

Figure 1. Model 1122A Power Supply

1. DESCRIPTION.

2. The Model 1122A Power Supply is a fully transistorized, regulated power supply providing operating voltages for operation of oscilloscope probes. The supply is designed to provide all power requirements for simultaneous operation of up to four HP active probes. The power supply consists of a fused input circuit with selectable transformer primary windings for operation from a 115-volt or 230-volt power source. The input transformer drives two separate rectifier and regulator networks referenced to power ground. The power ground circuit is isolated from the chassis ground circuit to avoid ground loops between the supply and the connected probes.

Table 1. Specifications

<p>PROBE DRIVING CAPABILITY: Four HP active probes.</p> <p>POWER REQUIRED: 115 or 230 volts $\pm 10\%$ 50 to 400 Hz 40W (with four probes).</p> <p>DIMENSIONS: 5-1/8 in. by 3-7/16 in. by 11-5/8 in. (130 x 87 x 295 mm).</p> <p>WEIGHT: Net 5-1/4 lb (2,4 kg), Shipping 7 lb (3,2 kg).</p> <p>ACCESSORIES: Four 36-inch extender cables (HP Model 10131B).</p>

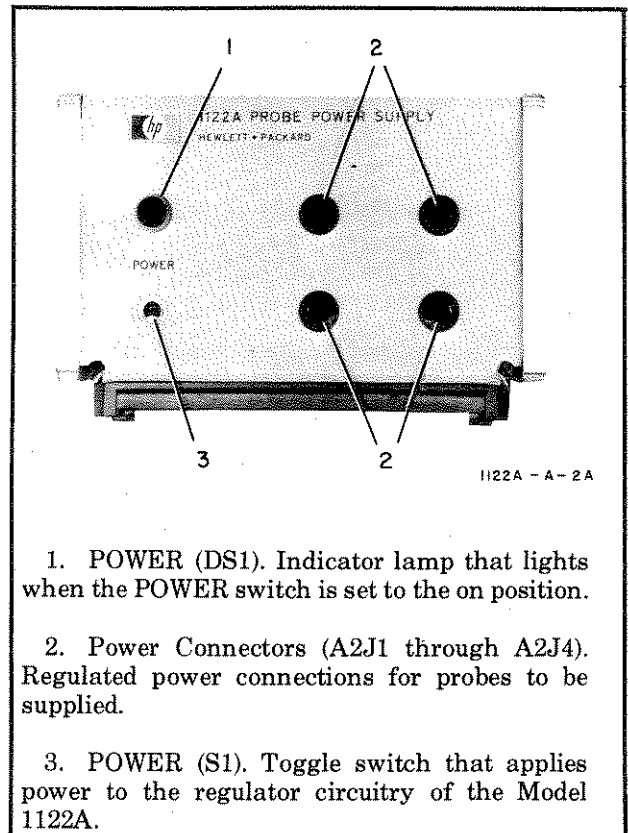
3. This operating note applies to 1122A units with serial number prefixes as listed in the title block above. The serial prefix is the first group of digits in the instrument serial number. Always include the complete serial number in correspondence concerning the power supply.

4. ACCESSORIES.

5. The accessories included with the 1122A include four 36-inch extender cables. These cables extend the power connections to the probe, providing longer reach.

6. CLAIMS.

7. Upon receipt, inspect the instrument for damage and perform the test procedure. Hewlett-Packard Company guarantees the performance of the instrument as stated in the certification located near the back of this note. If the condition of the instrument is unsatisfactory, notify the carrier and the nearest HP Sales/Service Office (listed in back) immediately. HP will arrange for repair or replacement without waiting for settlement of the claim with the carrier.



1. POWER (DS1). Indicator lamp that lights when the POWER switch is set to the on position.

2. Power Connectors (A2J1 through A2J4). Regulated power connections for probes to be supplied.

3. POWER (S1). Toggle switch that applies power to the regulator circuitry of the Model 1122A.

Figure 2. Controls, Indicators, and Connectors

Operating Note Part No. 01122-90904
Microfiche Part No. 01122-90804



Table 2. Recommended Test Equipment

Instrument		Required Characteristics	Required for
Type	Model		
DC VTVM	HP 410C	Measurement accuracy $\pm 3\%$	Output power adjustments
Oscilloscope	HP 180C	High input impedance	Measuring dc levels and peak-to-peak levels

8. POWER CORDS AND RECEPTACLES.

9. Figure 3 illustrates the standard configuration used for HP power cords. The HP part number directly above each drawing is the part number for an instrument power cord equipped with a connector of that configuration. If the appropriate power cord is not included with the instrument, notify the nearest HP Sales and Service Office and a replacement cord will be provided.

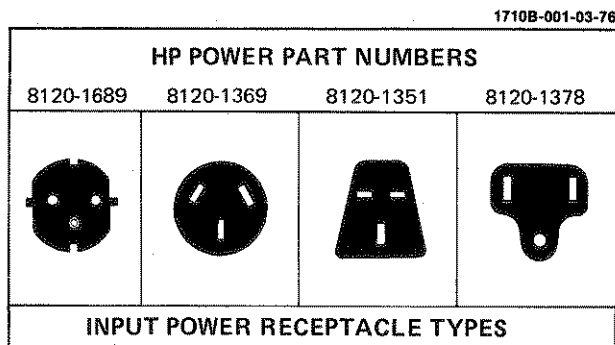


Figure 3. Power Cords

10. OPERATION.

11. The power supply is fully self contained. It will provide the power requirements for operation of from one to four of the designated probes in combinations described in paragraph 1. When operating power is connected to the rear-panel connector and the 115/230 slide switch is set for the input power in use, set the front-panel POWER switch to the on position and check that the POWER indicator lamp lights. Connect the probes to be supplied to the front-panel connectors. The Model 1122A will supply the regulated voltages required without further adjustments.



Set the 115/230-volt switch on the Model 1122A for the line voltage to be used. The instrument may be damaged if this switch is set in the wrong position. Use a thin bladed screwdriver to change the setting.

12. PRINCIPLES OF OPERATION.

13. The 1122A consists of two series regulator circuits providing regulated output voltages to four parallel front-panel connectors. The two regulator circuits are nearly identical, and only one will be discussed (see figure 6).

14. Operating power is connected to J1 and applied to the primary winding of transformer T1. Switch S2 selects the proper winding configuration for power supply operation from a 115- or 230-volt input power source. Diodes CR1 through CR4 form a full-wave bridge in the secondary winding of the transformer. Capacitor C1 is a filter capacitor. The regulator output voltage is dropped across voltage divider R10 through R12 and a sample voltage is applied to the base of transistor Q5. Transistors Q4 and Q5 form a differential comparator referenced to the level set by voltage regulator VR2 and resistor R5. The comparator drives amplifier Q2 which sets the conduction level through the series regulator Q1. Potentiometer R11 is adjusted to derive a +15-volt potential at the regulator output.

15. Transistor Q3 and resistor R4 comprise a current limiter in the regulator supply to limit output current to 800 milliamperes approximately. The current limiter provides a time delay under short-circuit conditions for correction of the short before power supply fuse F2 opens. Capacitors C1 and C3 couple instantaneous voltage fluctuations to the regulating circuitry.

16. Voltage regulator VR1 and resistor R1 provide voltage-limit protection across the Darlington regulator. The regulated voltages are used as reference levels on the collectors of the differential sensing transistors of the opposite regulators. The output voltages of both regulators are referenced to power ground.

17. PERFORMANCE CHECK.

18. To check the specified performance of the Model 1122A Power Supply, connect four HP active probes, connect the specified operating power to the 1122A, and check that all probes connected receive adequate operating power for normal probe operation.

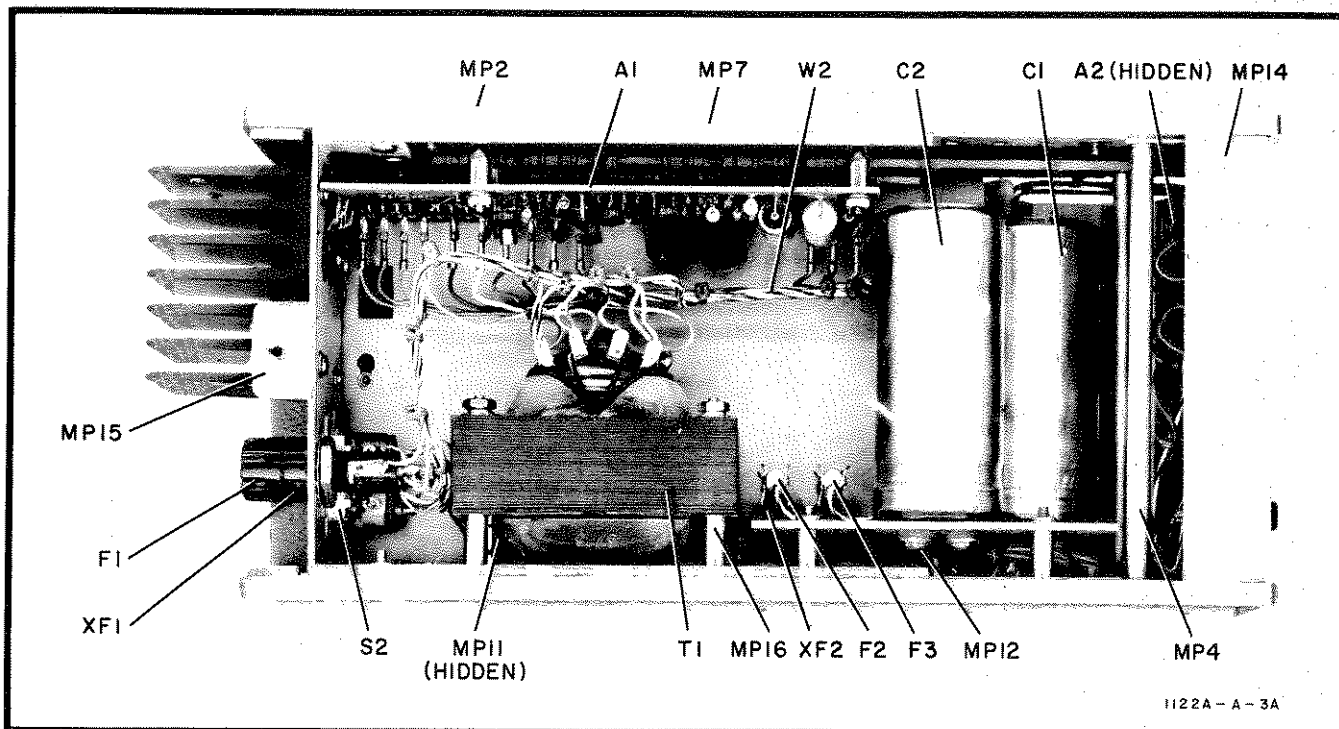


Figure 4. Model 1122A Chassis Parts Location

	A	B	C
1		(4) Q6 (7) CR5 (8) CR7 (98) CR8	Q1
		(2) CR2 (9) CR3 (935) CR4	R1
2		(3) Q7 (9) C4 (935) R14 (945) R15	Q2 VR1 R2 R3 C1
		R21 VR3	Q3 VR2
3		R20 R11	Q5 Q4 R7 R6 R8 R10 C3
		R12 (7) (2) (90)	C2 C5 C7
	A	B	

REF DESIG	GRID LOC	REF DESIG	GRID LOC
C1	C-2	R1	C-2
C2	B-4	R2	C-2
C3	C-3	R3	C-2
C4	B-2	R4	B-2
C5	B-4	R5	C-3
C6	B-3	R6	C-3
C7	B-4	R7	C-3
CR1	B-1	R8	C-3
CR2	B-1	R9	B-3
CR3	B-2	R10	C-3
CR4	B-2	R11	A-3
CR5	B-1	R12	A-4
CR6	B-1	R13	B-3
CR7	B-1	R14	B-2
CR8	B-1	R15	B-2
Q1	B-1	R16	B-3
Q2	B-2	R17	B-3
Q3	C-3	R18	B-3
Q4	C-3	R19	B-3
Q5	C-3	R20	A-3
Q6	B-1	R21	B-3
Q7	B-2	VR1	C-2
Q8	B-2	VR2	C-3
Q9	B-3	VR3	B-3
Q10	B-3		

Figure 5. Regulator Assembly A1 Parts Location

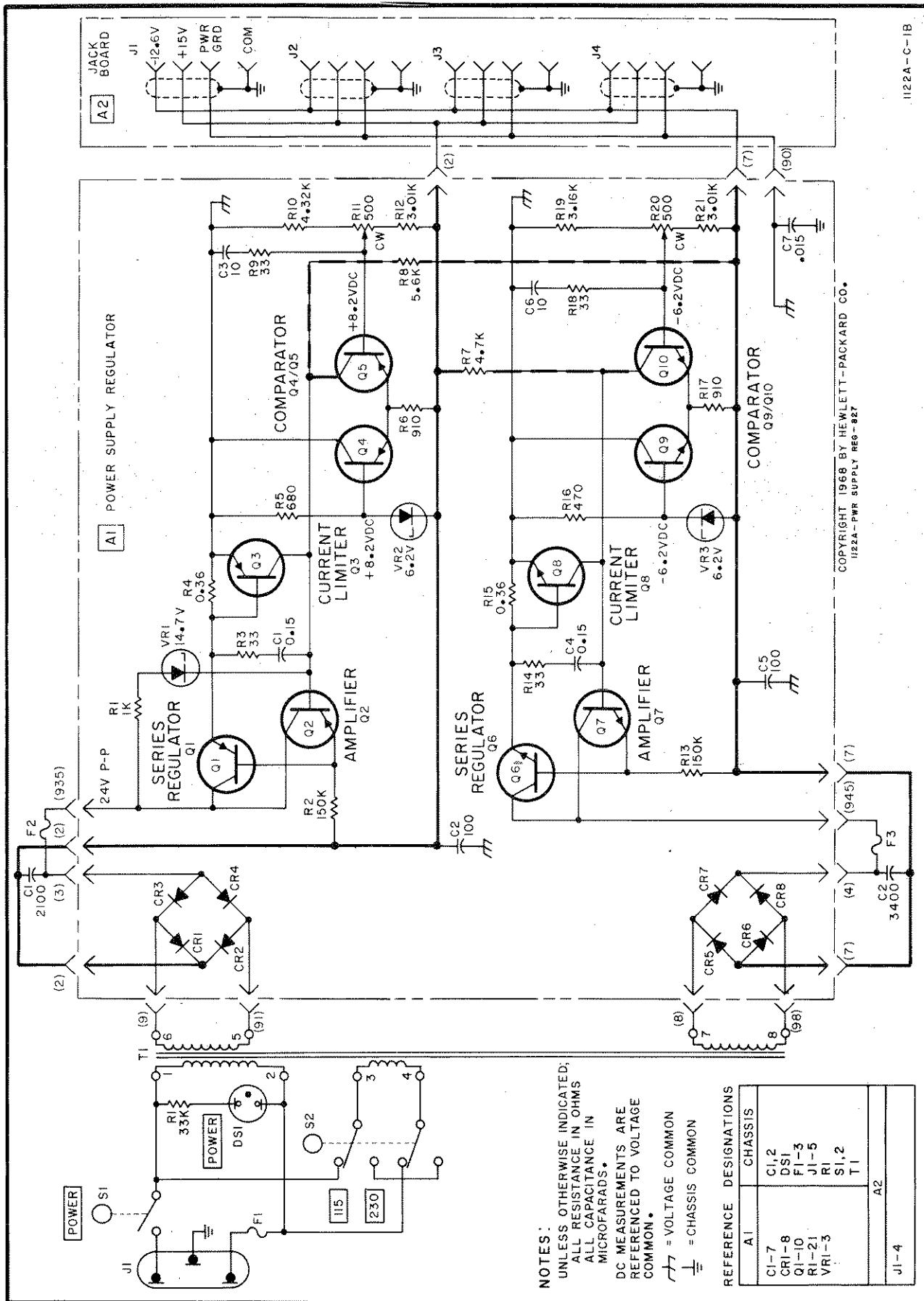


Figure 6. Model 1122A Power Supply Schematic

Table 3. Troubleshooting

Symptom	Check
Lamp DS1 does not light when the POWER switch is on.	Fuse F1. Lamp DS1. Input power connections.
POWER lamp DS1 lights normally, but both output voltages are abnormal.	Fuse F2 and F3. Assembly A1 connections. Diode A1VR1.
+15-volt power is abnormal but -12.6-volt power is normal.	Adjust potentiometer A1R11. Voltage regulators A1VR1 and A1VR2.
-12.6-volt power is abnormal but +15-volt power is normal.	Adjust potentiometer A1R20. Voltage regulators A1VR1 and A1VR3.
Power supply voltages are normal without load but become abnormal under full circuit loading.	Current limiters A1Q3 and A1Q8 and associated resistors A1R4 and A1R15.

19. ADJUSTMENTS.

20. The circuits of the power supply interact. Use the following procedure to adjust the supply to provide the proper operating voltages.

- a. Remove top cover of power supply.
- b. Connect supply to source of operating power; set POWER switch to on position and check that indicator lamp lights.
- c. Connect DC VTVM to pins 11 (-) and 13 (+) on regulator assembly A1.
- d. Adjust potentiometer A1R20 for indication of -12.6 volts dc on DC VTVM.
- e. Connect DC VTVM to pins 12 (+) and 13 (-) on regulator assembly A1.
- f. Adjust potentiometer A1R11 for indication of +15 volts dc on DC VTVM.
- g. Repeat steps c through f until both indications are obtained without further adjustment.

21. TROUBLESHOOTING.

22. The best initial troubleshooting is to turn on power and check that the power lamp lights. Check for the proper voltages at the pins of the front-panel connectors. Use the information obtained from the front-panel checks to determine the areas in the 1122A which should be suspected of malfunction. (All dc measurements are made with respect to power ground available on the hood-pin of each front-panel connector.)

23. Table 3 provides a list of possible trouble symptoms. The checks indicated will probably lead to a rapid determination of the cause of the trouble.

24. REPLACEABLE PARTS.

25. Table 5 lists replaceable parts and identifies the Hewlett-Packard Stock Number for each.

26. To order a replaceable part from Hewlett-Packard Co., address the order to the nearest HP Sales/Service Office listed at the rear of this note. Include the Model number and the complete serial number of the instrument, and the HP part number of the replaceable part desired. If a part is not listed, provide a description of the part, including its function and location.

27. OLDER INSTRUMENTS.

28. This operating note applies directly to the standard model having the serial prefix listed on the front page title block. Table 4 indicates changes required to adapt this operating note to an older instrument (lower serial prefix). Check table 4 for the proper instrument serial prefix and make the changes indicated.

Table 4. Operating Note Changes

Serial Prefix	Make Changes
1106A	1
827-	1 and 2
808-	1 thru 3

CHANGE 1

Table 5, Delete: MP2, MP3, MP8, and MP14. Use the corresponding parts from table 6.

CHANGE 2

CHANGE 3

Table 5,

J1: Change to HP Part No. 1251-0148, J: power.
 MP15: Change to HP Part No. 01122-00202, Panel
 assy: rear (includes J1 and S2).
 MP17: Change to HP Part No. 01122-21101, Heat-
 sink.
 W1: Change to HP Part No. 8120-0078, W: power.

Figure 5,

C1: Change to 3400.

Table 5,

C1: Change to HP Part No. 0180-2189, C: fxd 3400
 $\mu\text{F} -20 +75\% 25 \text{ wVdc}$.
 Q2, Q4, Q5: Change to HP Part No. 1853-0049,
 Q: Si pnp 2N3638.

Table 5. Replaceable Parts

Ref Desig	HP Part No.	TQ	Description
CHASSIS PARTS			
A1	01122-66501	1	A: board assembly; power supply
A2	01122-66502	1	A: board assembly; jack board
C1	0180-1865	1	C: fxd alum. 2100 $\mu\text{F} -20 +75\% 40 \text{ wVdc}$
C2	0180-1809	1	C: fxd alum. 3400 $\mu\text{F} -20 +75\% 25 \text{ wVdc}$
DS1	1450-0419	1	Lamp: neon white
F1	2110-0033	1	F: cartridge .75A 250V fast blow (115V Op-Std)
F1	2110-0067	1	F: cartridge .3A 250V (230V Op-Opt)
F2	2110-0001	2	F: normal blow 1A 250V
F3	2110-0001	1	F: normal blow 1A 250V
J1	1251-2357	1	J: power, 3-pin male
R1	0687-3331	1	R: fxd comp 33k ohms 10% 1/2W
S1	3101-0163	1	S: toggle submin spdt 5A 115 Vac
S2	3101-1234	1	S: slide dpdt 115-230V
T1	9100-1121	1	T: power
XF1	1400-0084	1	Holder: fuse extractor post type 3 AG
XF2	01122-22301	1	XF: dual
CHASSIS MISCELLANEOUS			
MP1	1490-0031	1	Stand: tilt
MP2	5000-8559	2	Cover: side, olive-gray
MP3	5000-8571	1	Cover: bottom, non-perforated, olive-gray
MP4	5020-0700	2	Spacer: cabinet
MP5	0350-0020	4	Washer: insulating
MP6	5040-0700	2	Hinge
MP7	5060-0700	2	Frame assembly
MP8	5060-8555	1	Cover: top, non-perforated, olive-gray
MP9	5060-0727	2	Foot assembly
MP10	1400-0090	1	Washer: fuseholder
MP11	0360-0007	1	Lug: terminal
MP12	0360-0053	4	Lug: terminal
MP13	0510-0097	1	Clamp: light
MP14	01122-00205	1	Panel: front, mint-gray
MP15	01122-00204	1	Panel assy: rear (includes J1 and S2)
MP16	0380-0008	7	Spacer: .5 in
MP17	01122-21102	1	Heat sink

Table 5. Replaceable Parts (Cont'd)

Ref Desig	HP Part No.	TQ	Description
W1	8120-1378	1	W: power
W2	01122-61601	1	W: internal
MOUNTED ASSEMBLY BREAKDOWN			
A1	01122-66501		A: board assy, power supply
A1C1	0180-0218	2	C: fxd Ta 0.15 uF 10% 35 wVdc
A1C2	0180-0094	2	C: fxd alum. 100 uF -10 +75% 25 wVdc
A1C3	0180-0374	2	C: fxd Ta 10 uF 10% 20 wVdc
A1C4	0180-0218		C: fxd Ta 0.15 uF 10% 35 wVdc
A1C5	0180-0094		C: fxd alum. 100 uF -10 +75% 25 wVdc
A1C6	0180-0374		C: fxd Ta 10 uF 10% 20 wVdc
A1C7	0160-0194	1	C: fxd my. 0.015 uF 10%
A1CR1 thru A1CR8	1901-0049	8	CR: Si 50 piv 0.75A
A1Q1	1853-0084	1	Q: Si pnp 2N4918
A1Q2	1853-0016	2	Q: Si pnp 2N3638
A1Q3	1853-0016		Q: Si pnp 2N3638
A1Q4	1853-0049	2	Q: Si pnp
A1Q5	1853-0049		Q: Si pnp
A1Q6	1854-0300	1	Q: Si npn MJE 521
A1Q7	1854-0045	1	Q: Si npn
A1Q8	1854-0071	3	Q: Si npn
A1Q9	1854-0071		Q: Si npn
A1Q10	1854-0071		Q: Si npn
A1R1	0684-1021	1	R: fxd comp 1k ohms 10% 1/4W
A1R2	0684-1541	2	R: fxd comp 150k ohms 10% 1/4W
A1R3	0683-3305	4	R: fxd comp 33 ohms 5% 1/4W
A1R4	0811-1746	2	R: fxd ww 0.36 ohm 5% 2W
A1R5	0683-6815	1	R: fxd comp 680 ohms 5% 1/4W
A1R6	0683-9115	2	R: fxd comp 910 ohms 5% 1/4W
A1R7	0683-4725	1	R: fxd comp 4.7k ohms 5% 1/4W
A1R8	0683-5625	1	R: fxd comp 5.6k ohms 5% 1/4W
A1R9	0683-3305		R: fxd comp 33 ohms 5% 1/4W
A1R10	0757-0436	1	R: fxd metflm 4.32k ohms 1% 1/8W
A1R11	2100-1757	2	R: var ww lin 500 ohms 10% 1/4W
A1R12	0757-0273	2	R: fxd metflm 3.01k ohms 1% 1/8W
A1R13	0684-1541		R: fxd comp 150k ohms 10% 1/4W
A1R14	0683-3305		R: fxd comp 33 ohms 5% 1/4W
A1R15	0811-1746		R: fxd ww 0.36 ohm 5% 2W
A1R16	0683-4715	1	R: fxd comp 470 ohms 5% 1/4W
A1R17	0683-9115		R: fxd comp 910 ohms 5% 1/4W
A1R18	0683-3305		R: fxd comp 33 ohms 5% 1/4W
A1R19	0757-0279	1	R: fxd metflm 3.16k ohms 1% 1/8W
A1R20	2100-1757		R: var ww lin 500 ohms 10% 1/2W
A1R21	0757-0273		R: fxd metflm 3.01k ohms 1% 1/8W

Table 5. Replaceable Parts (Cont'd)

Ref Desig	HP Part No.	TQ	Description
A1VR1	1902-3203	1	VR: breakdown 14.7V 5% 400 mW
A1VR2	1902-0761	2	VR: breakdown 6.2V 2% 400 mW
A1VR3	1902-0761		VR: breakdown 6.2V 2% 400 mW
A2	01122-66502		A: board assy, jack board
A2J1	5060-0467	4	J: output
thru			
A2J4			
			ACCESSORIES
W1	10131B	4	Cable: extender, 36-in.
thru			
W4			