R9	0663-1035	1	RESISTOR 10K 5% .25W FC TC=-400/+700	01121	C81035
R10	0663-3315	2	RESISTOR 330 5% .25W FC TC=-400/+600	01121	C83315
R11	0663-3315	2	RESISTOR 330 5% .25W FC TC=-400/+600	01121	C83315
R12	0669-0275	4	RESISTOR 2.7 5% 1W CC TC=0+412	01121	G82765
R13	0669-0275	4	RESISTOR 2.7 5% 1W CC TC=0+412	01121	G82765
R14	0663-4705	2	RESISTOR 47 5% .25W FC TC=-400/+500	01121	C84705
R15	0663-4705	2	RESISTOR 47 5% .25W FC TC=-400/+500	01121	C84705
R16	0669-2705	2	RESISTOR 27 5% 1W CC TC=0+412	01121	G82705
R17	0669-2705	2	RESISTOR 27 5% 1W CC TC=0+412	01121	G82705
R18	0653-2231	2	RESISTOR 22K 10% 2W CC TC=0+765	01121	H82231
R19	0837-0135	2	THERMISTOR	28480	0837-0135
R20	0837-0135	2	THERMISTOR	28480	0837-0135
CR15	1901-0040	2	DIODE, SIL		
CR16	1901-0040	2	DIODE, SIL		

See introduction to this section for ordering information

*Replaceable Parts*

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
			POWER SUPPLY ASSEMBLY CONT'D.		
R21	0652-4715	1	RESISTOR 470 5% 2W CC TC=0+529	01121	HB4715
R22	0653-2231	1	RESISTOR 22K 10% 2W CC TC=0+765	01121	HB2231
T1	9100-3909	1	TRANSFORMER, SWITCHING	28480	9100-3909
T2	9100-3908	1	TRANSFORMER, PULSE	28480	9100-3908
T3	9100-3907	1	TRANSFORMER, POWER	28480	9100-3907
	9135-0042	1	FILTER ELECT LINE		
U1	1820-0430	1	IC LM 309 V RGLTR	27014	LM309K
	0380-0383	6	STANDOFF-RVT-CN .125LG 6-32THD .25GD BRS	28480	0380-0383
	1205-0289	2	HEAT SINK TO-3-PKG	28480	1205-0289
	2110-0551	6	FUSE CLIP	28480	2110-0551
	2150-0011	12	WASHER-LK INTL T NO.-10 .195-IN-ID	06791	1022
	2200-0105	4	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	28480	2200-0105
	2190-0008	5	LKWSHR 6 EXT		
	2360-0113	2	SCREW-MACH 6-32	28480	2360-0113
	2360-0121	10	SCREW-MACH 6-32 .5-IN-LG PAN-HD-POZI	28480	2360-0121
	2360-0192	1	SCREW-MACH 6-32 .250L	28480	2360-0192
	2420-0001	4	NUT-HEX-W/LKWR 6-32-THD .109-THK	28480	2420-0002
	2680-0129	12	SCREW-MACH 10-32 .312-IN-LG PAN-HD-POZI	28480	2680-0129
	2190-0027	2	WSHR-LK INTL T		
	2740-0003	4	NUT-HEX-W/LKWR 10-32-THD .125-THK	73734	9227
	2950-0134	2	NUT-HEX-DBL-CHAM 1/4-28-THD .125-THK	28480	2950-0134
	6040-0239	1	GREASE:SILICONE COMPOUND	05820	120-5GM
	8151-0010	1	WIRE 16AWG 1X16	28480	8151-0013
	8150-1542	1	WIRE 22AWG RED	28480	8150-1542
	5001-2808	2	HEAT SINK	28480	5001-2808
	5040-0170	2	GUIDE:PLUG-IN PC BOARD	28480	5040-0170
	02640-00061	1	POWER SUPPLY, LEFT SIDE	28480	02640-00061
	02640-00063	1	POWER SUPPLY, RIGHT SIDE	28480	02640-00063
	02640-00060	1	POWER SUPPLY, FRONT PANEL		
	02640-00062	1	POWER SUPPLY, REAR PANEL		
	02640-00070	1	BRACKET, MOUNTING		
	0362-0328	2	TERMINAL-CRIMP		
	0400-0082	1	GROM CHAN .085 ID		
	0890-0006	1	TBG #4 PVC CLR		
	0890-0201	1	TBG #13 PVC BLK		
	1251-3836	1	CONN UTIL 4 PIN F		
	1251-3911	2	CONT CONN UTIL F		
	1251-4470	1	PWR INLET VDE		
	2360-0115	14	SCR-MACH 6-32		
	2420-0003	3	NUT 6-32 .250 AF		
	3050-0227	2	WSHR #6 SS		
	3050-0247	2	WSHR #6 FIBER		
	3101-2122	1	SWITCH ROCKER		
	7120-4369	1	WARNING LABEL		
	8150-2260	1	WIRE 18 AWG WHT-GRA		
	8150-2919	1	WIRE 18 AWG GRN-YEL		
	8150-2920	1	WIRE 18 AWG W-BK-GRA		
	0360-1263	1	TERMINAL, SOLDER LUG		

*Replaceable Parts*

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60142	1	POWER UNIT ASSEMBLY REVISION DATE: 06-02-77		
	0570-0605	1	SCREW-CAPTIVE		
	02640-00064	1	COVER P-S		
	02640-60169	1	ASSY P-S CNTL		
	02640-60130	1	ASSY POWR SUPPLY		
	02640-60148	1	CABLE PWR SUP AY		

See introduction to this section for ordering information

*Replaceable Parts*

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60148	1	POWER SUPPLY CABLE ASSEMBLY REVISION DATA: 11-10-76		
	0890-0029 0890-0732		TUBING HEAT SHRINK TUBING-HS .063 DIA		
	1251-0627	6	CONN-KEY		
	1251-0670	27	CONT; CONN		
	1251-3202	2	CONN POST 15F		
	1251-3537	1	CONN F 10 POST		
	1400-0249	2	CA TIE 3.6L		
	8120-2294		CBL-RF COAXIAL		
	8150-0672		WIRE 18 R		
	8150-2829		WIRE 18 BK		
	8150-2983		WIRE 18 W		
	8150-3246		WIRE 18 W/R		
	8150-3737		WIRE WHT/VIO 18		

See introduction to this section for ordering information

### Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60169	1	POWER SUPPLY CONTROL ASSEMBLY REVISION DATE: 08-03-77 DATE CODE: A-1718-42	28480	02640-60169
C1	0180-0228	1	CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X901582
C2	0160-2055	4	CAPACITOR-FXD .01UF +80-20% 100 WVDC CER	28480	0160-2055
C3	0160-2055		CAPACITOR-FXD .01UF +80-20% 100 WVDC CER	28480	0160-2055
C4	0160-3533	1	CAPACITOR-FXD 470PF +-5% 100WVDC MICA	28480	0160-3533
C5	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C6	0140-0198	1	CAPACITOR-FXD 200PF +-5% 300WVDC MICA	72136	DM15F201J0300WV1CR
C7	0150-0121	2	CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C8	0180-0374	2	CAPACITOR-FXD 10UF +-10% 20VDC 1A	56289	150D106X902082
C9	0180-0374		CAPACITOR-FXD 10UF +-10% 20VDC 1A	56289	150D106X902082
C10	0150-0121		CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C11	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C12	0160-0938	1	CAPACITOR-FXD 1000PF +-5% 100WVDC MICA	28480	0160-0938
C13	0180-2145	1	CAPACITOR-FXD 120UF +-10% 10VDC TA	56289	150D127X9010R2
CR1	1902-3155	1	DIODE-ZNR 9.53V 2% D0-7 PD=.4W TC=+.059%	28480	1902-3155
CR2	1901-0040	7	DIODE-SWITCHING 30V 50MA 2NS D0-35	28480	1901-0040
CR3	1902-0041	1	DIODE-ZNR 5.11V 5% D0-7 PD=.4W TC=-.009%	15818	CD 35622
CR4	1901-0040		DIODE-SWITCHING 30V 50MA 2NS D0-35	28480	1901-0040
CR5	1901-0040		DIODE-SWITCHING 30V 50MA 2NS D0-35	28480	1901-0040
CR6	1901-0040		DIODE-SWITCHING 30V 50MA 2NS D0-35	28480	1901-0040
CR7	1901-0040		DIODE-SWITCHING 30V 50MA 2NS D0-35	28480	1901-0040
CR8	1901-0040		DIODE-SWITCHING 30V 50MA 2NS D0-35	28480	1901-0040
CR9	1901-0040		DIODE-SWITCHING 30V 50MA 2NS D0-35	28480	1901-0040
J1	1251-3873	2	CONNECTOR 4-PIN M POST TYPE	27264	09-88-2041
J2	1251-3873		CONNECTOR 4-PIN M POST TYPE	27264	09-88-2041
L1	9140-0142	1	COIL-MLD 2.2UH 10% Q=32 .0950X.25LG	99800	1025-28
Q1	1854-0467	1	TRANSISTOR NPN 2N4401 SI T0-92 PD=310MW	04713	2N4401
Q2	1854-0467	1	TRANSISTOR NPN 2N4401 SI T0-92 PD=310MW	04713	2N4401
Q3	1853-0015	1	TRANSISTOR PNP SI PD=200MW FT=500MHZ	28480	1853-0015
R1	2100-3352	1	RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	73138	72-143-0
R2	0658-3155	2	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
R3	0757-1094	2	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
R4	0683-2235	1	RESISTOR 22K 5% .25W	01121	CB2235
R5	0683-4715	1	RESISTOR 470 5% .25W FC TC=-400/+600	01121	CB4715
R6	0683-1045	2	RESISTOR 100K 5% .25W FC TC=-400/+800	01121	CB1045
R7	0683-1025	4	RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R8	0683-1025		RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R9	0698-3150	1	RESISTOR 2.37K 1% .125W	19701	MF4C-1
R10	0683-1025		RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB 1025
R11	0683-1045		RESISTOR 100K 5% .25W FC TC=-400/+800	01121	CB1045
R12	0683-2225	2	RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
R13	0683-1025		RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R14	0683-1035	1	RESISTOR 10K 5% .25W FC TC=-400/+700	01121	CB1035
R15	0683-2215	1	RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R16	0658-3155		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
R17	0683-3325	1	RESISTOR 3.3K 5% .25W FC TC=-400/+700	01121	CB3325
R18	0683-2225		RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
R19	0757-1094		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
U12	1820-0578	1	IC-DIGITAL MC1024P ECL DUAL 2 OR-NOR	04713	MC1024P
U13	1820-0055	2	IC-DIGITAL SK7490N TTL DECD SYNCHRO	01295	SN7490N
U14	1820-1287	1	IC-DIGITAL SN74LS37N TTL LS QUAD 2 NAND	01295	SN74LS37N
U21	1826-0373	2	IC 555 TIMER	27014	LM555CN
U22	1820-1056	1	IC-DIGITAL SN74132N TTL QUAD 2 NAND	01295	SN74132N
U23	1820-0055		IC-DIGITAL SN7490N TTL DECD SYNCHRO	01295	SN7490N
U24	1820-0907	1	IC-DIGITAL SN7412N TTL TPL 3 NAND	01295	SN7412N
U31	1826-0049	1	IC-UA 723C V RGLTR	07263	723DC
U33	1826-0373		IC 555 TIMER	27014	LM555CN
U34	1820-1112	1	IC-DIGITAL SN74LS74N TTL LS DUAL	01295	SN74LS74N
Y1	0410-0585	1	CRYSTAL, QUARTZ 4.915 MHZ .01%	23875	A-0410-0585-1

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